Biological Psychology 103 (2014) 212–222

Contents lists available at ScienceDirect

Biological Psychology

journal homepage: www.elsevier.com/locate/biopsycho

Emotion processing deficits in alexithymia and response to a depth of processing intervention

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ARTICLE INFO

Article history:
Received 17 November 2013
Accepted 19 September 2014
Available online 28 September 2014

Keywords:
Alexithymia
Startle reflex
Emotion
Heart rate
Imagery
Depth of processing

ABSTRACT

Findings on alexithymic emotion difficulties have been inconsistent. We examined potential differences between alexithymic and control participants in general arousal, reactivity, facial and subjective expression, emotion labeling, and covariation between emotion response systems. A depth of processing intervention was introduced. Fifty-four participants (27 alexithymic), selected using the Toronto Alexithymia Scale-20, completed an imagery experiment (imagining joy, fear and neutral scripts), under instructions for shallow or deep emotion processing. Heart rate, skin conductance, facial electromyography and startle reflex were recorded along with subjective ratings. Results indicated hypo-reactivity to emotion among high alexithymic individuals, smaller and slower startle responses, and low covariation between physiology and self-report. No deficits in facial expression, labeling and emotion ratings were identified. Deep processing was associated with increased physiological reactivity and lower perceived dominance and arousal in high alexithymia. Findings suggest a tendency for avoidance of intense, unpleasant emotions and less defensive action preparation in alexithymia.

1. Introduction

In spite of receiving substantial clinical interest, the construct of alexithymia, introduced by Sifneos (1972) to describe the difficulty of psychosomatic patients to verbalize inner states, remains elusive. Research has since indicated that alexithymic deficits extend beyond the verbal expression of emotion (e.g. Lane et al., 1996; Wagner & Lee, 2008) to difficulties in distinguishing affect-related arousal from other bodily sensations, describing feelings, limited fantasy and daydreaming, and externally oriented thinking (Taylor, Ryan, & Bagby, 1985). It mostly characterizes older, low SES males, which suggests that it may be contextually controlled, and is associated with various psychiatric disorders (Bankier, Aigner, & Bach, 2001), symptom reporting and treatment seeking (De Gucht & Heiser, 2003).

Despite extensive research, few well-controlled experimental studies exist to specify alexithymic deficits and clarify whether these pertain to the physiological, the subjective or the behavioral component of emotions, or if the deficit relates to a disorganization of these systems (Luminet, Rime, Bagby, & Taylor, 2004; Roedema & Simons, 1999; Peasley-Miklus & Vrana, 2004 are some exceptions). The present study, using a well-established experimental paradigm, examines differences between individuals high and low in alexithymia at all of the three major emotion output systems (Lang, 1979) of emotional response (physiological, behavioral-expressive and cognitive-experiential), as well as differences in the concordance among these components.

Numerous investigations have attempted to map the physiology of alexithymic affective responding, using a variety of emotion materials (e.g. pictures, stressors, films) but resulted in conflicting findings. Some evidence (e.g. Eastabrook, Lanteigne, & Hollenstein, 2013; Friedlander, Lumley, Farchione, & Doyal, 1997; Stone & Nielson, 2001) supports what is known as the hyper-arousal theory, according to which alexithymics demonstrate exaggerated physiological responses (e.g. increased heart rate response among those high in Difficulty Describing Feelings; Luminet et al., 2004) to emotional stimuli or chronic (tonic) hyper-arousal (Lane, Ahern, Schwartz, & Kaszniak, 1997; Lumley, 2000). However, contradictory findings also exist, suggesting that physiological reactivity is similar to that of controls or even attenuated (Bausch et al., 2011; Connelly & Denney, 2007; Linden, Lenz, & Stossel, 1996; Neumann, Sollers, Thayer, & Waldstein, 2004; Peasley-Miklus & Vrana, 2004; Pollatos et al., 2011; Roedema & Simons, 1999), especially during negative emotions. Such findings have led to a

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http://dx.doi.org/10.1016/j.biopsycho.2014.09.011
0301-0511/

converse, hypo-arousal hypothesis. Hence although some type of autonomic arousal deficit characterizes this population, the direction of the difference is uncertain, as is whether differences pertain to resting physiology or to specific emotions.

Inconsistent results with regards to the physiological emotion response system in alexithymia can in part be attributed to methodological variations between studies. For example, studies differ in the stimuli used to elicit emotion; some have used stressors (e.g. Friedlander et al., 1997; Näätänen, Ryynänen, & Keltikangas-Järvinen, 1999), whereas others have used films and pictures. Findings about responses to stressors may not generalize to processing of other emotions such as fear or joy elicited by visual stimuli. Furthermore, some studies using films elicited specific emotion categories such as fear only (Stone & Nielson, 2001), whereas other studies using pictures compared positive to negative emotional conditions. The absence of systematic examination of emotion categories across studies, and inconsistent manipulation of aspects of emotion such as valence and arousal, makes it difficult to draw conclusions that can generalize beyond single investigations, which themselves may have been methodologically solid. Also different dependent measures of physiological reactivity have been used, including skin conductance response, heart rate, muscle tension, etc. Since each of these systems may be best suited for the assessment of different aspects of emotion processing, for example sympathetic versus parasympathetic autonomic nervous system activity, appropriate dependent measures need to be selected to answer specific research questions.

Studies have so far focused mainly on autonomic arousal, which provides an index of the global mobilization of the organism in the face of a significant event (emotion, action disposition). Autonomic responses, however, do not adequately differentiate between emotional states of different valences. The combined dimensions of valence and arousal explain most of the variance in emotion descriptions (Mehrabian & Russell, 1974) and are linked to differential aspects of approach and defense systems (e.g. Bradley, 2009). It is, therefore, difficult to conclude if alexithymic deficiencies in emotional processing are general for all emotions or valence-specific (observed only during positive or negative emotional situations, which are matched on other dimensions such as arousal). Research should aim to more clearly differentiate the affective context relevant to alexithymic difficulties and to specify the response systems in which deficits become apparent.

Additionally, most studies have compared emotion responses in high and low alexithymia individuals. Those studies that broke down the construct into the constituent factors measured by the TAS, however, suggest that these may show differential patterns of associations with specific emotion response systems (e.g. Luminet et al., 2004). Therefore the role of specific TAS sub-factors also needs to be taken into consideration.

It is possible more-over that alexithymic deficits do not pertain so much to the physiological, and specifically autonomic response system but to the behavioral or subjective-experiential systems of emotion: Reporting subjective experiences by labeling emotions (see review by Grynberg, Chang, et al., 2012) or rating them on different emotional dimensions, as well as the non-verbal facial expression of emotion may be compromised (e.g., Luminet, Rime, Bagby, & Taylor, 2004; Roedema & Simons, 1999), as initially suggested by the clinical descriptions of alexithymics during clinical interviews (Sifneos, 1972). Results addressing this prediction have also been mixed, with some studies finding decreased reports of specific emotions, or of affective arousal and valence among alexithymics (Vanman, Dawson, & Brennan, 1998), when others found no differences from controls or even higher reports of arousal (Grynberg, Davydov, Vermeulen, & Luminet, 2012; Roedema & Simons, 1999). With regards to facial expressions, many studies have found decreased facial responses in alexithymics (e.g., McDonald & Prkachin, 1990; Troisi et al., 1996), but others have not corroborated these findings (e.g. Näätänen, Ryynänen, & Keltikangas-Järvinen, 1999; Roedema & Simons, 1999), perhaps due, once more, to varied methodologies to induce and measure emotion and the aspects of alexithymia considered.

In addition to possible deficiencies in specific emotion response systems, another potential source of alexithymic difficulties is the concordance among these. Somewhat more consistency characterizes studies documenting this particular deficit named "alexithymic decoupling" (Martin & Pihl, 1986). A cognitive deficit involving poor mental representation of emotions has been suggested as the cornerstone of alexithymia (e.g. Luminet, Vermeulen, Demaret, Bagby, & Taylor, 2006; Suslow & Junghanns, 2002); alexithymic difficulties are believed to lie in how easily specific aspects of emotion are accessed, once other components have been activated within the associative network in memory. Physiological aspects of emotions may not be strongly linked with their symbolic representations, including emotion labels and subjective experience, and are thus misinterpreted as signs of illness (Taylor & Bagby, 2004; see also Mériau et al., 2006 for brain imaging support). This hypothesis is in line with findings from other patient groups who over-report symptoms compared to their objective arousal such as panic disorder patients (Lang & McTeague, 2009), who are believed to demonstrate "loose" emotions associative networks in memory (Lang, 1993).

To summarize, alexithymic deficiencies have been identified at multiple emotion response systems, including physiology, subjective-experiential and behavioral (non-verbal expression of emotions) but have not been replicated consistently. Deficits have also been identified in the form of discordance between these emotion output systems. The present study attempts to delineate where alexithymic deficits are mostly localized by measuring all aspects of emotion responses. The study also aims to specify if difficulties generalize to emotions of varied valences or are specific to positive or negative emotions. To this end, a validated experimental paradigm is used with standardized emotional imagery scripts, to manipulate emotional valence while keeping constant the dimension of arousal.

In this study we further examine whether deficits can be remediated. Clinical evidence, not yet systematically subjected to controlled, experimental verification, focuses on how specific interventions can rehabilitate alexithymic difficulties. Specifically, guided, deep emotional processing, which presumably alexithymic individuals do not spontaneously engage in, has been found to reduce alexithymia (Baikie, 2008; Lumley, 2004; Páez, Velasco, & González, 1999). Therefore, high alexithymia individuals may be able to process emotion appropriately if trained to do so. Studies unrelated to alexithymia have shown that deep processing of emotion influences physiological responses like the startle reflex (Herbert & Kissler, 2010), and brain activity (Hariri, Bookheimer, & Mazziotta, 2000). In one of the few studies relating deep processing to alexithymia, Luminet et al. (2006) found no effects of processing depth on memory of emotional words. Vermeulen, Toussaint, and Luminet (2011), using the same depth manipulation found more affective priming in alexithymics compared to controls, suggesting interactions between alexithymia and depth of processing.

Here we used the tone-cued imagery paradigm (Panayiotou, Brown, & Vrana, 2007) to induce emotion, which has been used effectively with alexithymics (Bausch et al., 2011; Peasley-Miklus & Vrana, 2004) and incorporated an emotional depth of processing manipulation. The startle reflex was included, along with autonomic measures and measures of facial expression as added indices of affective valence and defensive system activation. Physiological and self-report responses to both positive and negative emotions are examined, extending past findings, which mostly focus on negative affect. Self-report measures included subjective valence