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Reduced perception of bodily signals in anorexia nervosa

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Abstract

Objective: Interoceptive awareness is known to be impaired in eating disorders. To date, it has remained unclear whether this variable is related to the construct of interoceptive sensitivity. Interoceptive sensitivity is considered to be an essential variable in emotional processes. The objective of the study was to elucidate this potential relationship and to clarify whether general interoceptive sensitivity is reduced in anorexia nervosa.
Methods: Using a heartbeat perception task, interoceptive sensitivity was assessed in 28 female patients with anorexia nervosa and 28 matched healthy controls. Questionnaires assessing interoceptive awareness (EDI) and several other variables were also administered.
Results: Patients with anorexia nervosa displayed significantly decreased interoceptive sensitivity. They also had more difficulties in interoceptive awareness.
Conclusions: In addition to a decreased ability to recognize certain visceral sensations related to hunger, there is a generally reduced capacity to accurately perceive bodily signals in anorexia nervosa. This highlights the potential importance of interoceptive sensitivity in the pathogenesis of eating disorders.

Keywords: Anorexia nervosa; Heartbeat perception; Interoceptive awareness

1. Introduction

Eating disorders (EDs) are the most prevalent psychiatric disorders in females aged between 14 and 26 years and are associated with considerable physical and psychological morbidity (Zipfel, Lowe, Reas, Deter, & Herzog, 2000). In the last decades, the frequency of these illnesses has greatly increased (Fassino, Pierò, Gramaglia, & Abbate-Daga, 2004; Keski-Rahkonen et al., 2007; Friedrich et al., 2006; Klein & Walsh, 2003), representing a great challenge for physicians of various specialties and significantly impacting health care in the female population (Mitchell & Bulik, 2006). Several authors have

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contributed to a description of the psychological features of patients with EDs. A fundamental role has been played by Garner (Garner, Olmstead, & Polivy, 1983) who developed the Eating Disorder Inventory (EDI), a questionnaire which has become a standard tool in studies investigating EDs. The EDI (EDI-2) (Garner, 1984) assesses behavioral and psychological traits, such as the drive for thinness, bulimia, body dissatisfaction, and interoceptive awareness, the latter of which measures the ability to discriminate between individual sensations and to accurately respond to emotional states (Garner et al., 1983). This subscale also taps uncertainty in the identification of specific visceral sensations relating to hunger and satiety (Garner, 1984).

Poor interoceptive awareness characterized by uncertainty in the recognition of emotional states and difficulties to discriminate sensations related to hunger and satiety is often a core psychopathological element which plays an important role in the onset and maintenance of EDs (Fassino et al., 2004). Recent research has provided evidence that interoceptive awareness, as measured by the EDI, is impaired in patients with eating disorders (Fassino et al., 2004; Garner et al., 1983; Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006; Matsumoto et al., 2006): Fassino and co-workers found poorer interoceptive awareness in patients with various types of eating disturbances including anorexia nervosa, bulimia and obesity (Fassino et al., 2004). Matsumoto et al. (2006) also report poorer interoceptive awareness in patients with anorexia nervosa. This deficit significantly improved following treatment. Despite its great importance, interoceptive awareness has so far only been measured by means of self-report questionnaires. It can be hypothesized that patients with difficulties in discriminating visceral sensations with respect to hunger and satiety should also be less able to perceive bodily signals in general. This hypothesis draws upon a broader concept of interoception.

Interoceptive processes and the ability to perceive these processes accurately are often quantified using various heartbeat perception tasks that measure the ability to perceive one's heartbeats (Cameron, 2001; Critchley, Wiens, Rotshtein, Ohman, & Dolan, 2004; Dunn, Dalgleish, Ogilvie, & Lawrence, 2007; Pollatos, Gramann, & Schandry, 2007; Pollatos, Herbert, Matthias, & Schandry, 2007; Pollatos, Schandry, Auer, & Kaufmann, 2007; Pollatos, Trautmattausch, Schroeder, & Schandry, 2006; Wiens, 2005). While different kinds of heartbeat perception tasks are in use it is a common observation that there are substantial, interindividual differences in this variable (Jones, 1994; Cameron, 2001; Schandry & Bestler, 1995). Empirical data suggest that heartbeat detection correlates with the ability to detect changes in other autonomically innervated organs (Whitehead & Drescher, 1980), thus this variable should reflect a general sensitivity for visceral processes. The extent of an individual's sensitivity to bodily signals ("interoceptive sensitivity") is considered to be an essential variable in many theories of emotions such as that proposed by James or Damasio (James, 1884; Schachter & Singer, 1962; Damasio, 1994; Damasio, 1999). The idea that we feel emotions because we perceive our bodily reactions (Bennett & Hacker, 2005) is a core characteristic of these theories suggesting that participants who perceive bodily signals with a high degree of sensitivity should experience emotions more intensely and vice versa that reduced interoceptive awareness is accompanied with affected experience of emotions (Damasio, 1994; Damasio, 1999; James, 1884; Schachter & Singer, 1962). The question as to whether interoceptive sensitivity measured by a heartbeat perception task is reduced in eating disorders is still open.

Concerning other psychiatric disorders significant differences in heartbeat perception ability have been observed in several clinical samples: Many studies (Ehlers, 1995; Ehlers, Mayou, Springings, & Birkhead, 2000; Eley, Stirling, Ehlers, Gregory, & Clark, 2004; Pineles & Mineka, 2005; Roth et al., 1992; Wald & Taylor, 2005; White, Brown, Somers, & Barlow, 2006; Van der Does, Antony, Ehlers, & Barsky, 2000; Zoellner & Craske, 1999) have shown that interoceptive sensitivity is closely associated with anxiety disorders. For example, Ehlers et al. (2000) report a higher accuracy of heartbeat perception in panic patients. In a similar study with children, increased panic symptoms were associated with an enhanced ability to perceive internal physiological cues as measured by a heartbeat perception task (Eley et al., 2004). Interestingly a recent study could show that interoceptive sensitivity is reduced in depressed patients (Dunn et al., 2007). Concerning a possible deficit of interoceptive processes and interoceptive sensitivity in EDs it can be assume that patients with attenuated interoceptive awareness experience many emotional situations less intensely (Bennett & Hacker, 2005) which might contribute to deficits in emotional and social functioning known to be associated both with depression (Lee, Harkness, Sabbagh, & Jacobson, 2005) and EDs (Zonnevijlle-Bender, van Goozen, Cohen-Kettenis, van Elburg, & van Engeland, 2002; Zonnevylle-Bender et al., 2005). Deficits in interoceptive sensitivity might therefore play an important role in the aetiology and maintenance of EDs.

The main objective of the present study was to investigate the degree of interoceptive sensitivity in anorexia nervosa. Additionally the relationship between interoceptive sensitivity and the well-validated construct of interoceptive awareness (EDI subscale) should be examined. As former data indicated that interoceptive sensitivity is related to anxiety and depression these variables were also assessed and included as possible mediators for observed differences.