



Research paper

Affective temperaments in anorexia nervosa: The relevance of depressive and anxious traits



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ABSTRACT

Background: Affective temperaments have been so far understudied in anorexia nervosa (AN) despite the relevance of personality and both affective and anxious comorbidity with regard to vulnerability, course, and outcome of this deadly disorder.

Methods: Ninety-eight female inpatients diagnosed with AN and 131 healthy controls (HCs) were enrolled in this study and completed the Temperament Evaluation of Memphis, Pisa, Paris and San Diego Autoquestionnaire (TEMPS-A) in addition to assessments of eating psychopathology, depression, and anxiety.

Results: AN patients and HCs differed in all affective temperaments. The diagnostic subtypes of AN differed as well with binge-purging individuals being more cyclothymic and anxious than those with restricting-type AN. TEMPS-A scores correlated with body mass index and eating psychopathology but not with duration of illness. Concerning comorbidity, greater scores on the depressive and lower scores on the hyperthymic temperaments were found in depressed patients. Those who had either an anxious or irritable temperament were significantly more diagnosed with an anxious disorder than those who did not show this temperament. When logistic regression was performed, high depressive/low hyperthymic and high irritable/anxious traits resulted to be associated with depressive and anxious comorbidity, respectively, independently of confounding factors.

Limitations: Cross-sectional design, some patients on medications, few baseline clinical differences between diagnostic subtypes, no other personality assessments.

Conclusions: An affective continuum strongly associated with mood and anxious comorbidity emerged in AN. Such an evaluation could have several research and clinical implications given the need of improving treatment individualization and early interventions for such a complex disorder.

1. Introduction

Temperament describes those emotional and behavioral characteristics of personality that are biologically driven, genetically determined, present in childhood, and stable across the lifespan (Atiye et al., 2015). Certain temperamental traits like inhibition, perfectionism, anxiety, and altered reward sensitivity and interoceptive awareness are common in individuals affected by anorexia nervosa (AN; Anderluh et al., 2003; Fassino et al., 2004; Lilienfeld, 2011) and new insights into the neurobiology of such traits have been recently proposed (Kaye et al., 2013).

Over the last decades, research on temperament in AN has been widely conducted in the framework of Cloninger's model of personality using the Temperament and Character Inventory (TCI, Cloninger et al., 1993) yielding important results. In fact, temperament dimensions like harm avoidance and novelty seeking (Cloninger et al., 1993) have been called into question in neurobiology (Kaye et al., 2013), treatment

(Fassino et al., 2005), and outcome-related (Segura-García et al., 2013) lines of research in the field of eating disorders (EDs) with personality characteristics being now acknowledged as important contributors to AN (Lilienfeld, 2011; Atiye et al., 2015). However, there is no doubt that a whole variety of models has been applied to the investigation of personality in AN, including the five-factor model (Costa and McCrae, 1992), the Minnesota Multiphasic Personality Inventory (Hathaway and McKinley, 1983), and the sensitivity to punishment/sensitivity to reward model (Gray, 1970; Keating, 2010).

Nevertheless, affective temperaments (Akiskal and Akiskal, 2005a) have been so far understudied in AN. According to this model, affective temperaments represent those sub-affective traits initially theorized by the Ancient Greek medicine and then developed in the Nineteenth Century by German psychiatrists (Kraepelin, 1921; Akiskal and Akiskal, 2007; Rihmer et al., 2010). In fact, this model was originally inspired by Kraepelin's conception of the inter-episode "fundamental states" ("Grundzustände") of manic-depressive patients (Kraepelin, 1921)

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and then broadened in order to capture five temperaments: depressive, cyclothymic, hyperthymic, irritable, and anxious. Such affective temperaments reflect clinically observable, biologically-based vulnerabilities toward certain patterns of emotions, cognitions and behaviors, similarly to the concept of endophenotypes (Panksepp, 2006; MacDonald et al., 2013). These traits have been found to be stable over time (Kawamura et al., 2010) and to have solid genetic underpinnings (Gonda et al., 2006; Vázquez et al., 2008). Affective temperaments are thought to delineate the subclinical extreme of the continuum that encompasses the spectrum of affective disorders (Solmi et al., 2016). Nevertheless, they also apply to the affective core of different diagnostic categories, such as borderline personality disorder (Perugi et al., 2011) or attention-deficit/hyperactivity disorder, as recently proposed (Landaas et al., 2012; Ekinici et al., 2013).

Psychiatric comorbidities are hallmarks of AN; in fact, an anxiety disorder is also present in up to 65% of cases (Swinbourne et al., 2012) and major depressive disorder has a lifetime prevalence in patients with AN up to 75% (Abbate-Daga et al., 2011; Thornton et al., 2016). Still, anxiety tends to predate AN onset and has been found to persist after recovery (Kaye et al., 2004; Holtkamp et al., 2005). Notwithstanding, affective temperaments – including depressive and anxious ones – have been to date poorly applied to the AN field. A handful of papers focused mostly on the overlap between bipolar disorders and bulimia nervosa (BN) leading to accumulating evidence supporting an association between these diagnoses (Lunde et al., 2009; Nagata et al., 2013; McElroy et al., 2016). Ramacciotti et al. (2004) with a mixed sample of ED diagnoses found that those who binged showed greater scores on the cyclothymic temperament than the normal population. Perugi et al. (2006) investigated atypical depression in BN finding a 17.8% prevalence of BN in patients with atypical depression; moreover, higher scores of cyclothymic temperament emerged in those with BN. Recently, the relationship between BN and affective temperaments has been studied by Rybakowski et al. (2014) showing that cyclothymic and irritable temperaments may be significantly higher in comorbid bipolar disorder and BN compared with both pure diagnoses.

However, a characterization of affective temperaments in AN sufferers has been neglected so far in spite of the relevance of the aforementioned neurobiology and comorbidity issues. Therefore, the overarching aim of the current study is grounded on these gaps in literature and is three-fold: a) verify as to whether AN patients and healthy controls (HCs) differ with respect to affective temperaments; b) to ascertain if bulimic and restricting variants of AN show differences in this regard; and c) to assess differences in affective temperaments among those patients with anxious or depressive comorbid disorders also addressing the eventual association between temperament and clinical features. Our a priori hypothesis was that AN sufferers would show greater depressive and anxious affective traits than HCs and that those affected by the bulimic variant of AN would report more markedly altered affective features. Likewise, we expected to find that those patients with heightened scores on anxious and depressive temperaments would be more likely affected by a psychiatric comorbid condition, independently of body mass index (BMI) and duration of illness.

2. Methods

2.1. Participants and procedures

We enrolled in this study 98 women diagnosed with AN according to DSM-5 criteria (APA, 2013) at the Eating Disorders Center of the University of Turin, Turin, Italy. Patients were clinically interviewed in person upon hospital admission in order to collect socio-demographic data, duration of illness, clinical and psychiatric history, and medications in use. BMI was measured by a trained nurse. Psychiatric anxious and depressive comorbidity was evaluated by an experienced psychiatrist according to DSM-5 criteria (APA, 2013). Moreover, to be included

in this study patients had to meet the following inclusion criteria: a) age > 18 and < 55 y.o.; b) no substance dependence; c) no history of head injuries; d) psychosis or psychotic symptoms according to DSM-5 criteria (APA, 2013).

One-hundred and thirty-one gender-matched HCs were also recruited through flyers and e-mails sent around to University of Turin students; they were then interviewed in person in order to measure their BMI and to ascertain the following inclusion criteria: a) no lifetime history of psychiatric disorders according to DSM-5 criteria (APA, 2013); b) no use of medications; c) no current or lifetime organic illness as assessed per clinical interview; d) no substance dependence; e) age > 18 and < 55 y.o.

All participants provided written informed consent for this ethical committee-approved study.

2.2. Measures

2.2.1. Temperament Evaluation of Memphis, Pisa, Paris and San Diego Autoquestionnaire (TEMPS-A)

In its first version, the TEMPS-A contained 84 items, assessing depressive (items 1–22), cyclothymic (items 23–42), hyperthymic (items 43–63) and irritable (items 64–84) temperaments (Akiskal et al., 2005b). Later, deep clinical and theoretical work that yielded 26 new items capturing the anxious temperament which has been added resulting in the 110-item (109-item for men) full-length version of the TEMPS-A. Such a version has been validated in 25 different languages including Italian (Pompili et al., 2008).

2.2.2. Eating disorders inventory-2 (EDI-2)

The EDI-2 (Garner, 1991) is a psychometrically robust (Thiel and Paul, 2006) self-report measure of disordered eating attitudes, behaviors and personality traits common to individuals who are diagnosed with an ED. Ninety-one items and eleven subscales evaluate the symptoms and psychological correlates of EDs. Each item can be rated on a 6-point response scale; the higher the score, the more elevated eating psychopathology. Drive for thinness (seven items), bulimia (seven items) and body dissatisfaction (nine items) represent the ‘symptom index’.

2.2.3. State Trait Anxiety Inventory (STAI)

The STAI (Spielberger and Gorsuch, 1983) is a well-established 20-item instrument for the self-reporting of state and trait anxiety. All items are rated on a 4-point scale (e.g., from “Almost Never” to “Almost Always”). The STAI measures two types of anxiety: state anxiety, a temporary condition experienced in specific situations, and trait anxiety, a general tendency to perceive situations as threatening. Total scores for state and trait sections separately range from 20 to 80, with higher scores denoting higher levels of anxiety.

2.2.4. Beck Depression Inventory (BDI)

The BDI (Beck et al., 1961) is a 13-item self-report questionnaire used to evaluate depressive symptoms according to the following scoring system: scores from 0 to 4 represent minimal depressive symptoms, scores of 5–7 indicate mild depression, scores of 8–15 indicate moderate depression and scores of 16–39 indicate severe depression.

2.3. Statistical analysis

The Statistical Package for Social Sciences 23.0 (SPSS, SPSS Inc., Chicago, IL) was used for all analyses. A two-tailed alpha level of 0.05 was set.

Student's *t*-test and Fisher's exact test were used to evaluate continuous and categorical variables, respectively, between patients and HCs and between AN variants. A one-way analysis of variance (ANOVA) with Tukey post-hoc test was performed to analyze the

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