Original Article

Psychiatric Disorders and Personality Styles in Mothers of Female Adolescent Patients with Eating Disorders

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Abstract: *Objective:* To provide further insight into the presently poorly understood role of familial psychopathology in the development of eating disorders (ED). *Method:* The present study assesses psychiatric and personality disorders listed on Axis I and II of the DSM-IV in 27 mothers of adolescent patients with anorexia (AN mothers) and 14 bulimia nervosa (BN mothers) as well as 22 mentally healthy girls (CG mothers) on a categorical level. Furthermore, we conducted a dimensional diagnostic regarding personality styles and personality traits. *Results:* AN and BN mothers showed increased rates of Axis I disorders, especially affective, substance use, and anxiety disorders. Differences on Axis II did not reach statistical significance. However, BN mothers showed higher occurrences of paranoid, negativistic, and schizotypal personality styles compared to the other groups. BN mothers further showed higher occurrences than CG mothers of the personality traits excitability, aggressiveness, physical complaints, openness, and emotionality. AN mothers differed significantly from CG mothers on the scale demands. *Conclusions:* Increased occurrence of psychopathology on both categorical and dimensional levels in mothers of patients with AN and BN supports the assumption of a familial accumulation of psychopathology in ED. Longitudinal studies and genetic analyses should clarify a possible cause-effect relationship and interactions between familial dynamics and adolescent ED.

Keywords: eating disorders, adolescent patients, mothers, psychiatric disorders, personality styles.

Zusammenfassung: *Fragestellung:* Die Rolle familiärer Psychopathologie spielt in der Betrachtung von Essstörungen eine wichtige Rolle, ist jedoch bislang nicht hinreichend untersucht. Methodik: Die vorliegende Studie erfasst psychiatrische Störungen bei 27 Müttern von Patientinnen mit Anorexia nervosa (AN-Mütter), 14 Müttern von Patientinnen mit Bulimia nervosa (BN-Mütter) und 22 Müttern gesunder Kontrollprobandinnen (KG-Mütter) anhand kategorialer Kriterien. Zudem erfolgte eine dimensionale Untersuchung von Persönlichkeitsstilen und –merkmalen. Ergebnisse: Mütter von Patientinnen mit Essstörungen weisen erhöhte Raten von psychiatrischen Störungen, insbesondere affektiven Störungen, Substanzmissbrauch und Angststörungen, auf. Der Gruppenvergleich bezüglich des Vorliegens von Persönlichkeitsstörungen zeigte keine statistische Signifikanz. BN-Mütter wiesen jedoch stärkere Ausprägungen hinsichtlich des *paranoiden, negativistischen* und *schizotypischen* Persönlichkeitsstils im Vergleich zu den anderen beiden Gruppen auf. Zudem zeigten sie im Vergleich zu den KG-Müttern erhöhte Werte bezüglich der Persönlichkeitsmerkmale *Erregbarkeit*, *Aggressivität*, *körperliche* Beschwerden, *Offenheit* und *Emotionalität*. AN-Mütter offenbarten im Vergleich zu den KG-Müttern erhöhte Werte auf der Skala *Beanspruchung*. Schlussfolgerungen: Das Vorliegen von Psychopathologie sowohl auf kategorialer als auch dimensionaler Ebene bei Müttern essgestörter Patientinnen unterstreicht die Vulnerabilität für psychiatrische Erkrankungen. Längsschnittstudien und genetische Untersuchungen sollten den Ursache-Wirkungs-Zusammenhang klären und Interaktionen zwischen familiärer (Persönlichkeits-)Dynamik und adoleszenten Essstörungen weitergehend untersuchen.

Schlüsselwörter: Essstörungen, adoleszente Patientinnen, Mütter, psychiatrische Störungen, Persönlichkeitsstile

Introduction

Anorexia nervosa (AN) and bulimia nervosa (BN) are severe psychiatric eating disorders (ED) among children, adolescents, and adults. The lifetime prevalence for AN is 0.3 % and for BN 1 % (e.g., Nicholls, Lynn, & Viner, 2011). The age of onset peak for AN is postulated to lie in the period between 14 and 15 years as well as 18 years and for BN between 18 and 19 years (e.g., Rothenhäusler & Täschner, 2013). The multifactorial model of the pathogenesis and

maintenance of ED postulates various risk factors, including a combination of genetic, biological, psychological, and sociocultural factors as well as their combination (Kaye, Fudge, & Paulus, 2009).

Previous research confirmed the role of genetic factors in the pathogenesis of ED (Trace, Baker, Peñas-Lledó, & Bulik, 2013). Furthermore, several family studies described increased rates of psychiatric disorders in the relatives of patients with AN and BN (Lilenfeld, Kaye, & Greeno, 1998). These relatives consistently manifest an accumulation of affective disorders and ED (e.g., Strober, Freeman, Lampert, & Diamond, 2007; Wagner et al., 2008). In addition, the relatives of patients with AN showed increased rates of anxiety disorders (e.g., Bellodi et al., 2001; Lilenfeld et al., 1998; Steinhausen, Jakobsen, Helenius, Munk-Jørgensen, & Strober, 2015; Strober et al., 2007), and the relatives of patients with BN increased rates of substance use disorders (e.g., Fairburn, Cooper, Doll, & Welch, 1999; Kaye et al., 1996).

However, only a few studies explored personality disorders in the relatives of patients with ED as described on Axis II of the DSM-IV (American Psychiatric Association (APA), 1994). In general, these studies described an accumulation of Axis II disorders in relatives of patients with ED (e.g., Steinhausen et al., 2015; Strober et al., 2007). Increased rates of obsessive-compulsive personality disorders were demonstrated for the relatives of patients with AN (Strober et al., 2007). In contrast, the relatives of patients with BN showed higher rates of Cluster B personality disorders (Lilenfeld et al., 1998).

In sum, the results from record linkage data sets consider parental mental illness (e.g., affective disorder, anxiety/depression, personality disorder) as a risk factor for ED in offspring (Bould et al., 2015; Steinhausen et al., 2015).

To our knowledge, dimensional data regarding personality characteristics among the relatives of patients with ED are rare. Only Fassino et al. (2002, 2003) report low self-directedness as a common denominator in patients with ED and their families. The fathers of patients with AN showed high harm avoidance and reward dependence. In addition, the fathers of both patients' groups displayed low persistence.

The research to date has focused mainly on Axis I rather than Axis II disorders as described in the DSM-IV (APA, 1994). Dimensional data are insufficient, and methodological inconsistencies exist. Information about psychiatric disorders in relatives has been most notably assessed by indirect interviews (e.g., Eating Disorders Family History Interview, Strober, 1987) of the index participants (Kaye et al., 1996; Lilenfeld et al., 1998; Strober et al., 2007; Strober, Freeman, Lampert, Diamond, & Kaye, 2000; Wagner et al., 2008). The majority of the studies focused exclusively on familial psychopathology of either AN or BN (Kaye et al., 1996; Steinhausen et al., 2015; Strober et al., 2007). Only a few studies compared Axis I and II disorders in the relatives of patients with ED and a healthy CG (Bellodi et al., 2001; Lilenfeld et al., 1998; Strober et al., 2000; Wagner et al., 2008).

Therefore, our study focused on assessing categorical and dimensional familial psychopathology data of mothers of mentally healthy girls (CG mothers). This method amplifies the study of Woldt, Schneider, Pfeiffer, Lehmkuhl, and Salbach-Andrae (2010) and allows for a comparison between clinical and healthy subsamples. Linking categorical data to dimensional self-report measures of psychopathology represents a novel aspect that allows for a more extensive understanding of psychological functioning of ED mothers.

According to the current state of research, we projected that increased levels of psychopathology would be assessed on Axis I and Axis II of the DSM-IV (APA, 1994) as well as dimensional aspects of personality characteristics in AN and BN compared to CG mothers.

Methods

Participants

The clinical groups were recruited from a child and adolescent psychiatry department, while the CG was recruited through flyers and advertisements. An individual personality profile was offered for the CG mothers.

The clinical groups served as a baseline (Woldt et al., 2010) for the present investigation; they were compared to a healthy CG. We excluded mothers of patients who did not meet the diagnostic criteria according to their group. Furthermore, in the CG we excluded mothers of participants who met the criteria of a psychiatric disorder.

The psychological data of 27 AN mothers (M_{age} = 43.8, SD = 4.3) and 14 BN mothers (M_{age} = 46.1, SD = 3.7) were included. The daughters with AN (M_{age} = 15.5, SD = 1.6) or BN (M_{age} = 16.7, SD = 1.3) ranged in age from 12 to 18 years. Clinical diagnoses (ED) among the daughters were ascertained using semistructured interviews (Structured Inventory for Anorexic und Bulimic Eating Disorders, SIAB, Fichter, & Quadflieg, 1999; Composite International Diagnostic Interview/DIA-X, CIDI-DIA-X, Wittchen & Pfister, 1997). Because only four CG fathers were willing to participate in the study, the present survey of familial psychopathology was restricted to mothers.

The CG consisted of 22 mothers (M_{age} = 45, SD = 5.6) of aged-matched mentally healthy girls (M_{age} = 15.7, SD 1.9; $F(2, 58) = 2.40$, $p = .10$). The inclusion criterion for the CG

(daughters without psychiatric disorders) was verified via a semistructured diagnostic interview (Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version, K-SADS-PL, Kaufman, Birmaher, Brent, Rao, & Ryan, 1997; German translation, Delmo Weiffenbach, Gabriel, Stadler, & Poustka, 2001) by asking the CG mothers about the mental health of their daughters.

No significant differences were found for age, $F(2, 60) = 1.23$, $p = .30$, and for the socioeconomic characteristics between the subsamples (AN, BN and CG mothers). Socioeconomic characteristics were assessed via items from the Freiburger Personality Inventory (Fahrenberg, Hampel, & Selg, 2001) *graduation*, $\chi^2(14, N = 63) = 16.16$, $p = .30$, *family status*, $\chi^2(4, N = 63) = 3.38$, $p = .50$, *household*, $\chi^2(2, N = 63) = 4.70$, $p = .10$, *occupation*, $\chi^2(10, N = 63) = 10.34$, $p = .41$, and *occupational category*, $\chi^2(14, N = 63) = 19.94$, $p = .13$.

The project was approved by the Research Ethic Board at the Charité-University Medicine. All participants provided written informed consent.

Diagnostic Assessment

AN, BN and CG mothers passed a battery of tests for assessing psychopathology including the computer-based CIDI-DIA-X (Wittchen & Pfister, 1997), the German translation of the Structured Clinical Interview for DSM-IV Axis II (SCID-II, First, Gibbon, Spitzer, Williams, & Benjamin, 1997; Fydrich, Renneberg, Schmitz, & Wittchen, 1997), the Freiburger Personality Inventory (FPI-R, Fahrenberg et al., 2001) and the Inventory of Personality Styles and Disorders (PSSI, Kuhl & Kazén, 1997). This battery was chosen in accordance with the clinic's standard assessment battery for ED patients. It was necessary to assess mothers with the same battery as one part of the project aimed at a comparison of categorical and dimensional data between daughters and mothers (not reported here). We decided to use self-report measures as an additional method for assessing personality factors. Dimensional diagnostic allows the observation of low-threshold starting points as well as an individual observation of personality styles and traits (Schneider et al., 2008). Self-report measures have the risk of intended or unintended adulteration because of participant's memory, self-knowledge and attention (see Bortz & Döring, 2006). Otherwise, however, they have some benefits, as the interviewed person has no time pressure while answering the questions. Additionally, "interviewer effects" (Stier, 2013) are eliminated, and the anonymity of the interviewed person may lead to more honesty and carefulness. Moreover, self-report instruments allow for a more precise picture of the mental condition of participants.

Composite International Diagnostic Interview/DIA-X

Axis I diagnoses were assessed via CIDI-DIA-X (Wittchen & Pfister, 1997). This is a standardized interview allowing the assessment of psychiatric disorders according to DSM-IV (APA, 1994). As a revised and extended version of the Composite International Diagnostic Interview (CIDI, World Health Organization, 1993), it explores 13 domains including ED, affective, anxiety and substance use disorders in 12-month and lifetime versions. The present study used the lifetime versions. Nicotine-related disorders were excluded due to lack of clinical relevance to our study. Psychometric data concerning the reliability and validity could be classified as satisfactory (Wittchen & Pfister, 1997).

Structured Clinical Interview for DSM-IV Axis II

Axis II diagnoses were assessed via the German translation of the SCID-II (First et al., 1997; Fydrich et al., 1997), which explores Axis II disorders and the two additional personality disorders enlisted in an attachment of the DSM-IV (APA, 1994). Various investigations revealed satisfactory psychometric data concerning the applicability, reliability, and efficiency of the SCID-II (Fydrich et al., 1997).

Inventory of Personality Styles and Disorders

The PSSI (Kuhl & Kazén, 1997) is a self-report questionnaire allowing the quantification of the occurrence of personality styles, defined as nonpathological correspondents to Axis II disorders. The PSSI consists of 140 items, attributed to 14 scales representing personality styles (antisocial, paranoid, schizoid, avoidant, obsessive-compulsive, schizotypal, rhapsodic, narcissistic, negativistic, dependent, borderline, histrionic, depressive, and selfless). Higher scores indicate more rigid personality styles. The scales show high internal consistency and satisfactory retest reliabilities (Kuhl & Kazén, 1997).

Freiburger Personality Inventory

The FPI-R (Fahrenberg et al., 2001) is a self-report personality questionnaire that measures interindividual personality traits. It consists of 138 items, attributed to the following 12 scales: self-contentment, social orientation, commitment to performance, inhibition, excitability, aggressiveness, demands, physical complaints, health concerns, openness, and two secondary scales (extraversion and emotionality). Again, higher scores indicate more rigid personality traits. Additionally, participants were asked to give information regarding sex, age, education, family status, household, and occupation. Psychometric data concerning reliability and validity can be classified as high (Fahrenberg et al., 2001).

Data Processing and Statistical Approach

Using a fixed level of significance (α = .05), we did an analysis of the mothers' and daughters' ages by means of an ANOVA and calculated the socioeconomic characteristics by means of a χ^2-test using SPSS (version 18.0). χ^2-tests were conducted to compare the rates of Axis I and II disorders between the subsamples. Calculations of the raw values of personality styles were done using a MANOVA and following posthoc comparisons (Scheffé test). Normal distribution was verified by the Levene test, and variance homogeneity was verified by the Kolmogorov-Smirnov test. Equality of covariance matrices was shown. Based on missing normal distribution and variance homogeneity of the FPI-R-scales (Fahrenberg et al., 2001), the Kruskal-Wallis test with subsequent Mann-Whitney U tests were conducted for these analyses. The values of effect size (ES) η^2 were calculated for normally distributed variables with η^2 = .001 small ED; η^2 = .10 medium ES and η^2 = .25 large ES (Bortz & Döring, 2006).

Results

Frequency of Axis I Disorders

The frequency of Axis I disorders was 84 % for AN, 85 % for BN, and 41 % for CG mothers. Exact rates of Axis I disorders are presented in Table 1.

The χ^2-test revealed a significant difference in the frequency of Axis I disorders, comparing AN as well as BN mothers to CG mothers. Posthoc analyses showed significantly higher rates of affective disorders in AN than CG mothers. Further disorder-specific calculations were not significant. The entire results are given in Table 1. No statistical differences were found in the analyses of AN and BN mothers, except higher rates of ED in BN than in AN mothers, $\chi^2(1, N = 38) = 6.26, p = .03$. More extensive results are reported elsewhere (Woldt et al., 2010).

Frequency of Axis II Disorders

We observed 1 (7 %) BN mother, 5 (19 %) AN mothers, and 1 (5 %) CG mother with Axis II disorders. Thereby, only the avoidant (2 AN mothers, 1 BN mother, 1 CG mother), obsessive-compulsive (2 AN mothers, 1 BN mother), depressive (3 AN mothers), and borderline personality disorders (1 AN mother) were diagnosed. One BN mother showed an avoidant and an obsessive-compulsive personality disorder simultaneously. One AN mother showed an avoidant, an obsessive-compulsive, and a depressive personality disorder simultaneously. Another AN mother showed an avoidant and depressive personality disorder simultaneously. Furthermore, one AN mother showed an obsessive-compulsive, another AN mother a depressive, and finally one AN mother a borderline personality disorder. One CG mother showed an avoidant personality disorder.

The χ^2-test revealed no significant difference in the frequency of Axis II disorders, comparing AN, $\chi^2(1, N = 48) =$

Table 1. Frequency of Axis I disorders and statistical values of the pairwise comparisons of Axis I disorders (Fisher's exact test)

Axis I disorders	Frequency			Pairwise comparisons			
	AN % (n)	BN % (n)	CG % (n)	AN vs. CG		BN vs. CG	
				χ^2 (df, N)	p	χ^2 (df, N)	p
Any Axis I disorder[a]	84 (21)	85 (11)	41 (9)	9.41 (1, 47)	.01**	6.37 (1, 35)	.01**
Affective disorders	48 (12)	38.5 (5)	18.2 (4)	4.63 (1, 47)	.03*	1.76 (1, 35)	.18
Anxiety disorders	28 (7)	23.1 (3)	9.1 (2)	2.70 (1, 47)	.10	1.31 (1, 35)	.26
Eating disorders	–	23.1 (3)	4.5 (1)	1.16 (1, 47)	.47	2.77 (1, 35)	.13
Somatoform disorders	12 (3)	7.7 (1)	–	2.82 (1, 47)	.14	1.74 (1, 35)	.37
Substance use disorders[a]	28 (7)	30.8 (4)	13.6 (3)	1.44 (1, 47)	.20	1.50 (1, 35)	.21
Obsessive-compulsive disorders	4 (1)	15.4 (2)	–	0.90 (1, 47)	.53	3.59 (1, 35)	.13
Posttraumatic stress disorder & adaptation disorder	–	1 (7.7)	–	–	–	1.74 (1, 35)	.37

Note. Comparisons of pairs were calculated by Fisher's exact test. AN = mothers of patients with anorexia nervosa, BN = mothers of patients with bulimia nervosa, CG = mothers of mentally healthy girls, vs. = versus. Analyses concerning group differences for AN and BN only show a significant difference, $\chi^2(1, N = 38) = 6.26, p = .03$, for ED. Further results are reported elsewhere (Woldt et al., 2010). [a]excluding nicotine-related disorders. **p < .01, *p < .05.

2.35, p = .14, and BN to CG mothers, χ^2(1, N = 35) = 0.15, p = .61. Analyses concerning AN and BN mothers showed no significant differences between the subsamples χ^2(1, N = 39) = .89, p = .64.

Frequency of Personality Styles

The results of the MANOVA revealed significant differences between the three subsamples, F(28, 82) = 1.73, p = .03 (η^2 = .37). The ES suggests that 37 % of the variance in the specificity of the PSSI-personality styles (Kuhl & Kazén, 1997) were explained by the mothers' group affiliation. Further significant differences were revealed on the scales *paranoid*, *schizotypal*, and *negativistic*. Consequently, these scales differentiated between the three subsamples. Large ES supported the significance of these results. In addition, a trend toward higher values of BN mothers on the scales *schizoid, dependent,* and *borderline* was apparent. Posthoc calculations (Scheffé test) showed significantly higher values for BN mothers on the scales *paranoid* and *negativistic* compared to

CG mothers. AN and CG mothers did not differ significantly on any scale. BN mothers further showed significantly higher values on the scales *paranoid* and *schizotypal* than AN mothers. Complete analyses concerning the frequency of personality styles are summarized in Table 2.

Frequency of Personality Traits

The results of the Kruskal-Wallis test revealed significant differences between the three subsamples on the scales e*xcitability*, *aggressiveness*, *demands*, *physical complaints*, *openness*, and *emotionality*. With the required adjustment after Bonferroni (α' = .02), posthoc calculations (Mann-Whitney U test) displayed significantly higher medians for BN mothers on the scales e*xcitability*, *aggressiveness*, *physical complaints*, *openness*, and *emotionality* compared to CG mothers. AN and CG mothers differed significantly on the scale *demands*. AN and BN mothers did not differ significantly on any scale. Complete analyses concerning the frequency of personality traits are summarized in Table 3.

Table 2. Inventory of Personality Styles and Disorders (Kuhl & Kazén, 1997): Group-affiliated values, statistical values of the MANOVA and posthoc comparisons by the Scheffé Test

PSSI scales	MANOVA							
	Group-affiliated values			Statistical values				Posthoc comparisons Scheffé test
	AN *M (SD)*	BN *M (SD)*	CG *M (SD)*	F	df	p	η^2	
Antisocial	4.04 (2.94)	6.50 (3.81)	4.77 (3.60)	2.07	2	.14	.07	*ns*
Paranoid	9.25 (3.75)	13.70 (4.22)	9.41 (3.79)	5.32	2	.01**	.17	BN > CG (p = .02*) BN > AN (p = .01**)
Schizoid	8.54 (4.35)	11.50 (4.28)	7.64 (4.19)	2.84	2	.07†	.10	*ns*
Avoidant	10.67 (5.72)	13.20 (4.98)	9.50 (4.50)	1.78	2	.18	.06	*ns*
Obsessive-compulsive	15.50 (5.04)	17.30 (4.99)	14.86 (5.00)	0.82	2	.45	.03	*ns*
Schizotypal	5.08 (3.24)	9.30 (6.18)	7.27 (4.54)	3.58	2	.04*	.12	BN > AN (p = .05*)
Rhapsodic	12.58 (4.96)	12.10 (3.57)	14.95 (5.43)	1.75	2	.18	.06	*ns*
Narcissistic	8.04 (3.77)	6.60 (4.22)	7.23 (3.01)	0.65	2	.52	.02	*ns*
Negativistic	5.17 (4.36)	7.80 (4.52)	4.00 (2.47)	3.51	2	.04*	.12	BN > CG (p = .04*)
Dependent	11.17 (6.45)	15.10 (7.12)	10.27 (4.36)	2.42	2	.10†	.08	*ns*
Borderline	5.00 (5.42)	7.30 (7.89)	2.95 (2.90)	2.56	2	.09†	.09	*ns*
Histrionic	11.04 (4.37)	12.60 (5.13)	13.27 (5.78)	1.14	2	.33	.04	*ns*
Depressive	9.71 (5.34)	10.10 (4.53)	8.00 (4.29)	0.98	2	.38	.04	*ns*
Selfless	13.25 (6.08)	13.50 (5.95)	12.95 (4.62)	0.04	2	.96	.00	*ns*

Note. M = mean; SD = standard deviation, AN = mothers of patients with anorexia nervosa, BN = mothers of patients with bulimia nervosa, CG = mothers of mentally healthy girls. **p < .01, *p < .05, †p < .10, ns = not significant.

Discussion

Our study investigated familial psychopathology of ED on a categorical as well as a dimensional level. The present findings support our hypothesis as well as results of earlier studies of an association between familial psychopathology and ED, most notably in higher rates of Axis I disorders in the clinical subsamples. Overall, affective, substance use, and anxiety disorders occurred most frequently in all mothers. These findings are in line with epidemiologic data on Axis I disorders in women (Laßnig & Hofmann, 2007). Further, AN mothers were diagnosed with affective disorders more frequently than CG mothers. This finding is consistent with previous investigations (e.g., Bellodi et al., 2001; Fairburn et al., 1999; Kaye et al., 1996; Lilenfeld, 1998; Steinhausen et al., 2015; Strober et al., 2007; Thornton, Mazzeo, & Bulik, 2011). Adolescent illness may constitute contributing a factor to the development of mood disorders in predisposed mothers (Wittchen, 1994). Also, it is possible that mothers with mood disorders are more likely to have children with mental illness (Goodman et al., 2011). Unfortunately, we do not have enough information about the onset of the patients' illness. It might be difficult to draw clear conclusions on the temporal relationship between maternal and adolescent illness because of gradual illness onsets. The question of causality should be addressed in other research designs (see Limitations below). An accumulation of ED in the relatives of patients with AN and BN (Fairburn et al., 1999; Lilenfeld et al., 1998; Steinhausen et al., 2015), of anxiety disorders in the relatives of patients with AN (Bellodi et al., 2001; Lilenfeld et al., 1998; Steinhausen et al., 2015), and of substance use disorders in the family relatives of patients with BN (Fairburn et al., 1999; Kaye et al., 1996) failed to be replicated, perhaps the result of our small sample size or differing methods. The overall high rates of Axis I disorders must certainly be interpreted in light of the high sensitivity of the computer-based CIDI-DIA-X (Jacobi, Hoyer, & Wittchen, 2004; Wittchen, 1994), which is, nevertheless, a reliable instrument for the comprehensive categorical diagnostics of Axis I disorders (Fydrich, 2012). Because of its nonhierarchical assessment of comorbidities, the prevalence of Axis I disorders is higher than clinical interviews, such as the SCID-I (Jacobi et al., 2004). The low specificity results in a decreased discriminant validity. As this interview was conducted with every participant, however, the data remain evaluable, and differences between subsamples are presumably not affected. Our results concerning Axis I disorders in the CG (41%) support prevalence findings in the general population, obtained by use of structured interviews, where lifetime prevalence rates for women range from 33 to 47%

Table 3. Freiburger Personality Inventory (Fahrenberg et al., 2001): Group-affiliated medians, statistical values of the Kruskal-Wallis test and posthoc comparison by the Mann-Whitney *U* test

FPI-R scales	Group-affiliated median			Kruskal-Wallis Statistical values			Posthoc comparisons Mann-Whitney *U*
	AN	BN	CG	χ²	p	df	
Self-contentment	9	7.5	10	1.80	.41	2	*ns*
Social orientation	9	8	8	.29	.86	2	*ns*
Commitment to performance	7	7.5	6	1.19	.55	2	*ns*
Inhibition	4	10.5	4.5	3.83	.15	2	*ns*
Excitability	5	8	4	10.55	.01**	2	BN > CG (*p* = .002**)
Aggressiveness	2	4	2	8.14	.02*	2	BN > CG (*p* = .003**)
Demands	7	8	5	6.84	.03*	2	AN > CG (*p* = .01**)
Physical complaints	3	5.5	1	7.19	.03*	2	BN > CG (*p* = .01**)
Health concerns	5	6.5	4	8.55	.17	2	*ns*
Openness	5	7.5	4	8.03	.02*	2	BN > CG (*p* = .004**)
Extraversion	7	7	7	.22	.89	2	*ns*
Emotionality	5	10	2	10.05	.01**	2	BN > CG (*p* = .004**)

Note. AN = mothers of patients with anorexia nervosa, BN = mothers of patients with bulimia nervosa, CG = mothers of mentally healthy girls. ****p* < .01, *p* < .05, ns = not significant.

for any Axis I disorder (e.g., Kessler et al., 2007; Meyer, Rumpf, Hapke, Dilling & John, 2000).

Axis II disorders did not occur more frequently in our clinical subsamples compared to the CG mothers. Personality disorders constitute severe psychiatric disorders with enduring and pervasive symptoms. Given this severity and the respectively low prevalence of 6 to 13 % for personality disorders in the general population (Paris, 2010), the detection of significant differences in the frequency of Axis II disorders might have failed because of the small sample size of our study. The conservative measurement of the SCID-II (Fydrich et al., 1997) might additionally have enforced low rates of Axis II disorders in our sample. Furthermore, a lack of comparable studies makes the evaluation of the present findings and the classification in the current state of research difficult.

The explorative analyses of the FPI-R-scales (Fahrenberg et al., 2001) showed the prominent frequency of the scales *excitability, aggressiveness, physical complaints, openness*, and *emotionality* in BN mothers. These findings suggest a dimensional similarity to increased impulsive characteristics, which have been reported in the relatives of patients with BN (Lilenfeld et al., 1998). Also, increased levels of affective disorders in AN mothers were reflected in the higher scores on the scale *demands*. AN mothers reported more fatigue, difficulties in coping with daily demands, and a lack of relaxation and rest than CG mothers.

Our results regarding personality styles and traits support findings from Fassino et al. (2002, 2003), highlighting special personality characteristics in patients with ED and their family members. In contrast to the reports by Fassino et al. (2002, 2003), we did not observe self-directness as a personality marker for these families, but did find significance and trends toward 6 (paranoid, schizoid, schizotypal, negativistic, dependent, borderline) out of the 14 personality styles in BN mothers. These findings add to our nonsignificant categorical diagnostics, showing that psychological functioning of ED mothers differs from that of CG mothers. Specifically, altered emotional functioning, such as passivity or impulsivity as well as social interaction differ between groups. One might speculate that mothers' personality profiles may be a specific factor in the children's character development and thereby indirectly impact adolescent ED. The association between temperament, familial dynamics, and adolescent ED was discussed by some authors (e.g., Young-Seon, 2005), but further longitudinal studies should consider dimensional instruments exploring personality characteristics on a nonpathological dimensional level. Thus, the possible interactions of maternal personality characteristics and the development of adolescent ED could be clarified.

The current findings must be interpreted with caution due to methodological limitations. First, the small sample size limits the representativeness of the sample and any generalization of our findings. Second, the representativeness of the sample was restricted during the recruitment of the CG, because only four CG fathers were willing to participate in the study. Because of the voluntary participation by mothers of patients and healthy control participants, we cannot exclude selection in the subsamples. Participants with broad psychopathology may have intentionally not participated in our study. Likewise, the willingness of participants to be interviewed may result from family history or necessity. This bias may amplify levels of psychopathology in the CG. Third, the K-SADS-PL (Delmo et al., 2001) was administered only to the mother. A reliable evaluation would require information from the adolescent, too. Fourth, the exclusion of male patients with ED and mentally healthy boys as well as missing data for fathers means a decreased generalization of the results. As described, only four CG fathers were willing to participate in the study. Because of the restricted assessment period within the project, we were unable to consider these data and decided to limit the present survey of familial psychopathology solely to mothers. Results regarding psychopathology among parents (including fathers) of patients with eating disorders are reported elsewhere (Woldt et al., 2010). Fifth, results may be biased due to pairwise comparisons of unbalanced subsample sizes. Sixth, the small sample size for BN mothers restricts the results. One reason explaining the small sample size in this group may be the later age of onset for BN (young adulthood) compared to AN (early adolescence). AN patients and their parents may therefore be more available in our child and adolescent psychiatry department. Because of the restricted assessment period within the project, the BN group could not be enlarged. Seventh, the onset of the patients' illness was not assessed. The length of illness may have implications on aspects of psychopathology and familial dynamics. This should be controlled for in future studies. Eighth, the question of causality remains open. From a case-control study we cannot tell whether parental mental illness was a risk factor for child ED or whether child ED led to parental mental illness. Continuative genetic studies as well as longitudinal studies should clarify the cause-effect relationship (Trace et al., 2013). Finally, there is a risk of recall bias as subjects with a child with an ED might be more likely to recall their own mental health problems.

In sum, a replication of this study should take place within a longitudinal framework as well as larger and more homogeneous subsamples, in consideration of AN subtypes (restrictive versus bulimic type) and particularly inclusion of fathers.

Nevertheless, the present findings do emphasize increased levels of psychopathology in mothers of patients with ED and have some clinical implications. The results

provide indications for the improvement of the treatment of adolescent ED. Familial dynamics should be urgently integrated into treatment, and therapeutic interventions should involve affected family members by carefully advising them and if necessary offering diagnostic and treatment.

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