## Personality Disorders in a Total Population Twin Cohort With Eating Disorders

K. Ilkjaer, L. Kortegaard, K. Hoerder, J. Joergensen, K. Kyvik, and C. Gillberg

Findings regarding the occurrence of personality disorders (PDs) in eating disorders (EDs) have been contradictory. Most previous studies have been clinic-based. The aims of the current study were to assess the prevalence of PD in ED in a population-based twin group and to establish the distribution of PD in three subgroups of ED. A two-step screening and diagnostic study of ED was performed in a large Danish twin population. Axis I and axis II DSM-III-R and DSM-IV ED diagnoses were made on the basis of results obtained

THE COMORBIDITY between personality disorders (PDs) and eating disorders (EDs) has been described in numerous studies. Table 1 provides a summary of some of the most important studies in the field. There is limited evidence that cluster C PD may be particularly common in anorexia nervosa (AN), whereas cluster B PD may be more characteristic of bulimia nervosa (BN). The interpretation of this comorbidity is complicated by the use of different methods and study populations. <sup>1-4</sup> In general, the studies are of limited size, and comorbidity varies form one study to another whether or not the entire spectrum of ED has been included.

In a general population sample of young, adult twins, we hypothesized that the prevalence of PD would be higher in the group with ED than the group without ED, but still lower than in clinical studies. We expected that cluster C PD would be more common in AN in contrast with more cluster B PD in participants with BN. Each PD consists of a number of personality traits. We hypothesized that in monozygotic (MZ), but not in dizogotic (DZ) twin pairs, both twins would be equally affected by pathologic personality traits independent of concordance/discordance of ED.

## **METHOD**

Study Population

The study population of the current report represents a portion of the "Young Part of the Danish Twin Register." <sup>16</sup> This part of the register contains twins born from 1953 to 1982, and encompasses a total of 35,528 individuals (representing 19,180 pairs). By use of a two-step screening procedure, twins were targeted for the current study.

Study Design

Questionnaire screening. A large-scale twin study was initiated in 1994, when the study population was screened by

at clinical investigations and interviews. Forty-nine percent of the participants with ED had at least one PD, compared to 26% in those with no ED (P < .001). Cluster C PD was the most common type of PD in all subgroups of ED, and cluster B PD was found only in participants with bulimic symptoms. Genetic factors appeared to contribute significantly to the variance of cluster C PD in ED, which was evaluated as a possibly important background factor in ED.

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questionnaire. The questionnaire was constructed as part of a Danish multicenter study, and was a screening instrument for a number of diseases and symptoms. Our reseach group participated in the questionnaire study with three questions regarding ED: (1) "Did you ever have AN according to your own judgement?," (2) "In the opinion of relatives or friends, did you ever have AN?," and (3) "Did you ever have symptoms of BN?" 17. Each question was scored as "yes" or "no."

After completion of the questionnaire study, a 5-year birth cohort of twins born between 1968 and 1972 was chosen to take part in the clinical study of EDs. This group consisted of 5,726 individuals, representing 3,658 twin pairs. At the time of the study, the study population was aged 23 through 29 years. It was assumed that the twins of this cohort had passed through the high-risk period of onset of ED, and at the same time the risk of recall bias would be minimal.

Twins who had screened positive on at least one of the screening questions regarding EDs served as the probands, and participated in the study along with their cotwin. In total, they constituted an index group of 336 individuals. Nonresponders

From the Departments of Psychiatry, and Child and Adolescent Psychiatry, Odense University Hospital, Odense; Department of Child and Adolescent Psychiatry, Bispebjerg Hospital, Copenhagen; Department of Child and Adolescent Psychiatry, Esbjerg; The Danish Twin Register, Epidemiology Research Unit, Institute of Public Health, University of Southern Denmark, Odense, Denmark; Department of Child and Adolescent Psychiatry, University of Göteborg, Gothenburg, Sweden; and the University of London, St Georges's Hospital Medical School, London, UK.

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Address reprint requests to K. Ilkjaer, M.D., Centre of Eating Disorders, Department of Child and Adolescent Psychiatry, Odense University Hospital, Sdr. Boulevard 29, 5000 Odense C, Denmark.

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Table 1. DSM-III-R Personality Disorders and Cluster C Personality

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	Criterion for PD	ED subtype	Patient Status	Sample Size	% Total PD	% Cluster C PD
Self-report						
Kennedy (1990) <sup>1</sup>	MCMI, BSI	All EDs	Inpatient	44	93% at admission 73% at discharge	
Steiger (1991) <sup>2</sup>	PDQ-R	All EDs	Hospital-treated	67 and 24 controls	ED: 55% probable PD Controls: 0% probable PD	
Unstructured interviews					·	
Piran (1988) <sup>5</sup>	Diagnostic Interview for Borderline, MMPI	AN ± BN	Inpatient/waiting list for admission	68	87% in restricters 97% in bulimics	77% of restricters 29% bulimics
Semistructured interview	vs					
Gartner (1989) <sup>6</sup>	PDE	All EDs	Inpatient	35	57%	87%; no significance between different ED groups
Braun (1994) <sup>7</sup>	SCID-II	All EDs	Inpatient	105	69%	30%; no significant diffenence between different ED groups
Herzog (1992) <sup>8</sup>	SIDP	All ED	Outpatient	210	27%	AN: 19%, AN/BN: 17%, BN: 5%, total: 12%
Ames-Frankel (1992) <sup>9</sup>	PDE	BN	34 Inpatients 49 outpatients	83	38% of inpatients 29% of outpatients	
Skodol (1993) <sup>10</sup>	PDQ-R, PDE, SCID-II	All EDs	34 inpatients 8 outpatients	42	Self-report: 75% Interview: 42%	
Wonderlich (1990) <sup>11</sup>	SCID-II	All EDs	35 inpatients 11 outpatients	46	72%	57%
Gillberg (1995) <sup>12</sup>	SCID-II	AN	Population	51 and 51 controls	AN: 41% Controls: 18%	AN: 37% Controls: 10%
Nielsson (1999) <sup>13</sup>	SCID-II	AN	Population	50 and 51 controls	AN: 15% Controls: 7%	AN: 11% Controls: 4%
Matsunaga (2000) <sup>14</sup>	SCID-II	All EDs	For at least 1 yr recovered from ED	54	26%	
Godt (2002) <sup>15</sup>	SCID-II	All EDs	Outpatient	176	AN: 21% BN: 38% EDNOS: 36%	AN: 17% BN: 28% EDNOS: 32%
Present study	SCID-II	All EDs	Population	63 and 124 comp.gr	AN: 50% AN/BN: 50% BN: 48% comp. gr.: 26%	AN: 45% AN/BN: 35% BN: 39% comp. gr.: 16%

Abbreviations: MCMI, Millon Clinical Multiaxial Inventory; BSI, Borderline Syndrome Index; PDQ-R, Personality Diagnostic Questionnaire-Revised; MMPI, Minnesota Multiphasic Personality Inventory; PDE, Personality Disorder Examination; SCID-II, Structured Clinical Interview for DSM-III-R; SIDP, Structured Interview for DSM-III Personality Disorders; comp. gr., compare group consisting of participant without ED.

to earlier studies, unknown addresses, and mortality reduced the number of available cases to 318.<sup>17</sup> In total, 187 (163 females and 24 males) participated in the Structured Clinical Interview for DSM-III-R (SCID-II) (see below) to determine the prevalence of PD. Figure 1 provides an explanation of selection.

The interview study. The clinical study consisted of a number of interviews and investigations/procedures. The following interviews were relevant for the present part of the study: SCID Non-patient Edition (SCID-NP)<sup>18</sup> for psychiatric disorders, SCID-II<sup>19</sup> for PDs, and the Morgan Russell Evaluation Scale<sup>20</sup> for overall outcome level. Following the interview, the participants completed the Eating Disorders Inventory (EDI) questionnaire.<sup>21</sup> Diagnoses according to DSM-III-R<sup>22</sup> were made on the basis of results obtained on these measures and on psychiatric clinical examination. In addition we also made DSM-IV<sup>23</sup> ED diagnoses.

There were four interviewers; all had considerable experience in psychiatry/child and adolescent psychiatry. The interviewers had taken part in intensive SCID interviewing and Morgan Russell Evaluation Scale use training, including shared rating of live and video-taped interviews. The interviewers were blinded towards the responses on the original questionnaire. Also, during the psychiatric part of the interview, the interview-

ers were blinded towards the zygosity of the twin pair, and in no case did the same interviewer examine more the one twin in a pair. When probing into personality features, it was strictly evaluated whether the individual features led to impairment or subjective distress, and whether they appeared inflexible and maladaptive. The "total PD" group was composed of two subgroups: (1) a group with "threshold PD" fulfilling SCID-II criteria for a PD, and (2) a group with "subthreshold PD," meeting all SCID-II criteria except for one personality feature.

According to DSM-III-R diagnosis, the group of individuals with ED was divided into three subgroups: (1) "AN-only" containing all twins with life-time diagnoses of AN, but never of BN; (2) "AN/BN" containing all twins with a life-time diagnosis of both AN and BN; and (3) "BN-only" containing all twins with a life-time diagnosis of BN, but never of AN.

For this part of the study, the ED groups were collapsed and subdivided according to level of diagnostic completeness: (1) definite AN (BN) when all four (five for BN) SCID symptom criteria for AN (BN) diagnosis were met, and (2) probable AN (BN) when all but one item were met or almost met.

According to DSM-IV diagnosis, the group of AN-only were divided into AN-restricting type and AN-binge-eating/purge type. The group of AN/BN were divided into AN-binge-eating/

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