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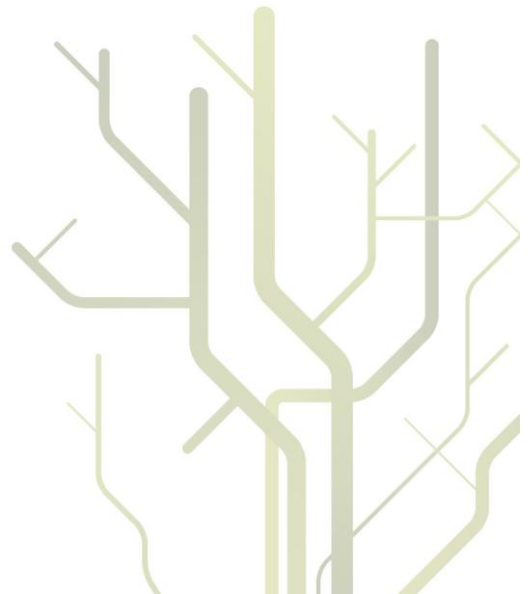# A five-year prospective follow-up study of longstanding eating disorders

Influence from personality disorders and child sexual abuse

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A five-year prospective follow-up study of longstanding

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You yourself, as much as anybody

in the entire universe

deserve your love and affection

- Buddha -

1. OVERVIEW

1.1 Acknowledgements

This is a clinical study, and first of all, thanks to all the patients for participating in this study. I am deeply indebted that they have taken their time to fill out dreadfully long questionnaires and sharing their feelings, thoughts, opinions and observation of life with me. My striving over this dissertation is nothing compared to their striving over these complicated issues.

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1.2 Summary

This study was conducted within naturalistic settings at Modum Bad Eating Disorder unit, Norway. Follow-up studies have shown that 20-30% of patients with eating disorders develop longstanding symptoms seriously impairing their daily life. There are very few studies on the course of these patients. The present work provides knowledge of the course and long-term outcome of longstanding eating disorders and comorbid personality disorders for patients with previous treatment failures.

This dissertation consists of three papers on patients admitted to a specialized inpatient treatment program at the Modum Bad psychiatric hospital. The participants were assessed upon admission, discharge and at one-, two-, and five-year follow-up.

Paper I reports on the course and outcome at five years after completing treatment and identifies subgroups of patients with different course and outcome. The key findings were first that among the 77 patients (90%) who participated, 46 patients (61%) had improved, and 30 (39%) did not meet diagnostic criteria for an eating disorder. Second, a cluster analysis identified a group of 21 patients (27%) with no improvement over time. These results underscore that the overall course of patients with longstanding eating disorder is favourable, but a subgroup of patients with no improvement over time may need intensified treatment efforts.

Many studies have found a high frequency of personality disorders among patients with eating disorders. Paper II reports on the change in proportions of personality disorders over time. The results showed that during inpatient treatment, 58 patients (78%) had one or more personality disorders and this was reduced to 32 patients (43%) at the five-year follow-up. Dimensional personality disorder scores were calculated by adding the 1-3 scores and dividing by the number of items in the Structured Clinical Interview for DSM-IV Axis II

diagnoses. Dimensional indices and a mean personality index changed significantly over time in anorexia nervosa, bulimia nervosa and eating disorder not otherwise specified, but no significant changes between diagnoses emerged. Recovered patients had lower frequency of personality disorder ($p < .01$). The substantial five-year follow-up reductions in the frequency of personality disorder in patients with eating disorder contribute to an optimistic clinical scenario for treating patients with comorbid eating disorder and personality disorder.

Paper III reports on prognostic factors for the poor outcome of eating disorder symptoms and how the predictors interact. Multi-level mixed model was used to examine the predictors. In these prospective longitudinal analyses, avoidant personality disorder and child sexual abuse interacted in predicting high levels of eating disorder during a long-term course. These results suggest that eating disorder, avoidant personality disorder and sequelae after child sexual abuse are the potential targets for treatment that need further investigation.

In sum, this dissertation addressed several important topics in the eating disorder field. The main findings are:

- There was statistically significant reduction in eating disorder symptoms at the five-year follow-up.

- Cluster analysis identified a group of patients with no improvement over time.

- Patients had higher probability of recovery from personality disorders than from eating disorders.

- Avoidant personality disorder and child sexual abuse interacted in predicting high levels of eating disorder symptoms during the long-term course.

1.3 List of papers

Paper I

Vrabel, K. R., Ro, O., Martinsen, E. W., Hoffart, A., & Rosenvinge, J. H. (2008). The course of illness following inpatient treatment of adults with longstanding eating disorders: A 5-year follow-up. *International Journal of Eating Disorders, 41,* 224-232.

Paper II

Vrabel, K. R., Ro, O., Martinsen, E. W., Hoffart, A., & Rosenvinge, J. H. (2009). Five-year prospective study of personality disorders in adults with longstanding eating disorders. *International Journal of Eating Disorders, 43,* 22-28.

Paper III

Vrabel, K., Hoffart, A., Ro, O., Martinsen, E. W., & Rosenvinge, J. Co-occurrence of avoidant personality disorder and child sexual abuse predicts poor outcome in longstanding eating disorders. *Journal of Abnormal Psychology (accepted for publication).*

1.4 Abbreviations

AIC	Akaike's information criterion
AN	Anorexia nervosa
ANOVA	Analysis of variance
ARMA	Autoregressive moving average
BED	Binge eating disorder
BMI	Body mass index
BN	Bulimia nervosa
CSA	Child sexual abuse
CBT	Cognitive behavioural therapy
DSM-IV	Diagnostic Statistical Manual of Mental Disorders, 4th edition
ED	Eating disorder
EDE	Eating Disorder Examination
EDI	Eating Disorder Inventory
EDNOS	Eating disorder not otherwise specified
ES	Effect size
GSI	Global Severity Index
ICD-10	International Classifications of Diseases, 10th edition
IIP	Inventory of Interpersonal Problems
MANOVA	Multivariate analysis of variance
MB	Modum Bad
PTSD	Post traumatic stress disorder
PD	Personality disorder
SCID-I	Structural Clinical Interview for DSM-IV axis I

SCID-II   Structural Clinical Interview for DSM-IV axis II

SCL-90   Symptom Check List

SPSS   Statistical Package for the Social Sciences

2. INTRODUCTION

Most follow-up studies on eating disorders (EDs) have been conducted on adolescents or adults in their early twenties. More knowledge is needed on the course of illness and prediction of outcome for older adults with severe, longstanding ED. Several studies have demonstrated comorbidity between ED and personality disorders (PDs). Most of these studies are limited by cross sectional designs, thus unable to catch changes and trends, and many studies use inadequate diagnostic procedures. There is a need for longitudinal studies using structured diagnostic interviews both for the ED and the PD to shed light on how PD and ED change over time.

In this dissertation, I address these themes through three broad questions, framed within a longitudinal, prospective study: What are the course and long-term outcome of patients with longstanding ED? How do the proportions of PDs in subgroups of ED and among ED patients evolve in a longitudinal perspective? What predicts poor outcome of longstanding ED?

2.1 Approaching eating disorders

2.1.1 Historical background

Historically restricted eating has not been considered an ED. Rather, self-inflicted starvation has played an important role in the history of mankind as one of many ways of exerting self-control, purifying oneself, and impressing other people. Early religious literature contains descriptions of what was probably anorexia nervosa (AN). The most famous representative of such holy anorexia was Catharina Benincasa from Siena. She lived in the 14th century and by the age of 12 she defied her parents, left them for a monastery life to

oppose their choice of a husband for her, and died after several years of self-inflicted starvation. She was canonised in 1461 by Pope Pius II.

Probably the earliest *medical* report of AN was that by Richard Morton in 1689, a report mainly focusing on the physical manifestation of the disorder. A decade later, two prominent physicians separately described AN, Charles Lasègue, professor in clinical medicine at the Faculty of Medicine in Paris and physician at La Pitiè Hospital, and Sir William Gull, physician at Guy's Hospital in London. Lasègue described the condition and attempted to explain it. Gull was the first to name the condition "anorexia nervosa." According to both clinicians AN was a psychogenic affliction that occurred predominantly in girls and women. The characteristics described by Gull and Lasègue are still valid today; severe weight loss, amenorrhea, constipation, restlessness, and no evidence of underlying organic pathology (Vandereycken, 2002).

Another perspective of eating disturbances occurred in Caesars' Rome where physicians recommended vomiting for curative, purification purposes (Nasser, 1988). One of the signs of a prosperous citizen from the affluent, higher bourgeoisie was to have a private "vomitorium," a special room where one could relax and vomit after excessive meals. Two millennia later, the London psychiatrist Gerald Russell was the first to describe bulimia nervosa (BN) as a distinct syndrome, yet he identified BN as an ominous variation of AN (Russell, 1979). Bulimia as a distinct syndrome had been described in medical literature almost 300 years before, but is nowadays more or less forgotten.

Around 1890, a general practitioner from Balsfjord in northern Norway was probably the first one to describe and publish accounts of severe eating disturbances in the Norwegian medical literature (Rosenvinge & Vandereycken, 1994). It is noteworthy that in the 1950s, when AN as a diagnostic entity had been recognised for nearly 50 years, influential Norwegian authors (Eitinger, 1951) still argued against AN as a separate nosological and

clinical entity, and that the illness should better be understood as a psychosomatic disorder, and a variant of female hysteria. The first Norwegian prospective outcome study of AN was conducted in 1982 (Bassøe & Eskeland, 1982). The second prospective study from Norway (Ro, Martinsen, & Rosenvinge, 2002; Ro, Martinsen, Hoffart, Sexton, & Rosenvinge, 2005b; Ro, Martinsen, Hoffart, Sexton, & Rosenvinge, 2005a; Ro, Martinsen, Hoffart, & Rosenvinge, 2005) included all ED diagnoses, and the present study is a part of that follow-up study.

2.1.2 Classification of eating disorders

ED is in this dissertation, as in almost all scientific studies, defined according to the criteria in DSM-IV (American Psychiatric Association, 1994). The diagnostic category ED consists of three diagnostic subcategories, AN, BN and eating disorder not otherwise specified (EDNOS). The EDNOS category includes the provisional diagnostic category of binge-eating disorder. AN comprises four specific criteria - marked weight loss, fear of gaining weight, body image distortion and (in females) amenorrhea. Furthermore, AN is divided into two subcategories, restricting subtype and binge-purge subtype (table 1).

Table 1: DSM-IV diagnostic criteria for AN.

A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g. weight loss leading to maintenance of body weight less than 85% of what expected; or failure to make expected weight gain during period of growth, leading to body weight of less than 85% of what expected).

B. Intense fear of gaining weight or becoming fat, even when underweight.

C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.

D. In postmenarcheal females, amenorrhea, i.e. the absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g. estrogen administration).

Specify type:
Restricting type: during the current episode of AN, the person has not regularly engaged in binge-eating or purging behavior (i.e. self-induced vomiting or the misuse of laxatives, diuretics or enemas)

	Binge-eating/purging type: during the current episode of AN, the person has regularly engaged in binge-eating or purging behavior (i.e. self-induced vomiting or the misuse of laxatives, diuretics or enemas).

BN is defined by binge eating and compensatory behaviour (e.g. vomiting, fasting) that occur an average of twice per week for three months and self-concept dominated by shape and weight. These symptoms must occur outside the course of AN. Like AN, BN is divided into two subtypes, a non-purging subtype and a purging subtype (table 2).

Table 2: DSM-IV diagnostic criteria for BN.

A.   Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:
    (1) eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances
    (2) a sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating)

B.   Recurrent inappropriate compensatory behavior in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.

C.   The binge eating and inappropriate compensatory behaviors both occur, on average, at least twice a week for 3 months.

D.   Self-evaluation is unduly influenced by body shape and weight.

E.   The disturbance does not occur exclusively during episodes of AN.

Specify type:
Purging type: during the current episode of BN, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics or enemas
Non-purging type: during the current episode of BN, the person has used other inappropriate weight compensatory behaviors such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics or enemas

Finally, EDNOS is reserved for those individuals with a clinically significant ED that does not meet criteria for AN or BN. Within this broad, heterogeneous category, binge-eating is defined by excessive intake of food and associated distress in the absence of inappropriate compensatory behaviours (table 3).

Table 3: The DSM-IV diagnostic criteria for EDNOS

A.	For females, all of the criteria for AN are met except that the individual has regular menses.
B.	All of the criteria for AN are met except that, despite significant weight loss, the individual's current weight is in the normal range.
C.	All of the criteria for BN are met except that the binge-eating and inappropriate compensatory mechanisms occur at a frequency of less than twice per week or for a duration of less than three months.
D.	The regular use of inappropriate compensatory behavior by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after the consumption of two cookies).
E.	Repeatedly chewing and spitting out, but no swallowing, large amounts of food.
F.	Binge-eating disorder: recurrent episodes of binge-eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of BN.

The current DSM-IV classification system has some assets worth noting. First, DSM-IV ED can be reliably diagnosed with several semi-structured or clinical interviews (Peterson & Miller, 2005). Second, there is some evidence of diagnostic validity. AN and BN appear to demonstrate different longitudinal patterns with regard to recovery (Herzog et al., 1999) and mortality (Keel et al., 2003). In addition, AN and BN differ with regard to their cross-cultural and cross-historical representations, with BN demonstrating a pattern more consistent with a culture-bound syndrome than AN (Keel & Klump, 2003). Finally, AN and BN appear to differ in terms of evidence-based treatment. Cognitive behaviour therapy (CBT) has achieved the status of well-established treatment for BN (Fairburn, Cooper, & Shafran, 2003a). As yet, no well-established evidence-based treatments have been identified for AN (Shafran & de Silva, 2009).

There are, however, important limitations. Empirical studies of the current DSM-IV classification have raised concerns mainly at three levels (Wonderlich, Joiner, Jr., Keel, Williamson, & Crosby, 2007): a) individual diagnostic criteria for the ED; b) the validity of the AN and BN subtype distinction; and c) questions about the validity of the AN, BN and EDNOS diagnoses themselves. Regarding specific criteria there have been numerous

concerns about the fear of weight gain on the grounds that in certain cultures, predominantly in Asia it may not be present in individuals nevertheless displaying apparent AN. The criterion of the presence of amenorrhea has been questioned because it is an unreliable indicator of weight status and does not provide information in terms of other important clinical features (Andersen, Bowers, & Watson, 2001; Garfinkel et al., 1996). Similarly the diagnostic criteria for BN have been criticised. The idea that a binge involves consumption of an amount of food that is definitely larger than what most people would eat has been difficult to operationalise (Pratt, Niego, & Agras, 1998). Moreover, the idea that the binge is time limited and the criterion that the BN-symptoms must occur twice a week for the three months fail to receive empirical support (Crow, Stewart, Halmi, Mitchell, & Kraemer, 2002; Kendler et al., 1991).

Empirical studies of the full range of ED diagnoses question the distinction between AN and BN. Patients with AN frequently "cross over" to developing BN (Keel & Mitchell, 1997; Keel, Dorer, Franko, Jackson, & Herzog, 2005). Moreover, a recent large-scale study found that many patients with the AN binge-purge subtype retrospectively reported a history of BN (Tozzi et al., 2005). Finally, recent research indicates that as much as 60% of those with ED do not meet DSM-IV diagnostic criteria for AN or BN (Fairburn & Bohn, 2005; Wade, Crosby, & Martin, 2006), and are thus classified as having EDNOS. One recent study (Milos, Spindler, Schnyder, & Fairburn, 2005) suggested that approximately 70% of EDNOS subjects move to either AN or BN over a 30-month follow-up. This concerns the stability and validity of EDNOS and suggests that such variations may have more to do with fluctuating body weight and symptom severity than with actual transitions from one illness to another.

2.1.2.1 Alternative classification models

Given the research criticising or questioning the validity of the DSM-IV ED diagnoses, new classification models have emerged.

One study conceptualised EDs in terms of a three-dimensional model (Williamson, Gleaves, & Stewart, 2005). One dimension, i.e. binge eating, is viewed as qualitative (taxonic) in nature, whereas the other two dimensions, fear of fatness – compensatory behaviours and extreme drive for thinness, are viewed as continuous. This model is based on a series of taxometric studies (Gleaves, Lowe, Snow, Green, & Murphy-Eberenz, 2000; Williamson et al., 2002). Although this model is interesting, its logic does not explain the limited efficacy of treatment for the AN binge-purge subtype. Also, the model remains mute on symptom clusters not currently represented in the DSM-IV, such as purging disorder (Wonderlich et al., 2007).

Fairburn and colleagues (Fairburn et al., 2003a; Fairburn et al., 2005) on the other hand, have proposed a single unitary diagnostic category, "ED", which would subsume the current diagnoses of AN and BN and their subtypes and EDNOS (Fairburn et al., 2005). The transdiagnostic model is founded on the belief that common characteristic features between the various forms of ED serve to unite more than separate them. First, it is argued that AN, BN and EDNOS essentially share the same *core psychopathology,* i.e. the overevaluation of the importance of controlling shape, weight and eating. Second, Fairburn and colleagues argued that EDNOS patients share many of the same *distinctive clinical features.* These commonalities, shared by at least some subgroups from each ED diagnosis, include the restriction of food intake, purging behaviours, excessive exercise, body checking, and binge eating. Finally, Fairburn pointed to the *fluctuating longitudinal course of ED patients,* like patients often migrating from one diagnostic category to another over time. This transdiagnostic model will represent a substantial departure from the DSM-IV scheme. This

model overcomes numerous problems associated with the heterogeneity in the existing DSM-IV ED diagnoses and their relative instability over time, and seeks to improve the inclusiveness of the ED classification. However, the transdiagnostic approach has been widely debated and criticised. Some of the reported differences between the diagnoses of AN and BN (e.g. cross-cultural representation; treatment response; chronicity; and most notably, mortality) is inconsistent with the transdiagnostic model (Wonderlich et al., 2007). However, it is worth noting that these features can be explained by effects of starvation in AN and not that AN is a single disorder different from BN.

As a result of the shortcomings in the diagnostic classification system, it is necessary to study heterogeneous diagnostic groups and to follow them prospectively over time at a certain length to gain knowledge about the outcome of longstanding ED. DSM-V is scheduled to be published in 2012.The Work Group will review, critique, and suggest revisions to the existing diagnostic criteria for ED. In this perspective, knowledge from longitudinal studies of EDs is important.

2.1.3. Prevalence

During the last decades ED changed from being a "strange case" to being a "hot case" (Skarderud, Rosenvinge, & Gotestam, 2004). A total of 30-50% of people do not get in touch with health services, (Hoek & van Hoeken, 2003) creating a difference between population estimates and number of patients at a given time. Still, ED is a hot case in the sense that more people with ED may seek treatment, and more patients with ED are admitted due to increased case detection competence.

A recent international review concluded with a prevalence of AN of 0.1% and BN of 1.3% for young females (Hoek, 2006). Studies indicate that the prevalence of AN has been

relatively stable for the past 25 years, whereas the prevalence of BN has increased to some extent (Hoek, 2006).

In Norway, a questionnaire-based study of ED in a representative sample of the general female population was conducted (Gotestam & Agras, 1995). The lifetime prevalence of ED was 8.7% with a point prevalence of 3.8%. The lifetime prevalence of BED was 3.2%, BN 1.6%, AN 0.4% and EDNOS 3.0%. A recent study (Zachrisson, Vedul-Kjelsas, Gotestam, & Mykletun, 2008) compared the prevalence of EDs and obesity in two nationally representative surveys in Norway in 1991 (N = 5 1,537) and 2004 (N = 5 1,467). ED diagnoses were obtained using the self-report questionnaire survey for EDs at both time points. Here the prevalence of overweight and obesity was doubled from 1991 to 2004, whereas the prevalence of EDs has been stable. In an epidemiological study among 15-year old students in Norway, the prevalence of AN was 0.3% and BN 0.7% (Rosenvinge, Borgen, & Boerresen, 1999).

2.1.4. Outcome

A review of the outcome studies from 1953 to 1999 covering nearly 6000 patients (Steinhausen, 2002) showed a mean crude mortality rate of 5%. On average, 47% of the surviving patients fully recovered, while 34% improved, and 21% developed a chronic course. Interestingly, with increasing duration of follow-up, the mortality rates increased from 1% in studies with duration of follow-up shorter than 4 years to 9% in studies with follow-up of more than 10 years. The recovery group increased from 33% to 73%, respectively. The rate of recovery was higher among younger patients and they also had less tendency to develop a chronic course. This is also supported in a review of adult and adolescent studies (Fisher, 2003) which concludeed that adolescents fare better than adults, particularly if treatment is given on an outpatient basis.

Two Norwegian outcome studies of AN were included in Steinhausen's review study. One study reported that of 132 patients treated between 1958 and 1976, 58% had good, 28% an intermediate and 14% a poor outcome at follow-up (Bassøe et al., 1982). The average time to follow-up was not reported. In a retrospective study of 41 patients with AN 14.4 years after termination of treatment, the mortality rate was 10%. Among the surviving patients 26% had a poor outcome, 41% an intermediate and 32% a good outcome (Rosenvinge & Mouland, 1990).

Another study reviewed 88 studies of 2194 BN subjects with follow-up assessments at least six months after the first assessment (Keel et al., 1997). The crude mortality rate was 0.3% after five to ten years, approximately 50% of the women initially diagnoses with BN had fully recovered, 30% had some BN-symptoms and nearly 20% continued to meet full criteria for BN.

In Ro's prospective follow-up study, which this dissertation is based on, 14% was recovered, 35% had an intermediate outcome and 51% had a severe or very severe outcome two years after inpatient treatment. A total of 71% had improved from inpatient treatment to two-year follow-up and no one died from ED (Ro et al., 2005a).

There are few follow-up studies of patients with a longstanding course of ED (Dalle, Ricca, & Todesco, 2001; Walsh et al., 2000). Longstanding ED are related to impaired daily functioning, somatic complications and reduced quality of life. Most patients have comorbid mental illnesses. Some of these patients have experienced repeated treatment failures and have been treated in the health care system for many years.

2.1.4.1 Measuring outcome in eating disorder research

A careful exploring of outcome findings reveals a considerable variability, where recovery rates range from 57% to 97% (Couturier & Lock, 2006). In larger studies 30-75% of

patients recover from AN (Bassøe et al., 1982; Fichter & Quadflieg, 1999; Fichter, Quadflieg, & Hedlund, 2006; Herzog et al., 1999; Lowe et al., 2001; Steinhausen, 2002; Strober, Freeman, & Morrell, 1997; Zipfel, Lowe, Reas, Deter, & Herzog, 2000; Fichter et al., 1999) and between 50 to 70% recover from BN (Ben Tovim et al., 2001; Fairburn et al., 1995; Fichter & Quadflieg, 1997; Keel et al., 1997; Keel, Mitchell, Miller, Davis, & Crow, 1999; Steinhausen & Weber, 2009). This variability as well as - at least until quite recently - the lack of consensus about outcome measures represents one of the main methodological problems conducting outcome studies of ED. Several factors may account for this problem; a) methods of assessments, i.e. various interviews and self-reporting questionnaires; b) outcome definitions; and c) definitions of remission.

Definitions of outcome may include behavioural symptoms only or additional ED-related psychological symptoms. Evaluation of outcome could also include measurements of general psychological distress and sociodemographic factors such as social relations and working ability.

The most common way to report outcome is to calculate the number of patients not meeting the diagnostic criteria or do not display any ED-symptoms. In a recovery process, most patients with AN and BN will some time be in the EDNOS group. This is problematic because the lack of stringency in the diagnostic description of EDNOS.

Some studies have used the Psychiatric Status Rating Scale (PSR) (Keller et al., 1987) and adjusted it to AN and BN (Herzog et al., 1993), however not to EDNOS. The PSR ratings range from 0 (no evidence of disorder) to 6 (definite criteria-severe). Remission is defined as PSR ≤ 2 (Button & Warren, 2002). Two on the PSR scale corresponds to residual, i.e. no ED behavioural symptoms, but still successfully has to fight impulses and ED-attitudes. This definition is nearly equivalent to recover or sub-threshold in the present dissertation.

The Morgan-Russell outcome scales (Morgan & Hayward, 1988) have been widely used to classify outcome of AN. Here, three categories (good, intermediate and poor outcome, respectively) are defined by cut-off scores, however, without taking time into account. In addition, eating pathology, mental status, psychosexual status and socio-economic situation are evaluated. In recent years, the use of the Morgan-Russell outcome scales has declined.

In a randomised controlled family therapy trial (Dare, Eisler, Russell, Treasure, & Dodge, 2001) adult AN-patients were assigned to four outcome categories according to weight, menstrual status and frequency of BN-symptoms. In the present dissertation, the following categorisation from this study has been a point of departure:

- *Recovered*: weight > 85 % of average body weight; menstruation returned; no BN-symptoms.
- *Significantly improved*: weight > 85 % of average body weight; no menstruation and/or occasional bulimic symptoms (< weekly).
- *Improved*: weight > 75 % of average body weight and 10% weight gain and/or regular BN-symptoms (≥ weekly).
- *Poor*: weight > 75 % of average body weight; or weight gain < 10% or frequent BN-symptoms (daily).

The terms partial and full remission, relapse, recovery and recurrence are traditionally used in medicine to describe the courses of illness. In their research on depression Frank and colleagues have suggested a framework for the operationalisation of these terms (Frank et al., 1991). This framework has been applied to ED by a consensus of European experts, and the empirical validity of the operationalisation has been tested and found to be satisfactory (Kordy et al., 2002). However in the ED-field today recovery is often defined as having a

global eating disorder examination (EDE) score less than one standard deviation above the community mean. In a recently published randomised controlled CBT-study for BN and EDNOS, two primary outcome variables were generated from the EDE ratings: change in the severity of eating disorder features as measured by the global EDE score, and having a global EDE score less than one standard deviation above the community mean (i.e., below 1.74) (Fairburn et al., 2009). Normative comparisons of this type are widely used to identify clinically significant change (Kendall, Marrs-Garcia, Nath, & Sheldrick, 1999; Ogles, Lunnen, & Bonesteel, 2001). This is in corroboration with researchers who state that an outcome criterion should be based on both statistical and clinical significance (Jacobson & Truax, 1991). This could be evaluated by (1) moving at least 2 standard deviations (SD) away from the mean in the dysfunctional group, or by (2) moving into a normal range, e.g. within 2 SD of the mean in this population, or by (3) coming closer to the functional than to the dysfunctional segment of the general population.

Despite this progress, reaching full consensus about the construct and external validity of outcome criteria stands out as a major future challenge. In this present dissertation three main methods of defining recovery were used, i.e. the percentage of patients

- not meeting the ED diagnostic criteria

- without any ED-symptoms

- who achieve a defined reduction of specified symptom measures.

2.1.5 Predictors of ED outcome

Factors predicting outcome in ED have been sought mainly in three specific areas; individual, environmental and therapeutic. So far, few predictive factors have been replicated across studies (Fairburn et al., 2003b; Keel et al., 1997; Vaz & Salcedo, 1996; Vaz, 1998). Nevertheless, to guide treatment approaches several reviewers have identified factors

associated with outcome of ED. In their review of the outcome of BN, Keel and Mitchell (Keel et al., 1997) concluded that personality traits, such as impulsivity, may contribute to poor outcome. Still, the reports on predictors of outcome in AN are conflicting. One review of outcome studies, described 12 prognostic factors, yet duration of illness was the only factor across all studies showing an unfavourable prognosis (Steinhausen, 2002). A recent review of BN concluded that there was only conflicting evidence for prognostic factors for BN (Steinhausen et al., 2009). This lack of consistency and failure in replicating prognostic factors are due to differences in time intervals to follow-up, sample characteristic, as well as definitions of outcome and inclusion criteria (Steinhausen, 2002; Berkman, Lohr, & Bulik, 2007). Another source to the lack of consistency relates to methodological problems. Most of the studies use conventional approaches to predict ED outcome. They centre on direct relations between patients characteristics assessed at an earlier time and the ED outcome at some later time. However, two assessments only give imprecise and unstable estimates of longitudinal course.

Avoidant PD is one of the most prevalent PDs in the ED literature (Rosenvinge, Martinussen, & Ostensen, 2000). Across ED diagnoses this PD has a considerably higher prevalence (16-27%) (Sansone, Levitt, & Sansone, 2005) compared to the general population prevalence reported in the DSM-IV (i.e. 0.1-1.0%). One longitudinal study on AN and BN found no evidence of PD predicting either longitudinal outcome (Herzog et al., 1999), or ED relapse (Keel et al., 2005). However, a reanalysis of this data set revealed that avoidant-insecure *scores* were consistently associated with poor functioning and poor outcome, including failure to show ED improvement, poor global functioning after five years, and high treatment utilisation after five years (Thompson-Brenner et al., 2008). Despite the high prevalence of avoidant PD, there is still limited understanding of the specific impact of avoidant PD in the medium to long-term course of ED.

In a review Steinhausen concluded that obsessive-compulsive PD is associated with an unfavourable prognosis in AN (Steinhausen, 2002). Intriguingly, hysterical personality traits somewhat the antithesis of obsessive-compulsive traits (Bruce & Steiger, 2006) coincide with a favourable prognosis. These findings may reflect the intuitive clinical notion that higher (hysterical) and lower (obsessive-compulsive) levels of emotional and interpersonal constriction may positively and negatively, respectively, affect the ability of AN-patients to benefit from treatment. This notion is reflected in other studies reporting that traits consistent with the obsessive-compulsive PD spectrum (i.e. perfectionism, harm avoidance and preference for sameness) predict poorer outcome in AN (Bulik, Sullivan, Fear, & Pickering, 2000; Fassino et al., 2001). For BN, there are few studies of the impact of cluster C PD (and more specifically; related traits like perfectionism and harm avoidance) in predicting treatment response. Nevertheless, one study concluded that avoidant PD was not a significant predictor of BN outcome. However, avoidant PD was associated with poorer psychiatric symptoms although much of this variance appeared to be attributable to the lifetime presence of any mood disorder (Rowe et al., 2009). In addition, a meta-analysis shows a high proportion of cluster C PDs in BN patients (Rosenvinge et al., 2000). This is puzzling as the frequency of obsessions and compulsions as well as obsessive-compulsive personality features is almost matching that of AN (Parikh & Halmi, 2006), and may be explained by the fact that the majority of available studies on BN have explored cluster B PDs and, most often, the borderline PD. This literature show that cluster B PDs (or traits) seriously deflate response to treatment aiming to reduce binge eating and vomiting (Herzog, Keller, Sacks, Yeh, & Lavori, 1992; Rossiter, Agras, Telch, & Schneider, 1993; Steiger, Stotland, & Houle, 1994). By contrast, in a study with an elegantly designed analysis, the severity of BN and personality symptoms was unrelated throughout the course of treatment (Fichter, Quadflieg, & Rehm, 2003). Furthermore, an extensive review of the literature on the effects of Axis II comorbidity

for BN treatment response, concluded that a PD is more closely linked to the longitudinal course of general mental symptoms or psychosocial functioning than with fluctuations of ED symptoms (Grilo, 2002). Based on this background, we have examined the predictive status of borderline, obsessive-compulsive, and avoidant PD (Paper III).

Despite the clinical experience of child sexual abuse (CSA) as precursor to a poor outcome predictor from ED, very few studies have actually examined CSA as a true predictor. Previous studies have related sexual abuse and CSA to the need for inpatient treatment (as a possible severity indicator) (Carter, Bewell, Blackmore, & Woodside, 2006), to a generally poor response to and benefit from treatment with dropout and relapses included herein (Rodriguez, Perez, & Garcia, 2005), as well as to more severe general mental health disturbances (Carter, Bewell, Blackmore, & Woodside, 2006). In summary, there is every reason to hypothesise that CSA among ED patients may predict a non-favourable course. However, as these authors point out, there is a need to evaluate the long-term impact of such a history, and whether CSA may predict outcome in ED

Examining the predictive status of CSA as well as the borderline, obsessive-compulsive and avoidant PD serves as an example of the importance of including candidate predictors that may become clinically relevant, i.e. by pinpointing a certain therapeutic focus. However, there is a need for methodologically sound longitudinal studies using statistical methods that can be more precise in mapping what may seem as continuous change processes.

2.1.6 Non-responder among ED patients

Although common, treatment failure is rarely discussed (Persons & Mikami, 2002). In the literature it has been described using a variety of imprecise and inconsistently applied general terms, e.g. treatment non-response, negative outcome, negative effect, negative

therapeutic reaction, deterioration effect and iatrogenic effect, relapse after treatment, drop out or premature termination.

As the literature not until recently has offered some kind of consensus about how to define treatment failure this was in this present dissertation defined empirically by the use of cluster analysis (paper I) and repeated measures throughout the five-year course by the use of the EDE interview (paper III). The cluster analysis provided three sub-groups as a clinically meaningful partitioning, conceiving treatment failure in its broadest possible sense to include no change in ED throughout the five-year follow-up course. In this present dissertation the sub-group "non-response" is included. As the present design prevents exploring effects of interventions, "non-response" is identified regardless of whether the treatment failure is attributable to events occurring "inside" or "outside" of therapy (e.g. major life stressors).

2.2 Personality disorders

The current understanding of PD goes back to ancient Greece and the Hippocratic tradition of explaining type of personality in terms of the four temperaments. In DSM-IV a PD is defined as *"an enduring pattern of inner experience and behaviour that deviates markedly from the expectations of the individual's culture"* (American Psychiatric Association, 1994). These patterns are inflexible and pervasive in most situations. Often these patterns are ego-syntonic, and therefore, perceived to be appropriate by the individual. Such patterns of behaviour are typically formed in adolescence or the beginning of adulthood. A diagnosis of a PD must satisfy the general criteria presented in table 5, in addition to specific criteria for each PD (American Psychiatric Association, 1994).

Table 5. The DSM-IV diagnostic criteria for a PD

_____

    A. An enduring pattern of inner experience and behaviour that deviates markedly from the expectations of the individuals' culture. This pattern is manifested in two (or more) of the following areas:
   1. cognition (i.e. ways of perceiving and interpreting self, other people, and events)
   2. affectivity (i.e., the range, intensity, and appropriateness of emotional response)
   3. interpersonal functioning
   4. impulse control
    B. The enduring pattern is inflexible and pervasive across a broad range of personal and social situations.
    C. The enduring pattern leads to clinically significant distress or impairment in social, occupational, or other important areas of functioning.
    D. The pattern is stable and of long duration and its onset can be traced back at least to adolescence or early adulthood.
    E. The enduring pattern is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g. head trauma).

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In the ICD-10 (World Health Organisation, 1992) a PD is defined as "*a severe disturbances in the characterological constitution and behavioural tendencies of the individual, usually involving several areas of the personality, and nearly always associated with considerable personal and social disruption*" (World Health Organization, 1992). Like in the DSM-IV the ICD defines a PD as involving deeply ingrained and enduring behavioural patterns that manifest themselves as inflexible responses to a broad range of personal and social situations, as well as encompassing multiple domains of behaviour and psychological functioning. They are frequently, but not always, associated with various degrees of subjective distress and problems in social functioning and performance.

Both definitions distinguish a PD from mental illnesses by their enduring, potentially life-long nature and by the assumption that they represent extremes of normal variation rather than some kind of morbid process. However, although temporal stability is central to this diagnostic construct, reviews of the available empirical data suggest that overall PD demonstrate only moderate stability and they can improve over time (Grilo et al., 2004a; Grilo et al., 2004b).

The DSM-IV distinguishes between ten PDs, grouped into three clusters. Cluster A (odd-eccentric) includes paranoid, schizoid and schizotypal PD, cluster B (dramatic-erratic) includes the antisocial, borderline, histrionic, and narcissistic PD, and cluster C (anxious-

fairful) includes the avoidant, dependent, and obsessive-compulsive PD (American Psychiatric Association, 1994). The Axis II clusters parallel broad dimensions of psychopathology. Cluster A reflects a cognitive dimension, while cluster B and C correspond, to externalising and internalising dimension respectively (Paris, 2003). The point- prevalence of one or more PDs in the community is between 9.0 – 15.7% (Crawford et al., 2005; Lenzenweger, Loranger, Korfine, & Neff, 1997; Samuels et al., 2002; Torgersen, Kringlen, & Cramer, 2001).

Because the PD's are a heterogeneous group of disorders the causes of PD are multifactorial and complex and most likely with multiple developmental pathways. Several etiological factors and their interaction are discussed. These include genetic predisposition (Kendler et al., 2008), temperamental and behavioural factors (Posner et al., 2003), attachment experience (Brennan & Shaver, 1998; Nordahl & Stiles, 1997), traumatic events (Johnson, Cohen, Brown, Smailes, & Bernstein, 1999; Laporte & Guttman, 2001), family constellation and dysfunction (Norden, Klein, Donaldson, Pepper, & Klein, 1995), and sociocultural factors (Paris, 1998).

2.2.1 Categorical and dimensional models

The issue that continues to be debated in the PD field is whether PD's are extreme versions of otherwise normal personality variations (dimensions) or ways of relating that are different from psychologically healthy behaviour (categories) (Widiger & Trull, 2007). There are advantages to using categorical models of behaviour, the most important being their convenience. With simplification, however come problems. One is that the mere act of using categories leads clinicians to reify them; that is, to view disorders as real "things" comparable to the realness of an infection or a broken arm. On the other hand, some have proposed that the DSM-IV personality section should be replaced or at least supplemented by a dimensional

model (Widiger et al., 2007) in which individuals would not only be given categorical diagnoses but also would be rated on a series of personality dimensions. An important obstacle to the adoption of a dimensional approach to PD is the lack of consensus regarding the most appropriate framework. There are several contenders proposing a dimensional system of personality, such as the interpersonal circumplex (Kiesler & Auerbach, 2003; Wiggins, 1996), several four-factor models (Livesley, Jang, Jackson, & Vernon, 1993; Livesley, Jang, & Vernon, 1998; Watson, Clark, & Harkness, 1994; Widiger, 1998), the big five (Costa & McCrae, 1992), and the seven-factor model (Cloninger, Svrakic, & Przybeck, 1993). All these frameworks emphasise that personality psychopathology represents crescendo on the end of a continuous scale defining personality traits. Conceptualised, then, as exaggerations of normal functioning (intense, extreme, hence maladaptive personality traits), the challenge to the diagnostic manual-makers is to develop a scheme that portrays this dimensional continuity and includes normal personality types or traits. Advocates of the categorical system use the convenience argument and contend that such change would be too discrepant from traditional medical and clinical tradition and that the categorical system, admittedly a somewhat artificial convention, should be maintained.

In this study both categorical classification and dimensional approach were used in assessing PD. However, it is important to note that dimensional assessment was based on scores from the Structured Clinical Interview for DSM-IV Axis II diagnoses, thus presupposing the PD diagnostic categories. This approach is "diagnostic dimensional" as opposed to the trait approach, giving a personality profile not anchored to any specific diagnosis (Clark, Livesley, & Morey, 1997).

2.2.2 Personality disorders and eating disorders

Several studies have demonstrated comorbidity between ED and PD. Among patients with ED, the reported frequencies of PD vary from 27% to 77% (Cassin & von Ranson, 2005; Herzog, Keller, Lavori, Kenny, & Sacks, 1992). This variation may be due to different patient populations such as outpatients or inpatients and to problems in defining and assessing PD. One review found that the average proportion of patients having at least one PD was 49% in outpatient and 75% in inpatient samples (Rosenvinge et al., 2000). Some studies have used self-report questionnaires, while others have used structured diagnostic interviews. Self report methods tend to inflate the PD estimates (Rosenvinge et al., 2000) and possible underestimation of PD proportions in interview studies is also an important reason for the variability in findings across studied. Underweight, malnutrition and frequent binging and vomiting affect personality, and these features contribute in deflating the validity of personality assessments. A diagnostic evaluation of PD requires that the personality traits to be stable patterns of long duration not better accounted for as manifestations or consequences of an Axis I disorder (American Psychiatric Association, 1994). An ED often starts in the teens and at that age the personality is only at the start of a life-long shaping process. Moreover, ED may interrupt normal development, especially with regard to the impact of friendships and sexual maturity on the personality-shaping processes. Many patients have comorbid depression or anxiety disorders, and this may also influence their evaluation of themselves.

Most of the studies in this area are limited by cross sectional designs, thus unable to catch trends or changes. Moreover, most of the previous longitudinal, prospective research has studied abnormal eating attitudes or "disordered eating" rather than diagnosable EDs (Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006), making results remotely applicable to EDs fulfilling diagnostic criteria. With the above considerations in mind, there is a need for

prospective longitudinal studies of adult patients using structured diagnostic interviews both for the ED and the PD to shade light on how PD and ED change over time (Grilo, 2002).

2.3 Child sexual abuse

In US community studies CSA prevalence may vary from 6% (Siegel, Sorenson, Golding, Burnam, & Stein, 1987) to 62% (Wyatt, 1985). A Norwegian national survey of CSA reported that 19% of the girls had experienced CSA according to a wide definition, while 14% had experienced fondling or more severe CSA (Sætre, Holter, & Jebsen, 1986). In ED several large scale retrospective clinical and non-clinical studies have been carried out. One study (Palmer, Oppenheimer, Dignon, Chaloner, & Howells, 1990) of 158 female ED outpatients found that 31% reported childhood sexual abuse and another 27% reported other unpleasant or coercive sexual events. No association was found between rates of abuse and a specific type of ED. In a systematic study of 112 consecutive referrals of normal-weight bulimic women, only eight patients (7%) mentioned a history of sexual abuse involving physical contact (Lacey, 1990). The extreme variation from 7% (Lacey, 1990) to 58% (Oppenheimer, Howells, Palmer, & Chaloner, 1985) in CSA prevalence rates may reflect sample heterogeneity due to different patient recruitment procedures ranging from community samples to patients from tertiary ED specialist centres. Another source of variation lies in how CSA is defined and reported. Some studies report only those sexually abusive experiences that took place before the onset of ED and when the perpetrator was at least five years older than the victim. Some investigate only CSA, while other studies also include more recent traumatic experiences involving peers during adolescence or adulthood. Another source of variation is judging the severity of the abusive acts and its impact on adult psychopathology. Hardly surprising sexual abuse starting before the age of five years, abuse combined with violence or physical abuse, and abuse involving multiple perpetrators who are close relatives

may bring about more severe subsequent psychopathology (Waller, 1992). Methods of assessment of sexual abuse may also affect the prevalence rates. The investigators own personal characteristics (male or female, involved in the therapy or not), the timing of the assessment (before, during, or after therapy) and the methods used to gather information may have an impact on the results. Currently, no data are available to support the use of any particular assessment method – for instance, a self-report questionnaire rather than a standardised interview (Vanderlinden & Vandereycken, 1997).

2.3.1 Possible mediators between ED and CSA

To the extent that CSA is involved in the development of at least some ED presentations, the potential mediating role of trauma symptoms becomes important. In ED patients, CSA is associated with more anxiety and depression (Carter et al., 2006; Fullerton, Wonderlich, & Gosnell, 1995) interpersonal problems (Carter et al., 2006), somatisation (Gustafson & Sarwer, 2004), alexitymia (Hund & Espelage, 2006), suicidality (Fullerton et al., 1995), obsessive and/or compulsive symptoms (Carter et al., 2006; Lockwood, Lawson, & Waller, 2004) substance abuse (Gustafson et al., 2004; Wonderlich et al., 2001), self-injurious behaviour (Favaro & Santonastaso, 2000; Paul, Schroeter, Dahme, & Nutzinger, 2002), impulsivity (Wonderlich et al., 2001), low self-esteem (Carter et al., 2006), dissociation (Brown, Russell, Thornton, & Dunn, 1999), and posttraumatic stress disorder (PTSD) (Kaye, Bulik, Thornton, Barbarich, & Masters, 2004). Several variables have been studied as potential mediators of the CSA-ED relationship, including borderline PD (Waller, 1992), adverse response to disclosure of the abuse (Waller & Ruddock, 1993), and dissociation (Vanderlinden, van Dyck, Vandereycken, & Vertommen, 1993). One study suggested that PTSD is a powerful mediator of the relationship between histories of sexual assault and ED (Dansky, Brewerton, Kilpatrick, & O'Neil, 1997) and another study concluded that PTSD was

a significant and powerful mediator of the relationship between sexual trauma and ED symptoms (Holzer, Uppala, Wonderlich, Crosby, & Simonich, 2008). Furthermore, these finding were most pronounced for the physiological arousal and avoidance components of PTSD.

One possible interpretation is that a PTSD may be a consequence of CSA and, furthermore, that ED symptoms may help victims to manage aversive emotional arousal associated with PTSD. Direct effects of abuse might include low self-esteem, shame, and a distorted body image, leading to a need to be good, thin, perfect and pleasing to others – all of which are associated with food restriction in many ED patients (Cassin et al., 2005). Coping responses to abuse, sometimes called *tension reduction behaviours*, on the other hand, generally arise when an individual's internal capacities to regulate trauma-related affects are overwhelmed, resulting in the need to resort to external activities that distract, sooth, numb, or produce distress-incompatible states (Briere, Scott, & Weathers, 2005). In this context, ED symptoms may serve as a way to down-regulate abuse-related distress. For example, food binging may distract the individual from painful cognitions and feelings and may produce positive (distress-compatible) sensations associated with eating or filling oneself. Purging may reduce the guilt, shame, and self-criticism associated with binging as well as further distracting the individual from abuse-related dysphoria.

Given the high prevalence and high severity it is important to investigate the prediction of CSA on the course of ED to gain valuable clinical knowledge.

2.4 Aims

The overall aims of this dissertation were to study the course of longstanding ED, the proportions of PDs during the course across diagnostic subgroups of ED and among ED-

patients with previous treatment failures, and the influence from PDs and CSA upon the course of ED. The dissertation consists of three papers with the following aims:

Paper I: Investigate the course and outcome of ED patients

Subordinate aims included: a) to report on the five-year course and outcome of adults with longstanding ED and b) to identify ED subgroups with various courses and outcomes.

Paper II: Investigate the course of PD among ED patients

Subordinate aims included: a) to report the presence of categorical and dimensional PD in adults with longstanding ED at admission to hospital treatment and at one-, two- and five-year follow-up; b) to compare the changes of PD in AN, BN, and EDNOS; c) to investigate if PD is less frequent among recovered patients.

Paper III: Identify predictors of poor outcome in longstanding ED

Subordinated aims included: a) to investigate if PD and CSA predict the course of severity of ED symptoms, b) examine how CSA and PD interact to affect the ED course. Does PD mediate, does CSA moderate, or do they independently influence the ED course?

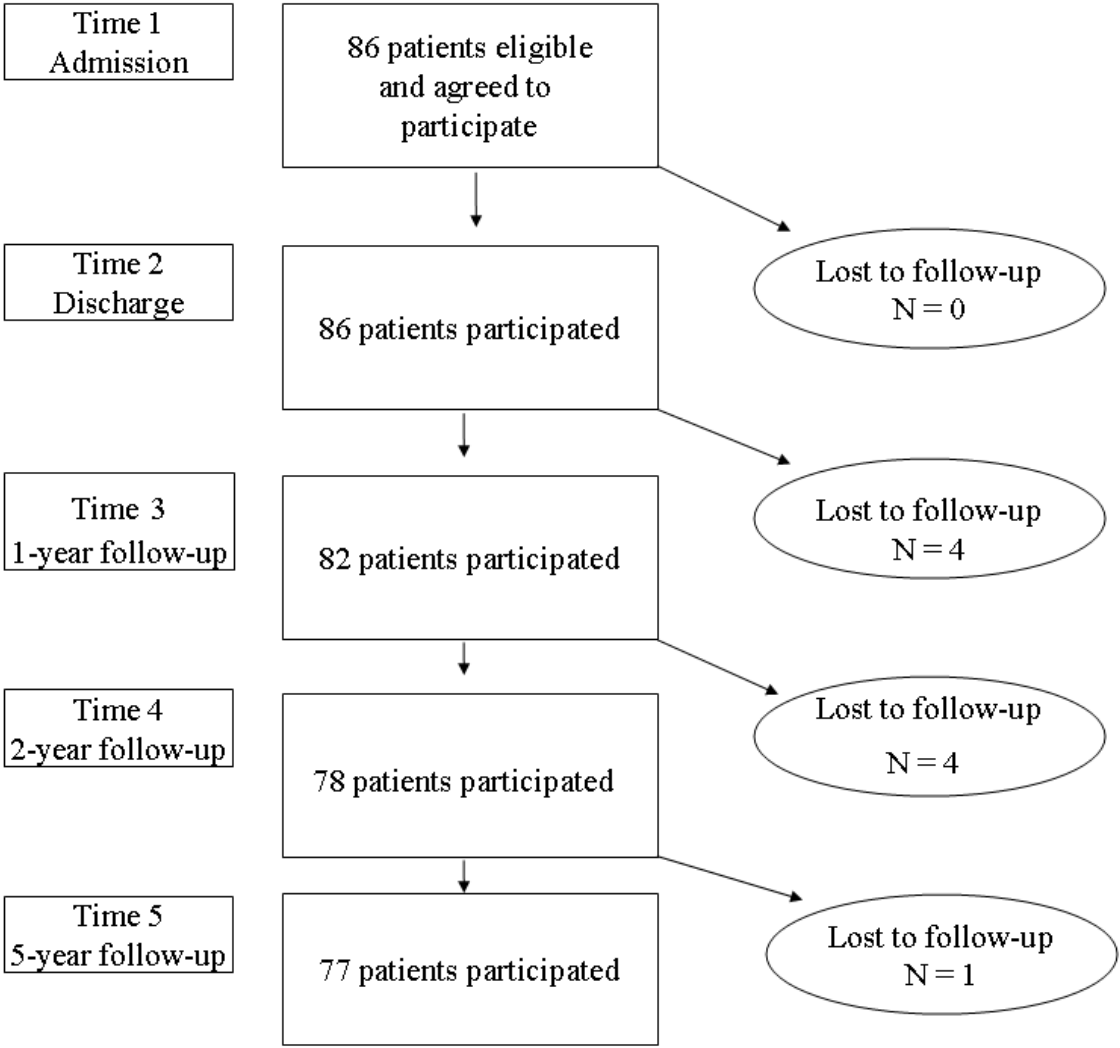## 3. MATERIAL AND METHODS

3.1 Participants and procedures

From August 1998 to June 2001, 92 consecutive patients were admitted to a specialised ED unit at a psychiatric hospital, Modum Bad. The admission criteria were symptoms of AN, BN, and EDNOS that impaired daily life functioning, inadequate responses

to previous treatment and age above 18 years. Those with severe medical complications and body mass index (BMI) < 14 were excluded. Patients were allocated to specific inpatient treatment programmes for AN and BN respectively. The programmes lasted 22–23 weeks for AN and sub-threshold AN with normal weight (i.e. EDNOS) and 15 weeks for BN and subthreshold BN (i.e. EDNOS). The treatment was multicomponent in nature focusing on ED-symptoms based on CBT. The components included a combination of small groups focusing on ED-symptoms, individual treatment and milieu therapy. The latter comprises the interpersonal benefits of daily interaction with the staff and the fellow patients, as well as the planning and conduction of joint structured activities. Each patient had one or two individual treatment sessions per week. An additional individual weekly session with an assigned nurse focused on practical issues related to mealtimes. Along with dietary education, patients were informed about psychological and physiological consequences of having an ED. Patients took part in weekly art therapy. Physical activity was performed twice a week. For patients with excessive exercise as a compensatory behaviour, individual sessions focused on gradually reducing their physical activity. Two weeks after admission the patients signed a contract committing them to follow the treatment plan and not to use drugs or alcohol. Later the patients' closest relatives were invited to participate in a three day workshop at the hospital. During the in-patient treatment, there was almost no use of neuroleptics. Patients were not allowed to use laxatives or diuretics. Self-induced vomiting and binges were monitored during the treatment course.

Six patients discharged themselves during the first two weeks. A total of 86 remaining patients, one male and 85 female, initially entered the study. Participants were assessed at five points in time, i.e. 1 (Admission, 1998-2001), 2 (Discharge, 1998-2001), 3 (1 year after admission, 2001-2002), 4 (2 years after admission, 2002-2003) and time 5 (5 years after

admission, 2004-2005). A total of 77 patients (90 %) were available for the five-year follow-up (Figure 1).

Figure 1. Flow chart illustrating the participation rate

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┌─────────────┐   ┌─────────────────┐
│ Time 1      │   │ 86 patients     │
│ Admission   │   │ eligible        │
│             │   │ and agreed to   │
│             │   │ participate     │
└─────────────┘   └─────────────────┘
                          │          ╲
┌─────────────┐   ┌─────────────────┐   ⬭ Lost to follow-up
│ Time 2      │   │                 │      N = 0
│ Discharge   │   │ 86 patients     │
│             │   │ participated    │
└─────────────┘   └─────────────────┘
                          │          ╲
┌─────────────┐   ┌─────────────────┐   ⬭ Lost to follow-up
│ Time 3      │   │                 │      N = 4
│ 1-year      │   │ 82 patients     │
│ follow-up   │   │ participated    │
└─────────────┘   └─────────────────┘
                          │          ╲
┌─────────────┐   ┌─────────────────┐   ⬭ Lost to follow-up
│ Time 4      │   │                 │      N = 4
│ 2-year      │   │ 78 patients     │
│ follow-up   │   │ participated    │
└─────────────┘   └─────────────────┘
                          │          ╲
┌─────────────┐   ┌─────────────────┐   ⬭ Lost to follow-up
│ Time 5      │   │                 │      N = 1
│ 5-year      │   │ 77 patients     │
│ follow-up   │   │ participated    │
└─────────────┘   └─────────────────┘
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3.2 Measures

Measures in this dissertation comprised self-report questionnaires completed by the participants and three structured personal interviews.

<u>3.2.1 Eating disorder pathology</u>

The Eating Disorder Examination interview version 12.0 (EDE) (Fairburn & Cooper, 1993) is a semi-structured interview that was used to assess ED psychopathology and generate ED diagnoses. It focuses on the previous 28 days, except for diagnostic items that are rated for duration stipulations on the DSM IV. It is generally considered the best established instrument for assessing ED. The EDE consists of four subscales: "restraint", "shape concern", "weight concern" and "eating concern". A mean value is calculated on a 0-6 point scale. At the five-year follow-up the first author conducted the interviews. The Cronbach's alpha for these subscales ranged from 0.91 – 0.97 during all measure points. All interviews at the five-year follow-up were videotaped, and 20 tapes were randomly selected for blind rating by an experienced clinician. Inter-rater reliability was high, with intraclass coefficients (ICC (1,1) of .99 for the restraint, eating concern, shape concern subscales as well as the global EDE score respectively, and .98 for the weight concern subscale. There was complete agreement between the two raters on all the 20 interviews about absence or presence of objective binge episodes.

Eating Disorder Inventory, EDI (Garner, Olmstead, & Polivy, 1983). The EDI is the most widely used self-report questionnaire in clinical and research settings. In this study we used the original EDI version with 64 questions related specifically to eating behaviours, body perception as well as more general questions about attitudes, behaviours and emotions. A total sum score and eight subscores were calculated, in which the sum score of "weight phobia", "bulimia" and "body dissatisfaction" comprises the symptom index, and the sum score of "ineffectiveness", "perfectionism", "interpersonal distrust", "interoceptive awareness" and "maturity fears" represents the personality index (Nevonen & Broberg, 2001). Cronbach's alpha for these subscales ranged from 0.95 – 0.97 during all measure points. Different norms of EDI were reported in different countries (Kordy, Percevic, & Martinovich, 2001). No validations study of the EDI has been published for a Norwegian population. However, two

Swedish studies (Nevonen et al., 2001; Nevonen, Clinton, & Norring, 2006; Norring & Sohlberg, 1988) found that women with ED scored significantly higher on both symptoms and personality characteristics relative to normal controls. BN patient scored highest, and AN patients lowest on self-reported pathology. Also, a Danish normal population study confirmed findings from other countries in the sense that overall, the EDI discriminates significantly between ED patients and normal control (Clausen, Rokkedal, & Rosenvinge, 2009). Hence, acceptable discriminant validity in culturally comparable populations supports the use of EDI in the present studies.

Body mass index (BMI). Height and weight were measured for each patient, and converted to Quetelet's index of body mass (weight in kilograms divided by height in meters squared). In paper I BMI was, together with several other criteria, further classified into four groups; recovery (BMI > 18.5); moderate recovery (BMI >17.5); poor recovery (BMI between 15.0 and 17.5) and no recovery (BMI < 15.0).

3.2.2 General psychopathology and interpersonal problems

Symptom Check List-25-Revised (SCL-25-R) has been widely used in both clinical and research settings to evaluate general psychopathology. SCL-90 was first developed in 1973 (Derogatis, Lipman, & Covi, 1973) and was later revised to SCL-90-R (Derogatis, 1977). The SCL-25-R is derived from SCL-90. The SCL-25-R consists of 25 items measuring general psychological symptoms and problems, particular depression and anxiety (Hesbacher, Rickels, Morris, Newman, & Rosenfeld, 1980). In addition we added one item; "thoughts about death, or how it is to die" as an index of suicidal ideations (Mehlum, Friis, Vaglum, & Karterud, 1994). A mean Global Severity Index (GSI) is calculated on a 0–4 scale range. Cronbach's alpha for the items in the scale was .91.

The Inventory of Interpersonal Problems (IIP) was developed to assess a comprehensive list of interpersonal problems (Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988). The circumflex version (IIP-C) with 64-items, is a subset of the original 127-item version (Horowitz et al., 1988). While the development of IIP was clinically motivated, the IIP-C also had a theoretical reference to the "interpersonal circle", inspired by Sullivan (Sullivan, 1953). It consists of 64 items broadly divided in two sets of statements. The first 39 items begin with "it is hard for me to…", and the second 25 items start with "things I do to much…". Each item is scored on a 5-point Likert scale from 0 (not at all) to 4 (extremely). Only the mean score of all items is reported (paper I). The first 14 patients included in paper I did not complete the IIP-C questionnaire. Cronbach's alpha values ranged from 0.92 – 0.96.

Structured Clinical Interview for DSM-IV Axis I diagnoses (SCID-I) (American Psychiatric Association, 1994) was used to determine if a patient had axis I mental disorders at the five-year follow-up. Only PTSD from this interview is reported in this dissertation (paper III).

3.2.3 Personality pathology

The Structured Clinical Interview for DSM-IV Axis II diagnoses, (SCID-II) (First, Spitzer, Gibbon, & Williams, 1995) was conducted during the inpatient treatment and at the one-, two- and five-year follow-up, respectively. To reduce the risk of false positive PD diagnoses affected by ED symptoms like binges or malnutrition, the SCID-II interviews were conducted during the last part of the hospital stay. Patients were inquired about stable personality traits prior to admission, and, at the one-, two- and five-year follow-ups about the preceding year. Despite some overlap with ED, binge eating was retained as one of five impulsivity specifiers of borderline PD in the SCID-II. In the SCID-II the presence of a given

43

PD is determined by a varying number of items for each diagnosis. Each item is scored on a 3-point scale (threshold = 3, sub threshold = 2, absent = 1). Categorical diagnoses were obtained when the number of "3" scores reached the DSM-IV diagnostic threshold.

The patient's individual therapists conducted the SCID-II interviews during hospital treatment. At the one and two-year follow-up, the second author of paper I conducted 50 % of them and at the five-year follow-up the first author conducted all interviews, except one that was conducted by the second author of paper I. All SCID-II interviews at five-year follow-up were videotaped, and 20 tapes were randomly selected for blind rating by an experienced clinician. Inter-rater reliability was high, with intraclass coefficients (ICC (1,1)) of .93 for the mean PI index and a kappa of .92 for the presence of PD.

Table 6 shows the number of patients in each study and provides an overview of the measures used. The total sample of 74 patients in paper II and III consists of the same sample as in paper I except 3 patients with incomplete SCID-II data from some assessment points (table 6).

Table 6. Overview of participant number and the measures used in the three papers.

Paper	Participants	Data collection
I	n = 77	Semi-structured interview and self-report questionnaires, i.e. the EDE, EDI, SCL-25, and the IIP
II	n = 74[a]	Semi-structured interviews, i.e. SCID-II, EDE
III	n = 74[a]	Semi-structured interviews, i.e. SCID-II, SCID-I, EDE

[a]There were complete SCID-II data from all assessment points on 74 of the 77 patients, constituting the sample of paper II and III.

3.3. Outcome and improvement measures

There are no standardised definitions of the outcome and improvement of ED (Keel, Mitchell, Davis, Fieselman, & Crow, 2000; Kordy et al., 2002). Based on the literature, we have chosen the following:

Paper I

- No. of patients with no diagnosis of ED

- All patients (AN, BN, EDNOS) were evaluated according to the level of severity on a four point scale proposed by Dare (Dare et al., 2001). The scale was modified by using BMI instead of the percentage of average body weight and stricter weight criteria of BMI above 18.5 in order to be recovered. In addition regular menstruation was not included as a criterion of full recovery, as there may be many reason for irregular menstruation unrelated to ED. At last a mean value of < 3 at the EDE weight or shape concern subscales was added as a criterion. Improvement during the study period was defined as moving to a less severe category (see table 7).

- Response patterns were tested empirically with use of K-mean cluster analysis based on the global EDE-score.

Table 7. Outcome criteria
_____

Full recovery	BMI > 18.5 and no binges or weight compensating behaviours the last 12 weeks*.
Moderate	BMI > 17.5, and/or binges and/or weight compensating behaviour** < weekly***
Poor recovery ****	Fulfil one or more of the following criteria: i) BMI between 17.5 and 15.0, ii) Regular binges (weekly), iii) Weekly weight compensating behaviours
No recovery****	Fulfil one or more of the following criteria: i) BMI < 15.0, ii) Daily binges, iii) Daily weight compensating behaviour

_____
* In contrast to Dare et al. regular menstruation was excluded as a criterion of full recovery, as there may be many reasons for irregular menstruation unrelated to ED.

**Weight compensating behaviours are vomiting, laxative misuse, diuretic misuse and compulsive extreme physical activity. Both quantity and frequency of laxative and diuretic misuse and compulsive extreme physical activity are taken into account.

***The numbers of binges and/or weight compensating behaviours are calculated for the last 12 weeks (number of episodes divided with 12 x 7 days = 84).

****Patients who are assessed to severity degree "serious" or "very serious" must also fulfil the DSM-IV diagnostic criteria to have an ED.

Paper II

- No. of patients with no diagnosis of ED

Paper III

- Global EDE-score measured at admission, discharge, one-, two- and five-year follow-up.

4. STATISTICAL METHODS AND DESIGN

The statistical analyses were performed using the Statistical Package for Social Science (SPSS), versions 13.0, 15.0 and 16.0. Material from all data collections were used for the analyses in all papers. P-values of < .05 were considered to be statistically significant.

4.1 Paper I

To control for type I errors, repeated measures of MANOVA were first used to determine statistical difference scores across admission, discharge and follow-ups. If the MANOVA yielded a significant time effect, the individual measures were analysed with repeated measures of ANOVA. Non-parametric tests were used to analyse behavioural symptoms due to skewed distributions. The chi-square test was used to test differences in the

distribution of categorical data in two groups. The McNemar test was used in testing differences in the distribution of dependent repeated categorical data.

To explore the variety of change patterns and subgroups a K-mean cluster analysis was conducted with Euclidian distance measures and running means in the iterations based on EDE-scores. No a priori hypothesis was established for initiating clusters. Successive analyses with increasing numbers of clusters were performed. The criteria for the final solution were based on F-ratios for a) the sums of mean-squares between clusters, b) for the sums of mean-squares within clusters, c) on a certain number of patients in each cluster and d) that the course and outcome of each cluster should be clinically informative. This method of partitioning may yield profiles of change patterns.

4.2 Paper II

Data were analysed, using multivariate repeated measures MANOVA and ANOVA and the bivariate analyses χ^2, McNemar´s test, t-tests and the Mann Whitney U-test. The Mann-Whitney U-test was used to test the differences in the distribution of categorical data in two groups. Interrater reliability was calculated as interclass correlation coefficients (ICC) and kappa. The effect size (ES) (Cohen, 1988) measures the magnitude of changes in scores. Unlike significance tests, this index is independent of sample size. There are several formulas for calculating the ES. Because the analyses are based on correlated measures (within-group design), effect size was determined by $d = t_C[2(1-r)/n]^{1/2}$ (Dunlap, Cortina, Vaslow, & Burke, 1996). As with Cohen's d, values $< .2$ indicate no effect, 'small' effect-size is indicated by values from .2 - .49, 'moderate' is indicated by values from .5 - .8, and a 'large' effect is indicated by values $> .8$. (Cohen, 1988).

4.3 Paper III

A mixed effect model was used to find significant predictors on ED symptoms with mean EDE scores as the dependent variable. Unlike traditional models for repeated measures, multilevel models can effectively manage unequal number of observations and missing data in the repeated measure. Multilevel models also take account of and adjust for any bias in standard errors and statistical tests resulting from the interdependence (autocorrelation) of observations that is typical in such data. It is also possible to model the time effect and to include predictors and time variables as covariates. One can specify models with different complexity and then select the best-fitting one using indices of relative goodness of fit such as the –2 log likelihood function, Akaike information criteria (AIC) and Bayesian information criteria (BIC). The term random effect is used to denote classification effects where the levels of the effects are assumed to be randomly selected from an infinite population of possible levels, while independent variables whose levels are set by the experimenter are said to have fixed effects.

In paper III a mixed effect model was fit to the five repeated assessments of ED. The intercept would represent initial status, and the slope would represent linear change across admission, discharge, one-year follow-up, two-year follow-up, and five-year follow-up, respectively. In this model, the predictors were entered as fixed effects.

4.4 Moderators and mediators

In paper III moderator and mediator effects are tested (figure 2). In its classical form, a moderator is a variable which "affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (Baron & Kenny, 1986). Put another way, the effect of the predictor on the outcome shifts, depending on the values of the moderator variable. Kraemer and colleagues (Kraemer, Stice, Kazdin, Offord, &

Kupfer, 2001) have further addressed the problem with directionality of the effect in testing moderators. They suggest a rather strict definition of moderation, i.e. that the moderator precedes the predictor, the moderator and predictor are not correlated, and the moderator and predictor codominate (the predictor and the moderator explains substantially more of the variance in the outcome variable than either of them alone).

A mediator is the generative mechanism through which the independent variable influences the dependent one (Baron et al., 1986). Four specific steps are specified as the sine qua non of mediation, i.e. 1) that the independent and dependent variable must be associated, 2) the independent variable must be related to the mediator, 3) the mediator must be related to the dependent variable, and 4) the relationship between independent variable and the dependent variable should be weakened when controlling for the mediator. Complete mediation is achieved when the association vanishes, partial mediation when the association is weakened (Baron et al., 1986).

Figure 2. Relations between predictors and ED. Top: mediator model. Bottom: moderator model

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┌─────────────────────┐      ┌─────────────────────┐      ┌─────────────────────┐
│ Independent variable│─────▶│ Mediator variable   │─────▶│ Outcome variable    │
│ Child sexual abuse  │      │ Personality disorder│      │ Eating disorder     │
└─────────────────────┘      └─────────────────────┘      └─────────────────────┘


┌─────────────────────┐                                   ┌─────────────────────┐
│ Independent variable│──────────────────────┐            │ Outcome variable    │
│ Personality disorder│                       │───────────▶│ Eating disorder     │
└─────────────────────┘                       │            └─────────────────────┘
                                              │
                                    ┌─────────────────────┐
                                    │ Moderator variable  │
                                    │ Child sexual abuse  │
                                    └─────────────────────┘
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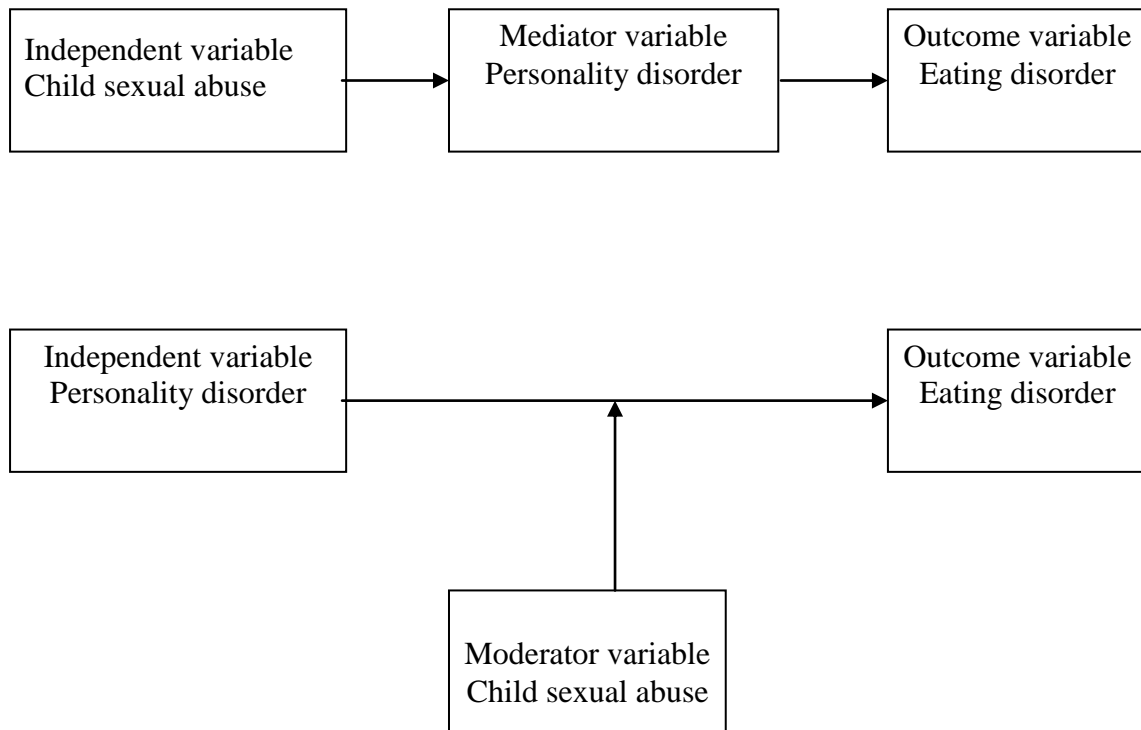
5. ETHICAL ISSUES

The study was approved by the Regional Committee for Medical and Health Research Ethics in Southern Norway, and by the Norwegian Social Science Data Services. All patients received written information about the study, and then gave written consent to participate. Still, the project raises at least two ethical issues. First, some of the participants had been in a patient relationship with the researcher. In studies using clinical samples there will always be a risk that patients feel "obligated" to participate in the study due to the patient-therapist

relationship. It was, however, emphasized both in the written and oral information that participation would not influence treatment access or treatment availability.

A second ethical issue is that the participants not necessarily will have a direct benefit from the results of the study. In clinical research it is important that the benefit of the study weight out the burden for the participants. An important question is whether this is the case in this study. The assessment itself however will potentially be of benefit to them and in all cases participants were informed about their results from the interviews. It is also an established and valued principal that an individual's experience can come to the benefit of others through participation in investigations like the present one.

6. RESULTS

6.1 Summary of paper I

"The course of illness following inpatient treatment of adults with longstanding eating disorders: A 5-year follow-up"

As most follow-up studies on ED have been conducted on adolescents or adults in their early twenties, the purpose of this paper was to contribute to our knowledge of the course of illness for older adults with severe, longstanding ED. Specifically, the aim was to study the course and outcome of longstanding ED five years after completing treatment, and to identify subgroups of patients with different course and outcome. Cluster analysis was used to identify such subgroups.

The key findings were firstly that of the 90% who participated, 30 (39%) did not meet diagnostic criteria for an ED. A total of 46 patients (61%) had improved. Secondly; the cluster analysis identified 20 patients with no improvement over time. Overall, the results underscore

that the course of patients with longstanding ED is favourable, but a subgroup of patients with no improvement over time may need intensified treatment efforts.

6.2 Summary of paper II

"Five-year prospective study of personality disorders in adults with longstanding eating disorders"

The purpose of this paper was to report the occurrence of PD in 77 adult patients with longstanding ED, to compare the changes of PD in AN, BN, and EDNOS, respectively, and to investigate if recovered patients had lower frequency of PD. The patients were assessed with the Structured Clinical Interview for DSM-IV Axis-II disorders during inpatient treatment, and at one-, two- and five-year follow-up, respectively. During inpatient treatment, 58 patients (78%) had one or more PDs and this was reduced to 32 (43%) at the five-year follow-up. Dimensional PD-scores were calculated by adding the 1-3 scores and dividing by the number of items in the SCID-II. This score changed significantly over time in both AN, BN and EDNOS. No significant differences emerged between these ED groups. Among the 23 recovered patients, 17% had one PD and among the 51 patients not recovered, 31% had one PD and 22% had two or more PDs ($p < .01$). The substantial five-year follow-up reductions in the frequency of PDs in patients with ED contribute to an optimistic clinical scenario for treating patients with comorbid ED and PD.

6.3 Summary of paper III

"Co-occurrence of avoidant personality disorder and child sexual abuse predict poor outcome in longstanding eating disorders"

Predictors of treatment outcome may become clinically relevant in terms of pinpointing a certain therapeutic focus. Such predictors may comprise PD and a history of

CSA, and in particular it is of interest to investigate how such possible factors interact. While PD as predictors have been much studied few studies have examined whether having experienced CSA could predict a poor outcome in ED, despite the fact that here is every reason to hypothesise that CSA among ED patients may predict an unfavorable course. Based on a careful examination of previous findings in the literature it can be hypothesised that a model would suggest that PD mediates the relationship between CSA and ED (mediator model). Secondly, it can be hypothesised that PD has a causal influence on ED, but that this effect is only present in the context of CSA (moderator model). Each model has distinct clinical implications.

Avoidant PD and CSA separately predicted the course of ED. When they were included in the analysis together, thus controlling for each other, only CSA predicted the ED course. Finally, avoidant PD and CSA had an interactive effect on the course of ED. Follow-up analyses showed that avoidant PD predicted ED course only among patients with a history of CSA. Thus it seems that the presence of CSA moderates the effect of avoidant PD on the ED course. CSA and the PD were not significantly correlated, indicating that the PD did not mediate the effect of CSA on the ED course.

7. DISCUSSION

This dissertation was designed to explore three topics framed within a longitudinal, prospective study: What is the course and long-term outcome of patients with longstanding ED? In a longitudinal perspective, what are the proportions of PD among ED patients and across diagnostic subgroups? What predicts poor outcome of longstanding ED?

One main finding was a statistically significant reduction in ED symptoms at the five-year follow-up, yet some patients did not improve over time.

Moreover, the number of patient below the diagnostic threshold for any PD significantly increased, and patients were more likely to recover from PD than from ED. Also, the frequency of PD and the mean personality index in recovered patient were significantly lower than for patient who had not recovered.

Lastly a main finding was that CSA moderated the effect from avoidant PD upon levels of ED during the whole course.

7.1. Methodological issues

7.1.2 Validity and reliability

The main questions to be asked when assessing *validity* are: "Do we measure what we intend to measure? And "To what extent can evidence support the inferences as true or correct?" There are in particular four types of validity to be considered; statistical conclusion validity, internal validity, construct validity, and external validity. I will in the following exemplify possible threats to these types of validity in this study.

Statistical conclusion validity concerns two related statistical inferences that affect the covariation component of causal inferences, i.e. 1) whether the presumed cause and effect covary and 2) how strongly they covary (Shadish, Cook, & Campbell, 2002). For the first of these, we can conclude that the relation exists in the population when it actually does not (Type I error), or we can conclude that it does not exist when it actually does (Type II error). For the second, we can overestimate or underestimate the magnitude of the relation, as well of the degree of confidence in that. There are several threats to statistical conclusion validity. Low statistical power, restrictions of range or unreliable measures can lead to Type II error, as

well as high statistical power or extraneous variables can lead to Type I error and overestimation of the magnitude.

Some caveats to the studies should be mentioned. The sample size of 77 in paper I and 74 in paper II and III is relatively small. Thus, our study could lack adequate power for many of the statistical tests that are undertaken. On one hand, this small sample size means there is little risk of type I error, suggesting that the positive significant finding would most likely be replicated. But on the other hand, using a larger sample one would expect to find more significant findings. However, we have tried to ensure that powerful statistical tests are used. In particular, the use of mixed model creates advanced models of integration among variables.

Statistical conclusion validity could be threatened, for example, by not using the correct effect size estimation. Because our data were correlated based on repeated measures, we needed to use a more sophisticated effect size estimation (Dunlap et al., 1996) than what is most common (Cohen, 1988).

Construct validity refers to the measurement procedure as a whole and reflects various psychometric properties of a construct (Shadish et al., 2002). Different types of validation may be seen as different sources of evidence of construct validity, but the main question is: Do we measure what we intend to measure? This concerns both whether the subscales cover all aspects of the constructs, and whether each subscale covers the sub-construct intended.

Construct underrepresentation, that there are important aspects of the ED construct that are left uncovered by the EDE, will be a threat to construct validity. In the field, the EDE is regarded as the gold standard of measurement of ED symptoms. This measurement intends to measure ED as such. A rather high alpha coefficient of .87 across all measure points on the global EDE was found. Some may find this excellent, whereas other may judge it as too high, indicating a "bloated specific". The question then is whether there are reasons to think about

ED in broader terms. Are there important aspects of an ED that is not captured by the EDE interview? The focus of EDE is on key behaviour and symptoms. However, it is well known that ED seriously affects not only the physical health, but also cognitive functions, self-awareness, interpersonal interaction as well as everyday function and subjective experiences are not considered. In this regard the EDE might be considered as somewhat underrepresenting the construct (i.e "ED") it intends to measure and an extended discussion of this is needed in the ED-field today.

In paper III, the research question addressed CSA as a predictor of ED, but there are some challenges regarding the conceptualisation and classification of CSA. Due to lack of a standardised measurement of CSA, the construct was defined as *any involuntary, repetitive sexual experiences with an adult (not necessarily a parent or relative) that occurred before the age of 16,* consistent with the conceptualisation of (Sanders & Becker-Lausen, 1995). The data collection was based on each patient's hospital record and personal interviews on each follow-up point. With such construct definitions and operationalisation, construct validation are bound to be challenging. To increase the validity there were a strong focus on the assessment process. Each classification of CSA was based on extensive knowledge of the patient. The knowledge was assessed over time, and by all available data.

The retrospective recollection of data of experiences of CSA is subject to recall bias and could influence the construct validity. Research has indicated that not reporting CSA is a common occurrence for women with documented histories of such abuse (Williams, 1994). Although it is impossible to know whether or not individuals were accurately reporting past sexual experiences, attempts to prevent the misclassification of abuse status were made. All patients reporting CSA indicated continuous memory for the event(s) and all of the patients that fulfilled criteria for PTSD at the five-year follow-up belonged to the CSA-group. Researchers have found no satisfactory way to ensure the validity of subject's recollection of

CSA. However, a longitudinal study about stability of child abuse reports (Fergusson, Horwood, & Woodward, 2000) found that unreliability in CSA reporting largely consisted of false-negative reports in CSA-positive individuals. We cannot exclude the possibility that some of the women in the non-CSA group have experienced CSA, with later permanent suppression, but during the follow-up interviews the women were carefully interviewed for CSA at each follow-up point, possibly minimising this risk. In order to reduce the risk of a false memory syndrome we required that the patients should have made a positive statement concerning CSA experiences, and the incidences should be repetitive. We could not definitely exclude false memory cases in our CSA sample; however by the confirmation by therapists of treatment CSA data at baseline as well as new examinations at four follow-up points, we consider the risk of false-positives included in the CSA-group as minimal. Nevertheless, further studies would benefit from using standardised validated measures of CSA. Although interview-based trauma inventories are available, a reliable and valid self-report measure would be useful, e.g. The Traumatic Events Questionnaire (Vrana & Lauterbach, 1994).

External validity concerns inferences about the extent to which a causal relationship holds over variations in persons, settings, treatments and outcomes (Shadish et al., 2002).

The main question herein is whether the present findings can be generalised to a broader population. A prerequisite is a satisfactory response rate. The overall response rate of 90% was very satisfactory, yet the relatively low number of respondents in the non-responder group may threat the generalisability. Future studies with numbers of respondents large enough to investigate differences with respondents and non-respondents are recommended.

Another possible limitation is that the patients as well as the programme within a residential treatment context may differ from other therapy settings. However, this unique context may also represent strength because for the field needs clinical research that is conducted within a variety of settings. Besides, all diagnostic categories were represented in

the series, reflecting the diagnostic distribution commonly seen in clinical practice, and thus increasing the external validity. Moreover, one may argue that the present series represent an atypical subset of patients due to symptom severity and comorbidity. However, this clinical picture seems rather common in ordinary clinical settings (Haas & Clopton, 2003), and moreover, some argues for a general trend that people who are admitted to treatment for ED even in general clinical settings present with complicated problems that are difficult to treat (Palmer, 2006).

A third concern is generalisation across methods. In the present study we have used two methods of data collection i.e. self-report and interview. The correlation with interview-based and rating scale ED assessment was highly significant, ranging from r 0.57 – 0.78. This may support the generalisability of the present findings.

Reliability is a necessary condition for construct validity, and refers to the consistency of a measurement procedure (Shadish et al., 2002). Indices of reliability describe the extent to which the measured scores on some variable are reproducible.

The data collection procedure used in this dissertation was based on a core set of internationally well validated and reliable instruments well suited for research purposes. Two approaches are taken to address reliability. First the internal consistency was estimated in conventional manner with Cronbach's alpha. As alpha is the mean of all split-half correlations, both the interrelatedness of the items in a test and the length of the test will influence the reliability coefficient. A high alpha value indicates that each item is highly related to the rest of the items, meaning that all items are measuring different aspects that are linked together as part of the same phenomenon that the instrument aims to map. Cronbach's alpha is reported in all papers and range from .80 to .97 depending on which measurement, thus well above alphas below .70 as the lower limit for acceptable reliability.

Secondly, the inter-rater agreement was tested. The follow-up assessments were not performed by independent assessors, but by expert clinicians who had been responsible for the patients at least at the time of the first admission. This may introduce a bias and deflate reliability in the sense that certain clinical features may catch the attention at the cost of others. One way to counteract this tendency is to use standardised measures. Expert, yet "dependent" assessors may be an asset rather than a flaw. Personal knowledge of the patient should increase the reliability of information, especially in the case of ED-individuals who may be highly likely to withhold relevant information due to shame, or due to their cluster C personalities, may be highly avoidant and unable to relate to a complete stranger in a manner that could make it likely to convey sensitive information. The personal interviews may also have contributed to the high response rate.

We examined agreement for the SCID-II at two-year follow-up and EDE at five-year follow-up. All interviews were videotaped and 20 EDE interviews and 20 SCID-II interviews were randomly selected for blind rating by an experienced clinician. Inter-rater reliability was high, with intraclass coefficients (ICC (1,1)) of .93 for the mean personality index and a kappa of .92 for the presence of any PD. ICC ranged from .98 to .99 for EDE subscales. However, the lack of inter-rater reliability testing on the other time points represents a limitation in this dissertation.

In total, both the internal consistency and test-retest correlation indicate that the measures listed here were reliable when applied on the present data-set.

7.2 Main findings

7.2.1 Outcome

Within the field of ED, the question of how to define outcome criteria, recovery or remission is still discussed. In this follow-up study, we used outcome criteria proposed by

(Dare et al., 2001), but we used a BMI of 18.5 instead of 85% of average body weight and 3 months free of BN-symptoms to indicate recovery (the time period with no BN-symptoms was not defined in the study of Dare et al). Our modifications represent a more conservative recovery evaluation. The question remains of course if this is the optimal way to operationally define criteria for recovery and outcome. Further away from the goal of consensus when this outcome study was in the mere beginning, this was regarded as a possible solution.

Despite the different outcome criteria that have been used, a review of outcomes of AN found that in studies with an average follow-up duration of less than four years, 33% of the patients had recovered (Steinhausen, 2002). In studies with an average two-year follow-up of BN, 47% had recovered (Keel et al., 1999). Two prospective follow-up studies of AN and BN found at the six-year follow-up that 55% and 71% respectively had no DSM-IV ED (Fichter et al., 1997; Fichter et al., 1999). In the present study with mixed AN, BN and EDNOS diagnoses, the recovery rate according to the outcome definition was 33%. Compared with most follow-up and treatment outcome studies of EDs, the participants in the present studies were older, i.e. 30 years compared with 25 years in the Fichter and Quadflieg studies. They argued that their samples had a negative selection with regard to prognoses because of previous unsuccessful treatments and the long duration of EDs. Our patients constitute a sample of even more chronic ED with several previous treatment failures. There are few other studies focusing on this subset of patients, but more researchers assume that the prognosis is worse for older patients than for younger patients. Based on previous findings (Button et al., 2002) as well as the findings in the present dissertation, the assumption of poor outcome for older patients with a history of treatment failures is seriously questioned.

A cluster analysis identified a subset of patients who did not improve over time, i.e. the non-responders. Most follow-up studies describe the course and outcome of ED in terms of average mean group scores. This may mask a possible heterogeneity in course and outcome

as subgroups of patients may show different courses regarding rate and stability of change. The question is whether the non-response group reflects a sample-specific cluster and not necessarily represent a latent group. We followed necessary strategies to validate the cluster typologies (paper I), i.e. by performing the analysis both with and without using running means, resulting in the same clusters. In addition we performed a boot-strapping procedure by ordering the data to be randomly selected (80%) and by rerunning the analyses, similar partitioning as in the original version occurred 8 out of 10 times. This increases the validation of the non-response group; however a true validation would be to run the cluster analysis in another ED sample who shares the same baseline characteristics.

7.1.2 Personality disorders

Our results confirmed previous findings of high frequencies of PDs among EDs (Cassin et al., 2005; Grilo, 2002; Rosenvinge et al., 2000). Like in other studies (Cassin et al., 2005; Lilenfeld et al., 2006; Rosenvinge et al., 2000) avoidant PD was the most frequent at all measure points both for the total series and in all ED subgroups. However, in the literature the primary focus has been on the comorbidity of borderline PD and BN and of obsessive-compulsive PD and AN.

The overall frequency of PD at admission corresponds well with findings from other studies of inpatient series (Rosenvinge et al., 2000), and the development over time fits well with other studies of mixed samples showing consistent trends toward recovery from PD (Grilo, McGlashan, & Skodol, 2000; Shea et al., 2002; Shea & Yen, 2003). In our study, however, patients were much more likely to recovery from a PD than from ED. Thus, ED had a recovery rate of 39% (Vrabel, Ro, Martinsen, Hoffart, & Rosenvinge, 2009) compared with 54 % for PD. An important question concerns the validity and relevance of comparing recovery rate from axis I and axis II disorders as the first one (Axis I disorders) is

61

distinguished from the PD in the sense that it is episodic in nature, and thus possibly conceptually different from PD, defined as an enduring pattern of experience and behavior that deviates markedly from the expectations of the individual's culture. Moreover, the EDNOS category - that account for 32% of the present series - is a rather heterogeneous group and thus not clearly defined

However, many longitudinal studies have concluded that PDs are somewhat less stable and more modifiable than once believed (Grilo et al., 2004a; Shea et al., 2003). Hence, our study re-asserts this conclusion of less stability in PD than one may have expected from the theoretical and clinical conceptions of PD.

The temporal instability have made several researchers to suggest that one may construct an alternative axis II not based on a categorical, but on a dimensional conceptualisation (Clark et al., 1997; Livesley, Schroeder, Jackson, & Jang, 1994; Oldham & Skodol, 2000; Widiger & Clark, 2000). In contrast to categories, dimensional models of PD offer greater temporal stability. This would relate to the criticism put forward by many investigators that a categorical system (in which disorders are judged as present/absent) is unsuitable for diagnosing PD. In particular, a categorical system may produce false positive non-existent or clinically meaningless distinctions.

In our study, several patients were just above the DSM-VI threshold for PD diagnoses at admission (i.e. paranoid- and obsessive-compulsive PD). Thirteen were just below diagnostic threshold at the first assessment and reached threshold at follow-up, even though the changes were small. Clinically this time differences may appear as remotely relevant. Personality pathology may thus be better conceptualised on a continuum from mild through moderate to severe cases, thus reintroducing stability in accord with the general understanding of PD. However, even though the PD *as such* is dimensional, the questions remain whether and how a dimensional system can inform clinical decision-making and that their complexity

complicates clinical communication. Our language is categorical *qua* nature and scientific and clinical communication is easier when we discuss categories rather then dimensions. However the complexity argument can be turned around, noting that dimensions provide diagnostic richness and subtlety not afforded by the DSM categories, which are criticized for oversimplicity (Verheul, 2005).

7.1.3 Outcome predictions

An avoidant PD and CSA had an interactive effect on the course of ED. Follow-up analyses showed that avoidant PD predicted the ED course only among patients experiencing CSA. Thus it seems that the presence of CSA moderates the effect of avoidant PD on ED course. Obviously, the opposite could be the case, i.e. that that avoidant PD moderates the long-term effects of CSA. Clinically this may be a reasonable interpretation. On the other hand, moderators always precede what they moderate, which in turn precedes outcome (Kraemer, Wilson, Fairburn, & Agras, 2002). Consequently, we cannot conclude that avoidant PD moderates CSA, since CSA in our study precedes the measurement of avoidant PD. One clinical issue to consider in this respect also in need of future research is the possibility that the moderator effect is present given for instance a particular age of the victim, or specific characteristics related to the abuse, e.g. a malignant threat, sexual abuse by a parent, long duration or high frequency of sexual abuse. In this dissertation such issues could not be addressed due to lack of information.

Research on personality related to CSA has mostly focused on links to borderline PD (Bradley, Jenei, & Westen, 2005). Our finding contrasts markedly to the fact that the combination of ED and avoidant PD often go unnoticed by clinicians. To our knowledge there are currently no available studies describing treatment effectiveness with patients experiencing both ED and avoidant PD. This is noteworthy as research shows that avoidant

PD is a common problem among ED patients (Cassin et al., 2005; Sansone et al., 2005; Vrabel, Hoffart, Ro, Martinsen, & Rosenvinge, 2009). A study of Ghaderi suggests that patients with ED and social phobia or avoidant PD may be less likely to benefit from standard CBT for ED (Ghaderi, 2006).

It seems puzzling that borderline PD did not enter our final predictive model. This contrasting conclusions drawn in treatment guidelines and position papers (e.g. NICE, 2004; APA, 2000), suggesting that a comorbid borderline PD negatively affect ED outcome. Our findings suggest that this conclusion is not obvious and may therefore need to be nuanced.

7. 3 Implication of the findings

7.3.1 Clinical implications

A majority of patients with severe and longstanding ED experience significant improvement that is fairly stable through years. The finding that longer duration may promote or at least may be associated with higher proportions of recovery is supported by previous literature reviews (e.g. Steinhausen, 2002), yet the present dissertation adds to our knowledge that this also apply to cases of *severe* ED. In total this knowledge stands in contrast to a widespread professional opinion that there is little chance of improvement for individuals with longstanding ED. Bridging the gap between science and clinical practice the refuting of this opinion by dissemination of research findings stands out as an important implication as one aspect of being a clinician is to provide a realistic hope to patients and relatives.

However, a subgroup of patients showed no improvement over time. Thus, avoidant PD and CSA interacted in predicting poor outcome of ED. Again, to bridge the gap between science and clinical work this is an important finding as treatment may be improved through a

better understanding of the nature and course of patient subgroups, and in this context the subgroup of non-responders with a history of CSA and a current avoidant PD. This finding may bridge the gap between science and practice in the assessment and treatment of ED patients. As there are no generally accepted guidelines for assessing trauma and dissociative symptoms, the present finding may elicit efforts to develop such guidelines.

Good treatment requires good assessment procedures. Trauma could be assessed by The Traumatic Events Questionnaire (Vrana et al., 1994), somatic dissociative symptoms could be assessed by Somatic Dissociation Questionnaire-20 (Nijenhuis, Spinhoven, van Dyck, van der, & Vanderlinden, 1998) and psychological dissociative symptoms could be assessed by Dissociative Experience Scale (Bernstein & Putnam, 1986).

Moreover, to date; there are no generally accepted interventions that address the ED, the traumatic experience and avoidant PD. Exploring effective treatments thus stands out as a future scientific and clinical challenge. Treatments that are effective for traumatic experiences, avoidant PD and ED separately may not be advisable when the disorders co-occur. For example treatment for trauma histories such as exposure may not be indicated if a patient has a co-morbid ED; evidenced-based treatment for ED (e.g. standard CBT) (Fairburn, Wilson, & Agras, 1994; Fairburn, 2008) may not work when a patient has trauma-related symptoms. Fairburn and colleagues (Fairburn et al., 2009) have developed an enhanced CBT-model that is a more complex treatment that in addition to focusing on ED features, it also addresses mood intolerance, clinical perfectionism, low self-esteem, or interpersonal difficulties. This model may be an option when the disorders co-occur (Fairburn et al., 2009). One important aspect is that treatment strategies for such cases should be integrative rather than additive. To date, there is no such empirically supported integrative model. It is recommendable to develop such a treatment model and to test the model using a randomised controlled trial. One possible treatment model could be developed from the essence of

treatment models for PTSD and substance abuse (Najavits, 2002). Given that ED symptoms and substance abuse can be regarded as *tension reduction behaviours* to regulate overwhelming trauma-related affects five central ideas from such models may apply to the treatment of ED and trauma-related symptoms: 1) safety as the priority of the first stage in treatment; 2) integrated treatment of trauma-related symptoms and ED symptoms; 3) a focus on ideals; 4) four content areas, i.e. cognitive, behavioural, interpersonal, and case management; and 5) attention to therapist processes. The treatment should be designed to continually address both traumatic experiences, avoidant PD and ED. That is, the disorders are treated at the same time by the same clinician. The focus should be on "owing" the disorders, recognize their interrelationship, and how they may trigger each other. Thus the content of the treatment can provide opportunities for patients to discover connections between the disorders in their lives – in what order they arouse and why, how each affects healing from the other, and their origins in other life problems. Moreover the present findings highlight and underscore some important issues probably well known to some experienced clinicians, but in need of a broader attention. Such issues comprise whether the patient should talk about painful trauma memories during the ED- treatment, and how one can contain a patient who becomes overwhelmed by trauma symptoms.

7.3.2 Research implications

The association between ED and PD needs further investigation. Do changes in PD influence the changes in ED symptoms, or vice versa? A longitudinal prospective study following adolescents with ED features into adulthood would be very interesting in that it would shed light on the interaction between ED and PD psychopathology in a developmental perspective. Future studies should take the advantages of more sophisticated statistical methods as panel models to investigate this interaction.

66

Clearly the present dissertation does not provide the full knowledge of the full course of ED. Thus, a 10-year follow-up study of the same cohort is in preparation, as these patients have been ill for many years, and the recovery process will probably take many years. One important research issue is whether long-term follow-up continues to increase the recovery rate.

A more fundamental issue is whether the idea of "the longer follow-up, the better" may represent a fallacy. More specifically, at what time point will it become meaningless to attribute possible follow-up time-problems to the ED and conversely, more meaningful to attribute such problems to life itself? Regardless of this problem, a long time perspective on follow ups may shed light on the so called "turning points". Of clinical curiosity I asked all the patients I met in the five-year follow interviews the same question: "what have been your most salient turning points"? Most of the patients told me that they got five years older, matured and had "let someone in". Moreover, turning points may be important to identify in order to facilitate or attenuate them to increase resilience. As with the case of non-responders, the matter may be not to mourn over the lack of "good cards" (i.e.. a history of symptom severity and lack of treatment benefit), but rather to "play a bad hand well". Thus, to identify turning points may be of particular importance in the aftercare of the non-responding ED-patients. Several studies (Pettersen & Rosenvinge, 2002; Pettersen, Rosenvinge, & Ytterhus, 2008) have identified many turning points. However, many such studies are flawed with heterogeneity with respect to illness duration and initial symptom load. A longer follow-up may more reliably identify turning points among the so far "non-responders". This may be important in the more extensive understanding of the course of ED. Moreover, a longer follow-up may evade the bias in the kind of turning points that are identified. While new biases in terms of retrospective recall may come into place, ones life history is constantly "rewritten" and a longer time perspective of follow up studies may take advantage of

maturation resulting in more valid data on the turning points that have proven viable over time.

8. GENERAL CONCLUSIONS

The present study of adults with longstanding ED showed that there were statistically significant reductions in ED symptoms at the five-year follow-up. More than one-third did not meet the criteria for an ED diagnosis and two-third had improved. However, the cluster analysis identified a group of patient with no improvement over the whole course.

The number of patient below the diagnostic threshold for any PD significantly increased from around a quarterpart at the time of admission to more than half of the sample at the five-year follow-up. Also, patients had higher probability to recover from PD than from ED. At the one-, two- and five-year follow-up, the frequency of PD and the mean personality index in recovered patient were significantly lower than for patient who had not recovered. CSA moderated the effect from avoidant PD upon levels of ED during the course of illness.

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