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# Anorexia Nervosa

*Emotion, Cognition, and Treatment*

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### **Abstract**

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Anorexia nervosa (AN) is a serious disorder with long-term consequences for those afflicted. No evidence-based care is available for adults with full or subthreshold AN. The thesis research investigated aspects of emotion and cognition relevant to the maintenance of AN that might inform psychological treatment. In addition, the effectiveness of a recent psychotherapy model of AN was investigated.

Study I investigated alexithymia and emotional awareness and their associations with depression, anxiety, and perfectionism among patients with AN compared with a control group. The AN group exhibited the same level of emotional awareness as did the control group and the same level of alexithymia when controlling for depression and anxiety. Alexithymia and emotional awareness were not associated, despite representing an overlapping construct. The results of the present study indicate that those with AN can trust their emotional awareness.

Study II explored implicit pro-thin and anti-fat attitudes (towards the self and others), striving for thinness (loosely corresponding to positive reinforcement), and avoidance of fatness (loosely corresponding to negative reinforcement). The AN and the control groups were found to have equally strong implicit pro-thin and striving for thinness attitudes. The AN group exhibited stronger implicit anti-fat and avoidance of fatness attitudes (loosely corresponding to negative reinforcement) than did the control group. There was no association between implicit and explicit measures. The results are in line with the over-evaluation of weight and shape as a core feature of eating disorders.

Study III compared the effectiveness of Acceptance and Commitment Therapy (ACT) and treatment as usual (TAU) for adults with AN after day-care. Follow-up measures indicated no difference in improvement or deterioration between the two groups. The level of perfectionism was reduced in the ACT group relative to the TAU group. The study was compromised by a lower inflow of patients than anticipated and by a high drop-out rate, and thus fails to provide evidence of a difference between the two groups.

The present thesis demonstrates that emotional awareness is intact in those with AN and that implicit attitudes concerning weight and shape reflect the explicit attitudes, although without association. The treatment study indicates that, when designing treatment, it is important to consider the ambivalence to treatment among those suffering from AN, which is reflected in the high drop-out rate in the present study.

*Keywords:* Anorexia Nervosa, subthreshold Anorexia Nervosa, emotional awareness, implicit attitudes, Acceptance and Commitment Therapy, alexithymia, Relational Frame Theory

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# List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.

- I Parling, T., Mortazavi, M., & Ghaderi, A. (2010) Alexithymia and emotional awareness in anorexia nervosa: Time for a shift in the measurement of the concept? *Eating Behaviors, 11*, 205–210
- II Parling, T., Cernvall, M., Stewart, I., Barnes-Holmes, D. & Ghaderi, A. (in press) Using the Implicit Relational Assessment Procedure to compare implicit pro-thin/anti-fat attitudes of patients with anorexia nervosa and non-clinical controls. *Eating Disorders: The Journal of Treatment and Prevention*
- III Parling, T., Cernvall, M. Holmberg, S., Ramklint, M., & Ghaderi, A. (2011). A randomized controlled trial of Acceptance and Commitment Therapy for anorexia nervosa after day-care treatment. *Manuscript submitted for publication.*

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# Contents

Introduction.....	11
History and early classification of anorexia nervosa .....	11
Current classification of eating disorders.....	12
Future classification of AN .....	13
Prevalence of and risk factors for Anorexia nervosa .....	14
Prevalence of AN .....	14
Risk factors for AN .....	15
Risk factors in the context of the present thesis .....	15
Outcome and mortality.....	17
Phenomenology and clinical impression of anorexia nervosa through its course .....	17
Comorbidity .....	19
Characteristic behaviours.....	19
Dietary restraint.....	20
Bingeing and purging .....	20
Excessive exercising.....	20
Body checking.....	20
Emotion functioning in AN.....	21
Emotion recognition: experimental studies .....	21
Emotion regulation .....	22
Alexithymia and emotional awareness.....	22
Cognition.....	25
The cognitive theory of AN.....	26
The Implicit Association Test .....	27
The Implicit Relational Assessment Procedure.....	28
A recent behavioral contribution .....	29
Theories and models of Anorexia Nervosa.....	31
Cognitive Behavior Therapy for Anorexia Nervosa .....	32
Treatment of AN .....	33
Acceptance and Commitment Therapy .....	35
Aims of the Thesis .....	36
The Empirical Studies.....	38
Study I: <i>Alexithymia and emotional awareness in Anorexia Nervosa: Time     for a shift in the measurement of the concept?</i> .....	39

Introduction and aims.....	39
Method .....	40
Participants .....	40
Procedure.....	40
Measures.....	40
Statistical analysis .....	41
Results .....	41
Discussion .....	42
<i>Study II: Using the Implicit Relational Assessment Procedure to compare implicit pro-thin/anti-fat attitudes of patients with anorexia nervosa and non-clinical controls.....</i>	<i>46</i>
Introduction and aims.....	46
Method .....	47
Participants .....	47
Measures.....	47
Procedure.....	48
Statistics.....	49
Results .....	50
Discussion .....	52
<i>Study III: A randomized controlled trial of acceptance and commitment therapy for anorexia nervosa.....</i>	<i>55</i>
Introduction and aims.....	55
Method .....	55
Participants .....	56
Procedure.....	56
Measures.....	57
Statistics.....	57
Results .....	58
Discussion .....	61
General Discussion .....	63
Alexithymia, emotional awareness, and implicit cognition: what are their role in AN treatment?.....	63
Limitations.....	65
Summary of findings.....	65
Acknowledgements.....	67
References.....	69
Appendix.....	83
DSM-IV-TR criteria for Bulimia nervosa and EDNOS.....	83

# Abbreviations

ACT	Acceptance and Commitment Therapy
AN	Anorexia Nervosa
BN	Bulimia Nervosa
CBT	Cognitive Behavioral Therapy
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders (4th edition)
ED	Eating Disorder
EDE	Eating Disorder Examination
EDNOS	Eating Disorders Not Otherwise Specified
HC	Healthy Controls
IAT	Implicit Association Test
IRAP	Implicit Relational Assessment Procedure
LEAS	Levels of Emotional Awareness Scale
RFT	Relational Frame Theory
TAS-20	Toronto Alexithymia Scale



# Introduction

This thesis mainly examines adults with anorexia nervosa (AN), particularly regarding emotional, cognitive, and psychological treatments. The outcome literature on AN reports a high risk of mortality (Treasure, Claudino, & Zucker, 2010) and that, 10 years after onset, 27% of subjects still meet the criteria for an eating disorder (Berkman, Lohr, & Bulik, 2007). No effective treatment for adults with AN is reported, so efforts to increase knowledge of AN that might lead to effective treatments are needed. This thesis investigates aspects of emotion (i.e., emotional awareness and alexithymia) and cognition (i.e., implicit attitudes) with the overall aim of informing AN treatment. Furthermore, this thesis also investigates an acceptance-based treatment that targets the over-evaluation of control over eating, weight, and shape.

## History and early classification of anorexia nervosa

Self-inflicted starvation has been described in various contexts over the centuries. Religious aesthetic ideals, such as miraculous maidens and fasting saints, as well as hunger artists who starve to earn money, have intrigued people. In the seventeenth century, the English physician Richard Morton presented the first medical report involving food abstinence and weight loss due to nervous causes (Vandereycken, 2002). Later, two similar descriptions were reported in medical journals: Laségue, in 1873, termed the condition “anorexia hysterica” and Gull, in 1874, coined the term “anorexia nervosa”. Both authors described similar physical characteristics involving, for example, weight loss, amenorrhea, and constipation, but without organic pathology (Bisaga & Walsh, 2005). Russell (1970) proposed the first diagnostic criteria for AN, which were followed by Feighner’s research criteria that prescribed co-occurrence of physical, behavioral, and psychological features (Feighner et al., 1972). In 1980, AN and bulimia nervosa (BN) were introduced in the Diagnostic and Statistical Manual (DSM-III).

The etiology of AN has always been related to emotional factors except in the “pituitary period” between 1914 and 1937 when AN was considered secondary to pituitary gland dysfunction. At that time, the dominant view of psychopathology was the psychoanalytic approach that understood food

refusal as an unconscious fear of oral impregnation. Hilde Bruch advanced the understanding of AN, as she recognized body image disturbance, perceptual and cognitive disturbances, and self-esteem to be of importance (e.g., Bruch, 1965). Her observations in the 1960s and the 1970s affected diagnostic criteria, psychotherapy, research into body image, and the proposed etiology of AN (Bisaga & Walsh, 2005). Garfinkel and Garner (1982) proposed a multifactorial model of AN etiology that included socio-cultural, familial, biological, and psychological factors. This model integrated a large body of research that emphasized various single causes of AN and was of clinical importance since individuals' characteristics could be linked to the model. The multifactorial model is still valid, and evolving due to ongoing empirical research.

## Current classification of eating disorders

The DSM-IV classification of mental disorders was developed for clinical, educational, and research use. A mental disorder is conceptualized as a clinically significant behavioral or psychological pattern associated with distress, disability, or increased risk thereof. The current criteria for AN in the DSM-IV-TR (American Psychiatric Association, 1994) are shown in Table 1.

Table 1. *DSM-IV-TR 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 per cent of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85 per cent of that expected).
  - B Intense fear of gaining weight or becoming fat, even though 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 postmenarchal females, amenorrhea, i.e., the absence of at least three consecutive menstrual cycles.

Specific type:

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

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The classification of AN and the Eating Disorders Not Otherwise Specified (EDNOS) category are of prime importance to this thesis, since participants in the three constituent studies included mixed cases of full AN and subthreshold AN. The latter cases belong to the EDNOS category in the current edition of the DSM. Those who do not meet the D criterion (amenorrhea) for AN in the current DSM-IV-TR will meet the criteria for AN in DSM-5 (American Psychiatric Association, 2011), which is currently under development. In addition, considering the shared eating habits, the similar attitudes to weight and shape (Fairburn et al., 2007), and severity as revealed in the Eating Disorder Examination (EDE) interview subscales (Turner & Bryant Waugh, 2004) in EDNOS and full AN, as well as the undifferentiated long-term outcomes for subthreshold and full AN (Ricca et al., 2010), the inclusion of these cases in the present thesis seems warranted.

A diagnosis of BN requires recurrent episodes of binge eating, compensatory behavior, and over-evaluation of body shape and weight for self-esteem. The EDNOS category includes eating disorders (ED) that do not meet the criteria for AN or BN as well as the proposed criteria for binge eating disorder (BED). For the DSM-IV criteria for BN and EDNOS, see the Appendix.

Ultimately, the DSM system should yield high clinical utility, i.e., differentiate between the EDs (and other mental disorders) in terms of recovery and response to treatment (Wonderlich, Crosby, Mitchell, & Engel, 2007). In adults, AN displays a longer time to remission, higher mortality rates, and poorer treatment response than does BN (Ben-Tovim et al., 2001; Treasure et al., 2010). The heterogeneous EDNOS category displays a shorter time to remission and higher recovery rate than does the full ED category (Agras, Crow, Mitchell, Halmi, & Bryson, 2009) but a treatment response similar to that of BN (Fairburn et al., 2009). However, the EDNOS diagnosis is questioned, as it seems to capture a snapshot of those moving from or to full ED rather than representing a distinct category in itself (e.g., Agras et al., 2009; Fairburn et al., 2007).

The subtypes of AN (i.e., restrictive and binge/purge) have not consistently displayed differential recovery, relapse, or mortality rates (Wonderlich, Joiner, Keel, Williamson, & Crosby, 2007), perhaps due to the frequent cross-over between them, which severely undermines the utility of AN subtyping (Peat, Mitchell, Hoek, & Wonderlich, 2009).

## Future classification of AN

The DSM-5 is under construction, and proposed revisions are published on the website of the work group (APA, 2011). The proposed changes for AN include clarification of the A and B criteria with more focus on behaviors leading to low body weight and behaviors that manifest “fear of weight gain”, since not all individuals endorse fear of weight gain. As it stands now,

criterion C will remain unchanged. The D criterion, amenorrhea, will be removed due to the few differences between those who do and do not meet the criteria; the differences noted seem mainly to reflect nutritional status and exercise behavior, and the criterion as such does not provide consistent information regarding treatment outcome (Attia & Roberto, 2009). Fairburn and Cooper (2011) applied the suggested DSM-5 categories to a sample of 167 adult patients. Moving from the DSM-IV to the DSM-5 classification scheme, the proportion of AN increases from 8.45% to 28.7%, BN is unchanged, and EDNOS drops from 52.7% to 25.1%; the new category BED is found in 7.2% of cases.

## Prevalence of and risk factors for Anorexia nervosa

Prevalence describes the number of cases in a population during a specific period, whereas incidence describes the number of new cases (e.g., per 100,000 person years). An initial questionnaire screening followed by an interview is considered the most acceptable method for determining prevalence and incidence (Hoek, 2006). Register studies underestimate the occurrence of ED in the community, so large population studies are preferred (Hoek, 2006).

### Prevalence of AN

A population study in the USA reported lifetime prevalence of AN (0.6%), BN (1.0%), and BED (2.8%) in adults (Hudson, Hiripi, Pope Jr, & Kessler, 2007); the lifetime prevalence rates in women (0.9%, 1.5%, and 3.5%, respectively) compared with men (0.3%, 0.5%, and 2.0%, respectively) indicated a higher proportion of males with AN and BN than earlier findings (Fairburn & Harrison, 2003). A Finnish population study estimated the lifetime AN prevalence at 2.2% in women (Keski-Rahkonen et al., 2007). A recent study reported the lifetime prevalence of AN (0.48%), BN (0.51%), and BED (1.12%) in six European countries (Preti et al., 2009). Thus, there is substantial variation in lifetime prevalence, and AN might be more common in males than previously thought (Keski-Rahkonen, Raevuori, & Hoek, 2008).

Comparisons between males and females with AN indicate that males weigh themselves and use inpatient treatment less frequently and have shorter times to remission and higher drop-out rates from care (Stöving, Andries, Brixen, Bilenberg, & Hörder, 2011). However, men and women did not differ in laxative use or length of treatment. No gender differences have been reported regarding familial genetics (Strober, Freeman, Lampert, Diamond, & Kaye, 2001). Other studies examining all EDs and comparing men and

women have found few gender-based differences (e.g., Button, Aldridge, & Palmer, 2008).

AN usually has its onset in mid to late adolescence (Fairburn & Harrison, 2003). However, Hudson et al. (2007), reported a mean age at onset of 18.9 ( $SD = 0.8$ ), while a register study found that an even later onset was common (Papadopoulos, Ekblom, Brandt, & Ekselius, 2009).

## Risk factors for AN

Knowledge of risk factors is crucial for understanding the etiology and course of the disorder, and for the classification and design of effective treatments. Kraemer et al. (1997) defined a risk factor as a characteristic, event, or experience that predates a given disorder and is associated with an increased probability of that disorder compared with the general population. The risk factors for ED have been reviewed (Jacobi, Hayward, de-Zwaan, Kraemer, & Agras, 2004) and are briefly summarized below.

*Weight concerns* and *dieting* are the best confirmed and most potent of the risk factors, while *sexual abuse* and *physical neglect* are of medium potency. The following longitudinal risk factors are confirmed in more than one study, but their potency could not be evaluated: a) *Female* gender; b) *Ethnicity* –compared with Caucasians, Hispanics display equal rates, native Americans higher rates, and Blacks and Asians lower rates; c) *Low interoceptive awareness*, i.e., interpretation of emotional and gastrointestinal stimuli; d) *Low self-esteem*, i.e., negative self concept or ineffectiveness; e) *Eating and digestive problems in childhood* (e.g., picky eating) predicted AN and BN diagnosis; f) Change in and level of *psychiatric morbidity* as well as *negative affectivity*; and g) High use of *escape-avoidance coping* and *low perceived social support* are prospective risk factors.

*Age* is a consistent, but non-specific, risk factor for all EDs, as their onset peaks in adolescence. Heritability studies have found an increased rate of EDs among relatives with AN or BN, and twin studies have found a *genetic contribution* of 48–76% for AN (Striegel-Moore & Bulik, 2007).

Further evidence of specific risk factors for AN has emerged for *perfectionism*, *family discord*, and *high parental demands* together with *critical comments about weight, shape, and eating* in a retrospective longitudinal study (Pike et al., 2008).

## Risk factors in the context of the present thesis

The construct *interoceptive awareness* has generally been studied using the Eating Disorder Inventory subscale with the same name (EDI; Garner, 1991). This subscale assesses difficulties in recognizing and responding to emotional states and in identifying sensations related to hunger and satiety.

It covers both confusion and mistrust regarding these states and as such taps into emotion recognition and regulation (see below). Although longitudinal studies are scarce, Jacobi et al. (2004) classified interoceptive awareness as a risk factor with unknown specificity, as found in prospective studies. Low interoceptive awareness has been found in those with depression, among whom it correlates with fluctuations in depression before and after treatment (Fava et al., 1997). Poor interoceptive awareness have consistently been found in acute AN and in association with depression and perfectionism (e.g. Fassino, Pieró, Gramaglia, & Abbate-Daga, 2004). Interestingly, the poor interoceptive awareness among recovered AN subjects versus HC did not remain after controlling for depression (Casper, 1990).

Retrospective studies find premorbid *perfectionism* to be a specific risk factor for AN (Fairburn, Cooper, Doll, & Welch, 1999; Pike et al., 2008); perfectionism is therefore suggested to be a specific retrospective correlate (Jacobi et al., 2004). Those with AN display a consistent pattern of high levels of perfectionism compared with HC on measures of both general and multidimensional perfectionism (Bardone-Cone et al., 2007). The perfectionism seen in AN subjects often involves a greater drive to avoid failure than a desire for improvement (Shafran, Cooper, & Fairburn, 2002). Shafran et al. (2002) defined clinical perfectionism as “the overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed, standards in at least one highly salient domain, despite adverse consequences” (p. 778). Maintenance of clinical perfectionism in ED involves failure to meet high standards of dietary restraint or weight, resulting in self-criticism that feeds negative self-evaluation, which in turn intensifies new efforts in these areas.

In longitudinal studies, *weight and shape concerns and a negative body image* are potent and well-supported risk factors for eating disturbance (e.g. Ghaderi & Scott, 2001); their specificity for ED, however, is unknown (Jacobi et al., 2004). These concerns are at the core of all ED and are thus important aspects in treatment (Fairburn, Cooper, & Shafran, 2003). Five-year-old girls report body dissatisfaction and weight concerns (Davison, Markey, & Birch, 2000), and nearly one half of adult women report concerns about their weight (Cash, 2004; Cash & Henry, 1995). From the age of eight, girls generally report more discontent with their bodies and a stronger preference for thinness than boys do (Ricciardelli & McCabe, 2001). Exposure to the thin ideal via the media increases negative body image and disordered eating (Levine & Murnen, 2009). Repeated exposure to this ideal and pressure to be thin might lead to acceptance and internalization of the thin ideal as the reference point for judging oneself (i.e. thin ideal internalization, Tiggemann, 2004). Together with family and peer influence, which predicts ED (Pike et al., 2008), there is increasing evidence that the thin ideal as portrayed in the media also predicts ED (Levine & Murnen, 2009). The im-

portance of weight and shape concerns in ED as well as for many women in the general population might in essence be expressed as “thin is good and fat is bad”. The present thesis will investigate these attitudes using implicit and explicit measures among those with AN compared with a control group.

## Outcome and mortality

In a review of AN covering the twentieth century, Steinhausen (2002) reported that, among survivors, 47% recover, 33% improve, and 20% have a chronic outcome. These grand mean estimates reflect the outcome 4–10 years after admission to care, while studies with 10-year or longer follow-ups found continued recovery (>70%) and a lower proportion of improved and chronic outcome; however, mortality increased from 4.9% (with 4–10-year follow-up) to 9.4% (>10 year follow-up). Adolescent onset is associated with better outcome than is adult onset of AN. A recent review covering the years 2004–2009 (Keel & Brown, 2010) confirmed earlier findings regarding outcome but found the eight years mortality rate markedly lower (2.7%) than the earlier estimate (Steinhausen, 2002). This trend toward lower mortality with time was confirmed in a Swedish register study in which the later cohort displayed lower mortality than did the earlier cohort of female inpatients (Lindblad, Lindberg, & Hjern, 2006). The standardized mortality rate (SMR) for AN subjects in a study covering 20 years ( $n = 326$ ) in a tertiary-care ED programme in Canada was 10.5 (Birmingham, Su, Hlynsky, Goldner, & Gao, 2005). The SMR was 6.2 ( $n = 6009$ ) in a Swedish register study covering a 30-year period (Papadopoulos et al., 2009). A retrospective study covering 26 years in a specialized ED unit ( $n = 201$ ) found an overall SMR of 10, although those with BMI below 11.5 had a SMR above 30 (Rosling, Sparrén, Norring, & von Knorring, 2011). Of those who died in the periods studied by Papadopoulos et al. (2009) and Rosling et al. (2011), 32% and 39% committed suicide and 15% and 26% died from AN, respectively. Rates of mortality among AN subjects are among the highest among all mental disorders (Harris & Barraclough, 1998).

## Phenomenology and clinical impression of anorexia nervosa through its course

Phenomenology examines the concrete lived experience of humans without seeking causal explanation (Fuchs, 2009). The phenomenology of AN is important in that it might improve our understanding of why and how those with AN persist in their dietary restriction. What is it like to initially lose weight and then to persist in striving for thinness, and what meaning is at-

tributed to it? Unlike most other mental disorders, AN is valued (Schmidt & Treasure, 2006) and as such the experiences and the meaning attributed to it might improve our understanding of the development, maintenance, and, in the end, treatment of AN (Nordbø, Espeset, Gulliksen, Skårderud, & Holte, 2006). The most common themes in AN, and those of interest for the present research, will be described. A disclaimer seems warranted, since not all AN subjects report these experiences, which might be attributed different meanings at different stages or phases of the development and course of AN.

The initial weight loss period is often experienced as very positive, marked by increased strength, energy, and vitality in the presence of few or no negative somatic, psychological, and social consequences (Nordbø et al., 2006). Instead, the sense of control over hunger, eating, and the body – a central feature of AN – is experienced as highly rewarding (Fox, Larkin, & Leung, 2011). AN subjects feel smart, pretty, and successful. In addition, peers or family might offer external rewards. Both the internal and external rewards are in line with the highly valued appearance of women in Western society, which may make the rewards even more gratifying. For many, perfectionism and the importance of striving further reinforce the effort. Pre-morbid low self-esteem is now bolstered by this initial success and is accompanied by feelings of being special and able to control body shape and weight (Fairburn, Shafran, & Cooper, 1999). “The less I weigh and the smaller I get, the more control and mental strength I gain” is the core meaning abstracted from this pattern. Increasingly, self-esteem becomes enmeshed in, and dependent on, weight loss and its effect on body shape, and the sense of being able to control them (and eating).

AN now provides its subjects with highly valued security, often in terms of rigid scheduling and strict rules about eating and exercising (Schmidt & Treasure, 2006). Without this schedule, AN subjects would feel confused, disorganized, and afraid of gaining weight (Nordbø et al., 2006). Intense pressure from themselves, peers, and family make them feel sad, lonely, and angry, and the refocusing on body weight and shape and on dietary restriction provides an escape from these negative feelings. Many find that starvation numbs their feelings, which may help in a context of high anger levels in the environment or of an invalidating environment (Fox, 2009).

Increased effort is needed to continue to lose weight as the body loses its fat reserves. Feelings of hunger might become more salient at the same time as the gastrointestinal tract is affected by increased feelings of fullness even after eating very little, in addition to constipation, that makes eating even less attractive (Schmidt & Treasure, 2006). These bodily symptoms are interpreted as lack of control and motivate further self-restraint efforts to avoid these sensations. Further weight loss now requires full-time commitment and social activities are more or less abandoned. The isolation steers AN subjects away from the uncertainty of interpersonal relationships and the uncertainty

such situations might evoke; at the same time, it gives them time to achieve in the area in which they know they will be rewarded: control and emotional avoidance coping. Though many experience an internal voice that is commanding and punishing, they may wish to keep hearing this voice, since it helps them achieve their goal of further food restriction or exercising (Fox et al., 2011). Being able to resist eating from one moment to the next provides consistent positive reinforcement. At the same time, one small mistake, such as eating something extra or not seeing weight loss on the scale or in the mirror, is regarded as total failure and is fatal to self-esteem. The highly valued goal is not met and more striving is thus needed. For AN subjects, the most negative aspects are the hurt they cause their families and not being understood by their peers (Fox et al., 2011).

## Comorbidity

Comorbidity among mental disorders is prevalent and a clinical concern is the effect it might have on treatment outcome. The community-based national comorbidity survey in the USA found that 56% of those with a lifetime prevalence of AN also had a comorbid Axis I disorder (Hudson et al., 2007). Most of those with a comorbid disorder displayed three or more disorders. Anxiety disorders (48%), major depression (39%), any impulse control disorder (31%), and alcohol use or dependence (24%) were common. Obsessive–compulsive disorder (OCD) was not found in the study by Hudson et al. (2007) and was not reported in other community-based studies. In clinical samples, OCD and obsessive–compulsive personality disorder (OCPD) are highly prevalent (Swinbourne & Touyz, 2007). In patients with AN, currently under treatment, lifetime prevalence of major depression is approximately 40% and significantly elevated versus in HC (Godart et al., 2007).

## Characteristic behaviours

The maintenance of ED and AN is dependent on behaviors that increase the focus on eating, weight, and body shape. These behaviors are used as coping strategies to regulate emotions and also reflect efforts to gain control over eating, weight, and body shape. It is crucial in psychotherapy to teach other ways (i.e., increase behavioral flexibility) to cope with private events (i.e., thoughts, feelings, and physiology) to break the maintenance of AN.

## Dietary restraint

Dietary restraint involves limiting the amount of food one eats. It often includes a set of demanding and rigid dietary rules about when (time of day), how much (determined by calorie counting and food weighing), and what to eat (Fairburn, 2008). AN subjects often avoid eating a particular set of foods (food avoidance), which makes it difficult to eat out. Calorie counting and food weighing are additional means subjects use to control their eating. Rituals are often involved in food shopping, preparation, and eating (Treasure et al., 2010). The term dietary restriction involves under-eating in a physiological sense and is a consequence of successful dietary restraint.

## Bingeing and purging

Objective or subjective binge eating refers to eating episodes in which an objectively (or subjectively) large amount of food is eaten, taking into consideration the context. A sense of loss of control should also be present. Objective binge eating is not common in AN (see diagnostic criteria for BN in the Appendix). Common features of binge eating are eating more rapidly than normal, until uncomfortably full, eating when not hungry, eating alone, and feeling disgust or guilt after the episode (Treasure et al., 2010). Purging involves self-induced vomiting and/or the use of laxatives, diuretics, and sometimes diet pills. Compensatory purging follows eating in order to achieve weight control. Non-compensatory purging is a routine behavior that is not as closely linked to eating.

## Excessive exercising

Excessive exercising is common in those with AN. Such exercising may be as obvious as, for example, doing a great many sit-ups each day and running two times a day, or as subtle as tensing the legs when sitting, i.e., almost not sitting on the chair (Fairburn, 2008). Driven exercising has the additional characteristics of being associated with impaired social and/or physical functioning (e.g., continued exercising even when it does harm) and a subjective sense of compulsion (Treasure et al., 2010).

## Body checking

To monitor the effects of the above behaviors, AN subjects often display body checking behaviors, such as mirror checking, weighing, body part measuring, pinching, wearing “thin clothes” or bracelets, and comparing one’s body with others’. This constant checking may turn aversive, in which case subjects avoid all of these behaviors, and refuse to weigh, look in mirrors, or wear baggy clothes.

## Emotion functioning in AN

The contemporary view of emotions regards them as adaptive processes that serve to inform or signal individuals to change or adjust their behavior to maintain wellbeing (Chaplin & Cole, 2005). However, wellbeing is not always attained and various emotional processing difficulties have been recognized in AN.

### Emotion recognition: experimental studies

A recent review on socio-emotional processing in AN concluded that, based on experimental studies, those with AN exhibit impairments in emotional processing (Oldershaw, Hambrook, Stahl et al., 2010). Several examples of such impairments will follow. Early, non-conscious, or automatic processing of emotional stimuli were found to differ between AN subjects compared with HC in terms of neural activity, for example, when viewing facial expressions representing both positive and negative emotions (Hatch et al., 2010). Conscious processing of others' emotions, measured using the Reading the Mind in the Eyes task (RME), is reduced in AN subjects compared to HC (e.g. Harrison, Sullivan, Tchanturia, & Treasure, 2010; Russell, Schmidt, Doherty, Young, & Tchanturia, 2009). Two studies included recovered AN in comparison with acutely ill AN and HC. One study found no significant differences between the three groups on the RME (Oldershaw, Hambrook, Tchanturia, Treasure, & Schmidt, 2010), while the other found that the recovered and acutely ill AN group displayed the same level of reduced emotion recognition as did the HC group (Harrison, Tchanturia, & Treasure, 2010). In the latter study, when controlling for depression, the group differences were reported at  $p = .05$ . Using another method, the Facial Expression Recognition Task, Jänsch, Harmer, and Cooper (2009) found that, when controlling for depression, the significantly higher degree of misclassification in the AN group versus the HC group disappeared (though the difference in reaction time remained).

Another set of studies reported in the review engaged participants in stress-induced speech tasks; those with AN reported higher levels of anxiety and distress but displayed muted physiological response (i.e., heart rate) compared with HC during the stress task (Miller, Redlich, & Steiner, 2003). Another study found the same physiological response as in the HC group but higher distress and negative affect during a stress task among partially and fully weight-recovered AN (Miller, Erickson, Branom, & Steiner, 2009). Evidence of muted physiology, measured as skin conductance, has also been found in AN compared with HC and a recovered AN group in a study employing the Iowa Gambling Task (Tchanturia, Liao et al., 2007). The AN group performed worse than both the HC and recovered AN groups and

exhibited lower skin conductance than did the HC. This suggests that attenuated physiological emotional guidance affects decision-making.

These experimental studies of emotional processing difficulties attest to difficulties in emotion recognition and muted physiology among those with AN. The results for recovered AN are more varied, suggesting that some of these difficulties subside as the patient recovers.

## Emotion regulation

Emotion regulation is another important domain in the understanding of any psychopathology. Gross (2002) describes emotional regulation as a process by which we influence the emotions we experience, and when and how we experience and express them. One may choose a situation (e.g., writing a thesis), modify it (e.g., write at home or at the office), attend to various aspects of the situation (e.g., write excessively about one topic or plan the structure of the thesis), change cognition (e.g., elaborate on the meaning of the thesis – “it is just another test” or “it represents me as a person”), and finally modulate one’s responses (e.g., taking beta blockers to relax on the examination day). The cognitive behavioral theory of AN regards difficulties in emotion regulation as an important maintenance factor (Fairburn et al., 2003; Vitousek & Hollon, 1990). Those with AN avoid emotions, emotional memory, and intimate relationships and use avoidance coping strategies in times of stressful events (Schmidt & Treasure, 2006). Furthermore, a meta-analysis reviewing novelty seeking and harm avoidance among ED subjects (Harrison, O'Brien, Lopez, & Treasure, 2010) found that those with restrictive AN display lower novelty seeking (i.e., sensitivity to reward) than do HC, while those with the binge/purge subtype do not differ from HC. There was some evidence of remission with recovery, but further studies are needed due to the high variability among recovered AN subjects. Harm avoidance (i.e., sensitivity to punishment), however, was greater among both subtypes of AN than among HC and seems to decrease with recovery.

## Alexithymia and emotional awareness

The construct of alexithymia (Greek, lack of words for emotions) is defined as difficulty identifying and distinguishing feelings from bodily sensations, difficulty describing feelings to others, poor imagination, and an externally oriented cognitive style (Taylor, Bagby, & Parker, 1997). In their formulation, they see alexithymia as a difficulty in cognitive emotional processing that taps into emotion recognition, expression, and regulation rather than as a defensive coping strategy. A good emotional processing capacity facilitates the verbal communication of emotional experiences to others.

The most frequently used measure of this construct is the Toronto Alexithymia Scale, i.e., TAS-20 (Bagby, Parker, & Taylor, 1994), which currently consists of three dimensions: difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. The TAS-20 does not cover the entire alexithymia construct, since it does not measure scarcity of fantasies. The first study that applied this measure to those with AN found that 68.8% of the AN group scored at or above the cut-off (61 points; Taylor, Parker, Bagby, & Bourke, 1996). This high estimate suggests that those with AN have a very high rate of alexithymia. Other studies have found rates of alexithymia among AN patients to vary between 23% and 77% using various versions of the TAS (Eizaguirre, De Cabezon, De Alda, Olariaga, & Maite, 2004), while the rate among non-clinical groups varies between 0% and 28% (Quinton & Wagner, 2005).

Alexithymia is associated with depression in the general population (Honkalampi, Hintikka, Tanskanen, Lehtonen, & Viinamäki, 2000). Levels of alexithymia in AN subjects (using the TAS-20; Becker-Stoll & Gerlinghoff, 2004) and in AN and BN subjects (using the TAS-26; Sexton, Sunday, Hurt, & Halmi, 1998) declined after treatment, and a recovered AN group did not display higher levels on the TAS-20 than did HC (Råstam, Gillberg, Gillberg, & Johansson, 1997). These findings suggest that alexithymia might be a state phenomenon in AN and the general population. Other findings suggest it is a trait due to the persistent high levels of alexithymia even after psychological distress is ameliorated in a non-psychiatric sample (Salminen, Saarijärvi, Äärelä, & Tamminen, 1994).

Alexithymia (using the TAS-20) correlates with depression in the general population and among AN (Bydlowski et al., 2005; Honkalampi et al., 2000). Using the TAS-26, Bydlowski et al. (using the TAS-26; 2005) found that the difference between ED and HC disappeared when controlling for depression but remained when controlling for anxiety. When controlling for negative affect (i.e., depression and anxiety), Montebanocci et al. (2006) found that the elevated levels of alexithymia in AN and BN relative to HC disappeared. Corcos et al. (2000), using the TAS-20, found equal levels of alexithymia in AN and BN when controlling for depression. High levels of alexithymia might therefore be explained by depression, while the findings regarding anxiety are not as suggestive.

A variable neglected in previous reports on alexithymia in AN, namely, the effect of starvation or nutritional status, might explain some of the mixed findings. Mood, cognitive function, and emotional dysregulation might be affected by neurochemical alterations due to starvation that exaggerate pre-morbid levels or add symptoms in AN (Kaye, Fudge, & Paulus, 2009). This might affect various aspects of symptoms, explaining anomalies seen in AN and possibly complicating the interpretation of personality data (Vitousek & Manke, 1994). Starvation also intensifies depression and anxie-

ty (Pollice, Kaye, Greeno, & Weltzin, 1997), which are known comorbid features of AN. The high levels of alexithymia, as reported on the TAS-20, might therefore be more attributable to depression and/or anxiety or the effect of starvation on cognitive function or emotional regulation than to the core psychopathology of AN. The confounding variable of starvation or malnutrition might be controlled for by enrolling individuals with AN that have moved out of the malnourished state. One alternative would be to include previously malnourished patients (e.g., those who have received inpatient care to abort starvation) who have established regular eating and displayed improvement in nutritional status.

A potential drawback of the TAS-20 is that it requires that respondents be aware of their deficit in identifying and describing feelings and in differentiating between feelings and somatic events. If they are unaware of these deficits, their responses might capture their *belief* about their ability in this regard and not alexithymia per se (Lundh, Johnsson, Sundqvist, & Olsson, 2002). Thus, a high score on the TAS-20 (indicating higher levels of alexithymia) require individuals with real alexithymia to be aware of their lack (deficit) of emotional awareness or it might reflect a low belief about their ability (Lane et al., 1996; Lundh et al., 2002). Furthermore, a self-report measure cannot tap into the whole spectrum of emotional processing, as some aspects of emotional processing are considered inaccessible to self-knowledge (Vanheule, 2008). The concurrent use of a performance-based instrument that measures an overlapping construct has been suggested, for example, the Levels of Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990). According to these authors, the experience of emotion develops in a hierarchical fashion of progressive differentiation and integration in five levels: bodily sensations, action tendencies, single emotions, blends of emotions, and combinations of blends. It is not the intensity or frequency but the structural organization of emotional experience that is measured in terms of the emotional range. The latter levels (e.g., blends of emotions and combinations of blends) are scored as indicating higher levels of emotional awareness than the former (e.g., bodily sensations and action tendencies). What is scored are the verbal responses to 20 short stories describing two people (the respondent and another person) in various situations. The respondent is asked to answer by describing what he/she feels and what the other person in the story feels. The joint use of the LEAS and TAS-20 has been proposed, since this would capture various aspects of emotional ability (Bydlowski et al., 2005) and as such make independent contributions (Lane, Sechrest, & Riedel, 1998). A further advantage of the LEAS over the TAS-20 is the lack of correlation with depression and anxiety, as found in both an ED sample and students (Bydlowski et al., 2005; Lundh et al., 2002). The correlation between the TAS and the LEAS varies

between negative to no (Bydlowski et al., 2005; Lane, Sechrest, Riedel, Shapiro, & Kaszniak, 2000) and positive (Lundh et al., 2002).

A further potential problem with the TAS-20 is the finding that perfectionism correlated with ( $r = .5$ ) and predicted TAS scores even when controlling for negative affect (Lundh et al., 2002). The assumption was that the nature of personal standards is likely to affect an individual's TAS-20 responses. The Lundh et al. (2002) study used the Frost Multidimensional Perfectionism Scale (MPS; Frost, Marten, Lahart, & Rosenblate, 1990) measuring six aspects of perfectionism. According to Frost et al. (1990), perfectionism involves high standards of performance accompanied by overly critical evaluations of behavior. The MPS assumes that perfectionism generalizes across various life domains, and accordingly would measure high personal standards, concerns about making mistakes, and doubts regarding one's ability to identify and describe emotions. Perfectionism is considered an important aspect of AN, as it is involved in developing and maintaining the condition (Fairburn et al., 2003; Jacobi et al., 2004; Slade, 1982). It is therefore important to investigate the association between alexithymia, emotional awareness, and perfectionism in AN. If those with AN display high levels of alexithymia (even after controlling for depression, anxiety, and perfectionism) and low emotional awareness compared with HC, this is indicative of impaired emotional processing. Treatment for AN might then target these difficulties.

## Cognition

Research in the cognitive domain might lead to findings that inform new treatment efforts; a recent example is research in cognitive performance that has found executive functioning to be impaired among those with AN. Set-shifting, an aspect of executive functioning, involves the ability to move back and forth between operations, tasks, or mental sets. Poor set-shifting is suggested to be a likely endophenotype, as it seems to be heritable, unaffected by recovery, and present in those with long-term recovery, and has been found more frequently in siblings (unaffected by ED) than in HC (Roberts, Tchanturia, Stahl, Southgate, & Treasure, 2007; Tenconi et al., 2010). Cognitive remediation training (CRT) was investigated as a way to improve poor set-shifting in a case report (Davies & Tchanturia, 2005) and in a preliminary report on four patients with AN (Tchanturia, Davies, & Campbell, 2007). Both studies found marked improvements on neuropsychological tests of cognitive set-shifting after ten sessions of CRT. Weak central coherence is another cognitive style that has been proposed to be associated with ED. This style refers to a bias towards local processing together with impaired global processing. A recent review found impaired global processing

in AN but inconsistent evidence of superior local information processing (Lopez, Tchanturia, Stahl, & Treasure, 2008).

## The cognitive theory of AN

The cognitive theory of emotional disorders expounded by Aaron T. Beck (Beck, 1976) has been very influential and successful in the treatment of emotional disorders. In short, distorted thinking and how the individual structures reality are seen to affect feelings and behavior (Dobson & Dozois, 2001). Cognitive structures, called schemata, organize and process information, and these patterns of thinking emerge in the early years. The schemata (or core beliefs) of maladjusted individuals will distort reality and facilitate mental disorders. The goal of cognitive therapy is to change underlying beliefs or schemata so that faulty thinking patterns are replaced with more realistic and adaptive appraisals (Dobson & Dozois, 2001).

Garner and Bemis (1982) emphasized the importance of cognitive processes in treatment in seeking to better understand the development and maintenance of AN. They also suggested that positive reinforcement, in addition to negative reinforcement, was important due to the external (e.g., attention from peers or family) and internal (e.g., control over appetite and body shape) consequences of weight loss. The “*self* at undesirable weight levels” (Garner & Bemis, 1982, p. 127) was considered the most feared stimulus maintained by negative reinforcement. The authors further proposed that a negative view of the self, fear of fatness, and desire for thinness were suitable targets for cognitive strategies. Simultaneously, Slade (1982) described a functional analytic etiological model of AN. Functional analysis views behavior as a function of antecedent events and consequences, which need to be specified if we are to understand current behavior. Weight loss behavior is influenced by positive (e.g., feelings of success, being in control, and progress towards thinness) and negative (e.g., reduced fear of weight gain or being fat) reinforcement.

Vitousek and Hollon (1990) proposed further research into schema content and processing going beyond self-reported statements. Weight-related self-schemata were proposed to influence perception, cognition, affect, and behavior in ED. To document the existence and operation of these schemata, they proposed a number of characteristics that could be further explored. One such characteristic was the ease and speed of information processing, such that some schema-related content, when applied to the self, should display shorter or longer latencies. The use of non-obvious techniques, such as the Stroop test, was proposed for investigating these characteristics. The Stroop test measures the latency difference between naming the color of emotionally relevant words (e.g., food and body) and neutral words while ignoring their content. A meta-analysis indicated that such biased cognitive

processing is evident in AN subjects in the case of food- and body-related stimuli as measured using the Stroop test (Johansson, Ghaderi, & Andersson, 2005).

In a review, Cooper (1997) emphasized that research into beliefs and attitudes was especially important in advancing theoretical knowledge, but is neglected even though beliefs and attitudes seem to “drive the self-statements that lie behind the disturbed behavior” (p. 135). One of the missing pieces was how concepts such as “fat” and “thin” were related to each other in those with ED versus in HC. The most recent review of the cognitive theory of ED reemphasized the importance of continued investigation in this domain (Cooper, 2005).

The content of thoughts, especially those regarding fatness and thinness in relation to the self, are worth exploring further with the use of non-obvious measures to inform the treatment of AN. The importance of self-worth judged in terms of weight and shape (Fairburn et al., 2003; Fairburn, Shafran et al., 1999) is acknowledged and highly endorsed in well-established self-report measures (e.g. Fairburn, Cooper et al., 1999).

Self-reports are contaminated by demand characteristics (e.g., deception and social desirability) and might also not capture dysfunctional beliefs of which one is unaware (De Houwer, 2002). The latter drawback has important implications for therapy and for our understanding of psychological problems. The use of non-obvious or, in this case, implicit measures is thought to circumvent these biases, as these measures assess thought processes not under conscious control (Vartanian, Polivy, & Herman, 2004).

## The Implicit Association Test

To gain better knowledge of how cognition, attitudes, and behavior are related, the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) has been used to supplement explicit measures. To examine pro-thin and anti-fat attitudes using the IAT, participants are typically asked to respond to representations of fat and thin people (e.g., represented by images or words such as fat, overweight, large and thin, slim, and skinny) paired with good (e.g., wonderful and excellent) or bad (e.g., terrible and nasty) attributes. The scoring procedure relies on the subtraction of congruent presentations (i.e., the mean latency of the thin–good and fat–bad responses) from the incongruent presentations (i.e., the mean latency of the fat–good/thin–bad responses). Thus, the IAT provides a measure of the relative strength of pro-thin/anti-fat versus anti-thin/pro-fat associations. An IAT effect indicating pro-thin/anti-fat attitudes allows limited opportunity to draw more precise conclusions, since the effect could be due to several attitudes. For example, the effect could be due to an anti-fat attitude while thin is neutrally valued. Schwartz, Vartanian, Nosek, and Brownell (2006) found

that the under- and normal-weight participants displayed a stronger pro-thin/anti-fat effect than did the overweight, obese, or extremely obese participants. The underweight group reported the strongest explicit preference for thinness, with successively lower explicit thin preference reported in each separate weight group with increased weight. Another study found equally strong implicit pro-thin/anti-fat effects displayed by restrained and unrestrained eaters, while the restrained group reported stronger negative explicit attitudes towards fatness than did the unrestrained group (Vartanian, Herman, & Polivy, 2005). Pro-thin/anti-fat (combined) responses are found to be made more quickly than pro-fat/anti-thin responses in various populations, which implies the existence of implicit pro-thin/anti-fat attitudes. Vartanian et al. (2005) discuss their results as possibly explained by similar learning histories, i.e., perceived pressure to be thin from media, peers, and family.

### The Implicit Relational Assessment Procedure

A recent methodology, called the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes et al., 2006), has been used to measure implicit beliefs and attitudes. The IRAP is a computerized latency-based response task that assesses pre-experimentally established stimulus relations (or verbal relations) between a sample (e.g., pleasant or unpleasant) and a target stimulus (e.g., love or murder) via the response option, which involves two relational terms (e.g., similar and opposite) to assess the properties of the relations among the presented stimuli (i.e., how the concepts are associated). Participants are asked to respond quickly and correctly (under time pressure) in a consistent or inconsistent way. In relational tasks in which the stimuli and the relational term are consistent with (hypothesized) pre-experimentally established verbal relations, shorter response latencies are expected than in inconsistent cases (Barnes-Holmes, Barnes-Holmes, Stewart, & Boles, 2010); please see Figure 1.

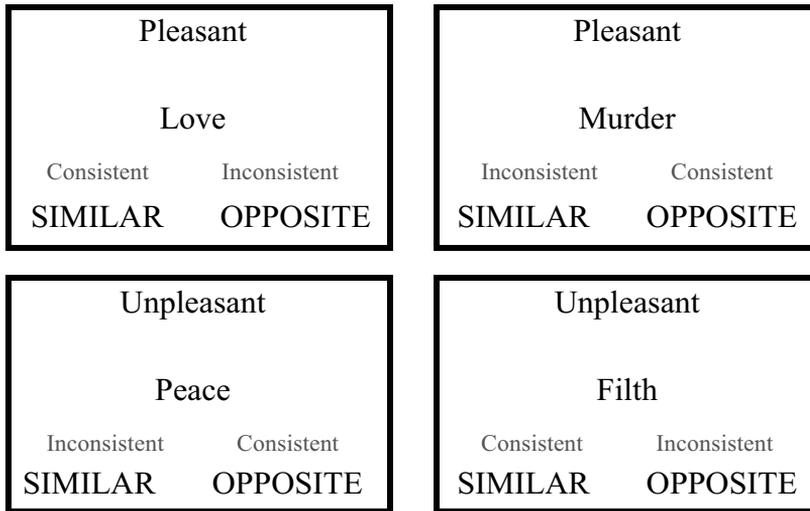


Figure 1. Examples of the four IRAP trial types as they appear on the screen (the terms “Inconsistent” and “Consistent” do not appear on the screen). For example, a consistent task would be correct when the relational term “similar” is chosen in the context of the sample stimulus “pleasant” and the target stimulus “love”, whereas in the inconsistent trials, the relational term “opposite” would be correct in the context of “Pleasant–Love”. On the keyboard, pressing “D” and “K” corresponds to SIMILAR and OPPOSITE, respectively.

One study has investigated body shape attitudes in a non-clinical population using both the IRAP and IAT (Roddy, Stewart, & Barnes-Holmes, 2010). Body shape-related bias was found using both procedures, although the IRAP data indicated that participants had pro-thin rather than anti-fat implicit attitudes. Thus, the IRAP provides more information than the IAT does in that it may not only provide data on combined pro-thin/anti-fat attitudes, but may also assess both pro-thin and anti-fat attitudes.

### A recent behavioral contribution

The IRAP was developed within a functional analytic conceptualization of language and cognition called Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001). This conceptualization sees relational responding as key to language. Evidence of the efficacy of the IRAP and confirmation of the basic RFT predictions is growing (e.g. Barnes-Holmes et al., 2006; Dawson, Barnes-Holmes, Gresswell, Hart, & Gore, 2009; McKenna, Barnes-Holmes, Barnes-Holmes, & Stewart, 2007).

According to RFT, framing events relationally (e.g., the relation between the word “cat” in the presence of a real living cat is a relation of sameness) is a generalized operant due to a history of multi-exemplar training with contingent reinforcement. RFT postulates that the ability to frame events

relationally is acquired through learning. Initially, we learn to respond relationally based on the formal properties of objects (e.g., physical properties such as weight and size), for example, “the bus is bigger than the car”, and we receive reinforcement (e.g., praise) from the socio-verbal community. Gradually, our relational responding comes under the control of cues that consistently accompany our “relating” behavior (e.g., the spoken stimulus “bigger than”), and once the cues control our relating, then it is arbitrarily applicable to any stimulus events no matter their formal characteristics or relationships. For example, if told that “A is bigger than B”, I could then respond to stimuli A and B as if A were bigger (e.g., by deriving that B is smaller), even though the stimuli themselves may not differ in physical size. Relational framing is characterized by three properties, which are mutual entailment, combinatorial entailment, and transformation of stimulus function. *Mutual entailment* means that a unidirectional relation between two events (e.g., “Alan (A) is younger than David (B)”) always allows derivation of an untrained relation in the opposite direction (e.g., “David (B) is older than Alan (A)”). *Combinatorial entailment* involves combining given relations to derive a novel relation. For example, if “Alan (A) is older than David (B) and David (B) is older than Michelle (C)”, then “Alan (A) is older than Michelle (C)” and “Michelle (C) is younger than Alan (A)”. The third property of relational framing is *transformation of stimulus functions*, in which the psychological functions of a stimulus in a relation with another stimulus are transformed in accordance with the nature of the psychological functions of the other stimulus and the nature of the relation between the stimuli. For example, if a person is trained to respond to X as the opposite of Y, and X is given a punishing function, then, without further pairing, Y may now exhibit a reinforcing function for that person.

The technical term used to describe relational framing is *arbitrarily applicable derived relational responding*; this activity is the essence of RFT. Arbitrarily applicable relational responding is arbitrarily applicable as suggested above, but *it is typically not arbitrarily applied*. The final words in the last sentence denote approval or support from the socio-verbal community of responding to certain arbitrary stimulus properties in some contexts but not in others. In psychological treatment informed by RFT (Hayes, Strosahl, & Wilson, 1999) processes concerning language and cognition are seen as central, since they enable psychological suffering. Through mutual entailment, combinatorial entailment, and the transformation of stimulus function, a human can be in contact with the aversive past and the dreaded future even if the moment in itself (apart from that) is not aversive. For example, attributes connected to (in relation to) thin and fat (e.g., success and control versus lazy and stupid) are examples of arbitrary stimuli that some people act upon (respond to) as if they were true facts (non-arbitrarily applied).

In RFT, the behavioral event of responding to derived relations between stimuli constitutes the core unit of cognitive functioning. In traditional cognitive theory, cognitive functioning is seen as based on associative processes (Barnes-Holmes et al., 2006). The difference between the two approaches, and methods, is illuminated by the following passage:

Consider the colors black and white. To speak of these concepts as associated does not specify how they are associated. In order to do that, one needs to specify the relationship between them given the context in which they are regarded. In a context where saturation is considered, black and white are related as different because one is very dark whereas the other is very light. Alternatively, in a context for color, black and white are similar because both are neutral colors. Thus, while the IAT assesses associations among stimuli in the procedure the IRAP allows the researcher to better specify the relationships among those stimuli. (Drake et al., 2010, pp. 82-83)

Investigating implicit relational responding involved in AN might provide a more fine-grained understanding of thinking processes than is attainable through the associative assumption on which the IAT is based (Roddy et al., 2010). A recent approach called contextual behavior science (CBS; Vilaradaga, Hayes, Levin, & Muto, 2009) integrates learning paradigms (i.e., respondent and operant learning together with related principles such as reinforcement and punishment) with the RFT approach to language and cognition. This evolved behavioral analytic approach might lead to a more integrated model of AN development and maintenance.

Implicit pro-thin and anti-fat attitudes towards the self and others will be investigated via the IRAP in an AN group versus in HC. In addition, striving for thinness and avoidance of fatness (loosely corresponding to positive and negative reinforcement, respectively) will be investigated. These implicit attitudes might provide further knowledge of AN treatment.

## Theories and models of Anorexia Nervosa

Numerous models or theories explain development and maintenance of AN. Findings regarding cognition and emotional functioning in AN are often shared, but might be put in different frameworks. Both causal and maintenance factors that include and combine findings in genetics, biology, and neuropsychology are proposed (Connan, Campbell, Katzman, Lightman, & Treasure, 2003; Southgate, Tchanturia, & Treasure, 2005). These findings are also connected to the cognitive and emotional processing, and associated behaviors, in AN. For example, Treasure, Tchanturia, and Schmidt (2005) suggested that an interaction between genetic factors and early life experiences (e.g., perinatal stress and anxious attachment) may develop into poor

emotion regulation strategies. In turn, this might lead to emotional avoidance that is manifested in self-reported alexithymia and low emotional awareness.

Schmidt and Treasure (2006) proposed a cognitive–interpersonal maintenance model of the restricting subtype of AN, partly because it is evidently a distinct phenotype, compared with the binge purge subtype, and partly because many subjects with this subtype achieve very low weight accompanied by medical risks and concurrent insistence on remaining at low weight. Maintenance factors in this model are perfectionism and/or cognitive rigidity, experiential avoidance, pro-anorectic beliefs, and the responses of close others. This model combines intra- and interpersonal maintenance factors but does not emphasize weight and shape concerns.

## Cognitive Behavior Therapy for Anorexia Nervosa

A model that has been successful in the ED area (and other areas) is the cognitive behavioral theory (or cognitive theory). It is a maintenance model that describes the necessary steps in successfully treating those with BN or BED. The current version of Cognitive Behavior Therapy (CBT) for AN was initiated by Fairburn et al. (1999). They proposed an account of AN in which the need for control was central. The interaction of AN patients' sense of ineffectiveness, perfectionism, and low self-esteem results in a striving for self-control in various areas in life. The experience of success in the area of eating and the failure of self-control in other areas makes control of eating (and the body) the most important aspect. When restriction of food is initiated, it is maintained by three mechanisms. First, the enhanced sense of control contributes to a heightened self-esteem, and this positive reinforcement is available at each moment that the AN subject decides not to eat or to eat very little. Second, physiological and psychological changes due to starvation (e.g., intensified hunger, increased fullness sensitivity, or impaired concentration) are perceived as failures of self-control, leading to further and more intensified reliance on food restriction. Last, the focus on weight (and body shape) includes behaviors for self-monitoring, such as frequent weighing. Weight gain, stable weight, or too slow weight loss indicate poor self-control. To regain self-control and self-esteem, increased dietary restriction is needed. Thus, AN treatment should address eating, weight, and body shape concerns in the context of self-control and self-esteem.

The next step in the development of CBT for AN was the introduction of transdiagnostic theory and treatment for all ED (Fairburn et al., 2003). The authors declared that all ED express the same core psychopathology and share the same attitudes and behaviors, as noted earlier. In addition to this core maintenance model of ED, four additional maintenance mechanisms might serve as obstacles to change. The first mechanism seen in many patients (mostly in AN) is termed *clinical perfectionism*, which was earlier

described as among the risk factors. *Core low self-esteem* is a global and persistent negative view of oneself, largely independent of performance (e.g., the resolution of binge eating), which also creates hopelessness about the capacity to change. A third factor that impedes change is *mood intolerance*, defined as an inability to regulate emotions in a functional manner. Self-injury behavior, drug or alcohol use, bingeing, purging, etc., rapidly change mood and become dysfunctional mood regulation habits. The last additional mechanism is *interpersonal difficulties*. Interpersonal therapy is as effective as CBT for BN (at long-term follow-up) without addressing the core psychopathology of eating disorders. Though the exact mechanism of the salutary effects has not been found, one of many possible effects is that poor social functioning undermines the self-esteem that might increase striving to control eating, weight, and body shape.

## Treatment of AN

Few randomized controlled trials (RCT) have examined the use of psychotherapy for adults with AN. In the acute phase of AN, CBT has been compared with Behavioral Therapy and TAU (Channon, De Silva, Hemsley, & Perkins, 1989), nutritional counselling (Serfaty, Turkington, Heap, Ledsham, & Jolley, 1999), behavioral family therapy in a mixed adolescent and adult sample (Ball & Mitchell, 2004), and interpersonal therapy and nonspecific supportive clinical management (McIntosh et al., 2005). A three-arm trial (i.e., of CBT, Fluoxetine, and both in combination) suffered from high drop-out rates (46%) that prevented comparisons between the three arms (Halmi et al., 2005). None of these studies favors the use of CBT in the acute phase of AN. Psychodynamic therapies have also been investigated in RCTs. One four-arm trial found that focal psychotherapy and family therapy produced greater, although modest, weight gain than did Cognitive Analytic Therapy or routine treatment (Dare, Eisler, Russell, Treasure, & Dodge, 2001). Treasure et al. (1995) compared Cognitive Analytic Therapy with Educational Behavioral Therapy, finding no objective difference between the groups. Weight-restored patients with AN have also been investigated, comparing CBT with supportive nutritional counseling (Pike, Walsh, Vitousek, Wilson, & Bauer, 2003). The results of this study are promising, indicating fewer and later relapses in the CBT arm. However, the sample size was small and the design did not control for psychotherapy-specific effects.

Preliminary findings from a large multisite study, not yet published, applying the transdiagnostic form of CBT (Fairburn, 2008) in outpatients with AN indicate that 60% display good outcome and low relapse rates in the

60% of those who found the treatment acceptable (Murphy, Straebler, Cooper, & Fairburn, 2010).

Treatment studies of a wide variety of drugs, in both the acute and weight-restored phases, do not support their use, according to two recent reviews (Crow, Mitchell, Roerig, & Steffen, 2009; Jackson, Cates, & Lorenz, 2010).

All treatment studies suffer from one or more limitations, such as small samples, high drop-out rates, short durations, and/or the reporting of completer analyses only. AN treatment is associated with high drop-out rates of 20–73%, as reported in a review of in- and outpatient care (Fassino, Pierò, Tomba, & Abbate-Daga, 2009).

Due to the lack of evidence supporting any treatment for adults with AN, the clinician is referred to guidelines for the best management of AN. The National Institute of Clinical Excellence in Great Britain (NICE, 2004) provides guidelines based on quantitative research using methodologically stringent and transparent criteria in contrast to other guidelines (Wilson & Shafran, 2005). In short, recommendations for the management of adults with AN includes management on an outpatient basis using psychosocial treatment by ED specialists, a weight gain of 0.5 kg per week, and regular physical monitoring (NICE, 2004). If inpatient treatment is needed, it should be combined with refeeding (up to 1.0 kg per week) and careful physical monitoring in combination with psychosocial interventions.

For adolescents with AN, use of the Maudsley model of family therapy is supported by the largest amount of research and is therefore considered the treatment of choice (Lock et al., 2010; Robin et al., 1999; Russell, Szmukler, Dare, & Eisler, 1987).

One RCT included all ED patients with a BMI above 17.5, thus including BN and EDNOS patients, and investigated the effect of CBT (the transdiagnostic approach) compared with a wait-list group (Fairburn et al., 2009). No differences were identified between the BN and EDNOS groups on any measures at baseline or at the 60-week follow-up. Prior treatment studies of adult BN and BED patients have identified CBT as the treatment of choice (NICE, 2004; Treasure et al., 2010). The findings in Fairburn et al. (2009) represent an important addition to the EDNOS literature.

The lack of progress in AN treatment calls for further research using novel models that might better address AN symptomatology and/or increased efforts to conduct large trials that accommodate the expectedly large drop-out rates. One example of such a new treatment model, Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), has been investigated in a case report on an adolescent girl with subthreshold AN (Heffner, Sperry, Eifert, & Detweiler, 2002) and in a case series reporting on three adults (BMI > 18.5) at pre, post, and one-year follow-up (Berman,

Boutelle, & Crow, 2009); the results at post and one-year follow-up were encouraging in terms of psychopathology and BMI.

## Acceptance and Commitment Therapy

Fairburn et al. (1999) concluded that the role of self-control in those with AN should be the principal focus of treatment. Additional important factors in AN treatment are the role of mood intolerance (Fairburn et al., 2003) and the avoidance of emotions as dysfunctional emotion regulation strategies (Schmidt & Treasure, 2006). In ACT, excessive attempts to control internal events (e.g., thoughts, feelings, and physiology) are seen as *the* problem in the maintenance of psychological problems. Persistent attempts to alter the form, frequency, or situational sensitivity of these events have been defined as experiential avoidance (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes, Wilson, Strosahl, Gifford, & Follette, 1996) and reflect a pathological process recognized by many theoretical orientations. Behaviors such as restriction, bingeing, excessive exercising, and purging are examples of experiential avoidance.

The goal of ACT is to help individuals increase their psychological flexibility. This refers to an ability to be in conscious contact, actively and openly, with their present-moment experiences (e.g., thoughts, feelings, memories, and bodily sensations), without defenses, and based on the demands of the situation, persist in or change behavior in the service of chosen values (Hayes, Villatte, Levin, & Hildebrandt, 2011). Six core processes are involved in creating psychological flexibility: being present, cognitive defusion, acceptance, self as context, values, and committed action (Hayes et al., 2006; Hayes et al., 2011). *Being present* refers to an ability to observe and notice internal (e.g., thoughts and feelings) and external events and to label and describe these events non-judgmentally or without evaluation; mindfulness techniques can be used to promote this ability. *Cognitive defusion* refers to an ability to see thoughts as thoughts, i.e., as an ongoing stream of private events to which one does not necessarily have to react based on their literal meaning. Various techniques are used to alter the function of one's thoughts or – differently expressed – to alter one's relationship with internal events. The thought "It's useless" may, for example, inhibit problem-solving behaviors when a person is fused with the literal content. Instead, seeing the thought as simply another internal event, such as "I am having the thought 'it's useless'" might add a new function to it, which may increase psychological flexibility. *Acceptance* refers to an ability that involves an active, non-judgmental, and aware embracing of the private events as they occur; this stands in contrast to experiential avoidance. Acceptance is not equal to resignation or passivity, as it reflects an active stance of making room for unwanted internal events in the service of chosen values. *Self as*

*context* or a transcendent sense of the self reflects a perspective-taking that increases the sense of “I-here-now”. By building the ability to return to the present moment, one may not be as enmeshed in past trauma or the dreaded future by returning to the self who is noticing these events right now. This ability, which is built or accessed via defusion and mindfulness techniques, also supports acceptance. *Values* reflect chosen qualities of purposive action. First, one may investigate what is important in various life domains (e.g., respecting, giving, and taking in relationships), and then one may identify actions (e.g., listening to a complaint or offering help) that are exemplars of that value. *Committed action* involves a defined goal in a valued direction followed by action tending towards that goal. It includes making room for unwanted experiences as the action unfolds by using present-moment awareness, defusion, and self as context (perspective-taking). In addition, noticing when actions are not consistent with values, redirecting actions according to values, and starting again are encouraged. By means of these six core processes, psychological flexibility is increased. ACT is considered a general model of psychotherapy, in that the processes described target cognitive processes, experiential avoidance, and lack of value clarity that appear the same across many syndromes (Hayes et al., 2006). ACT might therefore be considered a transdiagnostic model of psychotherapy (Hayes et al., 2011).

Due to the theoretical fit between ACT and AN regarding the focus on control and experiential avoidance and in light of the published promising case reports, the effectiveness of ACT in AN treatment is worth exploring.

## Aims of the Thesis

From a treatment perspective, the nature of anorexia nervosa is intriguing. AN subjects often strongly resist change, although they may be aware that further starvation is not the solution. Many suffer for an extended period of their life. This thesis seeks to advance our knowledge of, and ultimately inform the treatment of, AN.

If those with AN suffer from alexithymia and low emotional awareness, AN treatment might benefit from interventions to improve on these deficits. On the other hand, if those with AN do not exhibit these deficits, treatment interventions could focus on avoidance of negative emotions and excessive use of escape-avoidance coping while relying on their emotional awareness.

Explicit weight and shape-related attitudes, such as pro-thin, anti-fat, striving for thinness, and avoidance of fatness, are at the core of all ED. However, no research has reported on these implicit attitudes among AN subjects. In addition, the occurrence of pro-thin and anti-fat attitudes towards others in AN might be important if they support the maintenance of

similar attitudes towards the self. Treatment could then be tailored to correspond to these implicit attitudes.

No treatment has yet proven effective for adults with AN. The latest conceptualization and maintenance model of AN stresses the need for control over eating, weight, and body shape. ACT aims at undermining control over thoughts, feelings, and bodily sensations, and at the same time increasing behavioral flexibility in the presence of these events.

To summarize and relate the goal of the thesis to those of the included studies, the aim of the first study was to investigate the relationship between alexithymia, emotional awareness, and perfectionism in a group of AN subjects compared with a control group. Based on the overlapping constructs among alexithymia and emotional awareness, we hypothesized a negative correlation between them. We investigated whether the expected difference between groups in terms of alexithymia and emotional awareness would remain when controlling for perfectionism, depression, and anxiety.

The aim of the second study was to assess explicit and implicit responding to pro-thin and anti-fat stimuli towards the self and others, also in terms of striving for thinness and avoidance of fatness, among a group of AN subjects compared with a control group.

The aim of the third study was to compare the effect of ACT to TAU in AN patients after 9–12 weeks of day-care. ACT views the characteristic over-evaluation of control and the use of emotional avoidance behaviors as the generic problem in the maintenance of psychological problems in those with AN. Due to the theoretical correspondence between ACT and the psychopathology in AN, ACT was hypothesized to result in higher improvement and lower deterioration rates during the follow-up period compared to TAU.

# The Empirical Studies

# Study I: *Alexithymia and emotional awareness in Anorexia Nervosa: Time for a shift in the measurement of the concept?*

## Introduction and aims

High levels of alexithymia (i.e., 23–77%) according to TAS-20 have been found in AN (Eizaguirre et al., 2004). Findings suggest that alexithymia might be a state phenomenon in AN, as it is reduced after treatment (Sexton et al., 1998). Alexithymia correlates with depression in the general population (Honkalampi et al., 2000) and among AN subjects (Bydlowski et al., 2005). After controlling for depression, differences between AN and HC do not remain, although they do when controlling for anxiety (Bydlowski et al., 2005). However, when controlling for negative affect (i.e., depression and anxiety), Monteban et al. (2006) found that high levels of alexithymia in AN and BN subjects versus in HC disappeared. Some of the mixed findings might be due to starvation or low nutritional status, as they intensify depression and anxiety. To control for low nutrition effects, one might include participants who have established regular eating.

High scores on the TAS-20 requires that participants be aware of their poor ability to identify and describe feelings. If they are unaware of this deficit, they might merely report their *belief* about their ability (Lundh et al., 2002). In addition, the whole spectrum of emotional processing might not be accessible via self-knowledge (Vanheule, 2008). The concurrent use of a performance-based measure, i.e., the LEAS (Lane et al., 1990), has been proposed to counter these shortcomings when measuring emotional awareness. A further potential problem with the TAS-20 is the finding that perfectionism correlated and predicted TAS scores even when controlling for negative affect (Lundh et al., 2002). Perfectionism involves high standards and overly critical evaluations of behavior that might affect the self-reported ability measured using the TAS-20. Perfectionism and its relationship with alexithymia and emotional awareness are therefore important to assess.

The aims of the study were: (1) to investigate the correlations between Alexithymia (TAS-20), Emotional awareness (LEAS), and perfectionism, and (2) to investigate whether the expected differences between the AN and control group in terms of alexithymia and emotional awareness would remain significant after controlling for perfectionism, depression, and anxiety.

## Method

### Participants

The AN group consisted of 35 patients (age  $M = 21.6$ ,  $SD = 4.6$ ; BMI  $M = 19.0$ ,  $SD = 2.2$ ) recruited from four psychiatric clinics after transfer from in- to outpatient care. At intake to inpatient care, all were diagnosed with AN according to the DSM-IV. Transfer to outpatient care required established regular eating, stable physical and psychological conditions based on medical examination, favorable laboratory data, and team judgment. The control group, matched in age, consisted of 35 healthy students or hospital staff (age  $M = 22.6$ ,  $SD = 5.3$ ; BMI  $M = 22.0$ ,  $SD = 2.2$ ).

### Procedure

Patients were recruited via flyers distributed at psychiatric clinics for ED while the control group was recruited via ads in local and regional newspapers and flyers distributed at hospitals. Before participation, the AN group were reassessed for regular eating, concentration, energy, and physical status to confirm previous status. The control group was interviewed to rule out lifetime psychiatric disorders and current physical conditions in need of treatment.

### Measures

The Toronto Alexithymia Scale 20-item version (TAS-20) was used to measure alexithymia (Bagby et al., 1994); higher scores indicate higher levels of alexithymia. The Levels of Emotional Awareness Scale (LEAS; Lane et al., 1990) is a performance-based measure that assesses emotional awareness; higher scores indicate higher levels of emotional awareness. Perfectionism was measured using the Frost Multidimensional Perfectionism Scale (MPS; Frost et al., 1990). The Eating Disorder Inventory-2 (EDI; Garner, 1991; Garner, Olmstead, & Polivy, 1983) was used to assess ED symptoms. Depression was assessed using the Beck Depression Inventory (Beck & Steer, 1993; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The state-anxiety (S) sub-scale of the Spielberger State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was used to assess current level of anxiety. The Symptom Checklist-90 (SCL-90; Fridell, Cesarec, Johansson, & Malling-Thorsen, 2002) was used to evaluate a broad range of psychological problems and symptoms of psychopathology.

## Statistical analysis

Analyses of variance (ANOVA) were used to compare the groups, and Cohen's  $d$  was calculated as a measure of effect size (a  $d$  around 0.20 is considered a small, 0.50 a moderate, and 0.80 a large effect). Analyses of covariance (ANCOVA) were used to control for the potential confounding effects of education, depression, anxiety, or perfectionism. Given the high correlation between the STAI-S and STAI-T, and the higher relevance of the STAI-S in relation to the LEAS and answers to the other questionnaires, the STAI-T was omitted from the analyses. One case in the control group, with extreme  $z$ -scores ( $z > 3.29$ ) on three subscales of the EDI, four symptom scales of the SCL-90, and on the BDI, was omitted, leaving 69 cases. PASW Statistics 18 (SPSS, Chicago, IL, USA) was used for all analyses.

## Results

The AN group scored significantly higher on all indexes on the SCL-90 ( $p < .003$ ,  $d > 0.75$ ) and all subscales on the EDI-2 ( $p < .0058$ ,  $d > 0.68$ ) except for maturity fears ( $p = .055$ ,  $d = 0.47$ ) compared to the control group. The AN group also reported higher levels of depression, anxiety, and perfectionism ( $F > 15.3$ ,  $p < .0002$ ,  $d > 0.94$ ) compared to the control group. Alexithymia (TAS-20) was higher in the AN group for the total score ( $F(1,67) = 21.5$ ,  $p = .000017$ ,  $d = 1.12$ ) and on the DIF and the DDF ( $p < .0034$ ,  $d > 0.73$ ) subscale but not on the EOT ( $p = .57$ ) compared to the control group. There was no significant difference between the groups on the LEAS ( $F(1,67) = 0.66$ ,  $p = .79$ ,  $d = 0.06$ ). The correlations between emotional awareness, alexithymia, depression, perfectionism, and state anxiety are presented in Table 2.

Table 2. Correlations among the LEAS, TAS-20, MPS, BDI, and STAI-S in the control ( $n = 34$ ) and AN groups ( $n = 35$ ), presented as  $r$  and  $r$  in each cell.

Control & AN	LEAS	TAS-20	MPS	BDI	STAI-S
LEAS	1 & 1	-.16 & -.22	-.41 <sup>+</sup> & .04	-.29 & -.17	-.34 & .015
TAS-20		1 & 1	.36 <sup>+</sup> & .13	.43 <sup>+</sup> & .63*	.61* & .51 <sup>+</sup>
MPS			1 & 1	.39 <sup>+</sup> & .50 <sup>++</sup>	.60* & .44 <sup>++</sup>
BDI				1 & 1	.53 <sup>++</sup> & .66*

Note. LEAS = Levels of Emotional Awareness Scale; TAS-20 = Toronto Alexithymia Scale 20-item; MPS = Frost Multidimensional Perfectionism Scale; BDI = Beck Depression Inventory; STAI-S = State anxiety subscale of Spielberger State-Trait Anxiety Inventory.

<sup>+</sup>  $p < .05$ , <sup>++</sup>  $p < .01$ , \*  $p < .001$

No significant correlation was found between the TAS-20 and the LEAS. The LEAS and the MPS correlated negatively in the control group. The TAS-20 scores correlated significantly with depression and anxiety in both groups and with perfectionism in the control group. To control for depression, anxiety, and perfectionism, separate ANCOVAs were performed using the BDI, STAI-S, and MPS as covariates and the TAS-20 or LEAS as the dependent variable. When perfectionism (MPS) was entered as covariate, the significant group difference on the TAS-20 remained ( $F(1,66) = 12.0, p = .001$ ) but disappeared after controlling for depression (BDI:  $F(1,66) = 0.2, p = .64$ ) or anxiety (STAI-S:  $F(1,66) = 2.3, p = .13$ ). In addition, when controlling for education and marital status separately, the group differences concerning the TAS-20 remained, and no significant group differences emerged concerning the LEAS.

As the AN group had received treatment and established regular eating, there was considerable variability in their BMI, which ranged from 14.7 to 23.3. To investigate differences between those below and above a BMI of 17.5, the patients were grouped accordingly, i.e.,  $n(\text{BMI} \leq 17.5) = 10$  and  $n(\text{BMI} > 17.5) = 25$ , and compared in terms of the TAS-20, LEAS, depression, anxiety, and perfectionism scores. No significant differences were found in the TAS-20 or the LEAS. Given the low power of the analyses, we focused on the magnitude of the effect; the only noteworthy difference concerned depression ( $F(1,33) = 5.5, p = .025, d = 0.88$ ), those with  $\text{BMI} \leq 17.5$  reporting greater depression ( $M = 28.3, SD = 10.7$ ) than did those with  $\text{BMI} > 17.5$  ( $M = 19.3, SD = 10.0$ ).

## Discussion

The AN group reported a significantly higher level of alexithymia on the TAS-20 than did a matched control group. No such difference was found on the LEAS, a performance-based instrument for assessing awareness of emotions. After controlling separately for depression and anxiety, the group differences on the TAS-20 disappeared. This finding regarding depression is in line with the findings of Bydlowski et al. (2005) and, regarding the AN-bulimic/purging group, with the findings of Sexton et al. (1998), as well as in Montebanocci et al. (2006), and Eizaguirre et al. (2004) in which both depression and anxiety were entered as covariates. Thus, the score obtained from the TAS-20 should always be interpreted cautiously, taking negative affect into consideration. Our findings cannot simply be attributed to sample effect, as the mean TAS-20 score in the AN group in the present study was in line with previous findings (Corcos et al., 2000), although 37% ( $n = 13$ ) of our sample had a mean BMI in the normal range (above 20 and up to 23.3).

The low negative correlations between the TAS-20 and LEAS in both groups were not significant. The two instruments have been suggested to measure different aspects of meta-emotional functioning and should be seen as complementary (Lundh et al., 2002). Our findings suggest that AN patients *believe* they have difficulties in identifying and describing emotions, but when performing a task of identifying and reporting emotions, no differences emerge compared with a matched control group. These findings raise an important question: Might LEAS be a more adequate measure of an individual's ability to identify and report feelings? Subic-Wrana, Bruder, Thomas, Lane, and Kohle (2005) collected pre- and post data from inpatients with different diagnoses. The TAS-20 (but not the LEAS) correlated with negative affect at pre and post, and when controlling for negative affect, the significant decrease in the TAS-20 score disappeared for those with depression, somatoform disorders, and ED. The increase in LEAS for those with somatoform disorders and psychological factors with somatic disorders proved to be unrelated to negative affect. Subic-Wrana et al. (2005) concluded that the TAS-20 captured a change in negative affect, whereas the LEAS might be viewed as a more specific measure of emotional awareness in clinical contexts. Our findings further supports the sensitivity of the TAS-20 to negative affect, and propose the LEAS as a more specific measure of emotional awareness.

However, many other questions remain. What is the TAS-20 measuring over and beyond negative affect? Is it time for a change in the theoretical underpinning of the concept of alexithymia or its measurement? It should be noted that the presupposed fantasy aspect of the alexithymia construct is not included in the TAS-20. Furthermore, a review of studies of the validity and reliability of the TAS-20 identified important shortcomings (Kooiman, Spinhoven, & Trijsburg, 2002), characterized by instability of factor solutions and lack of criterion validity. Kooiman et al. (2002) did not recommend its use in clinical practice, and in empirical research they concluded that it should be used in combination with other instruments. Could the low and non-significant correlations between the TAS-20 and LEAS in different studies be due to the different response formats used in these questionnaires, and not necessarily a marker of different constructs being measured by them?

As both groups reported equivalent scores on the LEAS, the non-significant correlation between perfectionism and the LEAS in the AN group is unexpected, as they reported significantly higher levels of perfectionism (and equivalent ranges) compared to the controls, and the relationship between depression and perfectionism is almost identical in both groups. Future studies need to further investigate the relationship between these variables. Sample bias, nutritional status, and potential differences in LEAS coding might explain the mixed findings in the available studies.

Our results are also in line with those of Bydlowski et al. (2005), in which the TAS-20 scores correlated significantly with anxiety and depression and the LEAS scores did not, although their ED group scored lower on the LEAS than did our AN group. This difference cannot be explained by the fact that more than half of the patients studied by Bydlowski et al. (2005) suffered from BN, since the AN group reported the lowest levels on the LEAS. A potential difference between the AN group in the present study and the one in Bydlowski et al. (2005) might be the nutritional status, since our sample was considered not to exhibit a significant deficiency. Given the undesired effects of such a deficiency (Klein & Walsh, 2004), the differences between the groups in the study by Bydlowski et al. (2005) might be due to the patients' nutritional status. A correlation between BMI and the measures of emotional abilities might not be sufficient to exclude a relationship between nutritional status and its effects on cognition and emotion. Replication is needed to shed light on these mixed findings. It would be useful to administer both the TAS-20 and LEAS to AN patients during the course of the disorder, from start to full recovery, controlling for both nutritional status and negative affect over time.

Fairburn, Cooper, and Shafran (2003) have highlighted the importance of mood intolerance in the maintenance of ED. Instead of functionally regulating their mood and emotions, these patients tend to engage in dysfunctional strategies (e.g., binge eating, vomiting, and self-harming behavior). Our results indicate that the AN group, compared with a matched control group, display equal emotional awareness (according to LEAS) and no sign of alexithymia (according to TAS-20) after controlling for negative affect. Furthermore, reduced TAS scores and ED symptoms were found in AN patients enrolled in a day-care programme (Becker-Stoll & Gerlinghoff, 2004) and in inpatient care (Sexton et al., 1998) with treatments focusing on the ED and not on alexithymia. To our knowledge, no studies have specifically investigated the effect of alexithymia interventions on ED. In view of the current body of knowledge, AN patients can trust their emotional awareness while learning more functional coping strategies when negative emotions and mood are triggered.

A few important limitations of the present study need to be mentioned. Although experienced psychiatrists and physicians assessed the patients both before and after the inpatient treatment, the lack of structured and psychometrically sound interviews such as the EDE (Cooper & Fairburn, 1987) constitute a limitation. Details on laboratory data might have made some of the results easier to interpret. However, only the judgment of physicians who were specialists in ED treatment, based on lab data, in terms of whether patients were in a physically stable condition (i.e., in an acute phase of starvation or not) was available. Data were not systematically collected on subjects' previous psychotherapeutic treatments nor were the patients thorough-

ly screened for mental retardation. However, none of the patients displayed any signs of mental retardation in the clinical interviews or throughout the inpatient treatment. Results are usually more easily interpreted if data about the present and lifetime psychiatric symptomatology are available. However, due to potential starvation effects, only the state levels of anxiety and depression were assessed. The power was low in some analyses, and in such cases we focused more on the magnitude of the effects to balance our interpretations; however, in most analyses, the power was higher than 0.95.

In summary, accumulated mixed findings from various studies of alexithymia in clinical samples, together with the fairly well-replicated sensitivity of the TAS-20 to and correlation with negative affect, suggest a revision in at least the measurement of the construct, and perhaps its theoretical underpinnings. Meanwhile, use of the LEAS should be considered as an adjunct or alternative to the TAS-20 in the study of emotions in AN.

## *Study II: Using the Implicit Relational Assessment Procedure to compare implicit pro-thin/anti-fat attitudes of patients with anorexia nervosa and non-clinical controls*

### Introduction and aims

The desire to be thin and the fear of being fat are prevalent in the general population and are involved in the criteria for AN. Pro-thin and anti-fat attitudes are typically measured via self-report measures and these measures have potential drawbacks, such as demand characteristics (De Houwer, 2002). The use of implicit measures might provide further information to supplement explicit measures. The IAT (Greenwald et al., 1998) is an implicit measure that provides an estimate of the relative strength of, for example, pro-thin/anti-fat versus anti-thin/pro-fat associations. Such pro-thin/anti-fat IAT effects have been found in different studies and samples (Schwartz et al., 2006; Vartanian et al., 2005). However, such an IAT effect might be driven by a strong anti-fat attitude accompanied by a neutral pro-thin attitude or vice versa.

A recent method for measuring implicit attitudes, the IRAP (Barnes-Holmes et al., 2006), has been investigated. One study that used both the IAT and IRAP found implicit body shape attitudes by both measures in a non-clinical group (Roddy et al., 2010). However, the IRAP revealed that the composite body shape attitude was driven by pro-thin rather than anti-fat attitudes. Thus, the IRAP might be used to arrive at a more fine-grained understanding of pro-thin and anti-fat bias in AN (Roddy et al., 2010). It is also unclear whether difficulties in shifting these attitudes towards oneself might be based on similar attitudes towards others. Therefore, body shape attitudes towards both self and others might be worth exploring. The IRAP methodology is based on a behavioral account of language and cognition (RFT; Hayes et al., 2001) that approaches cognitive functioning as a behavioral event of responding to relations between stimuli. Behavior learning paradigms, such as positive and negative reinforcement, might thus be inte-

grated with the cognitive approach of RFT. Striving for thinness and avoidance of fatness might be conceptualized as positive and negative reinforcement, respectively, and might be explored by asking participants to respond to stimuli such as “I want to be thin” and “I must not be fat”.

The aim of the study was to investigate the relation between implicit and explicit pro-thin and anti-fat beliefs towards self and towards others as well as stimuli conceptualized as positive (striving for thinness) and negative reinforcement (avoidance of fatness) between those with AN (subthreshold and full AN) and a healthy control group. The second aim was to compare implicit and explicit attitudes within each group.

## Method

### Participants

The clinical group consisted of 17 women (Age  $M = 24.8$ ,  $SD = 5.5$ ; BMI  $M = 16.9$ ,  $SD = 1.6$ ), 12 with full and five with subthreshold AN, i.e., EDNOS. The criteria for EDNOS were met by five participants who met all criteria for AN except criterion A (the BMI of the EDNOS group ranged from 18.5 to 19.6); two of the five also did not meet the amenorrhea criterion. The control group consisted of 17 age-matched healthy women with no history of ED or other severe psychopathology (Age  $M = 24.8$ ,  $SD = 5.5$ , BMI  $M = 21.5$ ,  $SD = 2.1$ ).

### Measures

A short version of the semi-structured interview the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993), was used to investigate the presence or absence of ED. The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) assesses the same behavioral criteria as does EDE and its four subscales (omitted in the current short version of the EDE interview), i.e., restraint, shape concern, weight concern, and eating concern. The Eating Disorder Inventory-2 (EDI-2; Garner, 1991) assesses ED characteristics and symptoms; five subscales were used in the present study: drive for thinness, body dissatisfaction, ineffectiveness, perfectionism, and interoceptive awareness. The Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) assesses the extent of psychopathology and concerns related to body shape.

Explicit Pro-Thin and Anti-Fat attitudes (i.e., pro-thin, anti-fat, striving for thinness, and avoidance of fatness) were investigated using visual analogue scales (VAS). The endpoints corresponded to and reflected the attitudinal targets of the IRAP presentations. Level of attention variables examined for potential confounding effects on six items using double-anchored

VAS. The statements probed for current status in dieting, hunger, sadness and depression, level of attentiveness, feelings of being rested, alertness, and ability to focus.

**The Implicit Relational Assessment Procedure (IRAP).** The protocol was presented on a laptop PC. Synonyms for the words *thin* (i.e., thin, small, slender, underweight, skinny, and slim) and *fat* (i.e., fat, large, chubby, overweight, plump, and obese) were chosen from a list of terms relevant to ED (Cassin & von Ranson, 2005). The target words were presented by the IRAP program together with the sample stimuli and the response options *Same* and *Opposite* (see Table 3).

Table 3. *Sample, target, and response options for the four IRAP preparations, i.e., Self-, Others-, Thin-, and Fat-IRAP.*

	Self	Others	Thin	Fat
Sample	Good Bad	Good Bad	I want to be I don't want to be	I can be I must not be
Target	me <i>thin</i> me <i>fat</i>	others <i>thin</i> others <i>fat</i>	<i>thin</i> <i>fat</i>	<i>thin</i> <i>fat</i>
Response option	SAME OPPOSITE	SAME OPPOSITE	SAME OPPOSITE	SAME OPPOSITE

*Note.* *thin* = thin, small, slender, underweight, skinny, and slim; *fat* = fat, large, chubby, overweight, plump, and obese.

## Procedure

Participants were first interviewed using the EDE and then asked to respond to four IRAP preparations and the explicit scales concerning Pro-Thin and Anti-Fat attitudes. The order of presentation of the IRAP vs. the explicit scales, the four IRAP preparations, as well as whether pro-thin/anti-fat or pro-fat/anti-thin trials would be presented first, was randomized. Lastly, participants indicated their level of attention on the VAS.

**The IRAP task.** Four separate IRAP preparations were employed: Self-, Others-, Thin-, and Fat-IRAP. The procedure, exemplified by the Self-IRAP preparation below, was identical in all four preparations, except for the stimuli used (see Table 3).

*The Self-IRAP:* Two practice blocks were followed by six test blocks, each consisting of 24 trials. The procedure alternated between blocks requiring *pro-thin/anti-fat* responding (i.e., SAME was required on “Good – me *thin*” and “Bad – me *fat*” trial types, whereas OPPOSITE was required on “Good – me *fat*” and “Bad – me *thin*” trial types ;see Figure 2) and blocks requiring *anti-thin/pro-fat* responding (i.e., OPPOSITE was required on “Good – me *thin*” and “Bad – me *fat*” trial types, whereas SAME was required on “Good – me *fat*” and “Bad – me *thin*” trial types). The participant

was informed of the change in required response via a screen message before each new block started.

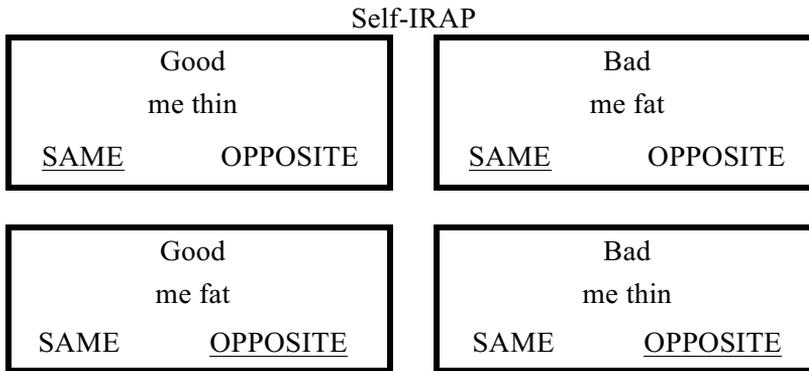


Figure 2. The four trial types included in the Self-IRAP preparation depicting the sample (top), target (middle), and response option (bottom). The target words “thin” and “fat” represent *thin, small, slender, underweight, skinny, and slim* and *fat, large, overweight, chubby, obese, and plump*, respectively. The underlined response option (i.e., SAME or OPPOSITE) indicates which response was deemed consistent.

The response options (i.e., SAME and OPPOSITE) switched between the “D” and “K” keys from trial to trial (in a quasi-random fashion). Practice blocks started with an on-screen message specifying that this was practice and that errors were expected. Before each test block, the participant was told that this was a test, that they should “go quickly”, and that “making a few errors is okay”. After each block, the median response time and percentage of correct responses were presented.

A criterion of at least 75% correct responding in every test block in each of the four IRAPs was required for the individual’s data to be included in the statistical analyses (see Table 4 for the number of participants included in each analysis). The recorded IRAP data was response latency in milliseconds measured from the onset of a trial until the correct key was pressed. Response time was transformed into *D-IRAP* scores (e.g. Dawson et al., 2009). Positive *D-IRAP* scores indicate pro-thin or anti-fat bias, whereas negative *D-IRAP* scores indicate anti-thin or pro-fat bias.

## Statistics

One-way ANOVAs were used to investigate group differences. On each IRAP trial type, and the corresponding explicit measures, planned one-sample *t*-tests were executed to determine difference from zero. Planned dependent *t*-tests were used to compare striving for thinness and avoidance of fatness within groups. No correction was made for multiple comparisons,

as significant differences were also evaluated in terms of effect size. Cohen's  $d$  was used as a measure of effect size. Pearson  $r$  was used to investigate correlations between level of attention and explicit Pro-Thin and Anti-Fat attitudes with the IRAP trial-type responses. PASW Statistics 18 (SPSS, Chicago, IL, USA) was used for all analyses.

## Results

There were significant differences between the clinical and control groups on the BMI, EDE-Q global (and on all subscales), BSQ, and the EDI subscales ( $p < .0018$ ,  $d > 1.17$ ). The groups did not differ in level of education. In the clinical group, the full and subthreshold AN subgroups did not differ in terms of education, duration of illness, the EDE-Q, BSQ, or on the EDI subscales ( $p > .09$ ). Unsurprisingly, the AN group ( $Mdn = 16.4$ ) had a lower BMI than did the EDNOS group ( $Mdn = 18.6$ ;  $U = 60.0$ ,  $p < .001$ ).

**Implicit attitudes towards Self: Self-IRAP.** Both groups displayed significant pro-thin attitudes in relation to the *Self* (see Table 4) on the trial type “Good – me *thin*”, as did the control group on the trial type “Bad – me *thin*”. There was a significant difference on the “Bad – me *fat*” trial type ( $F(1, 26) = 5.8$ ,  $p = .024$ ,  $d = 0.94$ ) between groups (clinical  $>$  control). In summary, both groups displayed implicit pro-thin attitudes, and the clinical group displayed a stronger anti-fat attitude in relation to the *Self* compared to the control group.

**Implicit attitudes towards others: Others-IRAP.** The clinical group displayed a significant pro-fat attitude towards *Others* on the “Good – others *fat*” trial type (see Table 4). There were no significant group differences. In summary, the clinical group displayed a significant pro-fat attitude towards *Others*.

**Implicit attitudes regarding striving for thinness: Thin-IRAP.** Both groups displayed significant striving for thinness on the “I want to be thin” and “I don't want to be thin” trial types (see Table 4) and significant avoidance of fatness on the “I don't want to be fat” trial type. Between groups, the clinical group displayed a significantly stronger anti-fatness attitude on the “I don't want to be fat” trial type ( $F(1, 28) = 4.2$ ,  $p = .049$ ,  $d = 0.79$ ) than did the control group. In summary, the Thin-IRAP indicated that both groups displayed striving for thinness and avoidance of fatness, while the clinical group displayed significantly higher levels of implicit fat avoidance.

Table 4. Mean (SE) and effect size (Cohen's *d*) for one-sample *t*-test for the four trial types in the Self-, Others-, Thin-, and Fat-IRAP preparations for the clinical and control groups as well as within-group differences.

	Clinical		Control	
	<i>M</i> ( <i>SE</i> )	<i>d</i>	<i>M</i> ( <i>SE</i> )	<i>d</i>
<b>SELF</b>	<i>n</i> = 14		<i>n</i> = 14	
Bad – me <i>fat</i>	0.23(0.12)	0.52	–0.12(0.09)	–0.37
Good – me <i>fat</i>	–0.05(0.07)	–0.19	–0.18(0.09)	–0.52
Good – me <i>thin</i>	0.61(0.11)	1.53*	0.43(0.09)	1.28*
Bad – me <i>thin</i>	0.10(0.17)	0.16	0.21(0.08)	0.69*
<b>OTHER</b>	<i>n</i> = 12		<i>n</i> = 13	
Bad – others <i>fat</i>	–0.26(0.15)	–0.48	–0.21(0.12)	–0.48
Good – others <i>fat</i>	–0.33(0.09)	–1.07*	–0.11(0.11)	–0.28
Good – others <i>thin</i>	0.27(0.12)	0.63	0.23(0.11)	0.59
Bad – others <i>thin</i>	0.10(0.10)	0.29	–0.15(0.12)	–0.35
<b>THIN</b>	<i>n</i> = 16		<i>n</i> = 14	
I don't want to be fat	0.48(0.08)	1.56*	0.23(0.09)	0.66*
I want to be fat	–0.11(0.09) <sup>a</sup>	–0.31	–0.06(0.11) <sup>b</sup>	–0.14
I want to be thin	0.61(0.11)	1.42*	0.40(0.09)	1.21*
I don't want to be thin	0.31(0.10) <sup>a</sup>	0.78*	0.30(0.09) <sup>b</sup>	0.89*
<b>FAT</b>	<i>n</i> = 15		<i>n</i> = 12	
I must not be fat	0.25(0.14)	0.46	0.13(0.14)	0.26
I can be fat	0.03(0.12) <sup>c</sup>	0.06	–0.12(0.08)	–0.44
I can be thin	0.43(0.12)	0.93*	0.36(0.13)	0.81*
I must not be thin	0.35(0.10) <sup>c</sup>	0.90*	0.05(0.14)	0.10

Note: *n* = those included in the statistical analysis due to meeting the inclusion criteria of 75% correct responses in every test block in each of the four IRAPs.

<sup>a, b, c</sup> Same superscripts indicate within-group differences of the following effect sizes: a) *d* = 0.71, b) *d* = 0.76, and c) *d* = 0.73. The Self- and Others-IRAP preparations were not analyzed. \* *p* < .05 significant difference from zero (one-sample *t*-test).

**Implicit attitudes regarding avoidance of fatness: Fat-IRAP.** There was no significant avoidance of fatness (see Table 4). Both groups displayed significant striving for thinness; in the clinical group, the “I must not be thin” and “I can be thin” trial types and, in the control group, the “I can be thin” trial type displayed significant IRAP effects. There were no significant group differences on the Fat-IRAP. In summary, both groups displayed significant implicit pro-thin (striving for thinness) attitudes.

**Within-group differences: striving for thinness and avoidance of fatness.**

Both groups displayed significantly stronger striving for thinness than avoidance of fatness on the Thin-IRAP trial types “I don't want to be thin” versus “I want to be fat” (see Table 4). Only the clinical group displayed a

significantly stronger striving for thinness than avoidance of fatness on the Fat-IRAP trial types “I can be fat” versus “I must not be thin”.

**Explicit Pro-Thin and Anti-Fat attitudes.** Compared with the control group, the clinical group displayed significantly higher anti-fat (“Bad – me *fat*”) and pro-thin (“Good – me *thin*”) attitudes towards themselves, more striving for thinness (“I want to be thin” and “I can be thin”), and more avoidance of fatness (“I must not be fat”) ( $d > 0.93$ ).

**Analyses of correlation.** None of the level of attention variables correlated significantly with the trial types that produced a significant between-group difference ( $-.30 < r < .41$ , and  $.11 < p < .99$ ).

There was a significant correlation between the Fat-IRAP trial type “I can be fat” and the corresponding rating on the explicit VAS measure “I can be fat–I must not be fat” in the clinical group ( $r(15) = .59, p = .022$ ). No other significant correlations were found in the two study groups ( $-.54 < r < .49$ , and  $.067 < p < .90$ ).

## Discussion

The present study primarily sought to compare implicit pro-thin/anti-fat attitudes towards *Self* and *Others* among individuals with full and subthreshold AN, with those of a matched-age control group, as well as to examine their striving for thinness and avoidance of fatness using the IRAP.

**Implicit attitudes towards *Self*.** Towards *Self*, both groups displayed equally strong pro-thin implicit attitudes, while the clinical group displayed significantly stronger anti-fat attitudes. The implicit pro-thin attitudes in both groups might be seen as evidence of a shared learning history involving repeated exposure to the thin ideal. The control group displayed only pro-thin attitudes which is in line with the findings of Roddy et al. (2010) in which non-clinical participants displayed pro-slim rather than anti-fat attitudes. The clinical group displayed both anti-fat and pro-thin attitudes. This might be indicative of the over-evaluation of weight and shape for self-esteem proposed to be at the core of ED (Fairburn et al., 2003).

**Implicit attitudes towards *Others*.** The clinical group displayed an implicit pro-fat attitude towards others that was not evident in the control group. Speculatively, this might be understood in terms of social comparison. Patients with AN tend to compare themselves with those who are thin and when surrounded by normal- or overweight people, they might feel more content and less self-focused. Indeed, individuals engaging in downward comparisons were found to display increased body satisfaction and self-confidence (van den Berg & Thompson, 2007).

**Striving for thinness and avoidance of fatness.** The present study also examined potential differences regarding the patterns of *striving for thinness* and *avoidance of fatness* (loosely corresponding to positive and negative reinforcement, respectively) between and within groups. Though both groups indicated equal striving for thinness (positive reinforcement), the clinical group indicated more avoidance of fatness (negative reinforcement). The presence of both implicit fat-avoiding and implicit pro-thinness attitudes in the clinical group might be related to and accompany negative and positive reinforcement. Hypothetically, this lends support to the cognitive behavioral maintenance model of AN and of ED in general, by revealing the implicit attitudinal cognitions that might be another feature of the “over-evaluation of weight and shape” construct in the model.

**The advantages of the IRAP.** Previous studies using the IAT (Schwartz et al., 2006; Vartanian et al., 2005) examined an amalgam of pro-thin and anti-fat attitudes. However, the IRAP allowed the investigation of pro-thin and anti-fat attitudes separately and towards *Self* and *Others*. The present study represents a useful advance in this respect. Using the IRAP, we found significantly stronger implicit anti-fat attitudes towards *Self* in the clinical group. Thus, the present investigation differentiates between the control and ED groups and suggests that the general implicit pro-thin/anti-fat attitudes previously identified in IAT studies might result from pro-thin implicit attitudes towards the *Self*.

**Implicit versus Explicit Attitudes.** We also investigated the relationship between implicit weight-related attitudes and their explicit counterparts. Earlier IRAP research has reported mixed findings regarding correlations with explicit measures (Dawson et al., 2009; Power, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009). A meta-analysis of correlations between the IAT and explicit measures found that the strength of correlation increased as a function of increased judgment spontaneity in explicit measures and increased conceptual correspondence between the measures (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). The present study found only one significant correlation between the implicit and the corresponding explicit attitudinal measures despite high conceptual correspondence between the measures. The lack of consistent significant correlations is a finding that might have clinical implications: implicit attitudes might contribute to a more accurate ideographic model of the AN maintenance in individual patients than from explicit attitudes, which may be distorted or inaccurate based on expectations and/or social context, and/or as a function of clinical disorders such as AN.

The present results support the RFT emphasis on the importance of context in understanding the function of a stimulus, behavior, or event. We investigated similar phenomena in two contexts, a common verbal social context (explicit) and an implicit verbal context, and found almost no corre-

spondence between the two. This is not unexpected in implicit attitudinal research, since implicit and explicit attitudes often diverge in this way (see Barnes-Holmes et al., 2010 for theoretical discussions of reasons for this divergence). Further research is needed to address key questions concerning the extent to which either implicit or explicit attitudes relate to behaviors. Future prospective studies examining the predictive value of explicit and implicit pro-thin and anti-fat attitudes (as well as striving for thinness and avoidance of fatness) along with thin-ideal internalization might be a productive line of research.

### **Limitations**

It should be noted that the present results are based on a small sample of patients and an equally small matched control group consisting only of women. However, the effect sizes were large and indicate important effects and differences that hopefully will motivate replication with larger samples. The mixed clinical group consisting of participants with full and subthreshold AN might be seen as a limitation. On the other hand, available data have led to persuasive arguments for viewing full and subthreshold AN as belonging to the same functional class of disorders (Fairburn & Cooper, 2007; Fairburn et al., 2007). In addition, no latency criteria were employed, which is a departure from typical IRAP preparations. Despite this, the mean latency was less than three seconds. Hence, participants were responding at speed and a definite pattern emerged, which attests to the robustness of the basic preparation.

### **Conclusion**

Despite these limitations, the present study is the first to investigate pro-thin and anti-fat implicit attitudes towards the self and others in a control group compared with an ED group. Both groups displayed implicit pro-thin attitudes towards *Self*; however, the clinical group displayed more implicit anti-fat attitudes towards *Self* as well as an implicit pro-fat attitude towards *Others*. Striving for thinness was equally strong in both groups, while avoidance of fatness was stronger in the ED group. Finally, both groups also displayed more striving for thinness than avoidance of fatness, the ED group in two comparisons and the control group in one.

# Study III: *A randomized controlled trial of acceptance and commitment therapy for anorexia nervosa*

## Introduction and aims

So far, there is no evidence-based treatment for adult AN. The over-evaluation of control over eating, weight, and shape and efforts to gain such control are key components in the development and maintenance of AN (Fairburn, Shafran et al., 1999). In ACT, excessive attempts to control internal events are seen as *the* problem in the maintenance of psychological problems (Hayes et al., 1999). Experiential avoidance (i.e., attempts to modify internal events) has deleterious effects when the behaviors used to modify them are dysfunctional (e.g., restriction and purging). The focus on control and experiential avoidance in ACT fits the key maintenance component of AN.

The aim of the study was to compare the effect of ACT with TAU for patients who had received 9–12 weeks of day-care for AN. It was hypothesized that ACT, compared with TAU, would result in higher improvement rate and reduced rate of deterioration during follow-up.

## Method

A randomized controlled trial was conducted with patients who had received 9–12 weeks of day-care at a regional specialist eating disorder unit for adults. Patients were randomized to either TAU or ACT. It was estimated that with a hypothesis favoring ACT, a medium effect size, and to obtain a power of at least .85, the study would need 120 participants to detect significant differences between groups. Recruiting participants proved much slower than anticipated, mainly due to reorganizations within the psychiatry. The study period was extended to facilitate additional recruitment, but the desired sample size was still not attained.

## Participants

Participants were 42 females and one male, with a mean age of  $M = 25.7$  ( $SD = 7.15$ ). Most (71%) lived with a partner, and the rest were single. Regarding education, 21% reported having higher education (university), 79% lower education (compulsory school, 12%; high school, 62%; and vocational school, 5%). The sample's occupational status was 31% working, 33.3% students, and the rest either unemployed or on sick leave. Only participants over 18 years of age, with an AN or EDNOS diagnosis (i.e., subthreshold or partial AN) before day-care, and who completed 9–12 weeks of day-care were included.

## Procedure

To gain access to day-care treatment, patients were assessed by a psychiatrist using the specific ED section from the Structured Clinical Interview, Research Version for Axis I Disorders (SCID-I-RV; Spitzer, Williams, Gibbon, & First, 1992), followed by the EDE (Fairburn & Cooper, 1993). The main aim of the first nine weeks of day-care treatment was to discontinue starvation, as described in Holmgren et al. (1984). An optional three-week weight gain program was available after patients completed the first nine weeks. In the ninth week of day-care, patients who agreed to participate in the present study completed the self-report measures and were subsequently interviewed using the EDE for the second time. In the ninth or twelfth week, the result of the randomization (to ACT or TAU) was disclosed. After completion of day-care, the ACT and TAU condition was initiated. Self-report measures and weight were obtained post ACT/TAU and at 6 and 12 months.

The therapy protocol used in the ACT treatment was a modification of the protocol for the individual and group treatment of polysubstance-abusing methadone clients (Hayes et al., 2004). Modifications were made for ED and for individual therapy for AN. The ACT treatment consisted of 19 one-hour sessions administered by three therapists (Ph.D. level or doctoral students). Sessions were audio-recorded and an independent rater performed an adherence check on nine randomly selected sessions. The mean rating for overall adherence to the manual was 2.9 and for overall therapist competence was 3.0 (on a five-point scale, in which 1 indicates “not at all”, 3 “somewhat”, and 5 “extensively”).

Participants in both the ACT or TAU conditions were allowed to receive additional day-care during the treatment period. The TAU condition included any type of further treatment available to and chosen by the patients.

## Measures

The SCID-I-RV (Spitzer et al., 1992) was used before day-care to assess for ED. The EDE (Fairburn & Cooper, 1993), a semi-structured interview, was used before and after day-care. A short version of the EDE was used (Loeb, Wilson, Gilbert, & Labouvie, 2000) to investigate ED diagnosis as operationalized by the interview.

Primary outcome variables were body mass index (BMI; kg/m<sup>2</sup>) and the EDE-Q (Fairburn & Beglin, 1994) that provides a global score and four subscales: restraint, eating concern, shape concern, and weight concern.

Secondary outcome variables included a battery of self-report measures administered pre and post ACT/TAU and on all subsequent follow-up occasions. The self-report version of the Montgomery Åsberg Depression Rating Scale (MADRS-S; Svanborg & Åsberg, 2001) was used to assess depression. The Quality of Life Inventory (QOLI; Frisch, Cornell, Villanueva, & Retzlaff, 1992) was used to measure life satisfaction. The Perceived Social Support questionnaire (PSS; Procidano & Heller, 1983) assessed support from friends and family. Six subscales of the Symptom Check List-90 (SCL-90; Somatization, obsessive-compulsive, interpersonal sensitivity, anxiety, anger-hostility, and phobic anxiety, from which the Global Severity Index was estimated), were used to measure current psychological symptoms (Derogatis, 1994; Fridell et al., 2002). The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1979) was used to assess global self-esteem, and the Body Shape Questionnaire (BSQ; Cooper et al., 1987) to assess body shape concerns. The Ways of Coping Questionnaire (WCQ; Folkman & Lazarus, 1988) was employed to identify thoughts and actions used to cope with specific stressors. Finally, the sub-scales drive for thinness, bulimia, body satisfaction, ineffectiveness, perfectionism, interpersonal distrust, and interoceptive awareness from the Eating Disorder Inventory-2 (EDI; Garner, 1991) were used to assess attitudes, feelings, and behaviors associated with eating disorders.

Both groups' use of care was recorded from the patients' psychiatric journals and summarized from pre to post ACT/TAU, and from post through the 12-month follow-up. The numbers of visits to the psychiatrist, psychologist, counsellor, nurse, physiotherapist, care assistant, and dietician were recorded. Additional day-care usage at the unit as well as other forms of psychiatric day-care were recorded as the number of days each service was used, visits to psychiatric emergency unit were coded as number of visits, and inpatient care was recorded as number of days in hospital.

## Statistics

Pearson  $\chi^2$  or Fisher exact test was used for demographic, diagnostic, attrition, improvement, and deterioration comparisons between groups. The

Mann-Whitney U test was used to analyze the groups use of care. One-way ANOVAs were used for self-report measures and BMI between groups pre ACT/TAU. Cohen's *d* was used as an effect size measure, according to which 0.2 is considered small, 0.5 medium, and 0.8 large (Cohen, 1988). A mixed-model repeated-measures (MMRM) analysis of variance was used to investigate effects using an intent-to-treat sample (Raudenbush & Bryk, 2001) with two between-group (i.e., ACT and TAU), three within-group (i.e., post, 6-, and 12-month follow-up) levels and one covariate (i.e., the pre-measure). Mixed regression models use all available data from subjects, which makes them suitable for intent-to-treat analysis. The model with the fewest parameters was reported unless there was no significant difference in the fit, as determined by comparison of the restricted log-likelihood. Effect sizes (Cohen's *d*) for *F* values were based on suggestions for repeated measures and multilevel designs (Rosenthal & Rosnow, 1991; Verbeke & Molenberghs, 2000), and effect sizes for planned contrasts were used to disassemble interactions as specified by Wackerly, Mendenhall, and Schaefer (2008, p. 271).

Improvement was defined as clinically significant and reliable change from pre- to 12 months on the subscales of the EDE-Q and in BMI at 12 months. Clinically significant change, combined with an estimate of reliable change, was calculated according to Jacobson and Truax (1991) for the EDE-Q sub-scales using the midpoint between the general and ED population based on Swedish norms (Welch, Birgegård, Parling, & Ghaderi, 2011). Participants who improved at post or 6 months (from pre measurement) but failed to maintain the improvement at later follow-ups were defined as deteriorated. For those with a starting BMI below 17.5, BMI improvement was defined as attaining a BMI higher than 17.5 (and at least 2 kg of weight gain), while for those with a starting BMI between 17.5 and 19, achieving a BMI higher than 19 (and at least 2 kg of weight gain) was required. Thus, deterioration in BMI occurred when BMI dropped below 17.5 or 19, respectively, at later follow-ups after improvement at post or 6-month follow-up. PASW Statistics 19 (SPSS, Chicago, IL, USA) was used for all analyses.

## Results

At pre ACT/TAU, there was a significant difference in marital status ( $p = .024$ ) between the groups, with a larger proportion of singles in the ACT group (43%) than in the TAU group (11%). There were no significant differences between the groups in terms of level of education, occupation, diagnosis (AN and EDNOS), nine versus twelve weeks of day-care ( $p > .19$ ), age, highest or lowest BMI ever, and age when participants started to use compensatory behaviors or go on a diet ( $p > .057$ ). In addition, no significant

differences were found between the groups on any of the self-report measures at pre ACT/TAU ( $p > .055$ ).

**Use of care during the ACT/TAU treatment period.** The TAU group made fewer visits to the psychologist than did the ACT group (visits to psychologists delivering the ACT treatment are included in this analysis, resulting in a significant difference;  $U = 357, z = 3.6, p < .001, n = 42$ ); in all other respects, both groups consumed equal amounts of care ( $-1.5 < z < 0.4, .13 < p < 1$ ).

**Attrition from study, missingness, and drop-out from ACT treatment.**

At post, there was a significant difference in attrition between the two groups ( $\chi^2 = 4.4, p = .037$ ), as 45.8% of the ACT participants and 15.8% of the TAU participants did not return for assessment. There were no significant differences between those missing and those complying post-measurement in terms of primary outcome variables, demographics, and level of depression, anxiety, or ED symptoms at pre-measurement. There was no significant difference between groups in terms of cumulative attrition at the 6- and 12-month follow-up ( $p > .095$ ). Fourteen participants were considered ACT treatment completers as they attended at least 16 sessions; eight participants attended 0–5 sessions and two attended 12 and 13 sessions.

**Primary outcome variables: improvement and deterioration.** Combined improvement (for BMI and all subscales of the EDE-Q) was found in 1 of 11 participants in the TAU group and none of 8 in the ACT group from pre to 12 months follow-up. Eighteen participants in each group were eligible for analyses of any deterioration of either EDE-Q subscales or the BMI. There was no significant difference between groups in terms of deterioration ( $\chi^2 = 0.5, p = .73$ ). In the ACT group, 5 of 18 (27.8%) and in the TAU group, 7 of 18 (38.9%) were found to deteriorate.

**Outcome at post, 6, and 12 months.** The main and interaction effects of ED measures are reported in Table 5 and analyses yielding significant results are detailed below. Regarding the primary outcome variable EDE-Q, there were significant main effects of time on the eating concern ( $F(2, 33.2) = 8.2, p = .001$ ) and shape concern ( $F(2, 18.6) = 7.5, p = .004$ ) subscales, and on the EDE-Q global score ( $F(2, 38.8) = 8.3, p = .001$ ).

Secondary outcome variables: On the perfectionism subscale of the EDI-2, no effect for group or time was evident, but the interaction effect between group and time was significant ( $F(2, 39.6) = 4.8, p = .014, d = 0.81$ ). The interaction effect was due to a non-significant difference between the groups at post ( $p = .65$ ), and the ACT group displayed a significantly lower level of

perfectionism than did the TAU group at the 12-month follow-up (estimate of mean difference = 2.3,  $SE = 0.9$ ,  $t(49.6) = 2.5$ ,  $p = .017$ ,  $d = 1.04$ ). From post to the 12-month follow-up, the TAU participants deteriorated significantly (estimate of mean difference = 1.5,  $SE = 0.6$ ,  $t(42.4) = 2.6$ ,  $p = .014$ ,  $d = 0.75$ ) while the ACT participants improved (estimate of mean difference = -1.2,  $SE = 0.6$ ,  $t(38.0) = -1.8$ ,  $p = .081$ ,  $d = 0.58$ ). No other significant effects were found on the self-report measures.

Table 5. Results of the MMRM analysis displaying group (TAU and ACT), time (post, 6- and 12-month follow-up), and interaction effects using the pre-measure for each outcome variable as the covariate.

	Group effect		Time effect		Group $\times$ time effect	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
BMI	0.13	.72	0.58	.57	1.96	.16
EDE-Q tot	0.10	.76	<b>8.32</b>	<b>.001</b>	1.59	.22
Restraint	0.0	.99	0.08	.92	0.63	.54
Eating	0.43	.52	<b>8.20</b>	<b>.001</b>	0.58	.57
Shape	0.71	.41	<b>7.53</b>	<b>.004</b>	2.98	.075
Weight	0.0	.99	1.42	.26	0.47	.63
BSQ	0.30	.59	0.84	.45	0.01	.99
EDI						
D	0.11	.74	2.06	.15	0.005	.99
B	0.02	.88	0.89	.42	1.04	.37
Bd	2.98	.095	0.04	.96	0.68	.52
Inef	0.48	.83	1.27	.30	0.86	.43
Perf	1.91	.18	0.11	.90	<b>4.75</b>	<b>.014</b>
Interp	0.24	.63	1.84	.18	1.08	.35
Intero	0.26	.61	0.41	.67	0.85	.44

Note. BMI = Body Mass Index, EDE-Q = Eating Disorder Examination Questionnaire, BSQ = Body Shape Questionnaire, EDI = Eating Disorder Inventory (D = Drive for thinness, B = Bulimia, Bd = Body dissatisfaction, Inef = Ineffectiveness, Perf = Perfectionism, Interp = Interpersonal distrust, Intero = Interoceptive awareness).

**Use of care after end of treatment.** From post treatment to the 6-month follow-up, the ACT group made significantly fewer visits to psychiatrists ( $U = 111$ ,  $z = -2.4$ ,  $p = .016$ ,  $n = 39$ ) and used less day-care ( $U = 143$ ,  $z = -2.1$ ,  $p = .039$ ,  $n = 39$ ). No other significant differences were recorded from post to the 6-month follow-up ( $-1.7 < z < 1.3$ ,  $.096 < p < .89$ ). From post to the 12-month follow-up, both groups consumed equal amounts of care ( $U = 109.5$ ,  $z = -1.8$ ,  $p = .079$ ) and made equal numbers of visits ( $U = 97.5$ ,  $z = -1.8$ ,  $p = .078$ ) over all categories. In the first year after treatment, there was a significant difference in the number of visits to psychiatrists between ACT treatment completers ( $Mdn = 0$ ) and the TAU group ( $Mdn = 1$ ;  $U = 58$ ,  $z = -2.57$ ,  $p = .01$ ,  $n = 31$ ).

## Discussion

The present study compared ACT with TAU after nine to twelve weeks of day-care. It was hypothesized that ACT would result in higher improvement rate and reduced rate of deterioration than would TAU. The results indicated that attrition from the ACT group was significantly higher at post, but not cumulatively higher at the 6- and 12-month follow-ups. Improvement and deterioration did not differ significantly between the two groups. In TAU, the pace and intensity of treatment was generally determined by the patient, which might be one reason for the lower drop-out rate.

There were no significant differences between the groups in terms of BMI, eating disorder indices, body shape, use of coping strategies, quality of life, and depression. However, the ACT group displayed reduced perfectionism over time, while the TAU group displayed increased perfectionism, resulting in a significant interaction effect. In terms of use of care, the TAU group visited the psychiatrist more often than did the ACT treatment completers from post to 12 months follow-up. Speculatively, the structured and weekly ACT treatments may have reduced the subjective need for psychiatrist visits compared with the less structured and occasional treatments in the TAU condition.

The psychotherapy delivered in this study (19 weekly sessions) was relatively brief compared with that delivered in some other trials, which involved 50 weekly sessions (Carter et al., 2009; Dare et al., 2001; Pike et al., 2003) or 25 sessions extended over a year (Ball & Mitchell, 2004). In addition, Fairburn (Fairburn, 2008) proposes a 40-session protocol for those with a BMI < 17.5 in the transdiagnostic treatment of eating disorders. Similarly, prolonged treatment when using ACT for AN might be needed to be effective. Encouraging preliminary results and the strong theoretical fit of ACT to AN (Berman et al., 2009; Heffner et al., 2002) were taken into account in the choice of 19 sessions in this study.

The use of a weight criterion for inclusion after day-care or hospitalization (Carter, et al., 2009; Pike, et al., 2003) might provide a firmer basis for obtaining full benefit from any psychotherapy. This study included patients after nine to twelve weeks of day-care without requiring weight gain for inclusion, and the day-care treatment was not modified in any way, which supports the high external validity of the study relative to the context in which it was carried out. The theoretical rationale (i.e., undermining the control agenda) for investigating the efficacy of ACT for AN is still valid, although a more extensive treatment plus a BMI above 15, as suggested by Fairburn (2008), might constitute a sounder starting point. In addition, ensuring a high level of therapeutic skill and higher adherence to the treatment manual are crucial for the further investigation of ACT for AN. Finally, the ACT treatment protocol used here was delivered using a general approach to

psychopathology. Further investigations using ACT for ED should focus more on weight and other known ED maintenance factors.

Many patients in the ACT group did not complete the treatment. Most dropped out at an early phase and clearly indicated their ambivalence towards proceeding with treatment in the first or second session. Some patients expressed discontent regarding the heavy burden of self-report questionnaires included in the study, a burden that may have contributed to the high attrition from follow-up assessment. In designing the study, attrition was anticipated and the head psychologist at the day-care unit was asked to contact the patients for follow-ups, taking advantage of his strong and well-known therapeutic relationships with the patients. Despite this, and possibly due to the high questionnaire load, attrition was high. However, attrition was higher in ACT at post measurement compared with TAU for unknown reasons. In future studies, we should consider using mixed methods. By using qualitative methods (e.g., in-depth interviews with those who drop out early from treatment), future studies might be able to generate useful hypotheses regarding drop-outs that can be tested quantitatively, producing knowledge that might help us reduce the drop-out rate.

Several limitations need to be addressed. Recruitment to the study was unexpectedly slow and, despite extending the recruitment period, the study is short of power. Furthermore, the attrition was high, severely limiting the possibility of drawing valid conclusions from the outcome.

Further studies using ACT for AN and subthreshold or partial AN should consider investigating the effects of more intensive and prolonged treatment for patients with a BMI of at least 15 and focus more on ED-specific pathogenic maintenance factors. We used no measures to investigate processes targeted in ACT treatment, since no psychometrically sound and relevant measures were available in Swedish at the onset of the study. Finally, in future studies, investigators should balance the number of self-report measures with the need to assess and detect clinically significant changes to avoid assessment overload.

High attrition from the study as well as drop-out from the ACT treatment severely limits the validity and generalizability of the findings. It can be concluded that the present study fails to provide evidence of a difference in outcome between the TAU and ACT treatments in terms of improvement and prevention of deterioration, at the 12-month follow-up.

# General Discussion

## Alexithymia, emotional awareness, and implicit cognition: what are their role in AN treatment?

The TAS-20 has repeatedly indicated higher levels of alexithymia among those with AN than among HC and has repeatedly indicated that negative affect must be taken into consideration when interpreting TAS-20 scores. The first study lends further support to this and contributes to our knowledge of AN by demonstrating that the emotional awareness of AN subjects without significant nutritional deficiency equals that of HC. There were no significant differences between an outpatient AN group and HC in terms of LEAS (Oldershaw, Hambrook, Tchanturia et al., 2010), which lends further support to our findings, although no information was given regarding the nutritional status of this sample. If emotional awareness had been lower among those with AN, treatment interventions could have been tailored to improving their capacity to be aware of and express their feelings; our findings indicate that such an intervention is unwarranted. However, as discussed in the first study, it would be valuable to investigate both the TAS-20 and LEAS while monitoring nutritional status and negative affect several times during the course of treatment, to gain better information on the relationship between these factors.

Poor interoceptive awareness is closely linked to alexithymia, as it includes difficulties in recognizing and responding to emotions and in identifying physical sensations related to hunger and satiety (Garner, 1991). A recent study aimed at distinguishing non-acceptance (in this case fear or guilt) of affective experience from uncertainty about somatic and affective states in interoceptive awareness in a mixed ED sample (Merwin, Zucker, Lacy, & Elliott, 2010). Regression analyses indicated that non-acceptance, but not lack of clarity, predicted dietary restraint (the EDE-Q subscale). Though these preliminary results need to be replicated, they might provide new insight into AN treatment. For example, non-acceptance of emotions indicates that there is awareness of emotions (see study I) but that they are to some extent avoided. This is in accordance with the CBT model of ED (Fairburn et al., 2003) and with both the cognitive-interpersonal model of AN (Schmidt and Treasure, 2006) and ACT (Hayes et al., 1999), all stressing experiential avoidance as a maintenance factor. Such avoidance might be

targeted by increased willingness and acceptance concerning the secondary reactions to arousal.

The second study found, using the IRAP, that implicit avoidance of fatness (loosely corresponding to negative reinforcement) and implicit anti-fat attitudes towards the self were stronger among the AN group than among HC. On the other hand, both groups displayed equally strong implicit striving for thinness (loosely corresponding to positive reinforcement) and implicit pro-thin attitudes towards the self. It would be of great value to investigate these implicit attitudes in a larger sample and using a longitudinal design to study their predictive value regarding treatment outcome and relapse risk. In addition, the issue of control in AN has not received much attention in experimental studies, although it should be the principal focus of treatment (Fairburn, Shafran et al., 1999). The presence of implicit attitudes (or implicit relational responding) towards control issues should be investigated as well as whether they are predictive of treatment outcome and/or relapse. Furthermore, Vartanian et al. (2004) hypothesized that it might be important to change implicit attitudes in combination with explicit ones. They specifically focused on the finding of increased relapse among those who still reported explicit shape and weight issues. Implicit social anxiety attitudes were changed among socially anxious participants exposed to a social positive conditioning task, and they were also more likely to participate in a speech task (Clerkin & Teachman, 2010). Might there be a similar and additional effect in AN treatment if one trained subjects to develop flexibility in implicit relational responding regarding control and body shape issues? Hypothetically, this might benefit defusion, willingness, and acceptance of weight and shape attitudes and/or increase behaviors in valued directions (e.g., regular eating). This approach is in accordance with the problems of set-shifting evident in AN and the cognitive remediation training aimed at alleviating them (Tchanturia, Davies et al., 2007).

The results of the IRAP investigation suggest that positive and negative reinforcement both operate in AN in relation to weight and shape. Treatment interventions might need to be more sensitive to the function of particular behaviors in specific contexts as they may vary. Perhaps more elaborate and specific interventions need to be tailored to address the fact that AN subjects highly value certain attribute of their condition (Schmidt & Treasure, 2006).

In addition to the discussion above regarding treatment studies, large and/or multisite randomized controlled clinical trials are needed to ensure enough power to detect significant differences between treatments. If this is not feasible, it might be more fruitful to narrow the focus, akin to the efforts to improve set-shifting (Tchanturia, Davies et al., 2007). This could be combined with flexibility training via the IRAP (or the IAT) and used in investigating the association with set-shifting abilities. In addition, efforts to investigate treatment effects via single-case experimental designs (e.g., multiple

baseline designs) could be a more effective way of increasing our knowledge of new AN treatment models.

It would also be interesting to investigate ambivalence to AN treatment. In an initial attempt to learn more, one would recruit those who voluntarily seek help and closely monitor the process they undergo. Many patients seem more or less accepting of a small increase in weight, but eventually come up against a specific weight or BMI that they find hard cross. What constitutes this limit? Might it be that they become more overwhelmed by feelings or physiology at that point, or that they cannot avoid or escape their feelings and physiology successfully? Do they have explicit rules about their self-evaluation and about their ability to be in control? This kind of ideographic monitoring in a series of patients might provide information about the ambivalence that occurs.

## Limitations

In addition to those already discussed, several limitations of the constituent studies of this thesis need further elaboration. The term “anorexia nervosa” – AN – has been applied consistently to the study participants, although according to the current DSM-IV criteria for AN, this does not correctly apply to all of them. Instead, the proposed DSM-5 criteria was in mind when using the AN label. As emphasized in the Introduction, there is broad agreement that both subthreshold and full AN according to the DSM-IV criteria display the same features. As stated earlier, the inclusion of subthreshold AN cases in this thesis seems warranted.

All three studies, especially studies II and III, suffered from low power. However, in study II significant differences were accompanied by convincing effect sizes. No corrections for multiple comparisons were made in study II due to the exploratory nature of the study and the focus on effect sizes. To reiterate, the reported significant differences indicated medium to large effect sizes.

## Summary of findings

The first study suggests that alexithymia in AN should not be assessed using solely the TAS-20, since after controlling for depression or anxiety, no significant differences remained relative to HC. The concurrent use of LEAS, a performance-based measure of emotional awareness, suggests that emotional awareness is as high in AN subjects as in HC. The use of LEAS should be considered as an alternative or at least in combination with the TAS-20 in clinical practice.

The second study suggests that those with AN display stronger implicit anti-fat attitudes towards the self and more avoidance of fatness (loosely

corresponding to negative reinforcement) than do HC. Both groups displayed equally strong pro-thin attitudes towards the self and equally strong striving for thinness (loosely corresponding to positive reinforcement). The advantages of the IRAP become evident, as it reveals that findings derived from the IAT regarding pro-thin/anti-fat attitudes might merely be due to pro-thin attitudes towards the self.

The third study compared ACT with TAU in AN after 9–12 weeks of day-care. There was a high drop-out rate in the ACT condition, most subjects dropping out at an early phase. At 12-month follow-up, there were no significant differences between the groups in terms of improvement or deterioration in BMI and EDE-Q. Over time, the ACT group reported less perfectionism and the TAU group more perfectionism, resulting in a significant interaction effect. No other significant group differences were found. The study failed to provide evidence of a difference in outcome between the ACT and the TAU groups due to high attrition from the study as well as drop-out from the ACT condition.

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# References

- Agras, W. S., Crow, S., Mitchell, J., Halmi, K. A., & Bryson, S. (2009). A 4-year Prospective Study of Eating Disorder NOS Compared with Full Eating Disorder Syndromes. *International Journal of Eating Disorders*, *42*, 565-570.
- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4 ed.). Washington: American Psychiatric Press Inc.
- American Psychiatric Association. (2011). DSM-5 Development Retrieved July 2011 from <http://www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=24#>
- Attia, E., & Roberto, C. (2009). Should amenorrhea be a diagnostic criterion for anorexia nervosa? *International Journal of Eating Disorders*, *42*, 581-589.
- Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale-I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research*, *38*, 23-32.
- Ball, J., & Mitchell, P. (2004). A randomized controlled study of cognitive behavior therapy and behavioral family therapy for anorexia nervosa patients. *Eating Disorders*, *12*, 303-314.
- Bardone-Cone, A. M., Wonderlich, S., Frost, R. O., Bulik, C. M., Mitchell, J. E., Uppala, S., et al. (2007). Perfectionism and eating disorders: Current status and future directions. *Clinical Psychology Review*, *27*, 384-405.
- Barnes-Holmes, D., Barnes-Holmes, Y., Power, P. M., Hayden, E., Milne, R., & Stewart, I. (2006). Do you really know what you believe? Developing the Implicit Relational Assessment Procedure (IRAP) as a direct measure of implicit beliefs. *The Irish Psychologist*, *32*, 169-177.
- Barnes-Holmes, D., Barnes-Holmes, Y., Stewart, I., & Boles, S. (2010). A sketch of the Implicit Relational Assessment Procedure (IRAP) and the Relational Elaboration and Coherence (REC) model. *The Psychological Record*, *60*, 527-542.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York: International Universities Press.
- Beck, A. T., & Steer, R. A. (1993). *Beck Depression Inventory*. Stockholm: Psykologiförlaget AB.
- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561-571.

- Becker-Stoll, F., & Gerlinghoff, M. (2004). The impact of a four-month day treatment programme on alexithymia in eating disorders. *European Eating Disorders Review*, *12*, 159-163.
- Ben-Tovim, D. I., Walker, K., Gilchrist, P., Freeman, R., Kalucy, R., & Esterman, A. (2001). Outcome in patients with eating disorders: a 5-year study. *The Lancet*, *357*, 1254-1257.
- Berkman, N. D., Lohr, K. N., & Bulik, C. M. (2007). Outcomes of eating disorders: A systematic review of the literature. *International Journal of Eating Disorders*, *40*, 293-309.
- Berman, M. I., Boutelle, K. N., & Crow, S. J. (2009). A case series investigating acceptance and commitment therapy as a treatment for previously treated, unremitted patients with anorexia nervosa. *European Eating Disorders Review*, *17*, 426-434.
- Birmingham, C. L., Su, J., Hlynsky, J. A., Goldner, E. M., & Gao, M. (2005). The mortality rate from anorexia nervosa. *International Journal of Eating Disorders*, *38*, 143-146.
- Bisaga, K., & Walsh, B. T. (2005). History of the classification of eating disorders. In C. Norring & R. L. Palmer (Eds.), *EDNOS : Eating Disorders Not Otherwise Specified : scientific and clinical perspectives on the other eating disorders*. London: Routledge.
- Bruch, H. (1965). Anorexia Nervosa and its differential diagnosis. *Journal of Nervous and Mental Disease*, *141*, 555-566.
- Button, E., Aldridge, S., & Palmer, R. (2008). Males assessed by a specialized adult eating disorders service: Patterns over time and comparisons with females. *International Journal of Eating Disorders*, *41*, 758-761.
- Bydlowski, S., Corcos, M., Jeammet, P., Paterniti, S., Berthoz, S., Laurier, C., et al. (2005). Emotion-Processing Deficits in Eating Disorders. *International Journal of Eating Disorders*, *37*, 321-329.
- Carter, J. C., McFarlane, T. L., Bewell, C., Olmsted, M. P., Woodside, D. B., Kaplan, A. S., et al. (2009). Maintenance Treatment for Anorexia Nervosa: A Comparison of Cognitive Behavior Therapy and Treatment as Usual. *International Journal of Eating Disorders*, *42*, 202-207.
- Cash, T. F. (2004). A "Negative Body Image" - Evaluating the epidemiological evidence. In T. F. Cash & T. Pruzinsky (Eds.), *Body Image: A handbook of theory, research, & clinical practice* (pp. 269-276). New York: The Guilford Press.
- Cash, T. F., & Henry, P. E. (1995). Women's body images: The results of a National Survey in the U.S.A. *Sex Roles*, *33*, 19-28.
- Casper, R. C. (1990). Personality features of women with good outcome from restricting anorexia nervosa. *Psychosomatic Medicine*, *52*, 156-170.
- Cassin, S. E., & von Ranson, K. M. (2005). Word lists for testing cognitive biases in eating disorders. *European Eating Disorders Review*, *13*, 216-220.

- Channon, S., De Silva, P., Hemsley, D., & Perkins, R. (1989). A controlled trial of cognitive-behavioural and behavioural treatment of Anorexia Nervosa. *Behaviour Research and Therapy*, 27, 529-535.
- Chaplin, T. M., & Cole, P. M. (2005). The role of emotion regulation in the development of psychopathology. In B. L. Hankin & J. R. Z. Abela (Eds.), *Development of psychopathology: A vulnerability-stress perspective* (pp. 49-74). California: SAGE Publication.
- Clerkin, E. M., & Teachman, B. A. (2010). Training implicit social anxiety associations: An experimental intervention. *Journal of anxiety disorders*, 24, 300-308.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New Jersey: Lawrence Erlbaum Associates.
- Connan, F., Campbell, I. C., Katzman, M., Lightman, S. L., & Treasure, J. (2003). A neurodevelopmental model for Anorexia nervosa. *Physiology & Behavior*, 79, 13-24.
- Cooper, M. (1997). Cognitive theory in anorexia nervosa and bulimia nervosa: A review. *Behavioural And Cognitive Psychotherapy*, 25, 113-145.
- Cooper, M. (2005). Cognitive theory in anorexia nervosa and bulimia nervosa: Progress, development and future directions. *Clinical Psychology Review*, 25, 511-531.
- Cooper, P. J., Taylor, M. J., Cooper, Z., & Fairburn, C. G. (1987). The Development and Validation of the Body Shape Questionnaire. *International Journal of Eating Disorders*, 6, 485-494.
- Cooper, Z., & Fairburn, C. G. (1987). The eating disorder examination: A semi-structured interview for the assessment of the specific psychopathology of eating disorders. *International Journal of Eating Disorders*, 6, 1-8.
- Corcos, M., Guilbaud, O., Speranza, M., Paterniti, S., Loas, G., Stephan, P., et al. (2000). Alexithymia and depression in eating disorders. *Psychiatry Research*, 93, 263-266.
- Crow, S. J., Mitchell, J. E., Roerig, J. D., & Steffen, K. (2009). What potential role is there for medication treatment in anorexia nervosa? *International Journal of Eating Disorders*, 42, 1-8.
- Dare, C., Eisler, I., Russell, G., Treasure, J., & Dodge, L. (2001). Psychological therapies for adults with anorexia nervosa: randomised controlled trial of out-patient treatments. *The British Journal of Psychiatry*, 178, 216-221.
- Davies, H., & Tchanturia, K. (2005). Cognitive remediation therapy as intervention for acute Anorexia Nervosa: A case report. *European Eating Disorders Review*, 13, 311-316.
- Davison, K. K., Markey, C. N., & Birch, L. L. (2000). Etiology of body dissatisfaction and weight concerns among 5-year-old girls. *Appetite*, 35, 143-151.
- Dawson, D. L., Barnes-Holmes, D., Gresswell, D. M., Hart, A. J., & Gore, N. J. (2009). Assessing the Implicit Beliefs of Sexual Offenders Using

- the Implicit Relational Assessment Procedure: A First Study. *Sexual Abuse: A Journal of Research and Treatment*, 21, 57-75.
- De Houwer, J. (2002). The Implicit Association Test as a tool for studying dysfunctional associations in psychopathology: strengths and limitations. *Journal of Behavior Therapy and Experimental Psychiatry*, 33, 115-133.
- Derogatis, L. R. (1994). *Symptom Checklist-90-R: Administration, Scoring & Procedure Manual for the Revised Version of the SCL-90*. Minneapolis, MN: National Computer Systems.
- Dobson, K. S., & Dozois, D. J. A. (2001). Historical and Philosophical Bases of the Cognitive-Behavioral Therapies. In K. S. Dobson (Ed.), *Handbook of Cognitive-Behavioral Therapies* (2 ed., pp. 3-39). New York: The Guilford Press.
- Drake, C. E., Kellum, K. K., Wilson, K. G., Luoma, J. B., Weinstein, J. H., & Adams, C. H. (2010). Examining the Implicit Relational Assessment Procedure: Four preliminary studies. *The Psychological Record*, 60, 81-100.
- Eizaguirre, A. E., De Cabezon, A. O., De Alda, I. O., Olariaga, L. J., & Maite, J. (2004). Alexithymia and its relationships with anxiety and depression in eating disorders. *Personality and Individual Differences*, 36, 321-331.
- Fairburn, C. G. (2008). *Cognitive Behavior Therapy and Eating Disorders*. New York: Guilford Publications.
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: interview or self-report questionnaire? *International Journal of Eating Disorders*, 16, 363-370.
- Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12.0 D). Interview schedule. In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: nature, assessment and treatment* (pp. 333-360). New York: The Guilford Press.
- Fairburn, C. G., & Cooper, Z. (2007). Thinking afresh about the classification of eating disorders. *International Journal of Eating Disorders*, 40, S107-S110.
- Fairburn, C. G., & Cooper, Z. (2011). Eating disorders, DSM-5 and clinical reality. *The British Journal of Psychiatry*, 198, 8.
- Fairburn, C. G., Cooper, Z., Bohn, K., O'Connor, M. E., Doll, H. A., & Palmer, R. L. (2007). The severity and status of eating disorder NOS: Implications for DSM-V. *Behaviour Research and Therapy*, 45, 1705-1715.
- Fairburn, C. G., Cooper, Z., Doll, H. A., O'Connor, M. E., Bohn, K., Hawker, D. M., et al. (2009). Transdiagnostic Cognitive-Behavioral Therapy for Patients With Eating Disorders: A Two-Site Trial With 60-Week Follow-Up. *American Journal Of Psychiatry*, 166, 311-319.
- Fairburn, C. G., Cooper, Z., Doll, H. A., & Welch, S. L. (1999). Risk Factors for Anorexia Nervosa: Three Integrated Case-Control Comparisons. *Archives of General Psychiatry*, 56, 468-476.

- Fairburn, C. G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: a "transdiagnostic" theory and treatment. *Behaviour Research And Therapy, 41*, 509-528.
- Fairburn, C. G., & Harrison, P. J. (2003). Eating disorders. *Lancet, 361*, 407-416.
- Fairburn, C. G., Shafran, R., & Cooper, Z. (1999). A cognitive behavioural theory of anorexia nervosa. *Behaviour Research and Therapy, 37*, 1-13.
- Fassino, S., Pieró, A., Gramaglia, C., & Abbate-Daga, G. (2004). Clinical, psychopathological and personality correlates of interoceptive awareness in anorexia nervosa, bulimia nervosa and obesity. *Psychopathology, 37*, 168-174.
- Fassino, S., Pierò, A., Tomba, E., & Abbate-Daga, G. (2009). Factors associated with dropout from treatment for eating disorders: a comprehensive literature review. *BMC Psychiatry, 9*.
- Fava, M., Abraham, M., Clancy-Colecchi, K., Pava, J. A., Matthews, J., & Rosenbaum, J. F. (1997). Eating disorder symptomatology in major depression. *The Journal of nervous and mental disease, 185*, 140.
- Feighner, J. P., Robins, E., Guze, S. B., Woodruff, R. A., Jr., Winokur, G., & Munoz, R. (1972). Diagnostic Criteria for Use in Psychiatric Research. *Archives of General Psychiatry, 26*, 57-63.
- Folkman, S., & Lazarus, R. (1988). *Ways of coping questionnaire, permission set, manual, test booklets, scoring key*. Palo Alto, CA: Consulting Psychologists Press.
- Fox, A. P., Larkin, M., & Leung, N. (2011). The Personal Meaning of Eating Disorder Symptoms: An Interpretative Phenomenological Analysis. *Journal of Health Psychology, 16*, 116.
- Fox, J. R. E. (2009). A qualitative exploration of the perception of emotions in anorexia nervosa: A basic emotion and developmental perspective. *Clinical Psychology & Psychotherapy, 16*, 276-302.
- Fridell, M., Cesarec, Z., Johansson, M., & Malling-Thorsen, S. (2002). SCL-90: Svensk normering, standardisering och validering av symtomskalan *SiS följer upp och utvecklar*: Statens institutionsstyrelse.
- Frisch, M. B., Cornell, J., Villanueva, M., & Retzlaff, P. J. (1992). Clinical validation of the Quality of Life Inventory: A measure of life satisfaction for use in treatment planning and outcome assessment. *Psychological Assessment, 4*, 92-101.
- Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449-468.
- Fuchs, T. (2009). Phenomenology and Psychopathology. In D. Schmicking & S. Gallagher (Eds.), *Handbook of phenomenology and cognitive science* (pp. 547-574). New York: Springer Verlag.
- Garfinkel, P. E., & Garner, D. M. (1982). *Anorexia nervosa: A multidimensional perspective*. New York: Brunner/Mazel.
- Garner, D. M. (1991). *Eating Disorder Inventory- 2 professional manual*. Odessa, FL: Psychological Assessment Resources.

- Garner, D. M., & Bemis, K. M. (1982). A cognitive-behavioral approach to anorexia nervosa. *Cognitive Therapy and Research*, 6, 123-150.
- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2, 15-34.
- Ghaderi, A., & Scott, B. (2001). Prevalence, incidence and prospective risk factors for eating disorders. *Acta Psychiatrica Scand*, 104, 122-130.
- Godart, N., Perdereau, F., Rein, Z., Berthoz, S., Wallier, J., Jeammet, P., et al. (2007). Comorbidity studies of eating disorders and mood disorders. Critical review of the literature. *Journal of Affective Disorders*, 97, 37-49.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, 74, 1464-1480.
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, 39, 281-291.
- Halmi, K. A., Agras, W. S., Crow, S., Mitchell, J., Wilson, G. T., Bryson, S. W., et al. (2005). Predictors of treatment acceptance and completion in anorexia nervosa - Implications for future study designs. *Archives of General Psychiatry*, 62, 776-781.
- Harris, E. C., & Barraclough, B. (1998). Excess mortality of mental disorder. *The British Journal of Psychiatry*, 173, 11-53.
- Harrison, A., O'Brien, N., Lopez, C., & Treasure, J. (2010). Sensitivity to reward and punishment in eating disorders. *Psychiatry Research*, 177, 1-11.
- Harrison, A., Sullivan, S., Tchanturia, K., & Treasure, J. (2010). Emotional functioning in eating disorders: attentional bias, emotion recognition and emotion regulation. *Psychological Medicine*, 40, 1887-1897.
- Harrison, A., Tchanturia, K., & Treasure, J. (2010). Attentional bias, emotion recognition, and emotion regulation in Anorexia: State or trait? *Biological Psychiatry*, 68, 755-761.
- Hatch, A., Madden, S., Kohn, M., Clarke, S., Touyz, S., & Williams, L. (2010). Anorexia nervosa: towards an integrative neuroscience model. *European Eating Disorders Review*, 18, 165-179.
- Hayes, S. C., Barnes-Holmes, D., & Roche, B. (2001). *Relational Frame Theory: A post-Skinnerian account of human language and cognition*. New York: Plenum.
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44, 1-25.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York, NY: Guilford Press.
- Hayes, S. C., Villatte, M., Levin, M., & Hildebrandt, M. (2011). Open, aware, and active: Contextual approaches as an emerging trend in the

- behavioral and cognitive therapies. *Annual Review of Clinical Psychology*, 7, 141-168.
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Bissett, R., Piasecki, M., Batten, S. V., et al. (2004). A Preliminary trial of twelve-step facilitation and acceptance and commitment therapy with polysubstance-abusing methadone-maintained opiate addicts. *Behavior Therapy*, 35, 667-688.
- Hayes, S. C., Wilson, K. G., Strosahl, K., Gifford, E. V., & Follette, V. M. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, 64, 1152-1168.
- Heffner, M., Sperry, J., Eifert, G. H., & Detweiler, M. (2002). Acceptance and commitment therapy in the treatment of an adolescent female with anorexia nervosa: A case example. *Cognitive and Behavioral Practice*, 9, 232-236.
- Hoek, H. W. (2006). Incidence, prevalence and mortality of anorexia nervosa and other eating disorders. *Current Opinion in Psychiatry*, 19, 389-394.
- Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A meta-analysis on the correlation between the implicit association test and explicit self-report measures. *Personality and Social Psychology Bulletin*, 31, 1369-1385.
- Holmgren, S., Sohlberg, S., Berg, E., Johansson, B., Norring, C., & Rosmark, B. (1984). Phase 1 treatment for the chronic and previously treated anorexia. Bulimia nervosa patient. *International Journal of Eating Disorders*, 3, 17-36.
- Honkalampi, K., Hintikka, J., Tanskanen, A., Lehtonen, J., & Viinamäki, H. (2000). Depression is strongly associated with alexithymia in the general population. *Journal Of Psychosomatic Research*, 48, 99-104.
- Hudson, J. I., Hiripi, E., Pope Jr, H. G., & Kessler, R. C. (2007). The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, 61, 348-358.
- Jackson, C. W., Cates, M., & Lorenz, R. (2010). Pharmacotherapy of eating disorders. *Nutrition in Clinical Practice*, 25, 143.
- Jacobi, C., Hayward, C., de-Zwaan, M., Kraemer, H. C., & Agras, W. S. (2004). Coming to terms with risk factors for eating disorders: application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin*, 130, 19-65.
- Jacobson, N. S., & Truax, P. (1991). Clinical Significance: A Statistical Approach to Defining Meaningful Change in Psychotherapy Research. *Journal of Consulting and Clinical Psychology*, 59, 12-19.
- Johansson, L., Ghaderi, A., & Andersson, G. (2005). Stroop interference for food-and body-related words: A meta-analysis. *Eating behaviors*, 6, 271-281.
- Jänsch, C., Harmer, C., & Cooper, M. (2009). Emotional processing in women with anorexia nervosa and in healthy volunteers. *Eating behaviors*, 10, 184-191.

- Kaye, W. H., Fudge, J. L., & Paulus, M. (2009). New insights into symptoms and neurocircuit function of anorexia nervosa. *Nature Reviews Neuroscience*, *10*, 573-584.
- Keel, P., & Brown, T. (2010). Update on course and outcome in eating disorders. *International Journal of Eating Disorders*, *43*, 195-204.
- Keski-Rahkonen, A., Hoek, H. W., Susser, E. S., Linna, M. S., Sihvola, E., Raevuori, A., et al. (2007). Epidemiology and course of anorexia nervosa in the community. *American Journal Of Psychiatry*, *164*, 1259.
- Keski-Rahkonen, A., Raevuori, A., & Hoek, H. W. (2008). Epidemiology of eating disorders: an update. In S. Wonderlich, J. Mitchell, M. de Zwaan & H. Steiger (Eds.), *Annual Review of Eating Disorders: Part 2* (pp. 58-68). Abingdon: Radcliffe Publishing Ltd.
- Klein, D. A., & Walsh, B. T. (2004). Eating disorders: clinical features and pathophysiology. *Physiology & Behavior*, *81*, 359-374.
- Kooiman, C. G., Spinhoven, P., & Trijsburg, R. W. (2002). The assessment of alexithymia: A critical review of the literature and a psychometric study of the Toronto Alexithymia Scale-20. *Journal of Psychosomatic Research*, *53*, 1083-1090.
- Kraemer, H. C., Kazdin, A. E., Offord, D. R., Kessler, R. C., Jensen, P. S., & Kupfer, D. J. (1997). Coming to terms with the terms of risk. *Archives of General Psychiatry*, *54*, 337-343.
- Lane, R. D., Quinlan, D. M., Schwartz, G. E., Walker, P. A., & Zeitlin, S. B. (1990). The Levels Of Emotional Awareness Scale - A Cognitive-Developmental Measure Of Emotion. *Journal Of Personality Assessment*, *55*, 124-134.
- Lane, R. D., Sechrest, L., Reidel, R., Weldon, V., Kaszniak, A., & Schwartz, G. E. (1996). Impaired verbal and nonverbal emotion recognition in alexithymia. *Psychosomatic Medicine*, *58*, 203.
- Lane, R. D., Sechrest, L., & Riedel, R. (1998). Sociodemographic correlates of alexithymia. *Comprehensive Psychiatry*, *39*, 377-385.
- Lane, R. D., Sechrest, L., Riedel, R., Shapiro, D. E., & Kaszniak, A. W. (2000). Pervasive emotion recognition deficit common to alexithymia and the repressive coping style. *Psychosomatic Medicine*, *62*, 492.
- Levine, M. P., & Murnen, S. K. (2009). "Everybody Knows That Mass Media are/are not [pick one] a Cause of Eating Disorders": A Critical Review of Evidence for a Causal Link Between Media, Negative Body Image, and Disordered Eating in Females. *Journal Of Social And Clinical Psychology*, *28*, 9-42.
- Lindblad, F., Lindberg, L., & Hjern, A. (2006). Improved survival in adolescent patients with anorexia nervosa: A comparison of two Swedish national cohorts of female patients. *American Journal of Psychiatry*, *163*, 1433-1435.
- Lock, J., Le Grange, D., Agras, W. S., Moye, A., Bryson, S. W., & Jo, B. (2010). Randomized clinical trial comparing family-based treatment with adolescent-focused individual therapy for adolescents with anorexia nervosa. *Archives of General Psychiatry*, *67*, 1025.

- Loeb, K., Wilson, G., Gilbert, J., & Labouvie, E. (2000). Guided and unguided self-help for binge eating. *Behaviour Research and Therapy*, *38*, 259-272.
- Lopez, C., Tchanturia, K., Stahl, D., & Treasure, J. (2008). Central coherence in eating disorders: a systematic review. *Psychological Medicine*, *38*, 1393-1404.
- Lundh, L. G., Johnsson, A., Sundqvist, K., & Olsson, H. (2002). Alexithymia, memory of emotion, emotional awareness, and perfectionism. *Emotion*, *2*, 361-379.
- McIntosh, V. V. W., Jordan, J., Carter, F. A., Luty, S. E., McKenzie, J. M., Bulik, C. M., et al. (2005). Three psychotherapies for anorexia nervosa: a randomized, controlled trial. *American Journal of Psychiatry*, *162*, 741.
- McKenna, I. M., Barnes-Holmes, D., Barnes-Holmes, Y., & Stewart, I. (2007). Testing the Fake-ability of the Implicit Relational Assessment Procedure (IRAP): The First Study. *International Journal of Psychology & Psychological Therapy*, *7*, 123-138.
- Merwin, R. M., Zucker, N. L., Lacy, J. L., & Elliott, C. A. (2010). Interoceptive awareness in eating disorders: Distinguishing lack of clarity from non-acceptance of internal experience. *Cognition and emotion*, *24*, 892-902.
- Miller, S. P., Erickson, S. J., Branom, C., & Steiner, H. (2009). Habitual Response to Stress in Recovering Adolescent Anorexic Patients. *Child psychiatry and human development*, *40*, 43-54.
- Miller, S. P., Redlich, A. D., & Steiner, H. (2003). The stress response in anorexia nervosa. *Child psychiatry and human development*, *33*, 295-306.
- Montebarocci, O., Codispoti, M., Surcinelli, P., Franzoni, E., Baldaro, B., & Rossi, N. (2006). Alexithymia in female patients with eating disorders. *Eating and Weight Disorders*, *11*, 14-21.
- Murphy, R., Straebl, S., Cooper, Z., & Fairburn, C. G. (2010). Cognitive Behavioral Therapy for Eating Disorders. *Psychiatric Clinics Of North America*, *33*, 611-627.
- NICE. (2004). Eating disorders: Core interventions in the treatment and management of anorexia nervosa, bulimia nervosa and related eating disorders. Retrieved 03/23, 2011, from <http://guidance.nice.org.uk/CG9>
- Nordbø, R. H. S., Espeset, E. M. S., Gulliksen, K. S., Skårderud, F., & Holte, A. (2006). The meaning of self-starvation: Qualitative study of patients' perception of anorexia nervosa. *International Journal of Eating Disorders*, *39*, 556-564.
- Oldershaw, A., Hambrook, D., Stahl, D., Tchanturia, K., Treasure, J., & Schmidt, U. (2010). The socio-emotional processing stream in Anorexia Nervosa. *Neuroscience & Biobehavioral Reviews*, 970-988.
- Oldershaw, A., Hambrook, D., Tchanturia, K., Treasure, J., & Schmidt, U. (2010). Emotional theory of mind and emotional awareness in recovered anorexia nervosa patients. *Psychosomatic Medicine*, *72*, 73.

- Papadopoulos, F. C., Ekbom, A., Brandt, L., & Ekselius, L. (2009). Excess mortality, causes of death and prognostic factors in anorexia nervosa. *The British Journal of Psychiatry*, *194*, 10-17.
- Peat, C., Mitchell, J., Hoek, H. W., & Wonderlich, S. (2009). Validity and utility of subtyping anorexia nervosa. *International Journal of Eating Disorders*, *42*, 590-594.
- Pike, K. M., Hilbert, A., Wilfley, D., Fairburn, C. G., Dohm, F. A., Walsh, B., et al. (2008). Toward an understanding of risk factors for anorexia nervosa: a case-control study. *Psychological Medicine*, *38*, 1443-1453.
- Pike, K. M., Walsh, B. T., Vitousek, K., Wilson, G. T., & Bauer, J. (2003). Cognitive behavior therapy in the posthospitalization treatment of anorexia nervosa. *American Journal Of Psychiatry*, *160*, 2046-2049.
- Pollice, C., Kaye, W. H., Greeno, C. G., & Weltzin, T. E. (1997). Relationship of depression, anxiety, and obsessiveness to state of illness in anorexia nervosa. *International Journal of Eating Disorders*, *21*, 367-376.
- Power, P., Barnes-Holmes, D., Barnes-Holmes, Y., & Stewart, I. (2009). The Implicit Relational Assessment Procedure (IRAP) as a measure of implicit relative preferences: a first study. *The Psychological Record*, *59*, 621-639.
- Preti, A., de Girolamo, G., Vilagut, G., Alonso, J., de Graaf, R., Bruffaerts, R., et al. (2009). The epidemiology of eating disorders in six European countries: Results of the ESEMeD-WMH project. *Journal Of Psychiatric Research*, *43*, 1125-1132.
- Procidano, M. E., & Heller, K. (1983). Measures of perceived social support from friends and from family: three validation studies. *American Journal Community Psychology*, *11*, 1-24.
- Quinton, S., & Wagner, H. L. (2005). Alexithymia, ambivalence over emotional expression, and eating attitudes. *Personality and Individual Differences*, *38*, 1163-1173.
- Raudenbush, S., & Bryk, A. (2001). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.
- Ricca, V., Castellini, G., Lo Sauro, C., Mannucci, E., Ravaldi, C., Rotella, F., et al. (2010). Cognitive-behavioral therapy for threshold and subthreshold anorexia nervosa: a three-year follow-up study. *Psychotherapy and Psychosomatics*, *79*, 238-248.
- Ricciardelli, L. A., & McCabe, M. P. (2001). Children's body image concerns and eating disturbance A review of the literature. *Clinical Psychology Review*, *21*, 325-344.
- Roberts, M. E., Tchanturia, K., Stahl, D., Southgate, L., & Treasure, J. (2007). A systematic review and meta-analysis of set-shifting ability in eating disorders. *Psychological Medicine*, *37*, 1075-1084.
- Robin, A. L., Siegel, P. T., Moye, A. W., Gilroy, M., Dennis, A. B., & Sikand, A. (1999). A controlled comparison of family versus individual therapy for adolescents with anorexia nervosa. *Journal of the American Academy of Child & Adolescent Psychiatry*, *38*, 1482-1489.

- Roddy, S., Stewart, I., & Barnes-Holmes, D. (2010). Anti-fat, pro-slim, or both?: Using two reaction-time based measures to assess implicit attitudes to the slim and overweight. *Journal of Health Psychology, 15*, 416-425.
- Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books Inc.
- Rosenthal, R., & Rosnow, R. (1991). *Essentials of Behavioral Research: Methods and Data Analysis*. New York, NY: McGraw-Hill. .
- Rosling, A. M., Sparrén, P., Norring, C., & von Knorring, A. L. (2011). Mortality of eating Disorders: A follow up study of treatment in a specialist unit 1974-2000. *International Journal of Eating Disorders, 44*, 304-310.
- Russell, G. (1970). Anorexia nervosa: its identity as an illness and its treatment. In J. H. Prince (Ed.), *Modern trends in psychological medicine* (2 ed., pp. 131-164). London: Butterworths.
- Russell, G., Szukler, G. I., Dare, C., & Eisler, I. (1987). An evaluation of family therapy in anorexia nervosa and bulimia nervosa. *Archives of General Psychiatry, 44*, 1047-1056.
- Russell, T., Schmidt, U., Doherty, L., Young, V., & Tchanturia, K. (2009). Aspects of social cognition in anorexia nervosa: Affective and cognitive theory of mind. *Psychiatry Research, 168*, 181-185.
- Råstam, M., Gillberg, C., Gillberg, I., & Johansson, M. (1997). Alexithymia in anorexia nervosa: a controlled study using the 20 item Toronto Alexithymia Scale. *Acta Psychiatrica Scandinavica, 95*, 385-388.
- Salminen, J. K., Saarijärvi, S., Äärelä, E., & Tamminen, T. (1994). Alexithymia--state or trait? One-year follow-up study of general hospital psychiatric consultation out-patients. *Journal Of Psychosomatic Research, 38*, 681-685.
- Schmidt, U., & Treasure, J. (2006). Anorexia nervosa: Valued and visible. A cognitive-interpersonal maintenance model and its implications for research and practice. *British Journal of Clinical Psychology, 45*, 343-366.
- Schwartz, M. B., Vartanian, L. R., Nosek, B. A., & Brownell, K. D. (2006). The Influence of One's Own Body Weight on Implicit and Explicit Anti-fat Bias. *Obesity, 14*, 440-447.
- Serfaty, M. A., Turkington, D., Heap, M., Ledsham, L., & Jolley, E. (1999). Cognitive therapy versus dietary counselling in the outpatient treatment of anorexia nervosa: effects of the treatment phase. *European Eating Disorders Review, 7*, 334-350.
- Sexton, M. C., Sunday, S. R., Hurt, S., & Halmi, K. A. (1998). The relationship between alexithymia, depression, and axis II psychopathology in eating disorder inpatients. *International Journal of Eating Disorders, 23*, 277-286.
- Shafran, R., Cooper, Z., & Fairburn, C. G. (2002). Clinical perfectionism: a cognitive-behavioural analysis. *Behaviour Research and Therapy, 40*, 773-791.

- Slade, P. (1982). Towards a functional analysis of anorexia nervosa and bulimia nervosa. *The British journal of clinical psychology*, 21, 167-179.
- Southgate, L., Tchanturia, K., & Treasure, J. (2005). Building a model of the aetiology of eating disorders by translating experimental neuroscience into clinical practice. *Journal of Mental Health*, 14, 553-566.
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Mind Garden.
- Spitzer, R. L., Williams, J. B., Gibbon, M., & First, M. B. (1992). The Structured Clinical Interview for DSM-III-R (SCID). I: history, rationale, and description. *Archives of General Psychiatry*, 49, 624-629.
- Steinhausen, H. C. (2002). The outcome of anorexia nervosa in the 20th century. *American Journal Of Psychiatry*, 159, 1284.
- Striegel-Moore, R. H., & Bulik, C. M. (2007). Risk factors for eating disorders. *American Psychologist*, 62, 181-198.
- Strober, M., Freeman, R., Lampert, C., Diamond, J., & Kaye, W. (2001). Males with anorexia nervosa: A controlled study of eating disorders in first degree relatives. *International Journal of Eating Disorders*, 29, 263-269.
- Stöving, R. K., Andries, A., Brixen, K., Bilenberg, N., & Hörder, K. (2011). Gender differences in outcome of eating disorders: A retrospective cohort study. *Psychiatry Research*, 186, 362-366.
- Subic-Wrana, C., Bruder, S., Thomas, W., Lane, R. D., & Kohle, K. (2005). Emotional Awareness Deficits in Inpatients of a Psychosomatic Ward: A Comparison of Two Different Measures of Alexithymia. *Psychosomatic Medicine*, 67, 483-489.
- Svanborg, P., & Åsberg, M. (2001). A comparison between the Beck Depression Inventory (BDI) and the self-rating version of the Montgomery Asberg Depression Rating Scale (MADRS). *Journal of Affective Disorders*, 64, 203-216.
- Swinbourne, J., & Touyz, S. (2007). The co-morbidity of eating disorders and anxiety disorders: a review. *European Eating Disorders Review*, 15, 253-274.
- Taylor, G. J., Bagby, R. M., & Parker, J. D. A. (1997). *Disorders of affect regulation: Alexithymia in medical and psychiatric illness*. New York: Cambridge University Press.
- Taylor, G. J., Parker, J. D. A., Bagby, R. M., & Bourke, M. P. (1996). Relationships between alexithymia and psychological characteristics associated with eating disorders. *Journal Of Psychosomatic Research*, 41, 561-568.
- Tchanturia, K., Davies, H., & Campbell, I. C. (2007). Cognitive remediation therapy for patients with anorexia nervosa: Preliminary findings. *Annals of General Psychiatry*, 6, 14.
- Tchanturia, K., Liao, P.-C., Uher, R., Lawrence, N., Treasure, J., & Campbell, I. C. (2007). An investigation of decision making in anorexia nervosa using the Iowa Gambling Task and skin conductance

- measurements. *Journal of the International Neuropsychological Society*, 13, 635-641.
- Tenconi, E., Santonastaso, P., Degortes, D., Bosello, R., Titton, F., Mapelli, D., et al. (2010). Set-shifting abilities, central coherence, and handedness in anorexia nervosa patients, their unaffected siblings and healthy controls: Exploring putative endophenotypes. *World Journal of Biological Psychiatry*, 1-11.
- Tiggemann, M. (2004). Media Influences on Body Image Development. In T. F. Cash & T. Pruzinsky (Eds.), *Body Image: A handbook of theory, research, & clinical practice* (pp. 91-98). New York: The Guilford Press.
- Treasure, J., Claudino, A. M., & Zucker, N. L. (2010). Eating disorders. *The Lancet*, 375, 583-593.
- Treasure, J., Tchanturia, K., & Schmidt, U. (2005). Developing a model of the treatment for eating disorder: using neuroscience research to examine the how rather than the what of change. *Counselling and Psychotherapy Research*, 5, 191-202.
- Treasure, J., Todd, G., Brolly, M., Tiller, J., Nehmed, A., & Denman, F. (1995). A pilot study of a randomised trial of cognitive analytical therapy vs educational behavioral therapy for adult anorexia nervosa. *Behaviour Research and Therapy*, 33, 363-367.
- Turner, H., & Bryant Waugh, R. (2004). Eating disorder not otherwise specified (EDNOS): profiles of clients presenting at a community eating disorder service. *European Eating Disorders Review*, 12, 18-26.
- van den Berg, P., & Thompson, J. K. (2007). Self-schema and social comparison explanations of body dissatisfaction: A laboratory investigation. *Body Image*, 4, 29-38.
- Vandereycken, W. (2002). History of anorexia nervosa and bulimia nervosa. In C. G. Fairburn & K. D. Brownell (Eds.), *Eating disorders and obesity: A comprehensive handbook* (2 ed.). New York: The Guilford Press.
- Vanheule, S. (2008). Challenges for Alexithymia Research: A Commentary on “The Construct of Alexithymia: Associations With Defense Mechanisms”. *Journal Of Clinical Psychology*, 64, 332-337.
- Vartanian, L. R., Herman, P. C., & Polivy, J. (2005). Implicit and explicit attitudes toward fatness and thinness: The role of the internalization of societal standards. *Body Image*, 2, 373-381.
- Vartanian, L. R., Polivy, J., & Herman, C. P. (2004). Implicit cognitions and eating disorders: Their application in research and treatment. *Cognitive And Behavioral Practice*, 11, 160-167.
- Verbeke, G., & Molenberghs, G. (2000). *Linear mixed models for longitudinal data*. NY: Springer-Verlag.
- Vilardaga, R., Hayes, S. C., Levin, M. E., & Muto, T. (2009). Creating a strategy for progress: A contextual behavioral science approach. *The Behavior Analyst*, 32, 105-133.

- Vitousek, K., & Hollon, S. D. (1990). The investigation of schematic content and processing in eating disorders. *Cognitive Therapy and Research*, *14*, 191-214.
- Vitousek, K., & Manke, F. (1994). Personality variables and disorders in anorexia nervosa and bulimia nervosa. *Journal of Abnormal Psychology*, *103*, 137-147.
- Wackerly, D. D., Mendenhall, W. I., & Scheaffer, R. L. (2008). *Mathematical statistics with applications*. Southbank: Thomson Learning.
- Welch, E., Birgegård, A., Parling, T., & Ghaderi, A. (2011). Eating Disorder Examination Questionnaire and Clinical Impairment Assessment Questionnaire: General population and clinical norms for young adult women in Sweden. *Behaviour Research and Therapy*, *49*, 85-91.
- Wilson, G. T., & Shafran, R. (2005). Eating disorders guidelines from NICE. *The Lancet*, *365*, 79-81.
- Wonderlich, S., Crosby, R., Mitchell, J., & Engel, S. (2007). Testing the validity of eating disorder diagnoses. *International Journal of Eating Disorders*, *40*, S40-S45.
- Wonderlich, S., Joiner, T., Keel, P., Williamson, D., & Crosby, R. (2007). Eating disorder diagnoses: Empirical Approaches to Classification. *American Psychologist*, *62*, 167-180.

# Appendix

## DSM-IV-TR criteria for Bulimia nervosa and EDNOS

Table 6. *DSM-IV-TR criteria for BN*

- 
- A Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
    - 1 eating in a discrete period (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 Anorexia Nervosa.

### Specific type

Purging type: during the current episode of Bulimia Nervosa, 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 Bulimia Nervosa, the person has used other inappropriate 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.

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The proposed changes for BN include relaxing the occurrences of binges to once a week over the last three months and removal of the specification of sub-typing (purging or non-purging). BED will be added to the EDs. The proposed criteria for BED include; the A1 and A2 criteria for BN (see Table 6), three out five B criteria (e.g., eating rapidly, until uncomfortably full, and eating when not hungry), and marked distress (C), binges at least once a week for three months, and finally (D), binges should not be associated with compensatory behavior.

Table 7. *DSM-IV-TR criteria for EDNOS.*

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The Eating Disorder Not Otherwise Specified category is for disorders of eating that do not meet the criteria for any specific Eating Disorder. Examples include:

- 1 For females, all of the criteria for Anorexia Nervosa are met except that the individual has regular menses.
  - 2 All of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual's current weight is in the normal range.
  - 3 All of the criteria for Bulimia Nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for duration of less than 3 months.
  - 4 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).
  - 5 Repeatedly chewing and spitting out, but not swallowing, large amounts of food.
  - 6 Binge Eating Disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of Bulimia Nervosa (see Appendix B in DSM-IV-TR for suggested research criteria).
- 

Unspecified Feeding or Eating Disorder will replace the EDNOS category and will include specific conditions that should be assigned to those who do not meet the criteria for full ED (e.g., atypical AN, subthreshold BN, subthreshold BED, or purging disorder).



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