Eating Disorders
Steps Towards an Increased Understanding

ELISABETH WELCH
Eating disorders and disordered eating attitudes and behaviors are characterized by an over-evaluation of weight and shape, under or over-controlled eating, as well as engagement in compensatory behaviors. The disorders are associated with psychological suffering, acute and long-term health impairments, a high rate of suicide attempts as well as an increased risk of mortality. Knowledge regarding the etiology of eating disorders is limited and based on current models it is not possible to adequately predict either who will get an eating disorder or who will recover. This lack of understanding has hindered the development of effective prevention and treatment interventions.

The aim of the present thesis was to contribute towards an increased understanding of eating disorders and disordered eating attitudes and behavior through the collection of norms and psychometric data, investigation of risk factors and their roles, and focusing on the understudied group of males with eating disorders. Five studies were included. Specifically, Study I focused on collecting general population and clinical norms on the well-established Eating Disorder Examination Questionnaire (EDE-Q) and the Clinical Impairment Assessment Questionnaire (CIA). Study II both collected general population norms on, and investigated psychometric properties of, the Body Shape Questionnaire (BSQ-8C), an instrument intended to assess body dissatisfaction. Study III focused on the role of perfectionism (an established risk factor for eating disorders) as a possible mediator or moderator between body dissatisfaction and disordered eating behavior and attitudes. Finally, in Study IV and V attention was placed on males. In Study IV the specific aim was to compare the clinical characteristics between young males and females with eating disorders while in study V the specific aim was to explore variables associated with disordered eating among young males based on a compilation of factors known to play a role among females as well as factors thought to be uniquely associated with males, such as sexual orientation and drive for muscularity. A greater understanding of eating disorders will help reduce the stigma that is associated with eating disorders, easing the way for affected individuals to seek help and ultimately improve the development of effective prevention and intervention.

Keywords:

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To my family
List of Papers

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


IV  Welch, E., Ghaderi, A., & Swenne, I. A comparison of clinical characteristics between adolescent males and females with eating disorders. *Manuscript submitted for publication*

V  Welch, E., Bulik, C., Myräl, M., & Ghaderi, A. Disordered eating attitudes and behavior in young Swedish males: sexual orientation and drive for musculaity. *Manuscript submitted for publication*

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<tr>
<td>ADHD</td>
<td>Attention Deficit Hyperactivity Disorder</td>
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<td>APA</td>
<td>American Psychiatric Association</td>
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<td>BMI</td>
<td>Body Mass Index</td>
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<tr>
<td>BMI-SDS</td>
<td>Body Mass Index - Standard Deviation Score</td>
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<td>BSQ</td>
<td>Body Shape Questionnaire</td>
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<td>BSQ-8C</td>
<td>Body Shape Questionnaire version 8C</td>
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<td>CIA</td>
<td>Clinical Impairment Assessment Questionnaire</td>
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<td>DMS</td>
<td>Drive for Muscularity Scale</td>
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<td>DMSATTS</td>
<td>DMS Muscularity-Oriented Body Image Attitudes subscale</td>
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<td>DMSBEHAV</td>
<td>DMS Muscle Development Behaviors subscale</td>
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<td>DSM-IV</td>
<td>Diagnostic and Statistical Manual fourth edition</td>
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<td>DSM-5</td>
<td>Diagnostic and Statistical Manual fifth edition</td>
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<td>EAT-26</td>
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<td>EDI-2</td>
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<td>Eating Disorder Inventory-2 Socially Prescribed Perfectionism</td>
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<td>EDI-P-SOP</td>
<td>Eating Disorder Inventory-2 Self-Oriented Perfectionism</td>
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<td>EDNOS</td>
<td>Eating Disorder Not Otherwise Specified</td>
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<td>EDE</td>
<td>Eating Disorder Examination</td>
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<td>EDE-Q</td>
<td>Eating Disorder Examination Questionnaire</td>
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<td>MPS</td>
<td>Multidimensional Perfectionism Scale</td>
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<td>MPS-SOP</td>
<td>Multidimensional Perfectionism Scale Self Oriented Perfectionism</td>
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<td>MPS-SSP</td>
<td>Multidimensional Perfectionism Scale Socially Prescribed Perfectionism</td>
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<td>MPS-OOP</td>
<td>Multidimensional Perfectionism Scale Other Oriented Perfectionism</td>
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<td>SD</td>
<td>Standard deviation</td>
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<td>SWLS</td>
<td>Satisfaction With Life Scale</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Introduction

Mental disorders

Definition
Mental disorders are defined as “syndromes characterized by clinically significant disturbances in an individual’s cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning” (American Psychiatric Association, 2013, p. 20).

Prevalence of mental disorders
Prevalence data suggest that mental health disorders affect a significant number of people. Based on a large study of close to 30,000 people from seven countries in North America, Latin America and Europe by the World Health Organization, we know that as many as one in five adults are expected to experience a mental disorder every year, and we also know that close to 40% of the population in Canada, Germany and Brazil and an even higher percentage of adults in the Netherlands and the US will suffer from some type of mental disorder in their lifetime (WHO, 2000). Being young provides little protection against mental illness as data suggest that the majority of mental disorders in adults emerge prior to adulthood (Merikangas et al., 2010). For example, in one Canadian epidemiological study, the median age for the onset of anxiety disorders in Canada was 15 years of age (WHO, 2000). The prevalence of mental disorders in adolescents is even higher than the most frequent major physical conditions in adolescence such as asthma and diabetes (Merikangas, et al., 2010). Just over 20% of children and adolescents, either currently or some time in their life, suffer from a mental disorder with severe impairment or distress (Merikangas, et al., 2010).

Costs associated with mental disorders
Mental disorders are characterized by great suffering, manifested in significant distress or impairment in most aspects of life, including social, occupational, and other key activities (American Psychiatric Association, 2013).
Mental health issues are often associated with decreased physical health, which, on an individual level, sometimes is irreversible or even a threat to life (Prince et al., 2007).

Mental disorders are truly chronic disorders. This chronicity is in turn reflected in the high rate of disability. In fact, mental disorders are the number one cause of disability worldwide, outnumbering the negative effects of major physical conditions such as heart disease and cancer (U. S. Burden of Disease Collaborators, 2013).

The costs associated with the maintenance and treatment of mental disorders are enormous, equivalent to that spent on cancer care and only surpassed by heart condition and trauma-related disorder expenditures (National Institute of Mental Health, 2014). Furthermore, of the five most costly medical conditions in the United States, expenditures for mental disorders are increasing by far the fastest, having risen 63% to 57.5 billion dollars from 1996 to 2006. However, these are only the direct expenditures and do not capture the hidden costs associated with mental illness such as failure to fulfill academic and career potential, sick leave, and unemployment.

**Eating disorders**

It is clear that mental health issues are associated with pronounced costs to society and the individual. The focus of this thesis is on a particular class of mental health disorders that concern body image and eating disturbances (i.e., eating disorders). Eating disorders are defined as a combination of three factors (Striegel-Moore & Bulik, 2007):

1) an overevaluation of weight and shape, meaning that a person judges his or her self-worth mainly in terms of shape and weight;
2) over- or undercontrol of eating in the form of either severe dietary restriction or binge eating; and
3) engaging in extreme compensatory behavior such as self-induced vomiting or excessive exercise with the aim of controlling weight and shape.

Using the definitions and criteria proposed by the fifth edition of the Diagnostic and Statistical Manual (DSM-5), Eating disorders or the more recent terminology Feeding and eating disorders refer to a “persistent disturbance of eating or eating-related behavior that results in the altered consumption or absorption of food and that significantly impairs physical health or psychosocial functioning” (American Psychiatric Association, 2013, p. 329). Feeding and eating disorders can, according to the DSM-5, be subdivided into a number of areas:
• pica (i.e., having an appetite for non-nutritive substances)
• rumination disorder (effortless regurgitation of most meals)
• avoidant/restrictive food intake disorder
• anorexia nervosa
• bulimia nervosa
• binge eating disorder
• other specified feeding or eating disorder
• unspecified feeding or eating disorder.

In this thesis anorexia nervosa, bulimia nervosa, binge eating disorder and other specified feeding or eating disorder are examined and not the other eating disorders listed in the DSM-5.

Anorexia nervosa

Taking a look first at anorexia nervosa, according to the DSM-5 this disorder is manifested by:

1) a persistent restriction in energy intake resulting in a significantly low body weight when taking age, sex, developmental trajectory and physical health into account
2) an intense fear of gaining weight or of becoming fat or persistent engagement in behavior that interferes with weight gain, and
3) a disturbance in how one perceives one’s own weight or shape.

There are two subtypes of anorexia nervosa dubbed the restricting type and the binge-eating/purging type. The restricting type is characterized by dieting, fasting and/or excessive exercise. An individual with restricting type anorexia nervosa does not engage in any regular episodes of binge eating or purging (i.e., self-induced vomiting, misuse of laxatives, diuretics or enemas). The binge-eating/purging type is also characterized by dieting, fasting and/or excessive exercise, but does engage in regular binge eating or purging episodes.

Bulimia nervosa

The second eating disorder we will look at is bulimia nervosa, which is manifested by:

1) recurrent episodes of binge eating,
2) recurrent engagement of inappropriate compensatory behavior (i.e., self-induced vomiting, misuse of laxatives, diuretics, or other medi-
cations, fasting or excessive exercise) with the intention to prevent weight gain, and
3) a self-evaluation that is unduly influenced by weight and shape.

Binge eating in the context of bulimia nervosa is defined by the DSM-5 as eating an amount of food in a discrete period of time (e.g., two hours) that is substantially larger than what most people would eat in a similar period of time or under similar circumstances (thus precluding, for example, a large holiday meal from being labeled a binge episode). Moreover, the binge-eating episode is accompanied with a lack of control, i.e., the person can neither control when or how much to eat. The binge-eating and compensatory behavior are to occur a minimum of once a week during 3 months.

**Binge eating disorder**

Binge eating disorder is characterized with recurrent binge eating episodes, at least once a week, during 3 months. Here the binge eating episodes are defined like they are for bulimia nervosa, but with the caveat that the binge eating is associated with at least three of the following:

1) Eating much more rapidly than normal
2) Eating until uncomfortably full
3) Eating large amounts when not feeling physically hungry
4) Eating alone because of feeling embarrassed by how much one is eating
5) Feeling disgusted with oneself, depressed, or very guilty afterward.

In addition there should be a marked distress associated with the binge eating.

**Other specified feeding or eating disorder**

A diagnosis of other specified feeding or eating disorder is given when there are symptoms of a feeding and eating disorder that causes clinically significant distress or impairment but the diagnostic criteria for the other feeding and eating disorder classes are not met. Other specified feeding or eating disorder is accompanied by a specification of why the diagnostic criteria for the other feeding and eating disorders are not met. Examples include: atypical anorexia nervosa; bulimia nervosa of low frequency and/or duration; binge eating disorder of low frequency and/or duration; purging disorder; and night eating syndrome. In situations when the clinician for various reasons chooses not to specify why the diagnostic criteria for the other feeding and eating disorders are not met, the diagnosis unspecified feeding or eating disorder is given.
Diagnostic criteria

It should be noted that the second empirical study included in this thesis was written before publication of the DSM-5, and thus the DSM-IV diagnostic criteria were used for the clinical sample included in that study. According to the DSM-IV, the diagnostic criteria for anorexia nervosa requires amenorrhea (i.e., absence of a menstrual period) for menstruating females. The DSM-IV also requires a higher frequency of binge eating and purging episodes for the diagnosis of bulimia nervosa. Finally, binge eating disorder falls under the eating disorder not otherwise specified category, which is more or less equivalent to other specified feeding or eating disorder in the DSM-5.

It should also be emphasized that eating disorders are characterized by frequent crossovers from one subtype of a disorder to another, as well as from one eating disorder to another. In other words, an individual may first fulfill the diagnostic criteria for restrictive type anorexia nervosa, only to at a later point in time fulfill the diagnostic criteria for the binge-eating/purging subtype and then perhaps even later migrate to a diagnosis of bulimia nervosa or other specified feeding or eating disorder. In a longitudinal study by Eddy and colleagues (2008) focusing on females, it was found that in the span of 7 years the majority of women with anorexia nervosa experience a diagnostic crossover either between the restricting and binge-eating/purging subtype of anorexia nervosa or from anorexia nervosa to bulimia nervosa and then often back to anorexia nervosa again. However, the authors found that a crossover from bulimia nervosa to anorexia nervosa was less likely to take place.

The terms disordered eating and eating pathology refer to eating behavior or symptoms such as severe dietary restraint, self-induced vomiting, binge eating or compensatory behavior indicative of problematic or abnormal eating or relationships to eating. The term disordered eating is used either when the full criteria for an eating disorder have not been meet or a full eating disorder diagnosis has not been assessed.

Prevalence of Eating Disorders

A large, nationally representative face-to-face survey in the United States ($n = 9282$) indicate that the lifetime prevalence for anorexia nervosa, bulimia nervosa and binge eating disorders is close to 6% (Hudson, Hiripi, Pope, & Kessler, 2007). When including sub-threshold binge eating disorder as well as any binge eating, the lifetime prevalence rises above 10%. In a study of more than 80,000 adolescents in the US, more than half of the females in ninth grade (56%) and twelfth grade (57%) reported engaging in one or more disordered eating behavior (Croll, Neumark-Sztainer, Story, & Ireland, 2002). In turn, disordered eating increases the risk of developing partial or
full syndrome eating disorders (Forman-Hoffman, 2004). So perhaps it comes as less of a surprise that anorexia nervosa is the third most chronic disorder after asthma and obesity among female adolescents (Lucas, Beard, O'Fallon, & Kurland, 1991).

Older adults with eating disorders have received less attention than adolescents or young adults, but according to Bulik (2013) the most common profile of an individual with an eating disorder is a woman in her thirties or forties struggling with weight control and suffering from binge eating disorder. Thus it is important to keep in mind that eating disorders do not discriminate; anyone, regardless of gender, age, race, body type or even sexual orientation can develop these disorders.

**Prevalence in males**

The prevalence rates for males are more uncertain, as males have not been well researched. However, recent data indicate that many more males than previously thought are affected by eating disorders. A recent population-based survey found that approximately one fourth of the cases of anorexia nervosa and bulimia nervosa were males (Hudson, et al., 2007). Likewise, a study of young adults aged 14-20 years presenting at an emergency department in Michigan, United States found that of 16% of the adolescents and young adults screening positive for an eating disorder, 26.6 % were males (Dooley-Hash, Banker, Walton, Ginsburg, & Cunningham, 2012). Moreover, other studies report a male to female ratio of 1:2 for full or partial syndrome anorexia nervosa and 1:2.9 for full or partial syndrome bulimia nervosa (Woodside et al., 2001). These numbers are in sharp contrast to discussions taking place only few decades ago where it was debated if males could have eating disorders at all, especially anorexia nervosa (e.g., Kidd & Wood, 1966). However, even recent data may not accurately reflect the true prevalence since the nosology of eating disorders has been skewed against men and normative data has largely been lacking (Jones & Morgan, 2010).

Males with eating disorders appear to be at a disadvantage in several respects when it comes to receiving treatment. First of all, there is evidence that they are less likely to seek help (O'Dea & Abraham, 2002). This may also be reflected in the relatively low proportion of male patients at roughly 90% of all specialized eating disorder care units in Sweden, where only 6% of patients under the age of 18 (198 out of 3307) and 3.6% of patients over the age of 18 (285 out of 7903) were male (A. Birgegård, personal communication, March 6, 2014). Based on the prevalence data above, one could expect as much as a quarter of the patients to be male. Second of all, males are less likely than females to be diagnosed with an eating disorder when seeking care (Button, Aldridge, & Palmer, 2008) even when presenting with identical symptoms as females (Currin, Schmidt, & Waller, 2007). Finally, males are less likely to access treatment even in the face of similar levels of clinical severity (Austin et al., 2008).
The consequences of eating disorders

Eating disorders are associated with enormous costs both on an individual and a societal level. The price for society exhibits itself in the form of rising healthcare bills. For example, a German study showed that the treatment of anorexia nervosa was more than three times higher than the average hospitalization cost for any other illness (Krauth, Buser, & Vogel, 2002). However, the costs for society are not limited to acute treatment; more than 20% of anorexia nervosa patients are dependent on society for their main source of financial income 9-14 years after hospital admission (Hjern, Lindberg, & Lindblad, 2006).

These numbers are disconcerting, however the most disturbing costs associated with eating disorders are in the form of human suffering, which may exhibit itself on the physiological level in acute, as well as long-term, medical complications such as cardiovascular and gastrointestinal problems and osteoporosis (Powers & Bannon, 2004). On the psychological level the suffering may be expressed as loneliness, despair, intense mood swings or even suicidal behavior (Treasure, Schmidt, & van Furth, 2005). As many as 40% of adolescents with an eating disorder make suicide attempts (Damsted, Petersen, Bilenberg, & Hørder, 2006). The most severe and tragic consequences of eating disorders are of course the loss of life. Anorexia nervosa is coupled with a higher mortality rate than any other psychiatric disorder (Sullivan, 1995; Zipfel, Lowe, Reas, Deter, & Herzog, 2000), although recent studies indicate a possible trend towards a decrease in the mortality rate (e.g., Lindblad, Lindberg, & Hjern, 2006), which is perhaps a consequence of increased knowledge of this area that has led to earlier detection and improved care.

Treatment and outcome

Eating disorders are challenging to treat. A major reason for the difficulty in developing effective treatments is the lack of knowledge regarding the etiology of eating disorders. For example, the paucity of treatment research on anorexia nervosa in addition to this lack of understanding of eating disorders has resulted in a weak evidence base for treatment of anorexia nervosa (National Institute for Clinical Excellence (NICE), 2004). According to Fairburn and Harrison (2003) in a Lancet review, this scarcity of research on the treatment of anorexia nervosa results in little more than a summary of mainstream opinion regarding treatment. A further complicating factor is the fact that some patients with eating disorders, especially among those diagnosed with anorexia nervosa, actively resist treatment attempts (Fairburn & Harrison, 2003). An exception is family-based treatment for youths with a short duration and early onset of anorexia nervosa where there is increasing
evidence being accumulated that family therapy may effect both weight and eating related psychopathology in a positive direction (Lock, 2011).

The evidence base for bulimia nervosa is much more robust, especially when it comes to adults where cognitive behavior therapy has been shown to be effective (Fairburn & Harrison, 2003). The evidence concerning the effectiveness of cognitive behavior therapy for youths is more limited, however. Furthermore, a transdiagnostic form of cognitive behavior therapy has recently been developed with initial results indicating that the treatment may be suitable for the majority of patients with eating disorders (Fairburn et al., 2009).

When it comes to treatment outcome, a recent review by Steinhausen (2009) highlights the fact that a sizeable proportion of eating disorder treatment interventions have limited success. Breaking the numbers down, Steinhausen states that of the patients that survive anorexia nervosa, only slightly less than half achieve full recovery while one third show some improvement and one fifth develop a chronic course of the illness. In addition a 40% probability of developing a comorbid disorder can be expected among younger patients with a persisting eating disorder at follow-up.

For bulimia nervosa the numbers based on a review of 24 outcome studies of bulimia nervosa also indicate similar outcomes (47.5% full recovery, 26% improved and 26% chronic course of the eating disorder) (Steinhausen, 2009). Other studies indicate much higher recovery rates, which are reported to be as high as 70 to 80% (e.g., Ben-Tovim et al., 2001). A large multicenter study using the transdiagnostic cognitive behavior therapy for patients with eating disorders (including only those with a body mass index over 17.5) report that at the end of 20 weeks of treatment more than half the sample had levels of eating disorder features less than one standard deviation above the community mean and at the 60-week follow up the recovery rate had risen to 61.4% for those with eating disorder not otherwise specified and 45.7% for those with bulimia nervosa (Fairburn, et al., 2009).

Different inclusion criteria, measurement methods as well as definitions of recovery may contribute to the variation in outcome data.

The need for norms
We have known about the existence of eating disorders for centuries; over three hundred years ago Morton provided the first medical description of anorexia nervosa (which interestingly included both genders). Descriptions of overeating and vomiting similar to today’s description of bulimia nervosa date even further back to antiquity. However, we are still far from a clear picture of eating disorders and even further away from an understanding of the causal factors behind these disorders.

A key to expanding our knowledge is accurate assessment of eating disorders and disordered eating behaviors and attitudes, their impact and
factors that might increase the risk for eating disorders and disordered eating. Thus we need psychometrically sound instruments that can accurately measure the variables or risk factors. These instruments also need to be as brief as possible while still detailed enough to capture the essence of the construct(s) we are attempting to measure. When we want to look at numerous variables at the same time it is not feasible to ask the participants to fill out several long questionnaires, therefore we need brief, reliable and valid instruments. Finally, no instrument is of any use unless we can accurately interpret the results. This is especially true for psychological tests that lack a true zero, i.e., where a score of zero does not necessarily mean a complete absence of the trait, character or the like (Kline, 2000). Consequently we require norms that provide us with an empirical context against which the relative standing of an individual or group can be accurately assessed. Sound psychometric properties include high reliability and validity. This can, for example, be assessed by investigating: 1) the internal consistency, i.e., do the different items on a test measure the same general construct? Internal consistency is investigated by looking at the correlations between different items on the same test or between items on a subscale of a larger test; 2) examining the test-retest reliability, i.e., the consistency of test results between assessment points, and; 3) construct validity, i.e., the degree to which two instruments intending to measure the same construct agree.

In order for norms to be of use, they need to be collected for all the groups one wants to use as a reference. Thus in the field of eating disorders it is important to collect norms both for the general population as well as for the clinical population. If we take a moment to a step away from risk factors, this is especially true when we would like to evaluate treatment outcome. Furthermore, the measurement of clinical significance relies on normative data.

Instruments for the assessment of eating disorders

Following is a brief description of the three main instruments employed in the studies included in this thesis.

The Eating Disorder Examination Questionnaire (EDE-Q)
The EDE-Q (Fairburn & Beglin, 1994) is a widely used instrument that measures the core features of eating disorders by assessing the frequency of key behavioral features (e.g., severe dietary restriction, binge eating and compensatory behavior) as well as attitudes toward restraint, eating, shape and weight. The EDE-Q is the self-report version of the Eating Disorder Examination (EDE), a semi-structured interview that has been referred to as the gold standard in eating disorder assessment (e.g., Wilson, 1993). The advantages of a self-report version over the interview version boils down mainly to a question of saving time and money as it takes longer time to
administer the interview, only one person can be assessed at a time and special training is required in order to properly administer the interview version. Thus there are many situations in research and clinical practice where the EDE-Q becomes a viable alternative and/or complement to the EDE, especially when assessments need to be done repeatedly. The EDE-Q consists of 28-items focusing on the past 28 days. The instrument provides a global score as well as four subscales: Eating concern, Shape concern, Weight concern and Restraint. The EDE-Q has well documented and sound psychometric properties (e.g., Fairburn & Beglin, 1994; Luce & Crowther, 1999). However, some studies have failed to replicate its original factor structure (e.g., Hrabosky et al., 2008; Peterson et al., 2007), although the extracted factors in most studies are often fairly close to the original 4-factor construct of the EDE-Q (for a review see Berg, Peterson, Frazier, & Crow, 2012).

The Clinical Impairment Assessment Questionnaire (CIA)
In contrast to the EDE-Q, the CIA (Bohn & Fairburn, 2008) is a more recent instrument, but a much needed one as there has been a shortage of instruments assessing the psychological impairments resulting from eating disorders. The importance of assessing these impairments is important as clinically significant psychosocial impairment is not only a diagnostic criterion for eating disorders, but also has been found to be a main reason to why people seek help. Thus the alleviation of these problems constitutes an important treatment goal (Bohn & Fairburn, 2008). The CIA is relatively short with its 16 items. Like the EDE-Q, it covers the past 28-days and is intended to be administered directly after completing another measure of current eating disorders in order to ensure that the eating disorder is at the front of the respondents mind (Bohn & Fairburn, 2008). Initial reports on the psychometric properties have been positive both when it comes to internal consistency, test-retest reliability, construct and discriminant validity as well as sensitivity to change (Bohn & Fairburn, 2008).

The Body Shape Questionnaire – short version (BSQ-8C)
The BSQ is one of the most commonly used questionnaires assessing concerns with body shape. The instrument is designed to capture the phenomenological experience of “feeling fat.” The original version of the BSQ consists of 34 items. Although it has good psychometric properties (P. Cooper, Taylor, Cooper, & Fairburn, 1987; Rosen, Jones, Ramirez, & Waxman, 1996), it is fairly long and therefore less practical when used repeatedly or when used in combination with other questionnaires. Considering also its unidimensional nature, it has been argued that it may be unnecessarily long (Evans & Dolan, 1993). Several shorter versions have been proposed but their psychometric properties are largely unknown. A confirmatory factor analysis was conducted by Pook, Tuschen-Caffier, and Brähler (2008) of different versions of the BSQ in order to identify the psychometrically best
version. A total of eight versions were included in the analysis and only one that had both a reasonable fit as well as a high sensitivity to change was the BSQ-8C. However, as concluded by Pook, Tuschen-Caggier and Brähler, further studies of the BSQ-8C as a standalone instrument are needed.

The importance of assessing body dissatisfaction is supported by Stice, Marti and Durant (2011) who argue that a brief screener for body dissatisfaction may be the most sensitive method for identifying young females at risk of developing an eating disorder. The short version investigated in Study II carries the additional advantage of being suitable for both genders as it does not include any items that are solely relevant for females (the long version contains item such as “Have you noticed the shape of other women and felt that your own shape compared unfavorably?”).

Attempting to model eating disorders

Accurate, norm-referenced instruments paves the way for the continued exploration of the causes behind eating disorders. Commonly layman, public and professionals refer to eating disorders as extreme dieting driven by reasons of vanity (Treasure, 2008). However, this simplistic conception is not only incorrect, it contributes to the stigma associated with eating disorders. The best way to understand the etiology of eating disorders is through the development of empirically verifiable models based on a solid theoretical framework. Early identification and prevention is key to all disorders, medical as well as mental, and thus these models should aim to explain the onset of eating disorders.

Most models that have attempted to explain the etiology of eating disorders have focused on anorexia nervosa. Some of the models have focused exclusively on biological factors, others have investigated sociocultural factors, while yet others have looked at a combination of factors. A number of researchers (e.g., Fairburn & Harrison, 2003; Klein & Walsh, 2003; Treasure, 2008) have expressed their belief in a model that includes an interaction between biology, psychology and environmental factors, sometimes referred to as a “biopsychosocial” model. This multi-causal model has been proposed to encompass a range of variables including genetic, biological, developmental, psychological, familial, cultural and social variables. However, the usefulness of this multi-causal model is limited by the fact that it does not provide a straightforward testable means to explain the root causes of eating disorders and empirical support remains weak, thus the model’s ability to predict the onset of eating disorders remains unclear (Jansen, 2001). In general, developing accurate etiological models for the different eating disorders is also complicated by the earlier mentioned high rate of diagnostic crossover. No model to date can accurately or at least adequately predict either who will get an eating disorder or who will recover, although advances are underway, especially in the area of biology and genetics. Today
numerous studies are pointing to genetic effects being a significant contributor to the variance in liability to eating disorders. For example, data from the Swedish Twin Registry estimate the heritability for narrowly defined anorexia nervosa to be 57% and for bulimia nervosa to be 62% (Bulik et al., 2010). Prediction lies at the heart of empirical science and as stated by De Groot, “If I know something I can predict something; if I cannot predict anything, then I know nothing” (Jansen, 2001).

Factors and other variables central to models of eating disorders

Attempting to understand the complex etiology behind eating disorders by looking at individual variables, though fruitful in initiating an understanding, does not suffice as the effect of one variable cannot be completely understood unless placed within the context of all other relevant variables (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001) Thus, it is necessary to look at how different variables may interact with each other in numerous ways. Different models of eating disorders and disordered eating consist of a unique mixture of variables such as risk factors, causal factors, predisposing factors, predictor variables, correlates, etc. In order to avoid confusion and misunderstandings it is of central importance to be precise regarding the meaning of these terms. The sometimes careless use of these terms is very unfortunate since it may add to the confusion in the already elusive and complex reality regarding the etiology of eating disorders and disordered eating.

The terms risk factor and causal factor are similar in that they focus on factors or variables that are present before an outcome. More specifically, Kraemer and colleagues (Kraemer, et al., 2001) proposed that a risk factor is a measurable characteristic, an experience or an event, that precedes an outcome and that is associated with a higher probability of a certain outcome than what would be expected in the general or unexposed population. The term risk factor is primarily used to describe factors that are associated with an increase of the probability of an undesirable or adverse outcome, whereas the term protective factor is used when referring to a factor that decreases the likelihood of an undesirable or adverse outcome (Kazdin, Kraemer, Kessler, Kupfer, & Offord, 1997). However, risk factors and protective factors are not simply opposites. A protective factor decreases the likelihood of an undesirable event when there are risk factors present. A causal factor affects or causes an output variable to vary. All causal factors are also risk factors, but risk factors need not be causal (Kraemer, et al., 2001). It is important to keep in mind that from a scientific point of view, it is impossible to have absolute or true knowledge regarding causal factors since it is beyond the researcher’s ability to identify or control every single contextual variable that might influence the outcome. The terms predisposing factors and vulnerability factors are generally established through prospective studies, and refer to varia-
bles that increase the possibility of a negative outcome. A predictor variable is a variable whose values are used to predict the value of the target variable (Clark-Carter, 2004). A predictor variable is analogous to an independent variable. Finally, a correlate is a variable that is either significantly positively or negatively associated with an outcome, although it does not necessarily precede the outcome and it cannot establish a cause-and-effect relationship (Offord & Kraemer, 2000).

Risk factors for eating disorders
In order to understand the complexity of eating disorders we need to focus our attention on risk factors and how these risk factors interact to cause or maintain eating disorders (Kraemer, et al., 2001; Striegel-Moore & Bulik, 2007). The aim of risk factor research is to understand the factors that cause an outcome. As argued by Striegel-Moore and Bulik (2007), this is important for several reasons: 1) It will help to determine who is at risk so we can target this group and design effective intervention programs; 2) It will help to improve treatment (effective treatment interventions are best accomplished when the causes of a disorder is known); 3) It will improve the classification of eating disorders and help us move away from the current nosology in the DSM that is based solely on the observed clustering of signs and symptoms, and; 4) It will hopefully reduce the stigma associated with eating disorders.

Kraemer et al. (2001) move on to propose five different and clinically important ways in which risk factors may interact with each other to influence an outcome, namely as proxy, overlapping, independent, mediating or moderating risk factors. Kraemer describes a proxy risk factor as a factor that may be “pseudocorrelated” with the outcome. It can be a small component of a strong global causal factor or it can be a global factor out of which only a small component is a causal factor. The sole relationship to the outcome variable might be through a strong risk factor to which the proxy risk factor is correlated. Overlapping risk factors are factors that influence the outcome to a similar degree compared to each other. Neither factor has temporal precedence over the other, but they are correlated. In the field of eating disorders this can be exemplified by body mass index and body dissatisfaction that in numerous studies have been found to be correlated (Friedman, Wilfley, Pike, Striegel-Moore, & Rodin, 1995; Killen et al., 1994) not only with one another but also with disordered eating attitudes and behavior, and when body mass index increases, so does body dissatisfaction. Body mass index and body dissatisfaction are examples of overlapping variables that predict disordered eating.

Mediators
A mediator is an intermediate variable in a causal chain, where an independent variable causes a mediator to vary and in turn the mediator causes the
outcome or dependent variable to vary. Using an example from the field of women health issues, the relationship between socio-economic status and frequency of breast self-exams might be explained by a third variable, education. Looking at the causal chain, socio-economic status might influence the level of education and the level of education might in turn impact on the frequency of self-breast examination, thus education would be a mediator in the relationship between socio-economic status and frequency of self-breast examination. If you were to remove education from the equation, the relationship between socio-economic status would be less strong or perhaps completely disappear.

**Moderators**
A moderator is an effect modifier, meaning that it tells for whom and under what circumstances a variable will affect the level of intensity of another variable, i.e., the outcome. Returning to the relation between socio-economic status and frequency of breast self-exams, age might be a moderator of the relationship, i.e., the relationship might be stronger among older women than younger women.

**Perfectionism**
Perfectionism is a known risk factor for eating disorders (e.g., Fairburn & Harrison, 2003; Ghaderi, 2001). In addition it has also been found to be an important feature associated with disordered eating behaviors and attitudes (Hewitt, Flett, & Ediger, 1995; Joiner, Heatherton, Rudd, & Schmidt, 1997). However, there is a lack of agreement regarding how perfectionism should be defined and as to which components should be included in the term. Shafran, Cooper and Fairburn (Shafran, Cooper, & Fairburn, 2002) argue that there is only one dimension of perfectionism, which they define as setting high standards for oneself and thereafter largely basing one’s self-evaluation on the determined pursuit (achievement) of those standards. Others argue that there is not only historical but also theoretical and empirical evidence for the value and importance of a multidimensional construct (Hewitt, Flett, Besser, Sherry, & McGee, 2003). Hewitt et al. suggest three dimensions of perfectionism, one self-oriented and two interpersonal dimensions of perfectionism, other-oriented and socially prescribed. Self-oriented perfectionism is very similar to the definition of perfectionism suggested by Shafran, Cooper and Fairburn (Shafran, et al., 2002) involving first setting high standards for oneself and then harshly evaluating one’s own behavior based how well one meets those standards. Socially prescribed perfectionism refers to the belief that others have unrealistically high standards for oneself. Finally, other-oriented perfectionism reflects unrealistic high standards that the individual sets for significant others. Frost, Marten, Lahart and Rosenblate (1990) argue that there are six dimensions of perfectionism which they
refer to as personal standards, concern over mistakes, doubts about actions, parental expectations, parental criticism and organization.

Perfectionism has not only been suggested to be a risk factor, but also a perpetuating factor, i.e., a factor that maintains the eating disorder (Fairburn, Cooper, & Shafran, 2003). Some go as far as to say that eating disorders are an expression of perfectionism (Shafran, et al., 2002). In the newly developed transdiagnostic cognitive behavior therapy for eating disorder, Fairburn, Cooper and Shafran (2003) argue that perfectionism is one of four core mechanisms maintaining eating disorders. Even though perfectionism has been studied extensively in relation to eating disorders and disordered eating, the picture of its contribution and specific role remains unclear.

Eating disorders in males

As mentioned earlier, only a few decades ago there was clear doubt as to whether males could have eating disorders at all. This is no longer a question of debate, but research on males still lags behind. In a recent study based on a PubMed search, Galusca et al. report that only 1% of research articles on anorexia nervosa concern males. Some goes as far as to say that the current assumptions regarding males with eating disorders do not rest on a solid empirical foundation (Darcy, 2011) Research on males is important since eating disorders and disordered eating behavior may be expressed differently in males. They may not always exhibit the stereotypical disordered eating behavior documented in females (Anderson & Bulik, 2004). This is highlighted in data indicating that women restrict to avoid looking fat whereas eating disorders in males may be expressed by a drive for muscularity (Olivardia, Pope Jr, Borowiecki III, & Cohane, 2004).

One possible male-specific risk factor for eating disorders is homosexuality. Gay and bisexual men have been found to exhibit more signs of eating disorders than heterosexual men (Bosley, 2011). This finding could either be a reflection of the fact that compared to heterosexual male culture, gay male culture places more importance on appearance (Morrison, Morrison, & Sager, 2004), which in turn could result in more gay men engaging in behavior that place them at risk for developing eating disorders. On the other hand, another interpretation of the higher proportion of gay and bisexual men that exhibit signs of eating disorders is a greater willingness of this group to disclose such information.
General overview of studies included in this thesis

The need for sound and accurate assessment instruments sets the scene for the first two studies where norms were collected and instrument properties were investigated. In Study I, both general population and clinical norms on the Eating disorder examination questionnaire, one of the internationally most widely used instruments to assess disordered eating attitudes and behaviors, and the Clinical Impairment Assessment questionnaire, a fairly new instrument measuring the clinical impairment resulting from an eating disorder, were collected. In Study II, general population norms (using the same sample as in Study I) on the Body Shape Questionnaire version 8C, a new and short version of a widely used instrument to assess body dissatisfaction, were collected. As this instrument has not been sufficiently well assessed as a stand-alone instrument, psychometric properties were also collected.

From norms and psychometrics, attention was focused on improving our understanding of risk factors for eating disorders by attempting to look at the interaction of two known risk factors, body dissatisfaction and perfectionism. Specifically, we investigated the role that perfectionism plays in the relationship between body dissatisfaction and disordered eating. In order to elaborate on this relationship, both mediation and moderation roles of perfectionism were considered. With increased knowledge of risk factors we will be able to step by step determine how the pieces in the puzzle of eating disorders fit together, and ultimately how the complex chains of risk factors lead to the disorders.

A great deal more research is required to fully understand eating disorders and this is particularly true when it comes to the understudied group of males with eating disorders. Consequently, in Study IV and V the focus was moved from females to exploring eating disorders and disordered eating among males. With males we need to take a step back and initiate the research on risk and causal factors for eating disorders among males by first looking at descriptives and correlates before we can move on to looking at how the factors interacts with each other. In Study IV, the clinical characteristics of young males with eating disorders were compared to those of young females with eating disorders. Over a time-period of 14 years, all male patients under the age of 18 that were being assessed for an eating disorder at the Children’s Hospital in Uppsala, Sweden were studied and compared with all female patients assess during largely the same time-period. The focus was both on variables that had been explored in previous studies but where a consensus is lacking (i.e. age, current weight, premorbid weight, and ADHD) and on two new variables that hitherto have received limited attention (i.e. diabetes and celiac disease).

A slightly older group of males aged 15 – 30 years old was investigated in Study V through the collection of self-report data on variables known
to play a role among women, as well as variables thought to be uniquely associated with males. Adequately large clinical samples are notoriously hard to collect, and as well they may be affected by the so-called “Berkson bias”, which is manifested here in a tendency to only recognize eating disorders when there is additional morbidity (Bramon-Bosch, Troop, & Treasure, 2000). Thus in order to reach a larger sample of males and to promote as honest as possible responses when dealing with sensitive issues, an anonymous Internet survey was utilized in Study V.
Aims of the thesis

The overall aim of the present thesis was to improve our understanding of eating disorders and disordered eating attitudes and behavior through collecting norms and psychometric data, investigation of risk factors and their roles, and focusing on the understudied group of males with eating disorders.

The specific aims were:

- Collect general population and clinical norms on a well-established instrument used to assess disordered eating attitudes and behavior (the eating disorder examination questionnaire, EDE-Q), as well as on a measure of the clinical impairment resulting from eating disorders (the Clinical Impairment Assessment Questionnaire, CIA).
- Collect general populations norms for the short version of the Body Shape Questionnaire (BSQ-8C) and investigate the psychometric properties of the BSQ-8C as a standalone instrument.
- To investigate the role of perfectionism as a possible mediator or moderator between body dissatisfaction and disordered eating behavior and attitudes.
- Compare the clinical characteristics between young males and females with eating disorders.
- To explore variables associated with disordered eating among young males based on a compilation of factors known to play a role among females, as well as factors thought to be uniquely associated with males with eating disorders, such as sexual orientation and drive for muscularity.
The Empirical Studies
Study I: *Eating disorder examination questionnaire and clinical impairment assessment questionnaire: General population and clinical norms for young adult women in Sweden*

Introduction and aims

Norms are essential in order to accurately interpret test results as they provide an empirical context against which the relative standing of an individual or group can be objectively determined. Without norms it is difficult to accurately interpret test results, since most psychological assessment instruments lack a true zero. A very widely used instrument to measure the key features of eating disorders both on an attitudinal and behavioral level is the eating disorder examination questionnaire (EDE-Q). A weakness of the EDE-Q is that it does not assess psychosocial impairment resulting from the eating disorder, which is a diagnostic requirement according to the DSM. In order to compensate for this weakness, the Clinical Impairment Assessment scale (CIA) was recently developed to assess the severity of psychosocial impairment secondary to eating disorder features.

In Sweden there is a shortage of both general population norms as well as clinical norms for both the EDE-Q and the CIA. Thus, the aim of the study was to collect norms for both the EDE-Q and the CIA from a general population sample of young women in Sweden, as well as from a clinical sample consisting of eating disorder patients in Sweden.

Method

Two parallel studies were carried out, one containing participants from the general population of young women in Sweden and another containing participants from a clinical population of eating disorder patients in Sweden.
Participants and procedure

From the general Swedish population a representative, randomized sample of 1501 females, aged 18-30 years was drawn. All potential participants were sent a questionnaires package including demographic questions, the EDE-Q and the CIA. 760 women returned the questionnaire packages. After correcting for incorrectly listed addresses, being abroad, and inability to complete the questionnaire due to mental disability, the response rate was calculated to be 52%. The mean age of the sample was 23.9 years (SD=3.8). Three reminder letters were sent out. The two last letters were accompanied by incentives (gift certificates, lotteries and move tickets, etc.) to maximize the response rate.

The clinical sample was taken from a large cross-national Swedish database of eating disorders. Of the clinics that register their patients in the database, there is an inclusion rate exceeding 90%. In the present study 2383 adults, predominantly females (97.6%) 18 years of age or older, were included. The overall mean age of the clinical sample was 25.8 years (SD=7.61). One out of five were diagnosed with anorexia nervosa, 35.5% bulimia nervosa, 44.5% eating disorder not otherwise specified. The eating disorder diagnosis was assisted by the Structured Clinical Interview for DSM-IV Axis-I research version (First, Spitzer, Gibbon, & Williams, 2002) and the Structured Eating Disorder Interview, created by the Resource Centre for Eating Disorders. The assessments were performed within the patient’s first three visits to the respective clinics.

Measures

The Eating Disorder Examination questionnaire is a widely used instrument to assess the main features of eating disorders, the frequency of key behavioral features as well as attitudes toward restraint, eating, shape and weight. The EDE-Q provides a global score as well as four subscales: Eating Concern, Shape Concern, Weight Concern and Restraint. The EDE-Q is an adapted version of the Eating Disorder Examination (EDE) (Fairburn & Cooper, 1993) and has well researched psychometric properties. The internal consistency of the EDE-Q in the general population sample was high both for the global scale and the subscales (global scale α = .951, restraint subscale α = .806, Eating Concern subscale α = .821; Weight Concern subscale α = .832; and Shape concern subscale α = .926).

The Clinical Impairment Assessment Scale (Bohn & Fairburn, 2008) is intended to assess the severity of psychosocial impairment resulting from an eating disorder. The CIA is to be filled out immediately after completing another measure of current eating disorder features, ensuring that the eating disorder features are “at the front of the respondents mind” (Bohn &
Fairburn, 2008). The internal consistency in the present study was very good ($\alpha = .945$).

### Statistical analysis

Descriptive statistics were used to present norms. $t$-tests and analysis of variance, Pearson's chi-square $\chi^2$ and post hoc Scheffé test were calculated on the clinical sample in order to allow comparisons between subgroups.

### Results

As shown in Table 1, there was a high prevalence of disordered eating behavior both in general populations sample and in the clinical sample. Nearly one out of every five young females in the general population sample reported dietary restrain and/or binge eating. Close to one out of every ten reported regular objective binge eating. In the clinical sample the majority (63.7% and 64%) reported dietary restraint and objective binge eating. Over half of the clinical sample reported self-induced vomiting. Approximately half reported regular occurrences of objective binge eating and/or self induced vomiting. The clinical sample had an average score of 4.06 on the EDE-Q global score, which is just above the suggested cut-off of 4.0 for clinical significance (J. C. Carter, Stewart, & Fairburn, 2001; Mond, Hay, Rodgers, & Owen, 2006). However, on two out of four subscales of the EDE-Q (Eating Concern and Restraint) the average clinical sample score was just under the cut-off.

There were significant differences in the average score of the EDE-Q and the CIA between the different diagnostic categories. Males in the clinical sample scored significantly lower compared with the female clinical sample on the EDE-Q global score ($t (2381) = 4.72, p < 0.001$) and subscales ($t (2381) > 3.62, p < 0.001$) as well as on the CIA ($t (989) = 2.16, p = 0.031$). When it came to frequency behavior, males also scored lower, but the only statistically significant difference between females and males (not subdivided into diagnostic categories) was in self-induced vomiting. The means and standard deviations for the EDE-Q and the CIA for the general population and the clinical samples are presented in Table 2.
Table 1. Proportion of female patients from the general population sample and proportion of female and male patients from the clinical sample that reported engaging in key disordered eating behavior. Regular occurrence is defined as 4 or more occurrences over the past 28 days with the exception of dietary restraint where it is defined as 13 or more occurrences over the past 28 days.

<table>
<thead>
<tr>
<th>Key Behavior</th>
<th>Any occurrence (%)</th>
<th>Regular occurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>female</td>
<td>male</td>
</tr>
<tr>
<td></td>
<td>general</td>
<td>clinical</td>
</tr>
<tr>
<td>Dietary restraint</td>
<td>18.6</td>
<td>63.7</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Objective binge episodes</td>
<td>19.1</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Self-induced vomiting</td>
<td>4.1</td>
<td>54.6</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Laxative misuse</td>
<td>1.1</td>
<td>11.6</td>
</tr>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Excessive exercise</td>
<td>12.5</td>
<td>44.9</td>
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<td></td>
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</table>

Table 2. Means and standard deviations for the EDE-Q and CIA for the general population, the total clinical and the clinical sample.

<table>
<thead>
<tr>
<th></th>
<th>EDE-Q global score mean (SD)</th>
<th>CIA global score mean (SD)</th>
<th>Restraint mean (SD)</th>
<th>Eating concern mean (SD)</th>
<th>Shape concern mean (SD)</th>
<th>Weight concern mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General population sample</td>
<td>1.56 (1.27)</td>
<td>8.25 (9.35)</td>
<td>1.22 (1.32)</td>
<td>0.81 (1.13)</td>
<td>2.4 (1.71)</td>
<td>1.78 (1.52)</td>
</tr>
<tr>
<td>Total clinical sample</td>
<td>4.06 (1.196)</td>
<td>30.22 (10.21)</td>
<td>3.67 (1.60)</td>
<td>3.36 (1.34)</td>
<td>4.72 (1.32)</td>
<td>4.07 (1.39)</td>
</tr>
<tr>
<td>Subgroup AN</td>
<td>3.74 (1.40)</td>
<td>31.89 (11.44)</td>
<td>3.82 (1.70)</td>
<td>3.05 (1.44)</td>
<td>4.23 (1.54)</td>
<td>3.58 (1.59)</td>
</tr>
<tr>
<td>Subgroup BN</td>
<td>4.36 (1.02)</td>
<td>31.46 (8.99)</td>
<td>3.88 (1.42)</td>
<td>3.75 (1.20)</td>
<td>5.0 (1.11)</td>
<td>4.4 (1.19)</td>
</tr>
<tr>
<td>Subgroup BED</td>
<td>3.89 (1.04)</td>
<td>28.50 (9.28)</td>
<td>2.43 (1.67)</td>
<td>3.45 (1.34)</td>
<td>4.91 (1.15)</td>
<td>4.18 (1.12)</td>
</tr>
<tr>
<td>Subgroup EDNOS</td>
<td>3.97 (1.21)</td>
<td>28.49 (10.36)</td>
<td>3.66 (1.57)</td>
<td>3.12 (1.31)</td>
<td>4.67 (1.33)</td>
<td>4.00 (1.42)</td>
</tr>
</tbody>
</table>

Note: AN=anorexia nervosa; BN=bulimia nervosa; BED=binge eating disorder; EDNOS=eating disorder not otherwise specified
Discussion

Eating disorder related issues were frequent both in the nonclinical general populations sample as well as in the clinical sample. The average score on the CIA for the clinical sample was similar to the pretreatment score reported by Bohn and colleagues (2008). The males in the clinical sample scored significantly lower on both the EDE-Q and the CIA; however, they scored as high as the females on the behavioral items of the EDE-Q.

In order to facilitate the comparison of the results from the present study with other studies presenting norms for the EDE-Q and the CIA a summary of the different studies and their results are presented in Table 3. As seen in the table, compared to previous normative studies, the norms for women in the general population sample on the EDE-Q were very similar to those found in an Australian general population sample (Mond, et al., 2006), but the Swedish women scored on average higher on the shape concern subscale of the EDE-Q. The norms for the CIA in the general population sample were somewhat higher than the average score documented in a sample of Norwegian university students (Reas, Overas, & Ro, 2012), but were in line with the post-treatment score reported by Bohn and colleagues (2008).

A limitation in the present study was the relatively low response rate in the general population sample (52%), which calls for caution when interpreting the results. The present study helps fill the void of normative data on the EDE-Q and CIA by providing data on young Swedish females as well as eating disorder patients in Sweden. The results of the present study will assist clinicians and researchers in the interpretation of scores on the EDE-Q and the CIA and consequently should be helpful in diagnosis, treatment and prevention of eating disorders.
Table 3. Comparison of level and occurrence of eating attitudes and behaviors in available studies of the EDE-Q in several Western countries.

<table>
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<tbody>
<tr>
<td>N</td>
<td>760</td>
<td>2325</td>
<td>438</td>
<td>808</td>
<td>5255</td>
<td>723</td>
<td>404</td>
</tr>
<tr>
<td>Sex</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Age</td>
<td>18-30</td>
<td>18-66</td>
<td>18-65</td>
<td>12-14</td>
<td>18-42</td>
<td>18-25</td>
<td>18-26</td>
</tr>
<tr>
<td>Country</td>
<td>Sweden</td>
<td>Sweden</td>
<td>Norway</td>
<td>United Kingdom</td>
<td>Australia</td>
<td>United States</td>
<td>United States</td>
</tr>
<tr>
<td>Scales</td>
<td></td>
<td></td>
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<tr>
<td>EDE-Q Global</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Restrained</td>
<td>1.56 (1.27)</td>
<td>4.06 (1.20)</td>
<td>1.6 (1.4)</td>
<td>1.52 (1.25)</td>
<td>1.74 (1.30)</td>
<td>1.09 (1.0)</td>
<td></td>
</tr>
<tr>
<td>Eating concern</td>
<td>1.22 (1.32)</td>
<td>3.67 (1.60)</td>
<td>1.4 (1.5)</td>
<td>1.30 (1.40)</td>
<td>1.62 (1.54)</td>
<td>1.04 (1.19)</td>
<td></td>
</tr>
<tr>
<td>Weight concern</td>
<td>0.81 (1.13)</td>
<td>3.36 (1.34)</td>
<td>1.0 (1.0)</td>
<td>0.76 (1.06)</td>
<td>1.11 (1.11)</td>
<td>0.43 (0.77)</td>
<td></td>
</tr>
<tr>
<td>Shape concern</td>
<td>1.78 (1.52)</td>
<td>4.07 (1.39)</td>
<td>1.8 (1.7)</td>
<td>1.79 (1.51)</td>
<td>1.97 (1.56)</td>
<td>1.29 (1.27)</td>
<td></td>
</tr>
<tr>
<td>CIA Global</td>
<td>2.40 (1.71)</td>
<td>4.72 (1.32)</td>
<td>2.2 (1.7)</td>
<td>2.23 (1.65)</td>
<td>2.27 (1.54)</td>
<td>1.59 (1.38)</td>
<td></td>
</tr>
<tr>
<td>Binge eating Any occurrence</td>
<td>8.25 (9.35)</td>
<td>30.22 (10.21)</td>
<td>6.4 (7.5)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Regularly</td>
<td>19.1</td>
<td>64.0</td>
<td>N/A</td>
<td>21</td>
<td>17.3</td>
<td>21.3</td>
<td>25.0</td>
</tr>
<tr>
<td>Vomiting Any occurrence</td>
<td>9.8</td>
<td>51.7</td>
<td>N/A</td>
<td>10.6</td>
<td>6.4</td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td>Regularly</td>
<td>4.1</td>
<td>54.6</td>
<td>N/A</td>
<td>4.0</td>
<td>8.8</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Laxative misuse Any occurrence</td>
<td>1.3</td>
<td>46.6</td>
<td>N/A</td>
<td>1.4</td>
<td>4.0</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Regularly</td>
<td>1.1</td>
<td>11.6</td>
<td>N/A</td>
<td>1.8</td>
<td>8.3</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>Excessive exercise Any occurrence</td>
<td>2.01 (2.65)</td>
<td>30.22 (10.21)</td>
<td>6.4 (7.5)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Regularly</td>
<td>12.5</td>
<td>44.9</td>
<td>N/A</td>
<td>38</td>
<td>30.8</td>
<td>31.4</td>
<td></td>
</tr>
<tr>
<td>Restraint Any occurrence</td>
<td>7.4</td>
<td>42.5</td>
<td>N/A</td>
<td>0.4</td>
<td>5.9</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Regularly</td>
<td>5.8</td>
<td>33.1</td>
<td>N/A</td>
<td>3.4</td>
<td>8.4</td>
<td>5.0</td>
<td></td>
</tr>
</tbody>
</table>
Study II: Body Shape Questionnaire: Psychometric properties of the short version (BSQ-8C) and norms from the general Swedish population.

Introduction and aims

Body dissatisfaction has been found to be a risk factor for the development of eating disorders (e.g., Ghaderi, 2003; Ghaderi & Scott, 2001). Prevention and treatments for body dissatisfaction are dependent on sensitive and reliable instruments that can track changes in body dissatisfaction over time. Furthermore, optimal use of assessment psychological instruments requires appropriate psychometric as well as normative data. One of most widely used instruments to assess body dissatisfaction is the Body Shape Questionnaire (BSQ; Z. Cooper & Fairburn, 1987). The BSQ has been found to have sound psychometric properties but is not always ideal or practical to employ due to being fairly long. Several shorter versions of the BSQ exist but adequate knowledge regarding their psychometric properties is lacking. In an attempt to identify the psychometrically best version, Pook, Tuschen-Caffier and Brähler (2008) conducted a confirmatory factor analysis. Of the eight versions included in their analysis the “BSQ-8C” not only showed a reasonable fit, but also showed a high sensitivity to change.

The aim of this study was to investigate the psychometric properties of the BSQ-8C as a stand-alone instrument assessing body dissatisfaction. As well, norms from the Swedish general population of young adult females were collected in order to provide an empirical context to aid in the interpretation of scores of the BSQ-8C.

Method

Two separate studies were conducted, one to investigate the psychometric properties (i.e., test-retest reliability, internal consistency, and validity) and another to collect general population norms for the short eight item version of the BSQ, namely the BSQ-8C.
Participants
Participants in the first study, from now on referred to as Study A, consisted of a sample of 182 undergraduate students from five different disciplines (Psychology, Gender Research, Information Technology, Law and Pharmacy) at a large university in Sweden. The participants from the second study, from now on referred to as study B with the purpose of providing norms, came from a random representative sample of 1501 Swedish females aged 18-30 years. 747 (51%) of the women from the randomized sample choose to participate in the study. The mean age of the sample was 23.9 years ($SD = 3.8$) and the mean body mass index was 22.9.

Procedure
Study A. After approaching and receiving approval from course leaders in five academic disciplines, students were approached at the start of lectures and informed about the study and its voluntary and anonymous nature. Those who choose to participate were given the BSQ-8C to fill out. Approximately two weeks (mean = 15.1 days, $SD = 4.3$ days, range = 11 - 21 days) later the procedure was repeated. In order to retain complete anonymity yet be able to match the answers from time 1 to time 2, answers on six control questions regarding the participants favorite color, book, movie, food, leisure time activity as well as gender were also collected at both measurement points.

Study B. Participants received a questionnaire package via the regular postal services. The package included demographic questions, the BSQ-8C, the Eating Disorder Examination Questionnaire (EDE-Q) and the Clinical Impairment Assessment Questionnaire (CIA). In order to maximize the response rate three reminder letters were sent out and incentives (gift certificates, lotteries, movie tickets, etc.) were included in the two last reminder letters.

Measures
The Eating Disorder Examination questionnaire is a widely used instrument to assess the main features of eating disorder, the frequency of key behavioral features as well as attitudes toward restraint, eating, shape and weight. One of the EDE-Q four subscales, Shape Concern, was used in the present study. The internal consistency for the Shape Concern subscale in the present study was high ($\alpha = .926$)

The BSQ-8C is a short version of the Body Shape Questionnaire designed to measure the extent of psychopathology of concerns about body shape. The highest possible score on the BSQ-8C is 48. The internal consistency for the BSQ-8C both when administered to the general population
sample as well as to the student sample was high ($\alpha = .936$ for general population sample and $\alpha = .92$ at time 1 and $\alpha = .93$ at time 2 for the student sample).

Statistical analysis
Test-retest was analyzed using both Pearson’s $r$ and Student’s $t$-test. Internal consistency of the BSQ-8C and the Shape Concern subscale of the EDE-Q were analyzed using Cronbach’s alpha. Norms were presented with descriptive statistics. To investigate whether the items in the BSQ-8C would load on a single factor, an exploratory and a confirmatory factor analysis was performed using linear structural equation modeling in LISREL (Jöreskog & Sörbom, 1993).

Results
The test-retest reliability and convergent validity for the BSQ-8C were found to be high. The one-dimensional nature of the BSQ was also supported based on exploratory and confirmatory factor analyses. The mean of the BSQ-8C for the general population-based sample was 20 ($SD = 10$) and the median was 18.

To investigate whether the items in the Swedish version of the BSQ-8C load on a single factor, as is the case in the English version, we conducted an exploratory factor analysis, which returned one factor that explained 59.5% of the variance. A confirmatory factor analysis using linear structural equation modeling in LISREL, employing weighted least square method of estimation, with all items loading on a single factor resulted in an excellent fit ($\chi^2 (df = 20) = 626.58, p < .00001$, RMSEA = 0.0, 95% CI for RMSEA = 0.0 - 0.0, Comparative Fit Index= .92, and Goodness of Fit Index = .99). Figure 1 displays the results from the LISREL analysis.
Discussion

The BSQ-8C was found to have sound psychometric properties when used as a stand-alone instrument as manifested in this study through a high test-retest reliability, internal consistency, and convergent validity. A particular benefit of the BSQ-8C over the full version is its gender non-specificity.

The norms for young females provided by the present study should aid clinicians and researchers in the assessment of occurrence and change in body dissatisfaction. However, to enhance the utility of this instrument, norms for males on the BSQ-8C should also be collected.

The main limitation with the present study was the relatively high non-response rate in the general population sample. However, the nearly identical mean age between the sample and the total population of the age group supports the representativeness of the results. In addition, a direct comparison with the full length version of the BSQ, taking the sensitivity, endorsement rate of items, and intercorrelations between the two versions would have provided even more useful data on the psychometrics of the BSQ-8C.
In summary, the good psychometric properties, gender non-specificity, as well as briefness of the questionnaire make the BSQ-8C a valuable instrument for measuring body dissatisfaction among both males and females.
Study III: Does perfectionism mediate or moderate the relation between body dissatisfaction and disordered eating attitudes and behaviors?

Introduction and aims

Perfectionism has been found in numerous studies to be an important feature of both eating disorders as well as disordered eating attitudes and behavior (Hewitt, et al., 1995; Joiner, et al., 1997). Not only has perfectionism been identified as an important risk factor (e.g., Fairburn & Harrison, 2003; Ghaderi, 2001) but some have also gone as far as to imply that eating disorders may be an expression of perfectionism (Shafran, et al., 2002). However, despite the documented link between the perfectionism and disordered eating the knowledge of the specific role of perfectionism is limited.

The aim of the study was to expand the knowledge regarding the specific role of perfectionism in the relationship between another well established risk factor, namely body dissatisfaction (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004), and disordered eating behavior and attitudes.

Method

Participants

The participants consisted of an ethnically diverse sample (53.5% White/Caucasian, 14.2% South Asian, 11.7% Chinese, 4.4% Black, 3.1% Arab/West Asian, 1.7% Korean, 1.5% South East Asian, 0.8% Latin-American, 0.6% Filipino, 0.2% Japanese and 8.3% Other) of 520 female undergraduate students from different faculties at a medium sized university in southern Ontario, Canada. The mean age was 20.89 years (SD = 4.43) and the average body mass index of the participants was 22.84 (SD = 4.34).

A significant minority of the participants in the study (8.3%) self-reported that they had sought help for an eating disorder and 3.8% reported having been diagnosed with an eating disorder. A history of dieting some-
time in the past 5 years was reported by 69.4% while 16.7% reported current
dieting.

Procedure
Participants were recruited at the student center on campus. Participants
interested to take part in the study were given either verbal or written infor-
mation about the study. Those who chose to participate were informed of the
voluntary nature of the study. All participants were given a questionnaire
package that they were asked to fill out within eyesight of the investigators.
After completing the questionnaire the participants were given a debriefing
sheet and 5 dollars for participating in the study.

Measures
The questionnaire package included the EAT-26 (Garner & Garfinkel,
1979), four subscales from the EDI-2 (Garner, Olmstead, & Polivy, 1983),
the Binge Scale (Hawkins & Clement, 1980) and the Multidimensional Per-

The EAT-26 is a widely used self-report measure of symptoms and
concerns characteristic of eating disorders. The EAT-26 consists of three
subscales; dieting, bulimia and food preoccupation, and oral control. Higher
scores are indicative of more abnormal eating attitudes and behavior. The
EAT-26 has been found to have good reliability, with a test-retest reliability
of 0.84 (P. I. Carter & Moss, 1984). The internal consistency in the present
study was very good (α = .86).

The EDI-2 is an instrument designed to measure behavioral and atti-
tudinal features of anorexia nervosa and bulimia nervosa. In the present
study two of its subscales were used, the Body Dissatisfaction and the Per-
fectionism subscales. The Perfectionism subscale can be divided into self-
oriented and socially prescribed perfectionism (Sherry, Hewitt, Besser,
McGee, & Flett, 2004). The internal consistency in the present study of both
the Body Dissatisfaction and the Perfectionism subscales was good (α = .88
and α = .79, respectively).

The Multidimensional perfectionism scale is a 45-item self-report
measure of “perfectionistic” tendencies. The MPS consists of three dimen-
sions: self-oriented perfectionism, other-oriented perfectionism and socially
prescribed perfectionism. The MPS has been found to have good test-retest
reliability and good validity (Hewitt, et al., 1991). The internal consistency
in the present study was α = .91 for the Self-Oriented Perfectionism sub-
scale, α = .76 for the Other-Oriented Perfectionism subscale and α = .85 for
the Socially Prescribed Perfectionism subscale.

The Binge Scale is a short, 9-item instrument designed to provide de-
scriptive, quantifiable information regarding behavioral and attitudinal fea-
tures of bulimia nervosa. It has good test-retest reliability (Hawkins & Clement, 1980). The internal consistency in the present study was high (α = .94).

Statistical analysis
In addition to computing the correlations between the different measures of perfectionism and disordered eating attitudes and behavior, the possible role of different dimensions of perfectionism as either mediators or moderators of the relationship between body dissatisfaction and disordered eating was investigated.

Mediation
Three separate statistical analyses were performed in order to investigate the role of perfectionism as a possible mediator between body dissatisfaction and disordered eating attitudes and behavior. First correlations between the possible mediators, the body dissatisfaction subscale of the EDI-2 and disordered eating attitudes and behavior (EAT-Total and the Binge Scale) were calculated. All three correlations (i.e., between the perfectionism subscales, EDI-P body dissatisfaction and EAT-Total or Binge scale) were required to be significant in order to consider a variable as a potential mediator. Second, when significant correlations were found, linear regressions were computed where the possible mediator was entered as the dependent variable and body dissatisfaction as the independent variable. Finally, a multiple regression using a saturated model in which both the possible mediator as well as body dissatisfaction were entered as independent variables and either EAT-Total or the Binge Scale were entered as the dependent variable. Based on the data from the above-described calculations the z-value from the Sobel’s test and corresponding p-value were calculated.

Moderation
Hierarchical regressions were performed in which the independent variable body dissatisfaction was entered in the first block, the possible moderator was entered in the second block, and lastly the interaction variable (independent variable multiplied by the moderator variable) was entered in the third block.
Results

Correlations
As shown in Table 4 there were weak but statistically significant correlations between all but one of the measures of perfectionism and the total score of the EAT-26; however there were no statistically significant correlations between perfectionism and the Binge Scale.
Table 4. Correlations between perfectionism and disordered eating attitudes and behaviors followed by the corresponding p-value.

<table>
<thead>
<tr>
<th></th>
<th>EAT-Dieting</th>
<th>EAT-Bulimia &amp; food preoccupation</th>
<th>EAT- Oral control</th>
<th>EAT-Total</th>
<th>Binge-Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score of the EDI-2 perfectionism</td>
<td>0.281*</td>
<td>0.217*</td>
<td>0.172*</td>
<td>0.305*</td>
<td>0.145</td>
</tr>
<tr>
<td>(&lt;=.0001)</td>
<td>(&lt;=.0001)</td>
<td>(&lt;=.0001)</td>
<td>(&lt;=.0001)</td>
<td>(&lt;=.0001)</td>
<td>(0.126)</td>
</tr>
<tr>
<td>Self-oriented perfectionism subscale of the EDI-P</td>
<td>0.279*</td>
<td>0.242*</td>
<td>0.158*</td>
<td>0.307*</td>
<td>0.059</td>
</tr>
<tr>
<td>(&lt;=.0001)</td>
<td>(&lt;=.0001)</td>
<td>(0.0003)</td>
<td>(&lt;=.0001)</td>
<td>(0.538)</td>
<td></td>
</tr>
<tr>
<td>Socially prescribed perfectionism subscale of the EDI-P</td>
<td>0.212*</td>
<td>0.140*</td>
<td>0.142*</td>
<td>0.227*</td>
<td>0.196</td>
</tr>
<tr>
<td>(&lt;=.0001)</td>
<td>(0.0012)</td>
<td>(&lt;=.0001)</td>
<td>(&lt;=.0001)</td>
<td>(0.038)</td>
<td></td>
</tr>
<tr>
<td>Self-oriented perfectionism subscale of the MPS</td>
<td>0.222*</td>
<td>0.135</td>
<td>0.138*</td>
<td>0.232*</td>
<td>0.105</td>
</tr>
<tr>
<td>(&lt;=.0001)</td>
<td>(0.0021)</td>
<td>(.0016)</td>
<td>(&lt;=.0001)</td>
<td>(0.273)</td>
<td></td>
</tr>
<tr>
<td>Socially prescribed perfectionism subscale of the MPS</td>
<td>0.276*</td>
<td>0.259*</td>
<td>0.076</td>
<td>0.288*</td>
<td>0.288</td>
</tr>
<tr>
<td>(&lt;=.0001)</td>
<td>(&lt;=.0001)</td>
<td>(.0848)</td>
<td>(&lt;=.0001)</td>
<td>(0.0021)</td>
<td></td>
</tr>
<tr>
<td>Other-oriented perfectionism subscale of the MPS</td>
<td>0.049</td>
<td>0.050</td>
<td>0.051</td>
<td>0.062</td>
<td>0.047</td>
</tr>
<tr>
<td>(0.262)</td>
<td>(0.253)</td>
<td>(0.246)</td>
<td>(0.157)</td>
<td>(0.619)</td>
<td></td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.0017 level (2-tailed). Bonferroni correction was applied.

Note: EDI = Eating Disorder Inventory, MPS = Multidimensional Perfectionism Scale, and EAT = Eating Disorder Attitude Test.
Perfectionism as a mediator

All measures of perfectionism except the other-oriented perfectionism sub-scale of the MPS were found to be partial mediators between Body Dissatisfaction and EAT-total. The amount of mediation varied between 5-10%. No mediation analysis was carried out with the Binge Scale since none of the perfectionism measures showed statistically significant correlations to the Binge Scale. Figure 2 illustrates the mediation by MPS-SPP between EDI-Body Dissatisfaction and EAT-Total.

<table>
<thead>
<tr>
<th>Type of mediation</th>
<th>Partial</th>
<th>Sobel z-value</th>
<th>3.414</th>
<th>significance &lt; 0.0006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>0.421</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>0.049</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Figure 2](image)

Note: ** indicates significance at or below the $p = 0.01$ level and *** indicates significance at or below the $p = 0.001$ level.

Figure 2. Overview of the mediation by MPS-SPP between EDI-Body Dissatisfaction and EAT-Total.

Perfectionism as a moderator

Perfectionism was found to be a moderator of the relation between body dissatisfaction and disordered eating. All of the possible moderators (i.e., EDI-P-Total, EDI-P-SOP, EDI-P-SPP, MPS-SOP, MPS-SPP and MPS-OOP) showed statistically significant moderation with one or both of the EAT-26 and the Binge Scale. Four subscales (EDI-P-total, EDI-P-SOP, MPS-SOP and MPS-SPP) were found to be weak moderators between EDI-Body Dissatisfaction and EAT-Total while all perfectionism variables were found to be clear moderators of the relationship between the EDI-Body Dis-
satisfaction and the Binge Scale. Plots of the interaction of perfectionism as a moderator between the EDI-Body Dissatisfaction subscale and the Binge scale are shown in Figure 3.

Figure 3. Plots showing the interaction of six moderating variables on the relationship between Body Dissatisfaction subscale of EDI-2 and Binge Scale. The moderating variables displayed are a) total score on perfectionism subscale of EDI-2, b) self-orientated perfectionism subscale of EDI-P, c) self-prescribed perfectionism subscale of EDI-P, d) self-orientated perfectionism subscale of MPS, e) socially prescribed perfectionism subscale of MPS, and f) other-orientated perfectionism subscale of MPS.
Discussion

The present study sheds light on complex interactions that may influence the risk of developing disordered eating. Specifically the role of perfectionism was investigated. Perfectionism was found to both partially mediate and to moderate the relation between body dissatisfaction and disordered eating. The support was strongest for the role of perfectionism as a moderator. This finding informs researchers of the need to look both at the interaction between different variables and their different roles - especially the potential role of perfectionism as a moderator between body dissatisfaction and disordered eating. Furthermore, a more informative and sound theory than the multifactorial model of eating disorders is needed to guide future empirical evaluation of risk factors and their interaction. The large sample and use of well-established instruments were strengths in the study; however, the cross-sectional design was a limitation. Future research would benefit from a prospective experimental design. Additionally, future studies should incorporate new and improved methods for assessing mediation and moderation.
Study IV: *A comparison of clinical characteristics between adolescent males and females with eating disorders*

Introduction and aims
Males are often underrepresented in eating disorder research (Galusca et al., 2012) and when included the sample sizes are often too small for separate and meaningful statistical analyses (Bulik, Berkman, Brownley, Sedway, & Lohr, 2007). This disparity becomes more prominent as recent findings indicate that eating disorders may affect substantially more males than previously thought (e.g., Dooley-Hash, et al., 2012; Madden, Morris, Zurynski, Kohn, & Elliot, 2009; Woodside, et al., 2001). This is evident both when looking at age of presentation, current weight and premorbid weight as well as previous weight history and psychiatric comorbidity in the form of ADHD. Additionally, when it comes to the somatic comorbidities type 1 diabetes and celiac disease, two somatic disorders that may be connected to eating disorders, data are insufficient to allow conclusions regarding gender differences and similarities to be drawn.

Thus in order to improve the understanding of clinical manifestations of males with eating disorders and how they differ from females, the aims of the present study were to: 1) compare males and females regarding age at presentation; 2) compare current weight and premorbid weight history between males and females, and; 3) look at psychiatric comorbidity (specificially ADHD) and somatic comorbidity, in the form of diabetes and celiac disease and their possible gender differences.

Method

Participants
All male patients \( (N = 57) \) seeking medical care or being referred for assessment/care for eating disorders during the years 1999 to 2012 at the Children’s Hospital/Department of Child and Adolescent Psychiatry in Uppsala Sweden were compared with 548 female patients seeking care in the time period from 2004 to 2012. The clinic is the only specialized eating disorder
servicing the region for adolescents less than 18 years old, thus all patients from Uppsala and the surrounding area are seen at the clinic. The patients come into contact with the clinic either by the parents directly contacting the clinic, or via referrals from family physicians or school health services.

Procedure
A pediatrician carefully assessed all patients upon presentation. Eating disorder diagnoses based on the DSM-IV were assessed. Retrospectively, the DSM-IV eating disorder diagnoses given were re-categorized according to DSM-5 criteria. Previously registered psychiatric and somatic diagnoses were also registered. Additionally, a careful somatic assessment was performed with an assessment including serological markers for celiac disease. Growth charts were obtained. Based on the growth charts maximal weight could be identified and well weight loss (i.e., the difference between maximal recorded weight and weight at presentation) could be estimated. Prepubertal assessments were generally based on measurements taken around the age of seven by the school nurse. Using growth charts it was also possible to determine pubertal status. Body mass index was calculated as weight/length\(^2\) (kg/m\(^2\)). Body mass index was also recalculated into standard deviation scores (Lindgren, Strandell, Cole, Healy, & Tanner, 1995).

Statistical analysis
Means and standard deviations were calculated. Gender differences were assessed by means of \(t\)-tests (with or without assumed equal variances based on Levene’s test) and chi-square \(\chi^2\). Effect sizes were calculated when \(p < .05\).

Results
It was found that the males were significantly younger at presentation. Differences in weight at presentation and premorbid weight history were mixed, with a significantly higher percentage of males having a history of a BMI SDS (i.e., BMI corrected for age) greater than two. Table 5 illustrates the prevalence of ADHD, which was 8.8% among males and 0.5% among females (\(\chi^2(1, N = 605) = 20.833, p < .0001\)). Celiac disease and type 1 diabetes was only found among the females with a prevalence of 2.2% and 1.1% respectively. Half of the cases of celiac disease were discovered in conjunction with the eating disorder assessment.
<table>
<thead>
<tr>
<th></th>
<th>Prepuberty</th>
<th>At top weight</th>
<th>At presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
</tr>
<tr>
<td></td>
<td>n = 54</td>
<td>n = 474</td>
<td>n = 56</td>
</tr>
<tr>
<td>Age (years)</td>
<td>7.53±0.99*1</td>
<td>7.24±0.64</td>
<td>13.94±1.59</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>29.38±7.83*3</td>
<td>26.72±5.56</td>
<td>60.57±16.77</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>126.56±17.15</td>
<td>125.52±8.63</td>
<td>166.36±11.53*4</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>17.55±3.16*6</td>
<td>16.74±2.55</td>
<td>21.71±4.72</td>
</tr>
<tr>
<td>Weight SDS</td>
<td>0.83±1.29</td>
<td>0.53±1.10</td>
<td>0.89±1.20*8</td>
</tr>
<tr>
<td>Height SDS</td>
<td>0.25±1.11</td>
<td>0.27±1.07</td>
<td>0.39±1.06</td>
</tr>
<tr>
<td>BMI SDS</td>
<td>0.87±1.38</td>
<td>0.53±1.09</td>
<td>0.81±1.41</td>
</tr>
<tr>
<td>BMI SDS &gt; 2.00</td>
<td>11 (20.37%)*9</td>
<td>48 (10.13%)</td>
<td>11 (19.64%)*10</td>
</tr>
<tr>
<td>Weight loss (kg)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Duration (days)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

SDS – standard deviation score  
BMI – body mass index  
Significance of difference between boys and girls based on independent samples t-tests (for assumed equal and when applicable unequal variances):  
* p < 0.05; ** p < 0.01  
Effect sizes for the differences between boys and girls:  

\[ d_1 = -0.35, \quad d_2 = 0.29, \quad d_3 = 0.39, \quad d_4 = 0.32, \quad d_5 = 0.52, \quad d_6 = 0.28, \quad d_7 = -0.26, \quad d_8 = 0.28, \quad d_9 = \]
Discussion

The present sample of males is one of only about a dozen with a sample size that provides adequate power to carry out meaningful statistical comparisons between the genders. It is also one of the most recent studies, including data from 1999 to 2012 (data for females were collected from 2004 to 2012), which may help identify trends when compared with previous research.

Males were found to be younger at presentation. As well a significantly higher proportion of males than females had a history of a BMI SDS greater than two. ADHD was fairly common among the males but uncommon among the females. Knowledge regarding ADHD is important as it impacts treatment. The somatic disorders screened for were only found among the females. Of special concern is the fact that half of the girls were diagnosed with celiac disease upon presentation, highlighting the importance of screening for celiac disease during initial assessment.

The main limitation was that the study was based on data from a single site; however, the clinic is the only one in the region thus all patients in the area seeking help for, or being referred for, eating disorder problems are assessed at the clinic, adding to the representativeness of the sample. Apart from referrals from family physicians and school health services, parents can also contact the clinic directly. During the past 15 years, significant efforts have been made at the clinic to identify ED cases as soon as possible and provide structured treatment (behavioral family therapy) to avoid risk for a chronic path and entrenched cases. This may positively have affected the likelihood that youths suffering from eating disorders came into contact with the clinics, resulting in an enhanced generalizability of this study. One might argue that the difference in data collection periods for the males (1999 to 2012) versus females (2004 to 2012) poses a problem, however, no major changes in the healthcare system were undertaken during the time period and no changes were made in the referral routines.

A better understanding of the clinical characteristics of males with eating disorder at presentation aids our ability to identify males with eating disorders and as well tailoring the best treatment alternatives.
Study V: Disordered eating attitudes and behavior in young Swedish males: sexual orientation and drive for muscularity

Introduction and aims

Eating disorders and disordered eating behavior may not be expressed the same way in males as they are in females. For example, whereas women may restrict in order to avoid looking fat, men may strive for a more defined muscularity (Olivardia, et al., 2004). The highly muscular body ideal may be difficult or impossible to attain for most individuals, and consequently it is not surprising that high concerns with muscularity in males have been found to be coupled with increased use of drugs, physique-enhancing supplements as well as binge drinking (Field et al., 2014).

A possible male-specific risk factor for eating disorders is homosexuality. Compared to heterosexual men, gay and bisexual men have been found to exhibit more signs of eating disorders (Bosley, 2011). However, this finding may either reflect a greater importance placed on appearance in gay cultures (Morrison, et al., 2004) or greater tendencies to admit to symptoms or seek treatment. Another possible factor that may be even more relevant to eating disorder risk in males is attention deficit hyperactivity disorder (ADHD). An association between ADHD and eating disorders has been found among at least a subset of individuals with eating disorders. ADHD also has a higher prevalence among males compared to females.

Due to the limited knowledge regarding males, the aim of the present study was to explore the relationship between disordered eating attitudes and behavior, drive for muscularity, ADHD tendencies, alcohol, drug and steroid use, and sexual preference using psychometrically sound and internationally established instruments in a large sample of males aged 15 – 30 years in Sweden.
Method

Participants
A sample of 824 Swedish speaking males aged 15–30 years. Mean age was 24.8 (SD 3.64) and mean body mass index (BMI) was 24.55 (SD 4.74).

Procedure
An online anonymous survey was utilized in which potential participants were primarily invited to participate via a Web link to the study that was spread via social networks (e.g. Facebook). Before participating the potential participants were provided with information regarding the purpose and the voluntary and anonymous character of the study.

Measures
All participants were asked to provide information regarding gender, age, educational background and living situation. As well the following internationally established instruments, all with sound psychometric properties, were used:

- **Eating Disorder Examination Questionnaire** (EDE-Q; Fairburn & Beglin, 2008). The EDE-Q measures the main features of eating disorder including both behavioral features (including binge eating and compensatory behavior) and attitudes (e.g., the excessive importance of weight and shape in determining self-worth). It provides both a global score as well as four subscale scores: Eating Concern, Shape Concern, Weight Concern and Restraint.
- **Drive for Muscularity Scale** (DMS; McCreary & Sasse, 2000). The DMS measures the desire to have increased muscularity. It has two subscales named the DMS Muscle Development Behaviors and the DMS Muscularity-Oriented Body Image Attitudes.
- **Satisfaction With Life Scale** (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The SWLS measures a subjectively perceived quality of life.
- **Adult ADHD Self-Report Scale** (ASRS; Kessler et al., 2005). The ASRS measures the frequency of the DSM-IV symptoms of ADHD.

Sexual preference was explored with the question “How would you describe your sexual orientation?” having four response alternatives: heterosexual, homosexual, bisexual, or other. Consumption of alcohol, illicit drugs, steroid and supplements was investigated by asking the participants to report how frequently they consumed the respective substance with the response alternatives ranging from “never” to “a couple of times a week.”
Statistical analysis

Means, standard deviations and medians were calculated. The relationships between variables were investigated by means of correlations with Bonferroni corrections applied to control for mass-significance. Differences between groups (of sexual preference and of low versus high symptoms of ADHD) were investigated by means of MANOVA, Kruskal Wallis and Mann-Whitney U Test.

Results

The sample consisted of a majority of males living in one of the four largest cities in Sweden. The educational status was higher than that in the general population (64.3% of sample had a university education as compared to 43% in the general population), but much of this difference can be accounted for by the high proportion of the sample living in large cities where the general population has a relatively high level of education (SCB, 2014). Close to half (49.6%) reported studying, 38% working, 6.8% searching for employment, 1.9% on sick leave, 0.5% on parental leave and 2.8% reported another main activity. The unemployment rate was lower than that of 6.8% for the whole Swedish population aged 15 - 74 (SCB, 2014), but again this could be a reflection of the higher proportion living in larger cities.

Table 6 displays the mean and median scores for the instruments used in this study.

Table 6. Mean, standard deviations and median for the EDE-Q, DMS, SWLS, ASRS (and when applicable their subscales)

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Mean (SD)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDE-Q Global</td>
<td>1.11 (1.00)</td>
<td>0.79</td>
</tr>
<tr>
<td>EDE-Q Restraint</td>
<td>1.03 (1.25)</td>
<td>0.45</td>
</tr>
<tr>
<td>EDE-Q Eating</td>
<td>0.47 (.79)</td>
<td>0.20</td>
</tr>
<tr>
<td>EDE-Q Shape</td>
<td>1.75 (1.44)</td>
<td>1.38</td>
</tr>
<tr>
<td>EDE-Q Weight</td>
<td>1.18 (1.20)</td>
<td>0.80</td>
</tr>
<tr>
<td>DMS</td>
<td>2.61 (.99)</td>
<td>2.43</td>
</tr>
<tr>
<td>DMSBEHAV.</td>
<td>1.83 (.96)</td>
<td>1.46</td>
</tr>
<tr>
<td>DMSATTS</td>
<td>3.39 (1.34)</td>
<td>3.29</td>
</tr>
<tr>
<td>SWLS</td>
<td>21.89 (6.47)</td>
<td>23.00</td>
</tr>
<tr>
<td>ASRS</td>
<td>10.55 (4.78)</td>
<td>10.00</td>
</tr>
</tbody>
</table>

Note: EDE-Q Global = the total score on the EDE-Q; EDE-Q Restraint = the Restraint subscale of the EDE-Q; EDE-Q Eating = the Eating Concern subscale of the EDE-Q; EDE-Q Shape = the Shape Concerns subscale of the EDE-Q; EDE-Q Weight = the Weight Concern subscale of the EDE-Q; DMS = the total score on the Drive for Muscularity Scale; DMS BEHA = the DMS Muscle Development Behaviors subscale; DMSATTS = the DMS Muscularity-Oriented Body Image Attitudes subscale; SWLS = the Satisfaction with Life Scale; ASRS = the Adult ADHD self-report scale
Disordered eating attitudes and behavior as well as use of supplements were reported by a non negligible number of participants. Close to 18% had either severely restricted their diet in the past month or engaged in an objective binge eating episode. On a regular basis 4.5% self-reported dietary restraint and 8% binge eating. Over 10% stated that they had exercised excessively and 2.1% reported doing that on a regular basis. Just under one third had used protein supplements in the past month, and just over 20% reported doing that on a regular basis. A significant minority also reported using creatine supplements.

There were significant but weak correlations between age and DMS total score as well as its behavioral subscale while no correlations between EDE-Q and age were found (Table 7). BMI on the other hand was correlated with the EDE-Q but not the DMS Total or its Muscle Development Behaviors subscale. Statistically significant correlations were found both between the total score on the EDE-Q and the DMS, as well as between all combinations of total scores and subscale scores for the instruments. The strength of the correlations ranged from .11 to .4.

Table 7. Correlations between Age, BMI, EDE-Q, DMS and their respective subscales

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th></th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rs</td>
<td>p</td>
<td>rs</td>
</tr>
<tr>
<td>EDE-Q global</td>
<td>.060</td>
<td>.086</td>
<td>.411*</td>
</tr>
<tr>
<td>EDE-Q restraint</td>
<td>.077</td>
<td>.026</td>
<td>.311*</td>
</tr>
<tr>
<td>EDE-Q eating</td>
<td>.073</td>
<td>.036</td>
<td>.308*</td>
</tr>
<tr>
<td>EDE-Q shape</td>
<td>.051</td>
<td>.147</td>
<td>.372*</td>
</tr>
<tr>
<td>EDE-Q weight</td>
<td>.041</td>
<td>.245</td>
<td>.388*</td>
</tr>
<tr>
<td>DMS</td>
<td>-.104*</td>
<td>.003</td>
<td>-.061</td>
</tr>
<tr>
<td>DMS Behavior</td>
<td>-.026</td>
<td>.464</td>
<td>-.006</td>
</tr>
<tr>
<td>DMS Attitudes</td>
<td>-.119*</td>
<td>.001</td>
<td>-.082</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.005 level (2-tailed). Bonferroni correction was applied.

Table 8 displays correlations between the EDE-Q, DMS and their subscales, and the SWLS and ASRS. The EDE-Q, DMS and their subscales were all negatively correlated with the SWLS. The non-significant relationship between DMS behavior and SWLS and ASRS can be compared to a slight correlation between DMS behavior and the EDE-Q shape concern scale ($r_s = .17, p = .002$).
Table 8. Correlations between EDE-Q, DMS, SWLS and ASRS

<table>
<thead>
<tr>
<th></th>
<th>SWLS</th>
<th>ASRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDE-Q global</td>
<td>-.384</td>
<td>.305</td>
</tr>
<tr>
<td>EDE-Q restraint</td>
<td>-.166</td>
<td>.126</td>
</tr>
<tr>
<td>EDE-Q eating</td>
<td>-.273</td>
<td>.262</td>
</tr>
<tr>
<td>EDE-Q shape</td>
<td>-.409</td>
<td>.333</td>
</tr>
<tr>
<td>EDE-Q weight</td>
<td>-.371</td>
<td>.284</td>
</tr>
<tr>
<td>DMS</td>
<td>-.215</td>
<td>.224</td>
</tr>
<tr>
<td>DMS Behavior</td>
<td>-.030</td>
<td>.035</td>
</tr>
<tr>
<td>DMS Attitudes</td>
<td>-.275</td>
<td>.279</td>
</tr>
</tbody>
</table>

All correlations were significant at the 0.005 level (2-tailed) except DMS Behavior against both SWLS ($p = .394$) and ASRS ($p = .314$). Bonferroni correction was applied.

When investigating whether eating disordered attitudes and behavior or drive for muscularity differed between groups with self-reported sexual preference, it was found that there were only significant differences with the EDE-Q shape subscale, the EDE-Q weight subscale, and the behavioral subscale of the DMS. As shown in Figure 4, males with homo- or bisexual preferences had higher scores on the weight and shape concern subscales of the EDE-Q.

![Figure 4](image)

*Figure 4.* Mean scores on EDE-Q shape and weight subscales and DMS behavior subscales as a function of self-reported sexual preference.
The participants that reported higher scores on the ASRS, and thus that may be judged to be at higher risk for ADHD, also reported higher scores on the global scale of the EDE-Q and all its subscales, and on the DMS Muscularity-Oriented Body Image Attitudes subscale.

Discussion

Similarities of the participants’ parameters in the present study with those from other studies in which participants were recruited through traditional channels indicate that anonymous Internet surveys may be a feasible means of gathering self-report data, particularly when dealing with questions of a sensitive nature.

The reported higher levels of weight and shape concerns among males with homo- or bisexual preferences is in line with the hypothesis of gay and bisexual men placing a stronger emphasis on appearance. The mixed pattern on the behavior subscale of the DMS indicates the need for further research on moderating variables.

The EDE-Q, having been developed in a female context may not capture disordered eating attitudes and behavior among men as accurately as it does for females, however its wide use and the availability of male norms adds to the advantages of using the instrument.

A limitation in the present study was the reliance on a non-probability sample, which limits the generalizability of the results. However, the sampling method was judged appropriate considering the exploratory aim of the study and the goal of promoting as honest as possible responses to the sensitive questions in the study. An additional limitation was that sexual preference was assessed by one item with mutually exclusive answers. This method may not accurately capture the complexity of sexual preference.
General discussion

Eating disorders and disordered eating attitudes and behavior are perplexing and challenging to understand. There is a current lack of understanding of the causes behind eating disorders, and as they have a negative impact both at the individual and societal level it is paramount that we continue the efforts to build a cohesive picture of eating disorders and disordered eating. In order to accomplish this task we need to continue studying the variables that may predict and/or influence eating disorders and disordered eating. In particular, attention needs to be paid to the interplay between different variables. Mediation and moderation help us to do this and can provide us with a deeper understanding of the “how” and “when”, respectively. However, as argued by Hayes (2012), looking only at mediation and moderation is insufficient; attention also needs to be paid to the combination of mediation and moderation, which Hayes (2012) refers to as conditional process modeling. This has traditionally been a formidable task but a new method developed by Hayes enables this to be accomplished with software packages commonly used in the field such as SPSS. By looking at the interplay of variables the risk of erroneously discounting variables due to lack of association at first glance may be reduced. This was highlighted by the results from Study III in which the relation between variables associated with eating disorders are shown to be sometimes far from simple. As highlighted by Hayes (2012) a solid foundation consisting of informed theory or empirical findings is a prerequisite or there is a risk of carelessly reconfiguring a model into something that is theoretically implausible or nonsensical.

Perfectionism was the focus of Study III and continues to be a variable that receives a fair amount of attention. Since the publishing of Study III the important role of perfectionism as a risk factor or even a causal factor has been further supported in experimental work by, for example, Boone, Soenens, Vansteenkiste and Braet, (2012). However, the lack of agreement regarding how perfectionism should be defined and as to which components should be included in the term remains. Some recent studies have focused in particular on the elements of high standards and self-evaluation (self-criticism) (e.g., Dakanalis et al., 2014; Goodwin, Arcelus, Geach, & Meyer, 2014). More specifically Goodwin et al. look at the possible role of self-criticism as a moderator or mediator between high standards and eating pathology. They failed to find support for its role as a moderator but they found that the relationship between high standards and eating pathology was fully
mediated by self-criticism. Dakanalis et al. (2014) investigated if maladaptive perfectionism (a combination of high standards and critical self-evaluation) moderated or mediated the relationship between insecure attachment (anxiety and avoidance) and eating disorders symptomatology, finding support for both roles.

As further examples, other researchers have looked at perfectionism as a mediator between maladaptive schemas and body image concern (Boone, Braet, Vandereycken, & Claes, 2013) while others such as Luo et al. (2013) have found mixed results in their investigation of whether other variables might act as mediators or moderators in the relationship between perfectionism and eating disorder behaviors. Interestingly, in the relationship between alexithymia and eating disorders, Marsero, Ruggiero, Scarone, Bertelli and Sassaroli (2011) found that maladaptive perfectionism acts as a mediator when assessed by the Frost Multperfecticism Scale and as a moderator when assessed by the perfectionism subscale of the EDI. The results of these studies illustrate both the complex picture of eating disorders as well as the need for a more sound theoretical foundation and theoretically informed operationalization of perfectionism, as mentioned above. As expressed by Hayes (2012) it is the theories and not the mathematics that need to justify and defend the undertaken exploration of relationships.

It should be stressed that the study of variables that play a role in eating disorders and their interaction necessitates psychometrically sound instruments and appropriate norms. Studies II and III contributed to the knowledge base in these aspects. Finally, one should keep in mind that the models and variables that have been suggested to be involved in the etiology and maintenance of eating disorders in females may not necessarily be the same as those that play a role for males. Studies IV and V contributed to our understanding of eating disorders in males by focusing on this understudied group.

Looking ahead - suggestions for future studies

In continuation of improving our understanding of eating disorders, there are currently a couple of studies underway that will complement the results presented in this thesis. In the first continuation study, norms based on a representative randomized sample of Swedish males are being collected for the EDE-Q and the Drive for Muscularity Scale. This is an important contribution as male norms based on general population samples are lacking for the EDE-Q in general and for Swedish males in particular. The norms will also allow a further determination of the representativeness of the results in Study V. A second study underway is looking at outcome data for the males in Study IV as well as variables predicting the outcome.
Bringing our understanding of eating disorders and disordered eating to the next level calls for the employment of sophisticated research methods such as longitudinal prospective multicenter designs. Multicenter designs will help increase the odds of achieving adequate sample sizes and consequently power, whereas longitudinal designs are of great importance when elucidating causal factors. Longitudinal designs also aid the understanding of how different starting points can lead people down the same eating disorder trajectory (equifinality) or how similar starting points (for example in the case of monozygotic twins) can sometimes lead to one twin developing an eating disorder but the other not (multifinality). On the downside, multicenter longitudinal studies are associated with high costs and logistical issues. Thus there is a need to compliment them with other methodologically strong and novel approaches. For example, the potential of studies may be boosted by utilizing a alternate approach to the traditional longitudinal design in which individuals at high risk at the beginning of a study are focused on (Jacobi et al., 2011). Reductionist experiments may be another approach that may provide a fruitful path in revealing factors that cause or maintain the eating disorder. This approach has received support from prominent researchers in the field (e.g., Treasure, Cardi, & Schmidt, 2014).

Novel approaches in the field of genetics also promise new insights into the etiology of eating disorders. For example, Stessman, Bernier and Eichler (2014) suggest reversing the customary method of determining the responsible gene by first characterizing patients’ phenotypes followed by genotyping to instead adopting a genotype-first approach. According to the authors, a genotype-first approach will lead to an unprecedented opportunity to bring together patients with common genetic etiology and thereafter classify or examine the phenotypes, which will aid in unraveling the underlying genetic etiology of complex diseases such as eating disorders.

Widening our focus to include not only eating disorders but also mental disorders in general, I believe in the opinions expressed by Thomas Insel, the current director of the National Institute of Mental Health (NIMH), that there is a need for a change in how we conceptualize mental disorders. Instead of thinking in terms of mental disorders and behavioral disorders, perhaps we are better off thinking of mental disorders in terms of brain disorders. After all, changes in behavior are most likely preceded by changes in the brain. Studies of schizophrenia lend support for this idea as structural brain alterations have been found to predate the onset of psychosis (Mechelli et al., 2011). Detection of early signs is paramount to enable prevention and early intervention before eating disorder behaviors and attitudes become entrenched. This is especially important in light of the challenges we have with treating the disorders and the high rates of chronicity coupled with them. Future studies combining psychological and brain imaging studies hold great promise for unveiling many of the secrets cloaked within eating disorders.
Finally, when putting the field under scrutiny it is also important to highlight that replication studies play an important role in adding confidence to findings. Thus a call for more replications is made.

Strengths and Limitations

Apart from the limitations and strengths discussed in the separate studies some overarching points deserve special attention. Studies I, II, III and V all relied on self-report measures as it was found to be the most appropriate method based on the sensitive nature of the data to be collected. However, self-reporting also has its downsides. Self-report instruments may cause a threat to the reliability through recall and response bias. On the other hand, the use of instruments that assess the present or immediate past limit the risk of recall bias. Additionally, making the forms anonymous hopefully reduced response bias. Ideally a multi-method design should have been employed to further reduce the risk of bias and thus improve the confidence of the present findings. As multi-method designs are extremely cost-ineffective in collecting data from large samples, further efforts are needed for validating simpler data collection methods such as self-report measures.

Knowledge of statistical methods continuously evolves and in retrospect, the reliance on Sobel’s test in Study III was suboptimal. Sobel’s test assumes normality of the sampling distribution of the indirect effect. This assumption may be reasonable in large samples such as the one in Study III, but a preferred method to Sobel’s test would have been bootstrapping of confidence intervals of the indirect effect (Hayes, 2012). In the case of the moderation analysis in Study III, instead of arbitrarily setting perfectionism as low, medium or high, it would have been preferable to use the Johnson-Neyman technique to investigate the regions of significance since perfectionism is a continuous variable. The regions of significance would then tell us at which levels of perfectionism the effect of perfectionism on the relationship between body dissatisfaction and disordered eating becomes significant (Hayes, 2012).

A strength throughout the studies is the reliance on almost exclusively psychometrically sound and internationally established instruments. This aids in providing clear and reliable results. As well, attention was paid and efforts were made in all studies to achieve adequate sample sizes in order to provide acceptable power to detect differences or associations when they exist and determine their importance. The sample in Study IV may at first glance appear small, but put in the context of existing data, it is relatively large. However, ideally we need larger sample sizes, especially when looking at eating disorders in relation to other variables that have relatively low frequency such as some sexual preferences, consumption of drugs, ADHD (among females), type 1 diabetes and celiac disease.
Concluding remarks

With a better understanding of the complex etiology of eating disorders, using models that enable prediction and that are both sensitive and specific, the way is paved for the development of more efficient prevention and treatment interventions. This will ensure that prevention efforts are geared towards the individuals that are at true risk for developing eating disorders. Progress is incremental and builds upon the growing body of research such as presented in this thesis where norms are gathered, instruments are validated and attention is given to underrepresented groups. Hopefully a greater understanding of eating disorders will reduce the current stigma that is associated with eating disorders, easing the way for affected individuals to seek help and ultimately improve the outcome of treatments.
Acknowledgements

I’m truly grateful for having been given the chance to dedicate the last few years to embark on the fantastic journey of pursuing a PhD. The journey has taken me to numerous exciting places, and along the way I’ve been accompanied by many wonderful people.

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References


A doctoral dissertation from the Faculty of Social Sciences, Uppsala University, is usually a summary of a number of papers. A few copies of the complete dissertation are kept at major Swedish research libraries, while the summary alone is distributed internationally through the series Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences. (Prior to January, 2005, the series was published under the title “Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences”.)