Developing Risk Factor Profiles for Anorexia and Bulimia Nervosa In Young Adults

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BY

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Abstract

Recent research has shown that weight concerns begin at a very early age. Marchi and Cohen (1990) found that a significant number of young children had levels of eating disorder symptoms high enough to be of concern. They also found that children were at risk of showing parallel problems in later childhood and adolescence. As well it has been shown that an estimated 2% to 3% of post pubertal girls and women suffer from eating disorders, and an additional 5% to 10% may have "subclinical" eating disorders. In an attempt to develop a profile of those individuals at risk for developing an eating disorder (anorexia nervosa or bulimia nervosa), 625 male and female undergraduate students from the University of Manitoba were given a number of questionnaires relating to family environment, self-esteem, depression, sex-role identification, body shape and eating attitudes and behaviors. Logistic regression procedures were used with three eating disorder measures in an attempt to determine the most succinct model for predicting correlates of risk for developing an eating disorder. Results indicated university attending females were at greater risk for developing an eating disorder than university attending males, however, males were also susceptible. Variables significant to each of the three measures varied, as did the predictive power (chi-square value) of each model. Variables such as self-esteem were more directly related to eating disorder outcome than variables such as age. Body shape dissatisfaction was highly correlated with eating disorders, and had both a mediating and moderating effect depending on the outcome measure used.

Developing Risk Factor Profiles for Anorexia and Bulimia Nervosa in Young Adults

Disordered eating can be conceptualized along a continuum, ranging from unconcern with weight and normal eating, to "normative discontent" with weight and moderately disregulated/restrained eating, to anorexia nervosa and bulimia nervosa (Rodin, Silberstein & Striegel-Moore, 1985). Although "normative discontent" does not merit categorization as a psychiatric diagnosis, it can cause considerable distress in its own right and can be a potential risk factor for development of the full clinical syndrome of bulimia nervosa (Polivy & Herman, 1987; Striegel-Moore, Silberstein, & Rodin, 1986). Anorexia nervosa and bulimia nervosa are serious public health problems in industrialized countries. Both of these disorders are associated with significant mortality and morbidity. Joiner, Heatherton, and Keel (1997) in a ten-year study of bulimia related factors found that bulimic symptoms display high temporal stability and may therefore affect long-term functioning and well being. Eating disorders occur mainly in young women (Mitchell & Eckert, 1987) and appear to be increasing in prevalence. Although their exact cause is unknown, most clinicians and researchers agree that anorexia nervosa and bulimia nervosa are multidimensional syndromes with biological, psychological, and sociocultural influences (Garner & Garfinkel, 1980; Herzog, 1984; Ordman & Kirschenbaum, 1986; McCarthy, 1990; Striegel-Moore et al., 1986). The present research will investigate correlates of risk for developing an eating disorder in young adults, with a focus on anorexia nervosa and bulimia nervosa. However, in order to understand the significance and purpose of this study, some information on the

eating disorders, anorexia nervosa and bulimia nervosa, and some of the studies in the area are first presented.

Eating Disorders

As indicated above, disordered eating can be conceptualized as a continuum from mild to severe. However the major focus of this study is on the severe end of the continuum, the eating disorders of anorexia and bulimia nervosa.

Anorexia Nervosa

The prevalence rate of anorexia nervosa in the general population appears to be less than 1% (Garner & Garfinkel, 1980). It is often referred to as the self-starvation syndrome and typically emerges first in adolescence. The anorexic individual usually feels unhappy, unattractive, and unworthy and feels if only they were thinner they would be happier. As the individual loses weight, people comment on it, which may then encourage the individual to lose more weight. This may be the first time this person sees himself or herself as competent and perhaps special, as a result of his/her ability to lose weight.

DSM-IV Diagnostic Criteria for Anorexia Nervosa. The DSM-IV (1994) criteria for a diagnosis of anorexia nervosa include: a) refusal to maintain body weight over a minimal normal weight for age and height, i.e., weight loss leading to maintenance of body weight 15% below that expected, or failure to make expected weight gain during a period of growth, leading to body weight 15% below that expected; b) intense fear of gaining weight or becoming fat, even though underweight; c) disturbance in the way in which one's body weight, size, or shape is

experienced, e.g., the person claims to "feel fat" even when emaciated or believes that one area of the body is "too fat"; and d) in females, absence of at least three consecutive menstrual cycles when otherwise expected to occur (primary or secondary amenorrhea).

General Medical Signs and Symptoms of Anorexia Nervosa. Symptoms of anorexia nervosa include: a) amenorrhea - endocrine loses testosterone, abnormal thyroid function, loss of bone mineral density; b) gastrointestinal problems - pain, bloating, constipation, postpandrial distress, pancreatic problems; c) cardiac arrhythmias - bradycardia, decreased cardiac chamber dimensions; d) hypotension e) hypothermia; and f) dehydration and electrolyte complications - renal complications.

Bulimia Nervosa

This frequently called "binge/purge" syndrome may involve induced vomiting, laxative or diuretic abuse, excessive exercise, or fasting. Most bulimic's begin binging between the ages of 15 and 18 (Garner & Garfinkel, 1980). The prevalence in the general population of bulimia nervosa is estimated to be between 1% and 5% (Garner & Garfinkel, 1980), although the exact prevalence is unknown because it is so difficult to detect. Reasons for this are: a) bulimic's often take great pains to hide their rituals; b) bulimic's may be underweight or obese, although most are within a normal range for their age, sex and height; and c) bulimic's exhibit normal and appropriate eating habits in social circumstances. Also, educators and researchers tend to focus on highly visible problems of young people such as teen

pregnancy, drug abuse, teen suicide and violent crime, as well as focusing on those young people experiencing such problems (Neighbors, Forehand, & McVicar, 1993). This focus on the more visible portion of the population may lead to ignoring those that need attention for eating disorders but who do not actively display signs of trouble, or do not seek out help.

DSM-IV Diagnostic Criteria for Bulimia Nervosa. The DSM-IV (1994) criteria for a diagnosis of bulimia nervosa include: a) recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time); b) a feeling of lack of control over eating behavior during the eating binges; c) regularly engaging in self-induced vomiting, the use of laxatives or diuretics, strict dieting or fasting, or vigorous exercise in order to prevent weight gain; d) a minimum of two binge-eating episodes a week for at least three months; and e) persistent over concern with body shape and weight.

General Medical Signs and Symptoms of Bulimia Nervosa. Symptoms of bulimia nervosa include: a) menstrual irregularities; b) dental and gum disease - gastric acid; c) swollen parotid glands; d) gastrointestinal problems - bloating, constipation, gastric and duodenal ulcers; and e) electrolyte abnormalities and dehydration - hypotension, light-headedness, dizziness.

Possible Correlates of Eating Disorders

G. Stanley Hall (1904), the first theorist to focus upon adolescence as a time of critical development, characterized this stage as a turbulent time of "storm and stress." It is the developmental period of transition from dependent childhood to self-

sufficient adulthood when established and once-stabilized family values come in conflict with societal, peer and media-espoused values. Demands for personal recognition are intensified and the adolescent, although not ready for the responsibility of being an adult, resents being treated like a child. These demands are intensified when the young person attends university, a place where one is treated as an adult and high demands are placed on him or her. Numerous studies have noted that, in middle adolescence, adjustment problems peak, and that these are associated with the heightened struggle for independence and identity (Connell, Stroobant, Sinclair, Connell & Rogers, 1975 in Harper and Marshall, 1991; Street, Kromery, Reed, & Anton, 1993). Thus, it is not surprising that the family environment might be a risk factor for developing an eating disorder.

Family Environment

Regardless whether biological, psychological or sociocultural factors are emphasized, the importance of the family environment in the etiology of anorexia nervosa and bulimia nervosa is often acknowledged. The environment of the family may act as a potential protective buffer from internal and external stresses, or as a potential risk factor for aberrant development (Thienemann and Steiner, 1993). Marchi and Cohen (1990, in one of the few studies dealing with children, found that they are definitely at increased risk of showing parallel problems in later childhood and adolescence. They also found that, although their general population sample did not show prevalence rates of DSM-III-R diagnoses of anorexia and bulimia as high as expected, significant numbers of the children had

levels of symptoms of these disorders to be of concern. They found that certain eating and digestive problems in early childhood were predictive of symptoms of bulimia nervosa and anorexia nervosa in adolescence. They also found that problems in self-control of eating behavior as well as eating-related family struggles in early childhood are risks for developing bulimia nervosa later on. For adolescents, interparental conflict has been linked to negative effects on social adjustment (Forehand, McCombs, Long, Brody and Fauber, 1988 in Neighbors et al. 1993), self-esteem, and anxiety, (Slater and Haber, 1984). Kurdek and Sinclair (1988) found family conflict to be linked with adolescent maladjustment across three family structures (two-parent, mother-custody, and stepfather). Conflict, often that between parents, has thus been implicated as detrimental in numerous areas of functioning for both children and adolescents.

Sours (1980) found anorectic's families to be perfectionistic, withdrawn, and isolated in their responses to the Minnesota Multiphasic Personality Inventory (MMPI). Strober, Salkin, Burroughs, and Morrell (1982) gave the MMPI to the parents of 35 adolescent bulimics and 35 adolescent restricters. They found that the parents of the bulimics, in contrast to the parents of the restricters, notably the fathers, demonstrated personality profiles suggesting disturbances in affect, weak internal controls, unmodulated expression of hostile impulses, and the absence of emotionally satisfying intrafamilial ties. As well, affective disorder, alcoholism, and drug use disorders were found to exist with greater frequency among blood relatives of bulimics than in relatives of restricters. They also found that the degree of affect

disturbance and dyscontrol still existing in parents was shown to have predictive value with regard to the severity of the bulimic state in individual subjects.

Families of eating-disordered individuals have been described as having specific characteristics and patterns of interaction (e.g., Rybicki, Lepkowsky & Arndt, 1989; Felker & Stivers, 1994). Minuchin, Rosman, and Baker, (1978) hypothesized that the anorectic's state preserves a tenuous harmony and closeness within the family by diverting attention away from the parents' vulnerabilities and marital strains. They identified five primary patterns of impaired interaction that they believed lay at the core of psychosomatic pathologies. These are enmeshment, overprotectiveness, rigidity, conflict avoidance, and poor conflict resolution. They have described families of anorectic's as being more enmeshed, more overprotective, and more rigid than normal families.

Humphrey, Apple, and Kirschenbaum, (1986) found that anorectic bulimic families used significantly more confusing, disorienting, ignoring, and walling-off communication behaviour than did normal families. Bailey (1991), in her study of individuals with bulimia or bulimic-like symptoms, reported that their families were lacking in commitment, help, and support, and were filled with anger, aggression, and conflict.

Strober and Humphrey (1987) reviewed the literature pertaining to the families of anorexic's and bulimic's. They concluded that the family environment of anorexics was described as generally enmeshed, overprotective, and controlling,

whereas families of bulimic's generally were found to be disengaged, chaotic, conflictual, and lacking in expressive communication.

In summary, previous research, although not always displaying the same findings, has demonstrated that the families of those with eating disorders typically have some type of impaired interaction. Most common of the reported problems appears to be dysfunctional communication patterns, more than normal conflict, and less than normal cohesion. For a review of literature relating to the family environment of individuals with eating disorders see Appendix A.

Sex Role

Research has shown that the strength of ones' sex role identification may determine how psychologically adjusted one is. As well, studies have argued that female and male sex-role-typed individuals may experience different types of problems. (For a review of some of the general literature on sex role identification, see Appendix B).

Gender roles and sociocultural expectations appear to be strongly implicated in the development of eating disorders (Van Strien & Bergers, 1988). For instance, anorexia and bulimia occur predominately among women (Garner & Garfinkel, 1982, Hsu, 1982). This is frequently attributed to the continued emphasis on physical attractiveness and a thin physique of women (Polivy, Garner, & Garfinkel, 1986 in Thornton, Leo, & Alberg, 1991). Garner, Garfinkel, Schwartz & Thompson, (1980) in their study of playboy centrefolds and Miss America Pageant contestants from the sixties to the eighties, showed there has been a shift to a thinner

"body ideal". As well, they found that there was a significant increase in diet articles in six popular women's magazines over the same time period. In a more recent study, Andersen and DiDomenico (1992) reported a correlation between the incidence of eating disorders between men and women and sociocultural norms promoting thinness. They found that popular women's magazines contained 10.5 times as many advertisements and articles promoting weight loss as did the men's magazines, which is the same as the ratio of incidents of anorexia nervosa between men and women.

Broverman, Vogel, Broverman, Clarkson, & Rosenkrantz, (1972) found that more feminine traits were negatively valued than masculine traits, therefore women tended to have more negative self-concepts than men did. The tendency for women to denigrate themselves in this manner, they said could be seen as evidence of the powerful social pressures to conform to the sex-role standards of the society. Moreover, these social changes have contributed to increased stress for women resulting from conflict between many of the competing role demands facing them in both personal and professional aspects of their lives. Clinical observations suggest that striving to achieve and excel in both stereotypic masculine and feminine domains may contribute to the development of eating disorders (Barnett, 1986 in Thornton et al., 1991). Attending university, where more historically viewed masculine traits are emphasized, may contribute to this risk. The expectation that a woman be physically attractive and capable of being an effective wife, mother, and working woman is an ideal that many women attempt to achieve, yet frequently find

to be unrealistic, unattainable, undesirable, and oppressive (Orbach, 1978). It has been suggested that disordered eating reflects women's response to the stress of these multiple pressures and conflicting demands (Orbach, 1978, Palazzoli, 1978). For instance, women may pursue a thin physique as a means to enhance their feminine attractiveness while serving to contradict feminine stereotypes about themselves and empower them in traditionally masculine pursuits. Orbach (1986) noted the exaggerated and oppositional nature of this pursuit to be a recurrent theme among anorectic women- "thinness as ultra-feminine and, at the same time, thinness as rejection of femininity"- with their thinness serving to parody feminine attractiveness while reducing the curves that define their "femaleness". Therefore in a culture in which women's roles are complex and frequently conflicting, and the emphasis placed on appearance and thinness resulting in an unrealistic body image and body dissatisfaction, conditions exist for heightened chronic stress and reduced self-esteem that may contribute to increased risk among women for developing an eating disorder. Women as compared to men reportedly express greater dissatisfaction about their bodies (Fallon & Rozin, 1985), more concern with appearance and body weight (Pliner, Chaiken, & Flett, 1990), and more frequently engage in weight-control efforts (Herman & Polivy, 1980).

The emphasis on feminine attractiveness has continued despite the changing social roles, expectations, and opportunities for women that have occurred in the past 25 years or so. Bem (1974) argued over two decades ago that men or women who were balanced in masculinity and femininity -androgynous individuals- tend to

be better adjusted than men high only in "masculinity" and women high only in "femininity". These data seem to support the view that those who regard themselves as possessing both masculine and feminine qualities are more likely to be capable, fulfilled, and happy. Thornton et al. (1991) found that both masculine and feminine gender-typed women who strongly adhered to a superwoman ideal were at greater risk for eating disorders than androgynous superwomen were. In contrast, androgynous superwomen had relatively low potential for disordered eating and appeared comparable to women who regardless of gender typing rejected the superwoman ideal. Women undifferentiated with regard to gender type, whether superwoman or not, also had reduced potential for disordered eating. Yet, Broverman, Broverman, Clarkson, and Rosenkrantz, and Vogel (1970) found that masculine attributes have been associated with psychological well-being. Traits composing the Masculinity scale of the Bem Sex Role Inventory are associated with an assertive, independent stance conducive to mental health (Taylor and Hall, 1982). Payne (1987) found that expressiveness (femininity) correlated weakly with traditional adjustment indices (global and social self-esteem, and lack of anxiety). He found that Instrumentality (masculinity) correlated moderately to highly with self-esteem, lower anxiety, and lower loneliness (although self-esteem mediated the relationships).

In summary, the continuing emphasis on a thin physique in today's culture combined with the pressures of succeeding in the business world appear to place more pressure on women than men. These pressures in turn, appear to place women

at greater risk for developing eating disorders. As well, those higher in "feminine" characteristics appear to be more susceptible to eating disorders than those higher in "masculine" characteristics.

Self-esteem

Self-esteem, in general, refers to the degree to which an individual likes him or herself, and sees him or herself as a worthy person (Martin & Osborne, 1993). Self-esteem has been shown to be a fairly good predictor of mental health in adults (Coopersmith, 1967) and adolescents (Rosenberg, 1965), and has been used as an indicator of psychological well being. High self-esteem, expressed as a positive self-evaluation, is considered by clinicians and researchers of differing theoretical orientations to be a healthy and desirable characteristic. In contrast, low self-esteem has been linked to such indicators of psychological distress as depression (Wilson & Krane, 1980); neuroticism (Bagley & Evan-Wong, 1975); anxiety (Percell, Berwick, & Biegel, 1974), poor general adjustment (Rios-Garcia & Cook, 1975) and eating disorders. Self-esteem has been used as the indicator of psychological well being for many of the sex-role studies. (This general topic is discussed further in Appendix B). Overall, studies seem to show that those who have lower self-esteem will be at greater risk for developing eating disorders.

Body Image

Bruch (1962) stressed, "no ideal or lasting cure is achieved (in anorexia nervosa) without correction of the body image misperception and that a correction of this distortion is a precondition to recovery" (Bruch, 1974). Garner and Garfinkel

(1981) specified two basic ways a body-image disturbance could be clinically manifested in anorexia nervosa. The first type is a "perceptual" disturbance in which the anorexic may appear unable to assess her size accurately. This is often called body-size distortion. The second type of disturbance is more of a cognitive and affective (or attitudinal) nature without a "disturbed size awareness". In this type "patients assess their physical dimensions accurately but they react to their bodies with extreme forms of disparagement or occasionally aggrandizement". This second type of body-image disturbance is called body dissatisfaction. Garner and Garfinkel (1981) stated that the two types might operate independently or conjointly. As well, they stated that in some cases there is a variation of this phenomenon in that body size distortion seems to be restricted to a particular part or region of the body. Likewise, with body dissatisfaction, certain body areas are particularly negatively evaluated by the patient, and therefore elicit the most dysphoria.

The distinction between body-size distortion and body dissatisfaction has been made with bulimic individuals as well (Freeman, Thomas, Solyom, & Miles, 1983). Striegel-Moore et al., (1986) attributed the increase in the prevalence of bulimia nervosa partly to our society's placing increasing value on attractiveness and thinness and the stigmatization of obesity. Altabe & Thompson (1993) in their study of 17-to-40 year olds found that females had higher levels of body dissatisfaction than males and that these differences did not diminish with age.

Slade and Russell (1973) in the first empirical study of body image in anorexia nervosa, from a series of comparative and longitudinal studies using a

Body Perception Index, found that: a) while a sample of normal females were remarkably accurate in estimating their body-widths, (i.e., face, chest, waist, and hips), a sample of anorexics overestimated by an average of between 17 and 58%; b) the tendency of anorexics to overestimate their body widths did not extend to inanimate objects or to their own height, although they overestimated the size of other females, but to a lesser extent than their own; c) as a direct result of treatment, anorexics became more accurate in judging their body widths. Research on body-image disturbance since that time has shown mixed results (see Appendix D).

In summary, body image correlates of eating disorders appear to be mixed. However, consistent in the studies across measures are the findings that greater body image disturbances are indicative of poorer prognosis and more marked psychopathology. Therefore the importance of identifying a distorted body image before it becomes too distorted may be imperative to effectively treat these individuals.

Depression

Herzog (1984) reported that 85% of anorexics and 60% of bulimic's suffer from depression (depressed mood). It has been argued that, as a consequence of sex-role socialization, women are less well prepared than men to deal with life stress events (Radloff & Rae, 1979). More specifically, Radloff and her colleagues suggested that socialization, which encourages the development of feminine characteristics in girls, also predisposes them to develop a pattern of adaptation to stress referred to as "learned helplessness" (Radloff & Rae, 1979). According to

Radloff and Rae (1979), gender-typed patterns of sex-role socialization render women more susceptible than men to the negative impact of life stress and, consequently, more vulnerable to depression.

McCarthy (1990) maintained that the current standard of feminine beauty in our society is thinness, the so-called "thin ideal". Although well below the weight of the average woman (Garner, Rockert, Olmstead, Johnson, & Coscina, 1985), this standard is vigorously promoted by the media and fashion industry and is one that many women try to achieve. According to McCarthy, there are several consequences of this. First the thin ideal is applied mainly to women, which causes body dissatisfaction and depression to occur more frequently in women than men. As well, McCarthy believes the thin ideal is responsible for several disturbing trends in our society; namely the rising rate of depression, especially in young females, and the earlier age of its onset. Current societal pressures to be physically fit, along with widely held assumptions about the body being infinitely malleable and the vast rewards that go along with the "perfect figure", only underscore the apparent validity of McCarthy's argument (Brownell & Wadden, 1992). Adams, Katz, Beauchamp, Cohen, and Zavis (1993) findings lend support to McCarthy's ideas. They found that female students were more inclined to prefer a thinner than average body shape. They were more dissatisfied with their bodies and, as a group; they scored higher than males on measures of disordered eating. Moreover, depression was moderately correlated with body dissatisfaction. Disordered eating scores were most extreme

among the 8th and 12th grade females, and less extreme among the 5th grade females.

Richards, Casper, & Larson (1990) reported that depression was related to eating attitudes in fifth and sixth grade girls. They suggest that preoccupation with food and dieting in girls begins in the fifth and sixth grades and increases in the seventh and eighth grades, a time when most girls are completing puberty

Lindholm and Wilson, (1988) found that the bulimics in their study, who were the most accurate in body-size estimation in their sample, also displayed the most depression. They hypothesized that this may make women more vulnerable to societal pressure to be thin.

In an epidemiological study of sex-role orientation and depression, Elpern and Karp (1984) reported a correlation between low masculinity and significant depression. Stoppard and Paisley (1987) found that although, masculinity and femininity were found to be significant predictors of depression, their influence was overshadowed by the greater power of life stress. One implication of their finding was that an exclusive focus on masculinity or femininity to the neglect of environmental influences in the investigation of gender-related factors in depression may lead to a tendency to overemphasize the importance of individual differences in sex role orientation. As a correlate of eating disorders, it appears that increased depression increases the probability of the development of an eating disorder.

Statement of the Problem

This study simultaneously examined the five variables of sex-role, self-esteem, body-shape, depression and family environment with a focus on developing a risk profile to help identify those individuals who may develop anorexia nervosa or bulimia nervosa. Although there have been many studies regarding anorexia nervosa and bulimia nervosa, to my knowledge, there have not yet been any studies that have simultaneously examined the five variables listed above as potential correlates of self-reported eating attitudes and behaviors in a large sample of non-clinical female and male university students. Most the studies conducted tend to measure only one or two of the variables together. In addition, this study used three different eating disorder questionnaires to identify those individuals who are at risk for developing an eating disorder. The importance of each of the independent variables and the interaction effects between these variables were examined.

This study also attempted to correct a number of limitations associated with previous studies that examined correlates of eating disorders. First, the study included male subjects. Most of the eating disorder research emphasizes female participants. Studies have shown that, between 26 and 79% of college women and between 41 and 60% of college men report binge eating of some description (Clarke and Palmer, 1983; Katzman, Wolchik, and Braver, 1984; Pyle, Mitchell, Eckert, Halvorson, Neumann, and Goff, 1983). Nelson, Hughes, Katz and Searight, (1999) found that eating problems might be more prevalent among males than previously estimated. In addition, Olivardia, Pope, Mangweth, and

Hudson (1995) found that men and women with eating disorders show far more similarities than differences.

Second, the focus was limited to university students. University is associated with an increase in stress, which in turn has been shown to increase abnormal eating habits. Haslam et al. (1989) found that examination stress may be accompanied by an increase in abnormal eating habits in a female undergraduate student population. Friedlander and Siegel (1990) found evidence of separation difficulties in college age women contributed to eating disorders. In addition to the general pressure of university life, specific pressures towards thinness may prevail on campus. A competitive school environment may foster not only academic competition, but also competition regarding the achievement of an outstanding physique (i.e., thin or muscular body). Individuals who strive for achievement and competition in the academic domain may also feel compelled to "achieve" in the weight domain. An additional relationship between achievement orientation and disordered eating can be derived from Horner's (1972) concept of the fear of success. Some women may feel that rigorous pursuit of academic excellence produces conflict with their traditional female sex role. As Spence (1985) in Striegel-Moore, Silberstein, Frensch, & Rodin, (1989) suggested, a felt challenge to gender identity may prompt an increase in sex role congruent behaviors. A focus on appearance and weight, therefore may serve to reaffirm a women's feminine identity. In addition, most of the research concerning dieting behavior and body image has been conducted with an adolescent aged population.

Third, non-clinical male and female subjects were the focus of this investigation. It has been estimated that 2% to 3% of postpubertal girls and women suffer from eating disorders, but studies have shown that an additional 5% to 10% may have "subclinical" " (i.e., do not meet all of the DSM-IV criteria) eating disorders (Levine & Smolak, 1992). As well, one of the characteristics associated with bulimia is that it is hard to recognize because many bulimics are of normal, or nearly normal, weight and frequently are identified only after they come in for treatment. However, this may not occur very readily as many are embarrassed to seek help. Therefore, although the number of diagnosed cases is cause for concern, attitudes and behaviors that have been implicated in the subsequent emergence of "clinical" (meet the DSM-IV criteria) eating disorders (Striegel-Moore et al., 1989) are also of concern. As a consequence, non-clinical male and female subjects were the focus of the investigation in order to more clearly identify the factors that correlate with future problematic eating attitudes and behaviors.

Fourth, this study surveyed a larger sample than has been typically surveyed in the eating disorder literature. Six hundred and twenty five university students were surveyed. The advantages of a large sample size includes generalizability and maintaining adequate power to determine the effects of factors such as age and gender on eating disorders.

By addressing limitations of previous studies, this study increased knowledge regarding the variance unique to each set of determinants in a large

sample of non-clinical males and females. This issue is important because progress in a variety of areas, including clinical assessment, intervention, and the design of effective prevention programs, requires more precise knowledge of the relative significance of the various potential risk factors.

Hypotheses

The hypotheses were as follows:

1) Those variables designated as "A" (e.g., Gender, Body Mass Index (BMI), etc.) variables would be less directly related to a clinical eating disorder diagnosis than those designated as "B" variables (e.g., Self-esteem, Body shape dissatisfaction, etc.,) see Table 1.
2) That some of the "A" variables would work through the "B" variables, i.e., there would be an interaction effect.
3) Both females and males would display aberrant eating attitudes and problem behaviors related to eating, however, more females than males would display these patterns.

Table 1.

Independent Variables Designated as "A" or "B"

"A" Variables	"B" Variables
Gender	Self-esteem
Age	Depression
Body Mass Index	Family Environment
Person(s) Live With	Sex Role Orientation
Siblings	Body Shape
Birth Order	Body Perception
Accommodations	Hours of Exercise
Age of Maturation	Compete in Sports*
	Compete in Nonsports**
	Total Hours of Competition
	Teased by Males
	Teased by Females

* e.g. team sports, single sports, working out
**e.g. piano, debating

Method

Procedure

The study was described to students from University of Manitoba introductory psychology classes. Those students interested in participating in the study were asked to complete a sign-up sheet indicating the time and place the questionnaires would be administered. Questionnaires were administered to participants in 18 group sessions. Credit was given for participation in the study,

which partially fulfilled the student's requirements for the psychology course. The participants were reminded that all of the information was strictly confidential and that they should not put their name or student number on the questionnaire packages. As a number of the questions in the package were of a potentially sensitive nature, which could raise issues for the respondent, phone numbers of services on campus that could offer assistance were provided.

Participants. Six hundred and twenty five students signed up to participate in the study. Twenty-seven questionnaires were discarded from the data set due to incomplete forms, missing data points, and/or erroneous scores. The final sample of 598 subjects consisted of 284 males (47.5%) and 314 females(52.5%).

Questionnaires.

A number of instruments were used in order to investigate a broad range of risk factors correlated to eating attitudes and eating behaviors of young adults. As well, a general demographic information sheet was included.

The Eating Disorder Inventory (EDI). The EDI is a widely used self-report measure of symptoms commonly associated with anorexia nervosa and bulimia nervosa (Garner, Olmstead, & Polivy, 1983). It consists of 64 items presented in a six-point format requiring respondents to answer whether each item applies "always," "usually," "often," "sometimes," "rarely," or "never". The EDI provides standardized subscale scores on eight dimensions that are clinically relevant to eating disorders. The subscales employed measure (a) drive for thinness; (b) bulimia; (c) body dissatisfaction; (d) ineffectiveness; (e) perfectionism;

(f) interpersonal distrust; (g) interoceptive awareness; and (h) maturity fears. In non-clinical settings, the EDI provides an economical means of identifying individuals who have "subclinical" eating problems or those who may be at risk for developing eating disorders" (Garner, 1991). See Appendix E for a general discussion of the EDI.

The Eating Attitudes Test (EAT). The eating attitudes test is a 40-item self-report measure developed by Garner and Garfinkel (1979) to assess symptoms associated with anorexia nervosa. Respondents rate each of the items on a 6-point scale of frequency similar to that of the EDI. By examining scores of anorexic and nonanorexic individuals, Garner and Garfinkel (1979), arrived at a cutoff of 30 or greater for identifying individuals with eating disturbances.

Setting Conditions for Anorexia Nervosa Scale (SCANS). This 40-item self-report measure was developed to detect individuals at risk for developing an eating disorder. Participants answer each item on a 1-5 Likert Scale (Slade & Dewey, 1986). Many of the scales and questionnaires used in the study of eating disorders provide direct measures of either the symptoms or the overt manifest behaviors of individuals currently with eating disorders, and as such, at best are only capable of identifying people who have already developed an eating disorder. Effective prevention, or even early identification, requires the recognition of those who are likely to develop such a problem before the overt symptoms are apparent. As well, the SCANS may have an advantage over other questionnaires measuring eating disorders because the component that measures eating disorder symptoms 'need for

weight control' is made up of the last two questions on the questionnaire. Consequently, the SCANS may have the advantage of being non-transparent in the sense that very few people completing the questionnaire will be able to determine its focus until the end.

Slade and Dewey (1986) suggested that a score of 42 or greater on the Dissatisfaction subscale and 22 or greater on the Perfectionism subscale be used to identify those at risk for developing eating disorders. For a general discussion of the SCANS see Appendix F.

Family Environment Scale (FES). The FES is a self-report of the respondent's perception of family dynamics that comes in four different forms. Form R, the Real Form, is a 90-item questionnaire that measures people's perceptions of their conjugal or nuclear family environments. The Ideal Form measures the type of family environment the respondent would ideally like to have. The Expectations Form measures what the respondent expects a family climate to be like. The 40-item Short Form was developed to permit relatively rapid assessments of large groups and was the form used in this study. Each subscale is the sum of the number of times participants responded "true" to those questions designated as 'true' questions and "false" to those questions designated as 'false' questions, regarding the four questions relating to the concept. For a general discussion of the FES see Appendix G.

Rosenberg Self Esteem Scale (RSE). The Rosenberg self-esteem scale consists of 10 items answered on a 4-point scale from "strongly agree" to "strongly

disagree". This scale has been widely used as a measure of global self-esteem in adolescence and adults. The scale produces a score between 0 and 6, with higher scores indicative of lower self-esteem. Rosenberg suggested a score of 3 or more as indicative of low self-esteem (Button, Sonuga-Barke, Davies, & Thompson, 1996). Silber and Tippett (1965) found a test-retest correlation of .85 for this scale.

Body Shape Questionnaire. The body shape questionnaire is a 34-item self-report measure developed by Cooper, Taylor, Cooper, and Fairburn (1987) to assess concerns about body shape in individuals with eating disorders such as bulimia. Respondents are asked to reflect on how they felt about their appearance over the past four weeks and to rate each item on a 6-point scale of frequency for that time frame. The total score is the sum of all items and scores may range from 34 to 204, with higher scores indicating more distress. For a general discussion of the BSQ see Appendix H.

Body Image Perceptions Scale (BIPS). The Body Image Perceptions Scale is an 8-item questionnaire assessing the respondent's perceptions of themselves (Sande & Buchanan, unpublished data). Respondents are asked their perceptions regarding various parts of their body, and are asked to rate these perceptions on a 7-point scale ranging from 1-"much too small" to 7-"much too big". Those with higher scores are said to have a more negative body perception. Reliability is .9 and inter-item correlation is .5.

Bem Sex-Role Inventory (BEM) or (BSRI). The Bem Sex-Role Inventory is a 60-item, self-report inventory that assesses one's masculine and feminine

personality traits. Respondents are asked how well each of the 60 items describes him or her. Scoring ranges from 1 ("never or almost never true") to 7 ("Always or almost always true"). Based on responses, an individual is given a Masculine Feminine, Androgynous, or undifferentiated classification. For a general discussion of the BEM see Appendix I.

Beck Depression Inventory (BDI). The Beck Depression Inventory (Beck, Steer, & Garbin, (1988), is a 21-item self-report depression scale. The BDI assesses cognitive, behavioral, affective, and somatic components of depression. Summing the severity of individual symptoms rated from 0 to 3 completes the scoring. Overall scores can range from 0 to 63. Cutoff points developed for the total BDI are: 0 to 9, non-depressed; 10 to 15, mild depression; 16 to 23, moderate depression; 24 or more, severe depression. For a general discussion of the BDI see Appendix J.

Results

Prior to data analysis:

Data was collected from 625 subjects and scrutinized for incomplete questicnnaires, missing data points, erroneous scores etc. This analysis resulted in 27 questionnaires being discarded. The remaining data was placed into a Statistical Package for the Social Sciences (SPSS) 8.0 program. The independent variables were separated into two groups. Those that were hypothesized to be less directly related to the clinical diagnosis outcome were called "A" variables. They included gender, age, body mass index (BMI), whom the person lives with, whether or not the

individual has siblings, where the individual is with regard to birth order, where he or she lives, start of menarche or chin- growth for males, and whether or not they were purposely trying to lose weight by eating less. Those variables that were hypothesized to have a more direct relationship to the outcome were designated as "B" variables. These included being teased by males, being teased by females, total hours engaging in physical activity a week, how often the person engages in competitive sporting activities, how often the person engages in competitive non-sport activities, the Rosenberg score, the BIP score, the BDI score, the Bem masculine, feminine, androgynous and undifferentiated scores, and the Family Environment scales of Cohesion, Expressiveness, Conflict, Independence, Achievement Orientation, Intellectual/Cultural Orientation, Active/Recreational orientation, Moral/Religious Emphasis, Organization, and Control.

Dummy Variables

Nominal scales (Steven's, 1946 in Norusis, 1998) are those that make qualitative distinctions among the objects they describe. Each factor is classified into one of '*g*' groups. The '*g*' groups cannot ordinarily be ordered in any way that is generally meaningful. To use nominal scales as independent variables in multiple regression/correlation, it is necessary to somehow represent them quantitatively. This can be done by capitalizing on the multiplicity of multiple regression/correlation and using not one, but a set of '*g*' groups with the use of dummy variables (Cohen & Cohen, 1983). The idea of dummy-variable coding is to represent the information of membership in one group by a series of '*g-1*'

dichotomies. For example, the variable accommodations is recoded to become Accom1 and Accom2. These represent a dichotomy in which all those living in a large house are scored 1 and all those not living in a large house are scored 0. Similarly, Accom2, is a dichotomy that can be understood as representing those living in a small house or condo. Each is a meaningful independent variable in its own right and also one aspect of the complete research factor of accommodations. No fourth independent variable is necessary. It is represented implicitly: all cases falling into this category have accom1, accom2, scores of 0 which can be taken to mean not living in a large house, small house or condominium. Because only the other group is left, the scores 0,0 by necessity designate members of that group. The group that has no explicit designation functions as the reference group in the analysis. As all of the dummy variables are part of that specific independent variable group, all of the dummy variables must be included in any analyses. For example, the Accom1 and Accom2 variables must always be entered together in any analysis that investigates the participant's accommodations.

Preliminary analyses:

Descriptive statistics for independent measures and multicolinearity, or associations between the independent variables, were computed. Frequencies of individuals falling within the range of a clinical eating disorder according to literature stated cutoffs for each of the three outcome measures are presented in Table 2. Between 11.2% and 23.2% of participants received scores that fell within a range considered to be clinically significant.

Logistic regression analyzes the effect of categorical or continuous independent variables on a dichotomous outcome using odds ratios to estimate relative risk. In order to conduct the logistic regression analyses, the scores on each of the three measures were recoded into a dichotomous variable according to literature "cut- off" values for clinical diagnosis. For example, a "cutoff" score of 30 or above was used to determine inclusion in the clinical-eating-disorder-category based on previous validation of the EAT (Garner & Garfinkel, 1979). Participants were assigned a "0" or a "1" depending on their score, indicating "non-clinical" or "clinical".

Table 2.

Number of Clinical and Non-clinical Males and Females by Outcome Measure

EAT*	**Male**	**Female**	**Total**
Non-clinical	261	241	502
Clinical	23	73	96
Total	284	314	598
SCANS**			
Non-clinical	241	218	459
Clinical	43	96	139
Total	284	314	598
EDI***			
Non-clinical	281	250	531
Clinical	3	64	67
Total	284	314	598

*Eating Attitude Test
**Setting Conditions for Anorexia Nervosa
***Eating Disorder Inventory

A similar procedure was conducted with the SCANS clinical cutoff based on

a score of 42 or greater on the body dissatisfaction scale and a score of 22 or greater on the perfectionism scale. A dichotomous variable indicating clinical diagnosis was created by having those that were above the clinical cut-off on each of the scales designated with a "1", and those that fell below the clinical cutoff designated with a "0". The columns were then added together and those individuals with a "0", or a "1" were designated non-clinical and those individuals with a "2" were then designated as having attained a score in the clinical eating disorder range.

A dichotomous variable indicating either "0" or "1" for a clinical diagnosis was created based on a cut off score of greater than 14 on the desire for thinness scale of the EDI. The results were then transposed into a dichotomous variable indicating "Yes" or "No" with regard to having a score within the clinical eating disorder range.

Observations of the number of individuals who fell within each of the combinations of independent variable cell categories indicated that some cells had very few, or even no, individuals in them. Although having a number of levels for each category would be informative, practical issues may preclude this. For example, the Exercise variable was divided into 4 different categories, indicating "Always", "Often/Usually", "Sometimes", or "Rarely/Never" engaging in exercise. This differentiation, however, may mean that a small number of individuals will respond to one, or more, of the categories. Therefore in an effort to balance information with pragmatic issues of optimizing cell size, the categorical independent variables were transposed into dichotomous variables. For example

with regard to the Accommodations variable, those individuals living in a house or a condominium were designated as "1" and those individuals who indicated they lived in an apartment, university residence, or other, were designated as "0".

Development of an equation to identify correlates of risk for developing an eating disorder

Logistic Regression Analysis

Eating Attitude Test. All independent variables in the "A" column (see Table 1) were put into a logistic regression to establish a general overview of the factors and their contributions to falling within the eating disorder range based on the EAT clinical cutoff score. At all steps of the analyses throughout this study, variables were removed if they did not produce a statistically significant $p<.05$ value. Results indicated that two variables, Gender and Whether The Person Was Purposely Trying To Lose Weight, were significant variables when using the EAT cutoff score of 30 for predicting a clinical diagnosis.

A similar procedure was then conducted with the "B" independent variables, or those that were hypothesized to have a more direct relationship to clinical diagnosis of an eating disorder (see Table 1). The results indicated degree of Exercise, the Rosenberg self-esteem score, and the score on the Body Shape Questionnaire were significant variables.

A logistic regression was then performed to analyze the main effects of the "A" and "B" variables together. Those "A" variables that were previously found to be significant were entered into a logistic regression procedure with the

significant "B" variables. As the "B" variables were hypothesized to have a more direct relationship on the outcome, (as shown by their greater chi-square values), they were entered into the equation in block one and the "A" variables were entered in block two. This approach controls for the effect that the "B" variables would have on the equation. When these "A" and "B" variables were combined the main significant effects came from degree of Exercise, the Rosenberg self-esteem score, the BSQ score and the Whether-The-Person-Was-Purposely-Trying-To-Lose Weight-By-Eating-Less variables.

These results indicate that independent of all other variables: a) those individuals who indicated they were not purposely trying to lose weight by eating less, had a .40 fold decrease in the odds of having an eating disorder; b) compared to individuals who "always" engage in exercise, those who indicated they exercise to a lesser degree, were .25 fold less likely to be diagnosed with an eating disorder, c) for every 1 point increase on the Rosenberg Self-Esteem Questionnaire, there was a 1.07 fold increase in the odds of having an eating disorder, d) for each 1 point increase on the Body Shape Questionnaire, there was a 1.03 fold increase in the odds of being diagnosed with a clinical eating disorder.

Interaction effects between the variables were than investigated. Interaction variables (AB) were created by multiplying the significant "A" variables with all of the significant "B" variables. A hierarchical logistic regression analysis was then performed with the "B" variables in the first block, the "A" variables in second

EAT Logistic Regression Significant Correlates of Risk for Developing an Eating Disorder

Variable	B	S.E.	df	Sig*	R	Exp(B)
EXERCIS	-1.6921	.7872	1	.0316	-.0876	.1841
RSETOT	.1300	.0558	1	.0198	.1003	1.1388
SUMBSQ	.0391	.0112	1	.0005	.1722	1.0399
GENDER	2.0174	1.5036	1	.1797	.0000	7.5190
LOSWTCOD	-.5815	1.4377	1	.6859	.0000	.5591
GENDER X EXERCISE	-.5567	.8213	1	.4979	.0000	.5731
GENDER X ROSENBERG	-.0216	.0548	1	.6940	.0000	.9787
GENDER X BSQ	-.0124	.0108	1	.2504	.0000	.9877
LOSEWEIGHT X EXERCISE	.9136	.8079	1	.2582	.0000	2.4933
LOSEWEIGHT X ROSENBERG	-.0800	.0530	1	.1311	-.0286	.9231
LOSEWEIGHT X BSQ	.0068	.0093	1	.4612	.0000	1.0069
Constant	-6.0158	1.5536	1	.0001		

*The Cut Value is .50

block and the "AB" variables in the third block. The result of this procedure produced a model for those individuals who were classified within the clinical diagnosis range according to the EAT. Table 3 shows the significance of each variable and Table 4 shows the chi-square values obtained.

Investigation of the interaction results showed that there were no significant interaction variables. However, the chi-square values changed (non clinical 95.82% to 95.62%, clinical 42.71% to 44.79%, overall 87.29% to 87.46%), and the Whether-The-Person-Was-Purposely-Trying-To-Lose Weight-By-Eating-Less variable was no longer significant. Baron and Kenny (1986) differentiated between mediator and

moderator effects of third variables. They indicated that a moderator is a variable that affects the direction and or strength of the relation between an independent variable and a dependent variable. It specifies when certain events hold. Mediators explain how and or why effects occur.

Table 4.

Chi-Square Values for EAT Final Model

		Predicted non clinical n	Predicted clinical c	Percent Correct
Observed				
non clinical	n	480	22	95.62%
clinical	c	53	43	44.79%
		Overall		87.46%

Examination of the results from the main effects regression analysis indicates that Gender was no longer significant when included with the "B" variables. This indicates that Gender was mediated through one of the "B" variables. A series of 2-variable-regression-models (e.g., Gender X Exercise) were then conducted to identify which "B" variable gender was mediated through. Analyses indicated that Gender had its effect through the BSQ score. An examination of the means for males and females on the BSQ helped to identify the relationship of these variables. Females tended to have larger BSQ scores, and it was the effect of the

BSQ score (not gender directly) that effected the outcome. This is not to say that gender was not important, but rather that females tended to have larger BSQ scores, which in turn affected outcome. All of these variables together contributed to correctly predicting 95.62% of the non-clinical group correctly, 44.79% of the clinical group correctly and 87.46% of the group correctly overall (see Table 4).

Setting Conditions for Anorexia Nervosa (SCANS). Analyses procedures similar to the EAT were conducted with the SCANS using clinical cutoffs based on a score of 42 or greater on the body dissatisfaction scale and a score of 22 or greater on the perfectionism scale. As previously described, a dichotomous variable was produced in order to conduct logistic regression procedures. The "A" and "B" independent variables were each analyzed with a logistic regression procedure in order to identify the variables contributing to the determination of those individuals above the clinical cutoff score on the SCANS. Gender and Whether Or Not The Respondent Was Purposely Trying To Lose Weight By Eating Less were the only variables that were significant from the "A" group of variables. The Rosenberg, BDI, Androgynous Bem, BSQ, and Family Cohesion "B" variables were significant.

A logistic regression procedure with the significant "B" variables in the first block and the significant "A" variables in the second block, was conducted in order to identify main effects of the "A" and "B" variables together. The results indicated that independent of all other variables: a) for every 1 point increase on the Rosenberg Self-Esteem Questionnaire, there was a 1.12 fold increase in the odds of having an eating disorder; b) for every 1 point increase on the Beck Depression

Inventory there was a 1.13 fold increase in the odds of being clinically diagnosed; c) those individuals who indicated an Androgynous sex-role orientation were .22 less likely to be diagnosed with an eating disorder; d) for each 1 point increase on the Body Shape Questionnaire, there was a 1.02 fold increase in the odds of being diagnosed with a clinical eating disorder; and e) individuals who indicated a higher level of Family cohesion were .51 fold less likely to be diagnosed with an eating disorder using the SCANS clinical cut off scores than those who indicated their families lacked cohesion.

Interaction variables were created by multiplying the significant "A" variables with the significant "B" variables. A hierarchical logistic regression procedure was then conducted by entering the "B" variables first, as they appeared to have the most direct effect on the outcome, entering the "A" variables in the second block, and the "AB" interaction variables in the third block.

One interaction variable was found to be significant when using the SCANS cutoff score as the dependent variable; Whether The Person Was Purposely Trying To Lose Weight By Eating Less X the BSQ score. The BSQ score had a larger effect on those individuals who were not purposely trying to lose weight. These individuals were .98 fold less likely to fall within the clinical range (see Table 5).

Examination of the results from the main effects regression analysis indicated that both Gender and Whether The Person Was Purposely Trying To Lose Weight By Eating Less were no longer significant when included with the "B" variables. This indicated that these variables were mediated through one of the "B"

Table 5.

SCANS Logistic Regression Significant Correlates of Risk for Developing an Eating Disorder

Variable	B	S.E.	df	Sig	R	Exp(B)
ROSENBERG	.0205	.0759	1	.7867	.0000	1.0207
BDI	.1113	.0530	1	.0358	.0784	1.1177
BEM MASC.	-1.2879	1.0100	1	.2023	.0000	.2758
BEM FEM.	-1.4683	1.2351	1	.2345	.0000	.2303
BEM ANDROG.	-.9353	1.2757	1	.4635	.0000	.3925
BSQ	.0333	.0115	1	.0039	.1272	1.0339
FES COHESION	-.2071	.8365	1	.8045	.0000	.8130
LOSWTCOD	-.4877	2.0675	1	.8135	.0000	.6140
GENDER	-2.0898	1.8202	1	.2509	.0000	.1237
GENDER X ROSENBERG	.0765	.0653	1	.2417	.0000	1.0795
GENDER X BDI	.0282	.0494	1	.5690	.0000	1.0286
GENDER X BEM MASC.	1.5627	.8936	1	.0803	.0520	4.7718
GENDER X BEM FEM.	.0240	1.1948	1	.9840	.0000	1.0243
GENDER X BEM ANDROG.	-.9654	1.2451	1	.4381	.0000	.3808
GENDER X BSQ	.0008	.0099	1	.9377	.0000	1.0008
GENDER X FAMILY COHESION	-.6116	.6702	1	.3615	.0000	.5425
LOSEWEIGHT X ROSENBERG	.0886	.0758	1	.2427	.0000	1.0926
LOSEWEIGHT X BDI	.0290	.0513	1	.5718	.0000	1.0294
LOSEWEIGHT X BEM MASC.	1.1200	.7605	1	.1408	.0208	3.0648
LOSEWEIGHT X BEM FEM.	1.3365	1.1035	1	.2259	.0000	3.8055
LOSEWEIGHT X BEM ANDROG.	-.6504	1.1268	1	.5638	.0000	.5218
LOSEWEIGHT X BSQ	-.0222	.0106	1	.0353	-.0788	.9780
LOSEWEIGHT X FAMILY COHESION	-.2939	.8165	1	.7189	.0000	.7453
Constant	-4.7613	2.1247	1	.0250		

*The Cut Value is .50

variables. A series of 2-variable-regression models (e.g., Gender X Exercise) were then conducted in order to identify which "B" variable(s), Gender and Whether Or Not The Person Is Purposely Trying To Lose Weight By Eating Less, had their effect through. Similar to the EAT results, Gender had its effect through the BSQ score. An examination of the means for males and females on the BSQ helped identify the relationship of these variables. Females tended to have larger BSQ scores, and it was the effect of the BSQ score (not gender directly) that affected the outcome. This is not to say that Gender was unimportant, but rather that females tended to have larger BSQ scores, that in turn affected outcome. Similarly, the Whether-The-Person-Was-Purposely-Trying-To-Lose-Weight-By-Eating-Less-variable had its effect through the BSQ score. Examination of the means indicated that individuals who reported that they were purposely trying to lose weight had higher BSQ scores. As with Gender, it was the effect of the BSQ score (not whether or not the person was purposely trying to lose weight) that affected the outcome.

Table 6.

Chi-Square Values for SCANS Final Model

		Predicted		
		nonclinical n	clinical c	Percent Correct
Observed				
nonclinical	n	433	26	94.34%
clinical	c	53	86	61.87%
			Overall	86.79%

The final model predicted 94.34% of the non-clinical participants correctly, 61.87% of the clinical participants, and 86.79% of the participants correctly overall, (see Table 6).

Eating Disorder Inventory. Similar procedures to those conducted with the previous scales were conducted with the EDI. Logistic regression analysis of the "A" variables produced Gender, and Whether The Person Was Purposely Trying To Lose Weight By Eating Less, as significant variables. The significant "B" variables were Exercise, the Rosenberg score, Bem male sex role identification, and the BSQ score.

As with the previous outcome measures, the main effects of the variables for the EDI were tested by putting the significant "B" variables in the first block and the significant "A" variables in the second block of a logistic regression. This model indicated that Gender, Whether Or Not The Person Was Purposely Trying To Lose Weight By Eating Less, the Rosenberg self-esteem score, and the BSQ score had significant main effects.

Multiplying each of the significant "A" variables with each of the significant "B" variables created interaction variables. In order to assess interaction effects, the variables were entered into a hierarchical logistic regression procedure where the "B" variables were entered first in order to control their effect. The "A" variables were entered in the second block and the "AB" interaction variables were entered in the third block.

Table 7.

EDI Logistic Regression Significant Correlates of Risk for Developing an Eating Disorder

Variable	B	S.E.	df	Sig	R	Exp(B)
EXERCISE	-55.0805	345.9213	1	.8735	.0000	.0000
ROSENBERG	-10.8474	28.4697	1	.7032	.0000	.0000
BEM MASC.	-52.2767	633.5277	1	.9342	.0000	.0000
BEM FEM.	33.7292	592.1552	1	.9546	.0000	4.451E+14
BEM ANDROG.	-129.9350	739.1792	1	.8605	.0000	.0000
BSQ	2.3420	5.6329	1	.6776	.0000	10.4024
GENDER	-17.3489	659.7267	1	.9790	.0000	.0000
LOSEWEIGHT	-.9924	2.8424	1	.7270	.0000	.3707
GENDER X EXERCISE	53.8377	345.9216	1	.8763	.0000	2.407E+23
GENDER X ROSENBERG	11.0007	28.4698	1	.6992	.0000	59916.427
GENDER X BEM MASC.	51.5564	633.5277	1	.9351	.0000	2.458E+22
GENDER X BEM FEM.	-33.4297	592.1563	1	.9550	.0000	.0000
GENDER X BEM ANDROG.	129.2408	739.1794	1	.8612	.0000	1.345E+56
GENDER X BSQ	-2.3041	5.6329	1	.6825	.0000	.0998
LOSEWEIGHT X EXERCISE	.4330	1.5203	1	.7758	.0000	1.5419
LOSEWEIGHT X ROSENBERG	-.0838	.0834	1	.3147	.0000	.9196
LOSEWEIGHT X BEM MASC.	.6812	9902	1	.4915	.0000	1.9763
LOSEWEIGHT X BEM FEM.	-109.1690	326.5078	1	.7381	.0000	.0000
LOSEWEIGHT X BEM ANDROG.	.7341	1.1632	1	.5280	.0000	2.0836
LOSEWEIGHT X BSQ	.0088	.0142	1	.5353	.0000	1.0089
Constant	10.3981	659.7253	1	.9874		

*The Cut Value is .50

The predictive value of this model increased slightly for identifying clinical participants, but decreased slightly for correctly identifying non-clinical participants

and participants overall (non-clinical 97.55% to 96.80%, clinical 61.19% to 62.69%, and overall 93.48% to 92.98%). In addition, none of the variables were statistically significant.

Gender and Whether Or Not The Individual Was Purposely Trying To Lose Weight By Eating Less were still significant when the "B" variables were added to the model, indicating they were not mediated by any of the significant "B" variables. Therefore some other effect must have been occurring. A series of 2-variable-analyses were conducted to test this effect, however, the sample size was not large enough to identify it. Therefore the model of best fit appears to be the model produced by the main effects procedure.

Gender was found to be highly significant with regard to the EDI cut off for a clinical diagnosis. Females were on average 8.24 fold more likely to be diagnosed with an eating disorder using the EDI. Those individuals who indicated that they were not purposely trying to lose weight by eating less, were on average, .28 fold less likely to be diagnosed with an eating disorder. The score on the Rosenberg self-esteem score was again found to be significant. Independent of all other variables, for every 1 unit increase in the Rosenberg score, there was a 1.12 fold increase in the odds of falling within the clinical range for an eating disorder based on the clinical cut off score on the EDI. Similarly, independent of all other variables, for every 1 unit increase in the score on the BSQ, there was a 1.05 fold increase in the odds of being clinically diagnosed as having an eating disorder according to the EDI

Table 8.

Chi-Square Values for EDI Final Model

Predicted		nonclinical n	clinical c	Percent Correct
Observed				
nonclinical	n	518	13	97.55%
clinical	c	26	41	61.19%
			Overall	93.48%

This main effects model was able to predict 97.55% of the non-clinical participants correctly, 61.19% of the clinical participants correctly and 93.48% of the participants correctly overall. (see Table 8).

Hierarchical Linear Regression Analysis

Following the logistic analyses, hierarchical multiple regression analyses of blocks of variables (Cohen & Cohen, 1983) were conducted to test the contribution of the independent variables in explaining the variance of the prediction of risk for developing an eating disorder as a continuous variable. This procedure does not use a clinical cutoff, but rather looks at the variance with each of the variables. Different variables were found to account for the variance for the three different outcome measures (see Table 9).

Eating Attitude Test.

Similar procedures conducted with the logistic regression procedures were conducted with the linear regression analyses. The "A" independent variables were entered into a linear regression using the total EAT scores as the outcome measure.

Table 9.

Linear Regression Final Model Significant Variables

EAT*			**SCANS****			**EDI*****	
Variable	Adjusted R Square		Variable	Adjusted R Square		Variable	Adjusted R Square
	0.439			0.500			0.649
BSQ			BDI			Family Intellectual Orientation	
Bem Androgynous			BSQ			Loseweight X Rosenberg	
Loseweight X Exercise			Family Expressiveness				
Loseweight X Rosenberg			Family Achievement				
BMI X Bem Androgynous			Loseweight X BDI				

*Eating Attitude Test
**Setting Conditions for Anorexia Nervosa
***Eating Disorder Inventory

The resulting significant variables were Whether The Person Was Purposely Trying To Lose Weight By Eating Less, Gender, and the BMI score. They accounted for 19% of the variance in clinical eating disorder diagnosis with the EAT. The "B" variables were similarly analyzed. Significant variables were Exercise, the

Rosenberg self-esteem score, the BSQ, and the Bem Androgynous score. These accounted for 41% of the variance.

In order to evaluate the main effects of "A" + "B", and keep the process consistent with the other analyses, the "B" variables were added to the equation in block one, as they were hypothesized to have the closest effect on the outcome. The "A" variables were then entered in block two. The main effects accounted for 42% of the variance. Multiplying each of the significant "A" variables times the significant "B" variables created interaction variables. Those variables hypothesized to have the strongest predictive relationship with risk of a clinical eating disorder, "B" variables, were entered in the first block. The "A" variables were entered in the second block and the interaction variables were entered in the third block of the multivariate regression analysis. This procedure allowed the determination of the amount of variance in the outcome explained by the block of hypothesized major predictors, "block B variables", and then whether the other predictors and the interaction variables added significantly to, or changed, the variation in the outcome. This procedure indicated three interaction variables were significant. Whether The Person Was Purposely Trying To Lose Weight By Eating Less, combined with Exercise and with Self-esteem, and BMI combined with a BEM Androgynous sex role orientation.

Investigation of the data indicated that BMI was no longer significant when the "B" variables were added to the equation. This indicated that there was a mediating effect occurring. As with the logistic regression procedure, a series of 2-

variable-regression models (e.g., BMI and exercise) were conducted to help identify this effect. When BMI and BSQ were entered into a linear analysis, BMI was no longer significant. This result indicated that BMI was having its effect through BSQ. We would likely see a correlation between these 2 variables. A look at the correlation matrix confirmed this. People with larger BMI scores had larger BSQ scores and it was the effect of BSQ (not the BMI directly) that affected the outcome. As indicated previously, this does not mean the BMI was unimportant, but rather that people with larger BMI scores tended to have larger BSQ scores, which in turn affected the outcome.

This final model accounted for 44% of the variance, in other words, 44% of the change in clinical diagnosis by the EAT was accounted for by changes in these independent variables.

Setting Conditions For Anorexia Nervosa.

Similar procedures were conducted for the SCANS using the total of the body dissatisfaction and perfectionism subscales combined, as the outcome measure. Analysis of the "A" variables with the multivariate regression model indicated Whether The Person Was Purposely Trying To Lose Weight By Eating Less and Gender, were significant variables. They accounted for 11% of the variation in the clinical diagnosis of an eating disorder by the SCANS. Analysis of the "B" variables indicated that the BDI score, BSQ score, Family Expressiveness, Family Achievement, Family Control and Bem Androgynous scores were significant variables. Main effects were investigated by entering the "B" variables in the first

block and the "A" variables in the second block of the linear regression. The BDI, BSQ, Family Expressiveness, Family Achievement, Family Control, Rosenberg, and Bem Androgynous score were significant. The main effects accounted for 49% of the variance.

The variables were then entered hierarchically in three blocks, the first containing the "B" variables, the second containing the "A" variables, and the third containing the "AB" variables in order to identify any significant interaction variables. One significant interaction variable emerged, Whether The Person Was Purposely Trying To Lose Weight By Eating Less combined with his or her score on the Beck depression inventory. Therefore whether the person was purposely trying to lose weight, or not, had a direct effect, but the relationship between this variable and the outcome depended on the Beck depression score.

When the "B" variables were added to the "A" variables, both of the significant variables, Gender and Whether The Person Was Purposely Trying To Lose Weight By Eating Less, were no longer significant. This indicated that mediating effects were occurring. As in previous analyses, a series of 2-variable-regression-analyses were conducted to help describe this effect. Analyses indicated that both variables were mediated by BSQ. It is the effect of BSQ and not Gender or Whether The Person Was Purposely Trying To Lose Weight By Eating Less that effected outcome. Females and those individuals who indicated they were purposely trying to lose weight had larger BSQ scores, indicating greater dissatisfaction with

their body shape, which in turn affected outcome. This final model accounted for 50% of the variance.

Eating Disorder Inventory.

The analysis of the EDI was carried out in a similar manner as the other outcomes. The "A" variables that were significant with the multivariate linear regression procedure were Gender, Whether The Person Was Purposely Trying To Lose Weight By Eating Less, and BMI. This accounted for 39% of the variance. The "B" variables that were significant were degree of Exercise, Rosenberg, Bip, Beck, BSQ, and Family Intellectual Orientation scores. They accounted for 61% of the variance. The "B" variables were then entered in the first block and the "A" variables entered in the second block of the linear regression analysis to determine the main effects. The Exercise, Rosenberg, Bip, Beck, BSQ, Family Intellectual Orientation, BMI, and Whether-or-not-the-person-was-purposely-trying-to-lose-weight variables accounted for 64% of the variance. The variables were then hierarchically entered into the linear regression equation with the "B" variables entered first and the "A" variables entered second. "AB" variables created by multiplying all of the significant "A" variables with the significant "B" variables, were entered in the third block of the regression equation. Only one interaction variable was significant; Whether The Person Was Purposely Trying To Lose Weight X the Rosenberg score. It indicated that for those individuals who said they were not purposely trying to lose weight, there was an inverse relationship between

their Rosenberg score and their score on the EDI. The lower the Rosenberg score, the higher the EDI score.

When the "B" variables were added to the model, the significant "A" variable, Gender, became insignificant. This indicated that there was a mediating relationship occurring. As in previous analyses this relationship was investigated with a series a 2-variable- regression-analyses. These analyses, however, indicated that Gender was mediated by a combination of variables. The final model of variables accounted for 65% of the variance in the eating disorder diagnosis as determined by scores on the EDI.

DISCUSSION

The primary purpose of this study was to attempt to create a succinct model that allows one to predict correlates of risk for developing an eating disorder. These variables were not identified as causal, but were identified as possible correlates of risk for developing an eating disorder.

Logistic Regression Analyses.

It was hypothesized that some factors are more directly related to the eating disorder outcome than other variables. This study confirmed this fact. Variables designated as "A" e.g., Gender, Age, (see Table 1) were less directly related to risk of a clinical outcome. Those variables designated as "B" e.g., Self-esteem, Body shape dissatisfaction, (see Table 1) had a more direct relationship to predicting eating-disorder risk in a university undergraduate population, as seen by their greater predictive power (chi-square values). One may hypothesize that

some variables (A) predispose one to developing an eating disorder, and other factors (B) precipitate the development of an eating disorder. This study found that females and those who were purposely trying to lose weight ("A" variables) were more likely to fall within the clinical eating disorder range as measured by the EDI, but not by the EAT or the SCANS (see Table 10). Hsu (1990) felt that eating disturbances range from simple dieting to diagnosable eating disorders and occur on a behavioral continuum. In his view dieting provides the entrée into an eating disorder, which is intensified by certain issues and accompanied by certain risk factors

Table 10.

Logistic Regression Significant Variables

EAT*			**SCANS****			**EDI***,[a]		
Variable	**Sig**	**Exp(*B*)**	**Variable**	**Sig**	**Exp(*B*)**	**Variable**	**Sig**	**Exp(*B*)**
Rosenberg	0.0173	1.2116	BSQ	.0012	1.0456	Rosenberg	0.0031	1.1163
BSQ	0.0045	1.0583	BDI	.0358	1.1177	BSQ	0.0000	1.0467
Exercise	0.0316	.1841	Loseweight X BSQ	.0353	.9780	Gender	0.0032	8.2443
						Loseweight	0.0019	0.2760
Predicted								
EAT			**SCANS**			**EDI**		
nonclinical	clinical	Total	nonclinical	clinical	Total	nonclinical	clinical	Total
97.41%	64.58%	92.14%	94.34%	61.87%	86.79%	97.55%	61.19%	93.48%

*Eating Attitude Test
**Setting Conditions For Anorexia Nervosa
***Eating Disorder Inventory
[a] final model is main effects model

Being female and being on a diet may therefore predispose one to an eating disorder,

but a precipitating factor ("B") may then increase the risk of the dieting behavior progressing to the far end on the continuum and becoming an eating disorder. The significant "B" variable however, depended on which inventory was used to identify a clinical diagnosis. As well, some of the "A" variables worked through the "B" variables, i.e., there was an interaction effect. In addition, some of the "A" variables were mediated through a "B" variable.

Eating Attitudes Test Final Logistic Regression Model Interpretation

None of the "A" variables were significant in the final model using the EAT clinical cut off score. However, Gender was mediated through BSQ. Females tended to have larger BSQ scores, and it was the effect of the BSQ score (not gender directly) that affected the outcome. This is not to say that Gender was unimportant, but rather that females tended to have larger BSQ scores which in turn affected outcome. The significant "B" variables included the Rosenberg self-esteem score, the BSQ score, and degree of Exercise. Those individuals with a higher score on the Rosenberg Self-Esteem Inventory, indicating lower self-esteem, and those with a higher score on the BSQ, indicating more body shape dissatisfaction, were at greater risk for falling within the clinical diagnosis range. Numerous studies in the literature indicate decreased self-esteem leads to a greater likelihood of being diagnosed with an eating disorder (Casper, Offer, and Ostrov, 1981, Garner & Garfinkel, 1981, and Thompson & Thompson, 1986). Similarly, increased body shape dissatisfaction and poor body image are strongly related to eating disorders in the literature. Those individuals who indicated they "Always"

exercise were more likely to be diagnosed with an eating disorder than those who indicated they exercised less frequently. This also agrees with findings in the literature that indicates individuals who have an eating disorder are inclined to engage in great amounts of exercise, rather than exercise in moderation. For example, Kinzl, Traweger, Trefalt, Mangweth and Biebl (1999) found that excessive exercise may be an important trigger for bulimic and binge eating disorder. As well, Mehler and Andersen (1999) found that males may have "reverse anorexia" in which they exercise relentlessly and attempt to increase their body weight because of their perception that they are never large enough.

The sum of all of these variables predicted 97.41% of the non-clinical participants correctly, 64.58% of the clinical participants correctly and 92.14% of the participants correctly overall.

Setting Conditions for Anorexia Nervosa Final Logistic Regression Model Interpretation

Using the combined cutoff scores of 22 or above, on the perfectionism scale and 42 or above, on the body dissatisfaction scale of the SCANS, some different variables emerged as significant correlates of risk than those found using the EAT. Similar to the EAT however, Gender and the Whether-The-Person-Was-Purposely-Trying-To-Lose-Weight-By-Eating-Less-variable were mediated through BSQ. Females and those who indicated they were purposely trying to lose weight tended to have larger BSQ scores, and it was the effect of the BSQ score (not gender or the purposely trying to lose weight by eating less directly) that affected

the outcome. In addition, the higher the score on the BSQ, the greater the likelihood of being classified in the eating disorder range. One variable that was not significant when using the EAT, but was significant when using the SCANS as the outcome measure, was the Beck Depression Inventory score. Those individuals who scored higher on the BDI, indicating higher levels of depression, were more likely to fall within the clinical eating disorder range. This agrees with findings in the literature that indicates that those with eating disorders are also likely to suffer from depression (Herzog, 1984, Lindholm & Wilson, 1988).

One interaction variable was found to be significant when using the SCANS cutoff score as the dependent variable; Whether Or Not The Individual Was Purposely Trying To Lose Weight X BSQ. Individuals who reported purposely trying to lose weight by eating less and who had greater body shape dissatisfaction were at greater risk for falling within the clinical range for an eating disorder. As previously mentioned BSQ has been found to be highly associated with eating disorders. One could speculate that the greater body shape dissatisfaction is the precipitating event that moves the dieting behavior further along the continuum to the eating disorder range, as discussed by Hsu (1990). This final model was able to predict 94.34% of the non-clinical participants correctly, 61.87% of the clinical participants, and 86.79% of the participants correctly overall.

Eating Disorder Inventory Final Logistic Regression Model Interpretation

There were no significant variables present in the model when testing for interaction effects using the EDI as the dependent variable. Although the predictive

value of the model that included the interaction variables increased slightly from the model that included the main effects only, nothing was statistically significant. This may be a result of small cell sizes. As a result, the main effects model appears to be the best model to describe those variables that indicated individuals who scored within the clinical range for an eating disorder diagnosis using the EDI clinical cut off scores.

Gender and Whether Or Not The Person Was Purposely Trying To Lose Weight By Eating Less were found to correlate highly with risk of falling within the clinical range according to the EDI cut off for a clinical diagnosis. Females and those individuals who indicated that they were purposely trying to lose weight by eating less, were on average, more likely to be diagnosed with an eating disorder. As with the EAT, a higher score on the Rosenberg Self-Esteem Inventory and a higher score on the BSQ, also increased the odds of falling within the clinically diagnosed range. As previously mentioned these results agree with findings in the literature (Casper, Offer, and Ostrov, 1981, Garner & Garfinkel, 1981, and Thompson & Thompson, 1986). All of these variables combined to form the final model and predict 97.55% of the non-clinical participants correctly, 61.19% of the clinical participants correctly and 93.48% of the participants correctly overall.

Linear Regression Analysis.

Hierarchical multiple regression analyses of blocks of variables (Cohen & Cohen, 1983) were conducted to test the contribution of the independent variables in explaining the variance of the prediction of risk for developing an eating

disorder as a continuous variable. This procedure does not use a clinical cutoff, but rather looks at the variance explained by each of the variables. As the development of eating disorders is very complex, analysis of the results may be informative in providing variables that one should also test when investigating eating disorders

This procedure allowed the determination of the amount of variance in the outcome explained by the block of hypothesized major predictors, "block B variables", and then whether the other predictors and the interaction variables added significantly to, or changed, the variation in the outcome.

Eating Attitudes Test Final Linear Regression Model Interpretation

With the exception of the BSQ, different variables than those found to be significant using the logistic regression procedure accounted for some of the variance with the EAT outcome measure using Linear regression analyses. Along with the BSQ, the BEM Androgynous score, and three interaction variables contributed to 44% of the variance. These were Whether The Person Was Purposely Trying To Lose Weight By Eating Less, combined with Exercise and with Self-esteem, and BMI combined with the BEM Androgynous sex role orientation. The Whether-Or-Not-The-Individual-Was-Purposely-Trying-To-Lose-Weight-Variable had a direct effect, but the relationship between this variable and the outcome as measured by the EAT score, depended on both the frequency of exercise, and the Rosenberg self-esteem score. For those individuals who indicated they were not purposely trying to lose weight, increased frequency of exercise led to higher scores on the EAT. Conversely, for those individuals who indicated they were purposely

trying to lose weight by eating less, there was no relationship between the degree of exercise and the outcome. In addition, for those individuals who indicated they were not purposely trying to lose weight, greater Rosenberg scores led to lower EAT scores, and for those who indicated they were purposely trying to lose weight, lower Rosenberg scores led to higher EAT scores. This result was counter-intuitive and does not agree with much of the literature that indicates that those with an eating disorder tend to have lower self-esteem. Small cell sizes may account for this finding.

BMI had both a mediating and a moderating effect when using the EAT as the outcome measure. People with larger BMI scores had larger BSQ scores and it was the effect of the BSQ, and not the BMI directly, that affected the outcome. In other words, people with larger BMI scores tended to have larger BSQ scores which in turn effected the score on the EAT. BMI also had a direct effect but, the relationship between it and the EAT outcome depended on the Androgynous sex role orientation. For those individuals who endorsed an Androgynous sex role orientation, higher BMI scores indicated a lower score on the EAT. This finding perhaps makes intuitive sense. Findings in the literature have indicated that those individuals with a more androgynous sex-role orientation generally score highest in self-esteem (Bem, 1977; O'Connor, Mann, and Bardwick, 1978; Spence, Helmreich, and Stapp, 1975) and higher self-esteem is considered to be a healthy and desirable characteristic. In contrast, low self-esteem has been linked to eating disorders. Bem (1974) argued that those who regard themselves as possessing both masculine and

feminine qualities, i.e., androgynous, are more likely to be capable, fulfilled, and happy. These variables accounted for 44% of the variance, in other words, 44% of the change in clinical diagnosis by the EAT was accounted for by changes in these independent variables.

Setting Conditions For Anorexia Nervosa Final Linear Regression Model Interpretation

Linear regression analysis of the variables using the body dissatisfaction plus perfectionism total scores as the dependent variable found 2 of the same variables to be significant as when logistic regression analyses were used. These were the BSQ and BDI scores. Two family environment subscales, Expressiveness and Achievement were also identified as contributing to the variance. Those individuals who indicated their families had an expressive orientation were more likely to have a lower SCANS score. This result agrees with findings in the literature that indicate that families of eating disordered individuals tend to describe their families as lacking expressiveness (Johnson and Flach, 1985, Humphrey, Apple, and Kirschenbaum, 1986, Strober and Humphrey, 1987). Similarly, results indicating that those individuals who reported a strong family achievement orientation were more likely to have a lower SCANS score agrees with findings in the literature (Johnson and Flach, 1985). One interaction was found to contribute to explaining the variance. Those individuals who indicated they were not purposely trying to lose weight, and had higher BDI scores, had decreased scores on the SCANS.

In addition, the Whether-The-Individual-Was-Purposely-Trying-To-Lose-Weight-By-Eating-Less-variable and Gender were mediated through the BSQ. Females and individuals who indicated they were purposely trying to lose weight by eating less had higher BSQ scores. This is not to say that Gender and Whether The Person Was Purposely Trying To Lose Weight By Eating Less were not important, but that the higher BSQ score was what affected the outcome. All of these variables combined accounted for 50% of the variance. In other words, 50% of the change in clinical diagnosis by the SCANS was accounted for by changes in these independent variables.

Eating Disorder Inventory Final Linear Regression Model Interpretation

When using the score on the EDI drive for thinness scale as outcome, identifying the independent variables that accounted for the variance was difficult to assess. Similar procedures were conducted with the EDI as with the previous measures, and the "A" variables Gender, Whether The Person Was Purposely Trying To Lose Weight By Eating Less, and BMI accounted for 39% of the variance. The "B" variables Exercise, Rosenberg, Bip, Beck, BSQ, and Family Intellectual Orientation accounted for 61% of the variance. When investigating main effects, Exercise, Rosenberg, Bip, Beck, BSQ, Family Intellectual Orientation, BMI, and Whether Or Not The Person Was Purposely Trying To Lose Weight By Eating Less accounted for 64% of the variance. However, when the variables were hierarchically entered into the linear regression equation, Family Intellectual Orientation, and one interaction variable was significant; Whether The Person Was

Purposely Trying To Lose Weight By Eating Less X the Rosenberg score. It indicated that for those individuals who said they were not purposely trying to lose weight, there was an inverse relationship between their Rosenberg score and their score on the EDI. The lower the Rosenberg score, the higher the EDI score. This does not make intuitive sense since we have seen previously, and as indicated in the literature, those individuals with lower self-esteem, indicated by a higher Rosenberg score, are generally associated with a higher score on the outcome measure. This result is possibly due to the small number of individuals in the cell, and because the range of possible scores for the outcome measure was small.

In addition, gender was found to have a mediating effect as it was significant when entered alone, but when combined with the "B" variables, it was no longer significant. However, after a series of 2-variable-regression-analyses were conducted, none of the variables presented as mediating the Gender variable. Therefore, it appeared that Gender was mediated by a number of variables. These results again are likely due to the small sample size and the small range of possible outcome scores, which therefore limits the variation. However, this final model of variables accounted for 65% of the variance in the eating disorder diagnosis using the EDI.

Comparison of All three Models

Perusal of the resulting models for each of the three dependent variables, EAT, SCANS and EDI show some similarities and some differences. With regard to the logistic regression analyses, the body-shape-dissatisfaction-variable was the only

"B" variable significant to all three measures. Those with poorer body satisfaction were on average at greater risk for falling within the clinical range for developing an eating disorder. This finding is perhaps not surprising, as body shape dissatisfaction has been widely documented as being related to a clinical eating disorder diagnosis. In addition, the BSQ also had a mediating effect with Gender when using the EAT as the outcome and with Gender and Whether Or Not The Person Was Deliberately Trying To Lose Weight By Eating Less when using the SCANS as the outcome measure in logistic regression analyses. It was also a mediating variable with BMI when using the EAT as the outcome measure, and again with Gender and Whether Or Not The Person Was Deliberately Trying To Lose Weight By Eating Less when using the SCANS as the outcome measure in linear regression.

The purpose of the study was to find the most succinct model for identifying correlates of risk for developing an eating disorder, however, identifying the "best" model was difficult. These results indicated that the SCANS and the EAT had similar numbers of significant variables when conducting logistic regression analyses. However, the EAT model was able to correctly predict only 44.79% of the clinical individuals correctly, whereas the SCANS was able to identify 61.87% correctly. However, the SCANS was slightly less able to predict the nonclinical individuals correctly and was much poorer at correctly predicting the overall categories.

Results of the linear regression analyses were complex and results from the EDI were particularly difficult to interpret. In terms of identifying the most

succinct model, five variables accounted for 44% of the variance with the Eat and five accounted for the 50% of the variance with the SCANS. Only 2 variables were significant when accounting for the variance when using the EDI. It is likely that small sample size was a major contributor to interpretation difficulties. The results suggest that using more than one measure would the best course of action until further studies with larger sample sizes are conducted.

Comparisons to Previous Research

This study also attempted to address a number of limitations of previous research in the eating disorder literature by simultaneously analyzing a number of variables thought to be related to the risk for developing an eating disorder with a large sample of male and female non-clinical undergraduate university students. Results confirmed the multidimensional, complex nature of eating disorders. The independent variables were correlated with risk of developing an eating disorder to different degrees and different variables emerged as being significant depending on the measure used to determine the eating disorder clinical cutoff.

The number of subjects falling within the range to be classified as having an eating disorder on the EAT, SCANS, or EDI ranged from 11.2% to 23.2% of the sample. The EAT identified 83.9% of the sample as non-clinical and 16.1% as clinical. Twenty-three males or 4% of the sample were designated as clinical and seventy-three females or 12% of the sample were placed in the clinical category. According to the SCANS, 76.8% of the sample was non-clinical and 23.2% clinical. Forty-three males or 7% were identified as clinical and ninety-six

females or 16% of the sample was identified as clinical. The EDI identified 88.8% of the sample as non-clinical and 11.2% as clinical. Three males or .5% were identified as clinical and sixty-four females or 11% were identified as clinical. These overall percentages are in line with Levine and Smolak's (1992) finding that an estimated 2% to 3% of postpubertal girls and women suffer from eating disorders, but that an additional 5% to 10% may have "subclinical" (i.e., not meeting the DSM-IV criteria for diagnosis) eating disorders and be at risk for developing a full blown eating disorder. This study found that females in a non-clinical university population are at a greater risk for developing an eating disorder than are university attending males, but that university males are also susceptible.

Conclusions

By addressing limitations of previous studies, this study has increased the knowledge regarding the variance unique to each set of determinants, in a large sample of non-clinical males and females. This issue is important because progress in a variety of areas, including clinical assessment, intervention, and the design of effective prevention programs, requires more precise knowledge of the relative significance of the various risk factors. The following conclusions are warranted from this study:

1. Correlates of risk for developing an eating disorder vary according to the measure used to establish a clinical diagnosis.

2. Some variables are more closely related to eating disorder outcome than are others, as measured by chi square values. These variables varied with the different outcome measures. It is suggested that some variables, those designated as "A" variables in this study, predispose an individual for risk of developing an eating disorder and other variables, those designated as "B" variables in this study, appear to precipitate an eating disorder.

3. The three frequently used measures of assessing eating disorders identified different numbers of participants as being at risk for having an eating disorder in a non-clinical university attending population.

4. Non-clinical university attending females are at greater risk for developing an eating disorder than are university attending males.

Implications for Future Research

This study attempted to overcome some of the limitations of past studies, by using a large sample size, by including males in the sample, and by focusing on a non-clinical university population. However, despite this some of the results may be a result of few responses in one category, therefore using an even larger sample would be beneficial.

Some of the "A" variables could be better represented. The "Are you purposely trying to lose weight by eating less?" factor could be expanded to include length of time on a diet, and although a question regarding desired weight was asked, it did not specifically ask how much weight the individual wished to lose and/or how much weight the individual had already lost. Answers to these questions would be informative to help establish if the dieting behavior was in the lower half of the continuum, or higher, a concept discussed by Hsu (1990).

The family environment of the individual appears to be related to risk of developing an eating disorder, but how this occurs is not clear. The smaller 40-item FES scale was used to shorten the length of the questionnaire package and increase the chance of holding the respondent's attention. Use of the larger 90-item version would be beneficial, as it would allow more variation between the scores.

The validity of these results hinged on the accuracy in which the equations developed can predict correlates of risk for developing a clinical eating disorder. To create more accurate equations, further research with even larger sample sizes would be beneficial.

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Appendix A

General Discussion of Research Related to the Family Environment of those Individuals with Eating Disorders

In an effort to study family functioning in eating disorders in a quantitative manner, several investigators have used self-report scales. The most frequently used instrument to assess family functioning in eating disorders has been the Family Environment Scale (FES) (Head & Williamson, 1990). It has been used to study comorbidity between substance abuse and bulimia (Bulik and Sullivan, 1993) and between childhood sexual abuse and bulimia (Hastings and Kern, 1994). The FES is a 90-item, true-or-false questionnaire with 10 subscales that reflect different aspects of family functioning. The subscales are cohesion, expressiveness, conflict, independence, achievement orientation, intellectual-cultural orientation, active recreational orientation, moral-religious emphasis, organization, and control. Strober (1981a), in a pioneering study of the FES in eating disordered families, gave this instrument to the parents of 22 adolescent anorectic women with bulimic symptoms who were diagnosed as having bulimic anorexia, and 22 female anorectic patients without bulimic symptoms diagnosed as having restricting anorexia. He found that the parents of the patients with bulimic anorexia rated their families significantly higher on conflict and lower on cohesiveness and organization than did the parents of the restricting anorexic patients.

Johnson and Flach (1985) gave the FES to 105 women with normal weight bulimia and to 86 noneating-disordered controls. They found that the bulimic

patients rated their families significantly higher than did controls on conflict and achievement orientation and significantly lower on cohesion, expressiveness, independence, and intellectual-cultural orientation. The patients also rated their families significantly lower on organization, active-recreational orientation, and moral-religious emphasis. Ordman and Kirschenbaum (1986) gave the FES to 25 young women with bulimia and to 36 non-eating-disorder controls. Three of the bulimics had a past history of anorexia nervosa. Similarly to Johnson and Flach, they found that bulimics rated their families significantly higher than did controls on conflict and significantly lower on cohesion, expressiveness, and active-recreational orientation.

Felker and Stivers (1994) examined the relationship of gender and family environment to the risk of developing anorexia nervosa or bulimia in adolescents. They administered the Family Environment Scale (FES) and the Setting Conditions for Anorexia Nervosa Scale (SCANS) to 393 older adolescents (mean age 16.3 years). They found the FES subscale of expressiveness to have a significant relationship with the risk of developing anorexia nervosa or bulimia. Female subjects displayed a greater risk than did males.

Humphrey (1986) gave the FES to 16 young women with bulimic anorexia and to 24 controls with no history of psychiatric problems in their immediate family. She also gave the FES to the mothers and fathers of the patients and controls. She found that the patients rated their families as significantly more isolated and non-disclosing and significantly less involved and supportive than did the controls. The

patients also rated their families as having significantly less order and organization and significantly more moral, religious, and intellectual de-emphasis than did the controls.

Shisslak, McKeon and Crago (1990) found evidence to support the hypothesis that university-age bulimic's, both with and without a past history of anorexia, perceive their families as significantly more dysfunctional than do normal control subjects. On the FES, both the normal-weight bulimics and bulimic anorexics perceived their families as less cohesive and expressive, more conflictual, and lower in active-recreational orientation than did the normal control subjects.

Hastings and Kern (1994), using the FES with college students, found that family environment factors were associated with bulimia. Bulimics reported growing up in relatively chaotic families (characterized by high levels of conflict and low levels of cohesion and organization) and to some extent, relatively restrictive families (characterized by low independence and expressiveness and high levels of control).

Bulik and Sullivan (1993) with their study of bulimic women, bulimic women with comorbid alcohol abuse or dependence, and 30 normal controls, found that the greatest differences between families with bulimic and control women rests in the individual parental characteristics rather than global measures of familial environment and functioning. Fathers of bulimic women (with or without alcohol abuse or dependency) were perceived as being significantly more seductive than fathers of normal controls. Bulimic women (with or without alcohol abuse or

dependence) tended to view their mothers as more neurotic and to have experienced less enjoyment in their maternal role. Mothers of bulimic women with alcohol abuse tended to place the greatest emphasis on weight, exercise, and appearance.

Head and Williamson (1990), in direct contrast to other studies, using the FES, did not find families of bulimics to be more dysfunctional than those of control subjects. In their study it appears that the family environment associated with bulimia is more strongly correlated with secondary psychopathology such as neuroticism or extroversion, than with bulimic symptoms.

Kent and Clopton (1992) used the FES and found that families of bulimics differ from other families in important ways, such as a greater likelihood of father-daughter closeness and more weight and eating problems. However, the pathological family interaction patterns found in previous research on bulimia did not emerge. They did not find more reported family conflict or less reported caring from the parents of the bulimics than from the symptom-free subjects.

Appendix B

Discussion of Sex Roles in Society

One of the most frequent findings from investigations carried out through the 1970s was that the types of problems reported by the sexes are different (Clements and Oelke, 1976, Harper & Collins, 1975; Nicholson & Antill, 1981). A common finding has been that girls are troubled by interpersonal relationships while boys are concerned about finance, education, and vocational issues. It has been argued that such findings reflect societal attitudes, which orient females toward interpersonal, family, and psychological concerns, and orient males to be competitive and vocational and future directed. Given the changing role of women in the 1980s and 1990s, are these attitudes different now, or at least less influential?

Porteous (1985) found that Irish and English female and male adolescents had the same "amounts" of problems, but that "boys were more concerned with authority, restrictions and rules, and being combative and aggressive and girls were more self-critical, self-aware and perhaps more 'neurotic'.

Literature that examines the relationship between sex role identity and psychological well-being has generally followed one of three models. The traditional sex-typed model (Connell & Johnson, 1970; Sappenfield & Harris, 1975), the androgynous model (Bem, 1974, O'Connor, Mann, & Bardwick, 1978), and the masculinity model (Adams & Sherer, 1985; Taylor and Hall, 1982; Whitely, 1984). Each of these models assumes that stereotypic masculinity is measured by traits generally associated with self-efficacy and femininity is measured by traits generally

associated with expressiveness and relationality. The traditional model assumes that males' identification with efficacy (masculinity) and females' identification with relationality (femininity) are paramount to mental health. This assumption led to the hypotheses that well-being would be fostered only if one's sex-role orientation was congruent with one's gender and that such congruence would be necessary for psychological well-being. (Lubinski, Tellegren, & Butcher, 1981). In contrast, the androgyny model assumes that masculinity and femininity are independent and complementary, rather than incompatible, dimensions. This model asserts that both males and females high in efficacy (masculinity) and relationality (femininity) are more likely to be psychologically well adjusted than either undifferentiated individuals who report low identification with both or those who are identified with only their own sex-stereotypic characteristics (Bem, 1974). The masculinity model, on the other hand, views self-efficacy (masculinity) as the critical component in mentally healthy individuals of both sex groups. Advocates of this model point to findings that suggest that the relation is primarily attributable to the masculinity component of androgyny and that the influence of femininity on well-being is negligible (Antill & Cunningham, 1979; Kelly & Worrell, 1977; Silvern & Ryan, 1979).

Appendix C

General Discussion of Research on Self-Esteem

Self-esteem has been used as the indicator of psychological well-being for many of the sex-role studies. The Bem Sex Role Inventory is one instrument that a majority of self-esteem studies have used as a measure of sex-role orientation. Harris, Blum & Resnick (1991), in their study of adolescents in grades seven through twelve in Minnesota, found that significant numbers of adolescent girls may be psychologically distressed. They found that adolescent males tend to be engaged in acting-out behaviors such as fights, homicides or vandalism, while adolescent females display a "picture of quiet disturbance". For girls, they say, distress appears to turn inward. As a consequence, girls' cries for help may be harder to hear and easier to ignore. Disordered eating patterns and emotional stress, they say do not often call attention to themselves until the damage is severe. Their findings also agreed with a number of other studies that have shown that a strong feeling of connectedness with parents and family emerged as the most important factor for protecting adolescent females from developing these "quietly disturbing behaviors". Salminen (1994) found with Finnish 14-16 year olds that those with low self-esteem had more traditional gender-role expectations.

Striegel-Moore et al., (1986) point out that physical maturity brings boys closer to a masculine ideal of attractiveness, whereas the opposite is true for girls. Therefore as their bodies grow away from a thin, prepubertal look, girls may be

more inclined to perceive themselves as overweight, feel unhappy, and develop maladaptive ways of coping such as extreme dietary measures.

Burnett, Anderson & Heppner, (1995), found that gender roles, are embedded within a cultural context that can interact with one's personal traits. They found that environmental pressures to meet or live up to a definition of masculinity, (goal directedness, high achievement motivation, competitiveness, and assertiveness), were significantly greater than for femininity. They found that especially for women, those low in individual masculinity were at a particular risk for decreased self-esteem.

Spence and Helmreich, (1979) found that, among self-report adjustment measures dealing with self-esteem and closely related constructs, instrumentality (masculinity) produced the highest correlations and expressiveness (femininity) produced weak but statistically significant relationships. Many studies have found that people who perceive themselves as possessing traditionally masculine traits will also report high self-esteem (Antill and Cunningham, 1979), Baruch and Barnett, 1975; Long, 1986).

Whitely (1983) found that masculinity, femininity and the interaction between the two were all positively related to self-esteem, but masculinity carried the most weight. Antill & Cunningham, (1980) found that male and female university students who describe themselves primarily with masculine characteristics displayed higher self-esteem than those with a more feminine self-concept. They found that masculine sex-typing for males was a prerequisite for satisfactory

adjustment, adding credence to the masculine model. They found that femininity was negatively correlated with self-esteem in females. Therefore they concluded that females who tend to think of themselves in feminine terms, - sensitive, passive, dependent, etc.- are likely to have a particularly unflattering self-concept.

Connell and Johnson (1970), found that high sex-role identification males have greater feelings of self-esteem than low-sex-role identification males and high-sex-role identification females. In addition, Jones, Chernovetz, and Hansson (1978) reported the self-esteem of androgynous persons as lower than that of masculine persons, but higher than that of feminine persons.

Long (1989) found that women scoring high on the masculine dimension of the BEM Sex-Role Inventory, compared with low-masculine women, regardless of occupation, reported: (a) lower levels of strain, trait anxiety; and work impairment; (b) greater frequency of problem-focused and preventive coping as opposed to emotion focused coping; and (c) higher levels of personal efficacy. Gump (1972) found that more purposive, resourceful women are less traditional in their sex-role orientation.

Allgood-Merten & Stockard (1991), the associations of sex-typed attributes with self-esteem for adolescents are consistent with those found in college samples and adults, supporting the masculinity model. Masculinity, but not femininity, is strongly associated with self-esteem, especially in females. In contrast, both masculinity, and femininity are associated with self-esteem for both sex groups in the fourth grade, providing support for the androgyny model. Their results suggest

that as children move into adolescence where adult sex-types roles and attitudes become more salient, femininity is no longer associated with self-esteem, especially for females.

Studies have advocated for adolescents and adults of both sexes, those who were androgynous generally score highest in self-esteem (Bem, 1977; O'Connor, Mann, and Bardwick, 1978; Spence, Helmreich, and Stapp, 1975).

Appendix D

General Discussion of Body image Research

Whereas some studies have indicated that bulimics show distinctive patterns of body-image distortion or dissatisfaction (Freeman, Thomas, Solyom, & Koopman, 1985; Willmuth, Leitenberg, Rosen, Fondacaro, & Gross, 1985), others have not (Birtchnell, Lacey, & Harte, 1985; Huon & Brown, 1986). Freeman, Beach, Davis & Solyom, (1985) found in their study that dissatisfaction with body image is an important feature of bulimia. It has been demonstrated that in comparison to matched normals, bulimic women reported significantly more distortion of their body parts and were significantly more dissatisfied with their bodies (Gleghorn, Penner, Powers, & Schulman, 1987 in Dacey, Nelson, Clark, & Aikman, 1991). Bulimic women, in comparison to matched controls, perceived themselves to be larger and wished to be much smaller (Williamson, Kelley, David, Ruggiero & Blouin, 1985). Body dissatisfaction in bulimic adolescent girls has also been reported. In a study of adolescent students, Johnson, Lewis, Love, Lewis, & Stuckey (1984) found that bulimic subjects were much more dissatisfied with their body-image than non-bulimic subjects. Post & Crowther (1985) reported that bulimic adolescent girls, when compared to non-bulimic girls, had significantly greater body dissatisfaction and viewed themselves as more overweight. Dacey et al., (1991) in their study of adolescent girls found that significant differences were found between the bulimic and control groups in body image dissatisfaction. Dacey et.al. feel the results of their study strongly support the inclusion of persistent over

concern with body shape and weight in the diagnostic criteria of the DSM-III-R (now DSM-IV) for bulimia with adolescent girls. They feel that efforts to detect bulimia in the adolescent years should focus on body dissatisfaction, shape, and concern rather than waiting for behavioral manifestations to appear. "Early treatment strategies need to address this factor to hopefully prevent an exacerbation of the disorder in later years" (Dacey et.al., 1991).

Some reports suggest that body-image dissatisfaction accompanied by weight concerns may develop as young as eleven years of age (Post & Crowther, 1985; Faust, 1983). Fabian & Thompson (1989) found very high connections between depression, self-esteem, body esteem, eating disturbance, and teasing at a very young age, in both premenarcheal, and postmenarcheal asymptomatic 10-15 year old females. This fits with evidence that body-image disturbance is related to low self-esteem and eating disturbance in young females (Grant & Fodor, 1986). Joiner, Schmidt and Wonderlich (1996)found that body dissatisfaction accounted for a greater amount of global self-esteem among patients with bulimia nervosa, compared to nonpsychiatric control subjects, and that this relation was similar in those diagnosed with depression.

Although Lindholm & Wilson (1988) did not find that body- image disturbance discriminated bulimics from non-clinical controls in their study, they found that there were qualitative differences in their estimates. Bulimics tended to be more accurate with estimates than did restrained and unrestrained eaters, who significantly underestimated their body size. However, they also found that there

was a discrepancy between perceived body size and ideal body size between their sample groups. Bulimics and restrained subjects showed significantly more discrepancy between perceived and ideal than did unrestrained subjects.

Slade (1985) reviewed attempts to replicate his 1973 (Slade & Russell) study. He found that results were mixed and varied. However, his conclusion was that contrary to Bruch's (1974) contention that size-awareness disturbance is "pathognomic for true anorexia nervosa", the studies that he reviewed did not support that contention. He found that body-size distortion was neither necessary nor sufficient for the diagnosis of anorexia nervosa. However, evidence supported Bruch's contention that a "realistic body-image concept is a precondition for recovery in anorexia nervosa". He found a clear relationship between body-size disturbance and outcome in the studies. Therefore he felt that the prognostic significance of body image was supported.

Cash and Brown (1987) reviewed studies that compared anorexics or bulimics to some other control group on some body-image variable. Those studies did not give unequivocal evidence that eating-disordered groups have a more perceptually distorted body image than various comparison groups. However, their review did find that studies that measured attitudinal aspects of body image provide more consistent evidence that anorexics and bulimics report greater body image dissatisfaction/dysphoria than various comparison groups.

Cash & Brown (1987) also found that the normal controls used in the studies they reviewed also typically overestimated their body sizes as well. Overestimation

of body size has been observed in obese subjects (Garner, Garfinkel, Stancer, & Moldofsky, 1976; Pearlson, Flournoy, Simonson, & Slavney, 1981); normal thin women (Cash & Green, 1986), neurotics (Norris, 1984; Pierloot & Houben, 1978), and pregnant women (Slade, 1977). Thompson & Thompson (1986) have observed that more than 95% of normal women overestimate their body size. On average their estimate is one-fourth larger than they really are. As all of these studies have shown, one cannot argue that body-size estimation is unique to anorexia nervosa or bulimia nervosa. These findings have even led Hsu (1982) to conclude that disturbance of body image should be deleted from the diagnostic criteria for anorexia nervosa, as it is not a pathognomic indicator of the disorder. Other's such as Freeman et al., (1985) and Garfinkel, (1992) have disagreed with Hsu, and have argued that the "anorexics' very satisfaction with an emaciated body shape suggests underlying body image disturbance". As well, Hsu based his suggestion on his review of studies that used only body-size distortion measures.

Somewhat more consistent than the findings of studies comparing anorexics or bulimics to some control group are the findings relating body size distortion to such clinical variables as treatment response and relapse. Following Bruch's assertion that the correction of body-image distortion is a "precondition to recovery", several researchers have found that greater size overestimation in anorexics is related to poorer outcome and less weight gain during treatment (Casper, Halmi, Goldberg, Eckert, & Davis, 1979; Garfinkel, Moldofsky, & Garner, 1977; Norris, 1984), and is also a predictor of relapse (Button, Fransella, & Slade, 1977; Crisp & Kalucy, 1974;

Slade & Russell, 1973). Two of these studies (Crisp & Kalucy, 1974; Slade & Russell, 1973,) found that anorexics estimated more accurately following weight restoration, while two other studies, (Button et. al., 1977; Garfinkel, Moldofsky, & Garner, 1979) found anorexics' estimates to remain unchanged. Consequently, although a body-image disturbance may not be specific to anorexia nervosa, its relation to outcome may highlight its important role in the maintenance and relapse of eating disorders. Therefore, Hsu's recommendation to delete it from the diagnostic criteria for anorexia nervosa seems invalid.

For bulimics, greater size overestimation has been associated with less progress in therapy (Norris, 1984). As well, Freeman et al., (1985) found that among several clinical and psychometric variables entered, dissatisfaction with body image was the most potent predictor in a regression equation predicting relapse. Birtchell et. al. (1985) found that bulimics estimated their body sizes more accurately following treatment. Similarly two studies found bulimics' body image to improve after therapy (Huon & Brown, 1985; Ordman & Kirschenbaum, 1985).

Appendix E

General Discussion of the Eating Disorder Inventory

The drive for thinness indicates excessive dieting, preoccupation with weight, and entrenchment in an extreme pursuit of thinness. Items reflect both the desire to lose weight as well as a fear of gaining weight. The bulimia subscale indicates the tendency towards episodes of uncontrollable overeating (bingeing) and the possibility of a following impulse to engage in self-induced vomiting. The body dissatisfaction subscale measures dissatisfaction with overall shape and with the size of those regions of the body that are of greatest concern to those with eating disorders (i.e., stomach, hips, thighs, buttocks). It is generally viewed as a major factor responsible for initiating and then sustaining the weight controlling behaviors of those with eating disorders. The ineffectiveness subscale assesses feelings of general inadequacy, insecurity, worthlessness, and lack of control in one's life. It is conceptually very closely related to poor self-esteem or negative self-evaluation, but goes beyond these constructs to include feelings of emptiness and aloneness. High scores on this subscale reflect a significant deficit in self-esteem owing to intense feelings of inadequacy (Garner, 1991). The perfectionism subscale measure the belief that only the highest standards of personal performance are acceptable and the belief that outstanding achievement is expected by others (e.g., parents, teachers). The interpersonal distrust subscale reflects a sense of alienation and a general reluctance to form close relationships. It also measures the person's reluctance to express thoughts or feelings to others. The interoceptive awareness subscale

measures confusion and apprehension in recognizing and accurately responding to emotional states. It also reflects one's lack of confidence in recognizing and accurately identifying sensations of hunger and satiety. The Maturity fears subscale measures one's wish to retreat to the security of childhood.

The EDI-2 includes 3 new subscales: (a) asceticism; (b) impulse regulation; and (c) social insecurity. The asceticism subscale measures the tendency to seek virtue through the pursuit of spiritual ideals such as self-discipline, self-denial, self-restraint, self-sacrifice, and control of bodily urges. The impulse regulation subscale assesses the tendency toward impulsivity, substance abuse, recklessness, hostility, destructiveness in interpersonal relationships, and self-destructiveness. The tendency toward poor impulse regulation has been identified as a poor prognostic sign in eating disorders (Casper, Eckert, Halmi, Goldberg, & Davis, 1980; Garner, Olmstead, Davis, Rockert, Goldbloom, & Eagle, 1990). The social insecurity subscale measures the belief that social relationships are tense, insecure, disappointing, unrewarding, and generally of poor quality.

Internal consistency reliability estimates (Cronbach alphas) based on an eating disorder sample (Garner and Olmstead, 1984) and a non-patient population (Shore & Porter, 1990) respectively are: drive for thinness=.86, .81; bulimia=.88, .69; body dissatisfaction=.90, .91; ineffectiveness=.93, .82; perfectionism=.85, .70; interpersonal distrust=.85, .77; interoceptive awareness=.83, .78; maturity fears=.89, .65; asceticism=.70, .44; impulse regulation=.77, .79; and social insecurity=.80, .80.

Appendix F

General Discussion of Setting Conditions for Anorexia Nervosa

The scale is based on Slade's (1982) functional-analytic model of anorexia nervosa and bulimia nervosa. According to the model, initial dieting behavior is triggered by psychosocial stimuli, which set conditions that create a strong need for bodily control. Successful dieting is then powerfully reinforced by its consequences, which rapidly lead to a "full-blown" eating disorder. Questionnaire items were formulated to assess the five following hypothetical constructs of dissatisfaction with life and oneself, perfectionistic tendencies, social and personal anxiety, adolescent problems, and weight control. . Concerning the reliability of the SCANS, in a sample of nursing students, Slade and Dewey, (1986) reported the internal consistency as measured by Cronbach's alpha for each of the subscales as follows: .89 for the Dissatisfaction subscale; .81 for the Anxiety subscale; .66 for the Perfectionism subscale; .83 for the Adolescent Problems subscale; and .90 for the Weight Control subscale.

Concerning validity of the SCANS, Felker & Stivers (1994) found that 22.8% of their male subjects and 32.2% of their female subjects, all of whom were non-clinical subjects, were at risk for developing an eating disorder. They also found that both the male and female subjects identified as at-risk in their study recorded a higher mean score on perceived family conflict and control, but a lower mean score on the subscales of cohesion, expressiveness, organization, and independence. Slade, Butler, and Newton (1989) found that higher scores on the General

Dissatisfaction subscale were associated with more neuroticism, introversion, and psychotism while higher scores on the Perfectionism subscale were associated with lower psychotism scores and more social desirability responding. Slade and Dewey, (1986) compared the questionnaire score of clients with eating disorders to those of control subjects and found that anorexic and bulimic clients scored much higher on each of the five subscales. Two studies (Slade & Dewey, 1986; Kiemle, Slade, & Dewey, 1987) provided evidence for the classificatory power of the questionnaire. Both studies identified individuals at risk for developing eating disorders by using the cutoff scores established for the questionnaire. Comparisons of these at-risk individuals and the not-at-risk individuals on tests designed to measure existing eating disorders showed that the at-risk individuals scored much higher on these tests than the not-at-risk individuals.

Appendix G

General Discussion of the family Environment Scale

The subscales of the Family Environment scale are: Cohesion, which is the degree of commitment, help, and support family members provide one another; Expressiveness, which is the extent to which family members are encouraged to act openly and to freely express their feelings; Conflict, which is the degree to which anger, aggression, and conflict are readily expressed; Control, which is the extent to which set rules and procedures are used to run family life; Independence, which is the extent to which family members are assertive, self-sufficient, and make their own decisions; Achievement orientation, which is the extent to which activities (such as school or work) are cast into an achievement oriented or competitive framework; Intellectual-Cultural, which is the degree of interest in political, social, intellectual, and cultural activities; Active-Recreational, which is the extent of participation in social and recreational activities; Moral-Religious, which is the degree of emphasis on ethical and religious issues and values; and Organization, which is the degree of importance of clear organization and structure in planning family activities and responsibilities.

Even though some have disputed the effectiveness of the FES for detecting differences in the environments of families of eating disordered individuals, (Thienemann and Steiner, 1993), it is still by far the most commonly used instrument, and other researchers have found it to be effective. As well, a self-report measure is appropriate when the focus is the respondent's subjective reality.

According to Moos and Moos (1986) the FES taps an individual's perception of the social environment that characterizes his or her family. Therefore, the FES is described as a measure of whole family functioning because it is designed to capture the perceptions of individuals regarding the whole family system.

Forman and Hagen, (1984) and Moos (1976) found the FES to be a reliable and valid tool. Internal consistencies, as measured by Cronbach's alpha for each of the scales is as follows: Cohesion-Cronbach's alpha= .78; Expressiveness-Cronbach's alpha=.69; Conflict-Cronbach's alpha=.75; Independence-Cronbach's alpha=.61; Achievement Orientation-Cronbach's alpha=.64; Intellectual-Cultural Orientation-Cronbach's alpha=.78; Active-Recreational Orientation-Cronbach's alpha=.67; Moral-Religious Orientation-Cronbach's alpha=.78; Organization-Cronbach's alpha=.76; and Control-Cronbach's alpha=.67.

The development of the FES included groups of normal and distressed families. For the normative group, the distressed families were drawn from groups of psychiatric patients, alcohol abusers, probation and parole department clients, and families with problem children or adolescents. distressed families scored significantly lower on Cohesion, Expressiveness, Independence, Intellectual-Cultural, and Recreational subscales, and significantly higher on Conflict and Control than normal families. There were no significant differences on the Organization and Moral-Religious subscales. This pattern remained the same when socioeconomic status and family background were controlled.

Appendix H

General Discussion of Body Shape Questionnaire

Each item of the Body Shape Questionnaire correlated at .60 or above with the total scale in a sample of patients and a sample of nonpatients (Cooper et al., 1987), demonstrating reliability. Cooper et al. (1987) and Hadigan and Walsh (1991) found that higher scores on the Body Shape Questionnaire were associated with higher scores on several measures of eating disorders, thereby demonstrating the measures validity. Studies of bulimic clients have found higher scores were related to depression and lower self-esteem (Cooper & Fairburn, 1993, Hadigan & Walsh, 1991). Cooper et al. (1987) found that bulimic clients scored much higher on the Body Shape Questionnaire than women in a community sample, who on the basis of screening questions were identified as probably having bulimia, scored higher on the questionnaire than women who did not have bulimia. They also found that women who were concerned with slimness scored higher on the questionnaire than women not concerned with slimness. Hadigan and Walsh (1991) also found that female bulimic clients scored much higher on the questionnaire than other women.

Appendix I

General Discussion of Bem Sex Role Inventory

Concerning reliability, the test-retest reliability correlations reported for each score are (a) Masculine, r=.90; (b) feminine, r=.90; and (c) androgynous, r=.93. BEM (1974) reported that a "masculine" sex role is indicative of masculine traits and a simultaneous rejection of "feminine" traits. A Feminine sex role indicates not only an endorsement of feminine traits, but also a simultaneous rejection of masculine attributes. Rowland (1977), using the BEM with an Australian sample, found that Australian and American females do not differ significantly. Australian males, were significantly higher in femininity than American males were. Thompson and Melancon (1986) in one of the very few studies of the BEM with adolescents found that it is indeed valid with this population as well. The Short Form or Short BSRI is composed of 30 items and was found to correlate highly with the original 60-item form. In addition, the three scores of the Short BSRI tend to be more internally consistent than those of the original BSRI (BEM, 1981).

Appendix J

General Discussion of Beck Depression Inventory

The BDI is one of the most widely used self-report depression inventories whose psychometric properties have been well investigated in adult populations (Kendall, Hollon, Beck, Hammen, and Ingram, (1987). There have also been a fair number of studies (Teri (1982); Ambrosini, Metz, Bianchi, Rabinivich, & Undie, 1991; Roberts, Lewinsohn, & Seeley, 1991), using the BDI with adolescent populations.

Reliability estimates based on Cronbach's coefficient alpha for a Mixed Depression =.86; for Major Depressive Disorder Single Episode = .80; for Major Depressive Disorder Recurrent Episode =.86; for Dysthymic Disorder =.79; for Alcoholic =.90; Heroin =.88 and for nonpsychiatric samples =.81.

Concerning validity, validity studies have been done with adults (Beck, 1967), college students (Blumberry, Oliver, and McClure, 1978) and adolescents (Strober, Green, & Carlson, (1981). Pearson product-moment correlations conducted between the BDI and the construct hopelessness demonstrate the construct validity of the BDI. For the Mixed diagnosed sample $r=.60$, $p<.001$; for the Major Depression Single Episode sample $r=.38$, $p<.001$; for the Major Depression Recurrent Episode sample $r=.63$, $p<.001$; for the Dysthymic Disorder sample $r=.65$, $p<.001$; for the Alcoholic sample $r=.76$, $p<.001$; and for the Heroin-addicted sample $r=.46$, $p<.001$.

Teri (1982) found the BDI to be a reliable and useful measure for grades 9 through 12. She found that because the measure is written in a clear and simple fashion they had no problem reading the test items.