1989

Coexistence of Eating Disorders and Substance Use: A Spectrum of Eating Disorders Based on a Dimension of Severity

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COEXISTENCE OF EATING DISORDERS AND SUBSTANCE USE: A SPECTRUM OF EATING DISORDERS BASED ON A DIMENSION OF SEVERITY

by

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A Dissertation Submitted to the Faculty of the Graduate School of Loyola University of Chicago in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

September

1989

ACKNOWLEDGMENTS

This dissertation is dedicated to Karl Leif Bates, whose devotion, understanding, and assistance helped propel this project toward completion.

Thanks are extended to the parents of the author, who inspired their daughter to believe in her ability to pursue intellectual goals. Also, the author would like to thank the members of her dissertation committee for being supportive and helpful during the planning, execution, and writing of this project.

Finally, the author would like to acknowledge the American Psychological Association and the Parkside Alcoholism Research Foundation who awarded research support monies to the author.

VITA

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INTRODUCTION

Increasing interest in eating disorders in the past decade has focused attention from the public sector and various health disciplines on anorexia nervosa and more recently bulimia (Garner, Olmsted, & Polivy, 1983) and has brought about an increase in research papers and case reports on eating disorders as evidenced by the formation of the International Journal of Eating Disorders in 1982. Several researchers have suggested that the "incidence of eating disorders has risen dramatically over the past two decades (Schisslak, Crago, Neal, & Swain, 1987, p. 660). Others argue eating disorders, such as bulimia, are only "recently recognized pathological attempts ... (to) mitigate the effects of excessive food intake ... (which) have been practiced for thousands of years" (Weiss & Ebert, 1983, p. 293). Despite any disagreements over the amount of increase in the incidence of eating disorders over time, "these disorders have become a matter of increasing concern for mental health professionals" (Shisslak et al., 1987, p. 660).

The diagnostic groups and criteria for eating disorders have undergone changes in recent years and the

"classification of this syndrome is still controversial" (Weiss & Ebert, 1983, p. 293). The Diagnostic and Statistical Manual of Mental Disorders, 3rd. ed.-revised, (American Psychiatric Association, 1987; DSM-III-R) revised the eating disorders portion of the manual. Perhaps the authors of the DSM-III-R were following the lead of researchers in the area of eating disorders who split the Diagnostic and Statistical Manual of Mental Disorder (3rd. ed.) (American Psychiatric Association, 1980) (DSM-III) bulimia diagnostic group into two subgroups: bulimics (binging with no purging or restricting behavior) and "bulimarexics" (binging with purging and/or restricting behavior) (Cullari & Redmon, 1983). Bulimarexia was first introduced into the literature by Boskind-Lodahl (1976) in an attempt to separate the heterogenous groups created by the DSM-III diagnostic criteria under which a person could be diagnosed as bulimic without engaging in either purging or restricting behaviors. She found empirical evidence to validate the existence of two types of bulimics and DSM-III-R appears to have integrated some of her findings into the revised bulimia nervosa criteria.

In addition to the lack of an accepted unitary eating disorders classification system in the eating disorder literature, some authors have criticized the arbitrary, non-empirically based DSM-III-R criteria for bulimia nervosa (Beumont, 1988; Grace, Jacobson, & Fullager, 1985; Mintz,

1987). As a result, the criteria often do not adequately describe or discriminate between eating disorder types and between abnormal and normal eating habits.

In response, several authors have proposed and attempted to validate various "spectrums" or "continua" of eating disorders (Harju, 1987; Mintz, 1987; Ousley, 1987), similar to the degree of dependency notion in the substance abuse literature. These continua are based on a variety of dimensions including temporal stage of the disorder, degree of psychopathological disturbance, and frequency of disturbed eating behaviors.

As numerous research papers appear in the literature, etiological theories are proposed and many psychosocial characteristics of eating disorder subjects are discussed. One potentially important, yet underinvestigated, characteristic is the high percentage of eating disorder individuals who have a concurrent substance use disorder. Estimates of a concurrent substance use disorder among eating disorder individuals range from 19% (Hatsukami, Eckert, Mitchell, & Pyle, 1984) to 40% (Beary, Lacey, & Merry, 1986).

Yet, as evidence supporting the existence of this clinical subgroup grows, few researchers have attempted to further delineate its characteristics. Some researchers have even excluded the eating disorder subjects with a concurrent substance use disorder from their eating disorder

subject group because of the concurrent disorder (Hatsukami, Owen, Pyle, & Mitchell, 1982).

The purpose of this study is twofold. First, to describe the clinical subgroup of eating disorder subjects who have a concurrent substance use disorder in terms of demographic, historical, and psychosocial characteristics. Second, to classify eating disorders along a continuum of eating disorders pathology and hypothesize that placement along the continuum will predict quantity and severity of substance abuse and dependence symptoms, as well as other psychosocial signs of disturbance. It is expected that there will be a high correlation between disturbed eating, substance use and psychopathology.

REVIEW OF RELATED LITERATURE

Evolution of Eating Disorders as Psychiatric Diagnoses

Eating disorders were officially recognized as a psychiatric diagnostic classification of disorders by the American Psychiatric Association in 1980 when the Association published the third edition of the Diagnostic and Statistical Manual of Mental Disorders. The manual recognized four distinct types of eating disorders including anorexia nervosa, bulimia, pica, as well as rumination disorder and a residual category with no specific classification criteria called atypical eating disorder. Pica and rumination disorder are disorders typical of infancy with age of onset occurring by 24 months and 12 months respectively; whereas anorexia and bulimia typically begin in adolescence (American Psychiatric Association, 1980).

This study will focus on anorexia nervosa, bulimia and various subclinical types of disordered eating. The DSM-III diagnostic criteria for these two disorders are presented in Tables 1 and 2.

Table 1

DSM-III Diagnostic Criteria for Anorexia Nervosa

A. Intense fear of becoming obese, which does not diminish as weight loss progresses.

B. Disturbance of body image, e.g., claiming to "feel fat" even when emaciated.

C. Weight loss of at least 25% of original body weight or, if under 18 years of age, weight loss from original body weight plus projected weight gain expected from growth charts may be combined to make the 25%.

D. Refusal to maintain body weight over a minimal normal weight for age and height.

E. No known physical illness that would account for the weight loss.

Table 2

DSM-III Diagnostic Criteria for Bulimia

A. Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time, usually less than two hours).

B. At least three of the following:

(1) consumption of high-caloric, easily ingested food during a binge.

(2) inconspicuous eating during a binge.

(3) termination of such eating episodes by abdominal pain, sleep, social interruption, or self-induced vomiting.

(4) repeated attempts to lose weight by severely restrictive diets, self-induced vomiting, or use of cathartics or diuretics.

(5) frequent weight fluctuations greater than ten pounds due to alternating binges and fasts.

C. Awareness that the eating pattern is abnormal and fear of not being able to stop eating voluntarily.

D. Depressed mood and self-deprecating thoughts following eating binges.

E. The bulimic episodes are not due to Anorexia Nervosa or any known physical disorder.

In 1987, the revised edition of DSM-III, DSM-III-R, presented new criteria for both anorexia nervosa and the renamed bulimia "nervosa." The revised criteria appear to take into consideration the many research findings in the area of eating disorders between 1980 and 1987. The DSM-III-R diagnostic criteria for anorexia nervosa and bulimia nervosa are presented in Tables 3 and 4. Some important changes in the criteria took place between 1980 and 1987. The new criteria and research findings which apparently led to the changes in the criteria will be discussed in greater detail below.

Many researchers in the area of eating disorders still find the DSM-III-R criteria insufficient: producing heterogeneous groups and excluding other patterns of disordered eating (Beumont, 1988; Fairburn & Garner, 1986; Ousley, 1987; Prather & Williamson, 1988; Thompson, 1988). The present study will consider a broader range of disordered eating patterns than described by the DSM-III-R, while also attempting to delineate potential subgroups of bulimics.

Nosology: Definitions and Criteria

One of the earliest definitions of disordered eating in modern clinical literature was published by Stunkard in 1959. His paper, entitled "Eating patterns and obesity," described three types of disordered eating in obese persons:

the night-eating syndrome; eating binge; and eating-without-satiation. Stunkard identifies three variables which have proven useful in the definition of eating patterns in man and animals which he uses to differentiate between the three disorders he describes. According to Stunkard, differentiation is achieved by the presence or absence of self-condemnation in association with a deviant eating pattern, the degree of personal meaning or symbolic representation which is attached to the eating pattern, and the degree of stress experienced during the deviant eating behavior.

In the years since, many have followed Stunkard's lead in terms of proposing various "types" of eating disorders within various weight categories and by describing and applying various psychological variables to the definition of an eating disorder type.

Anorexia nervosa has been recognized as a psychiatric disorder since at least 1873 (Nemiah, 1950), but has come under closer scrutiny since the 1970s. Like Stunkard's reliance on weight categorization to classify eating disorders, one of the hallmarks of anorexia nervosa is severe weight loss. However, the weight loss appears to be unrelated to the loss of appetite, as the name "anorexia" implies (Garfinkel, 1974). Instead, the weight loss is purposeful (Bruch, 1973) and anorexics do not actually lose their appetite until a state of starvation is reached

Table 3

DSM-III-R Diagnostic Criteria for Anorexia Nervosa

A. Refusal to maintain body weight over a minimal normal weight for age and height, e.g., weight loss leading to maintenance of body weight 15% below that expected; or failure to make expected weight gain during 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, believes that one area of the body is "too fat" even when obviously underweight.

D. In females, absence of at least three consecutive menstrual cycles when otherwise expected to occur (primary or secondary amenorrhea). (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen, administration.)

Table 4

DSM-III-R Diagnostic Criteria for Bulimia Nervosa

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 eating binges.

C. The person regularly engages in either self-induced vomiting, use of laxatives or diuretics, strict dieting or fasting, or vigorous exercise in order to prevent weight gain.

D. A minimum average of two binge eating episodes a week for at least three months.

E. Persistent overconcern with body shape and weight.

(Garfinkel, 1974). In addition to the pursuit of thinness, anorexics have a nearly delusional disturbance of their body shape and weight (Bruch, 1973). The anorexic denies his or her severe state of emaciation while attempting to lose even more weight.

A longstanding and on-going debate over the relationship between anorexia nervosa and bulimia arose from research on anorexia nervosa. One author reported the appearance of binge eating and purging symptoms in anorexics and, as defined by Russell's criteria (1970), divided anorexics into a "purger" type and a "dieter/restricter" type (Beumont, 1977). Beumont found empirical support for the distinction and cited a number of significant differences between the groups. The anorexic dieters/restricters displayed more obsessional traits, were more competitive with peers, were sexually inexperienced and were of a normal weight prior to the onset of anorexia nervosa. The anorexic purgers were more socially outgoing, heterosexually experienced, premorbidly obese, and were teased about their weight prior to the onset of anorexia nervosa.

Another study which supports the distinction between "pure" anorexics and those with binge eating and purging behaviors was published several years later by Casper, Eckert, Halmi, Goldberg, and Davis (1980). Using their own diagnostic criteria for anorexia nervosa which are similar

to the DSM-III criteria, they found a higher degree of psychopathology and several distinct psychiatric symptoms among the anorexic bulimics as compared to the "anorexic fasters." They conclude the presence of bulimic symptoms indicates a subgroup of anorexia nervosa and may be a sign of chronicity.

Russell (1979) coined the term "bulimia nervosa" to describe the symptom of "an irresistible urge to overeat followed by self-induced vomiting or purging" (p. 429). He conducted a prospective study of anorexics with and without bulimia nervosa, and found some serious complications involved with the bulimia nervosa symptoms. Namely, those with bulimia nervosa found the vomiting habit-forming, there were additional physical side-effects and complications, they were more sexually active and often had severe depressive symptoms which led to a high risk of suicide. Russell (1979) concludes anorexics with bulimia nervosa have a less favorable prognosis than those without.

At this point in time, Russell stopped short of describing bulimia nervosa as a distinct syndrome saying "it would be premature to think of the disorder described in this article as constituting a distinct syndrome" (Russell, 1979, p. 429). Instead, he cautiously speculates that perhaps bulimia nervosa is "an aftermath or chronic phase of anorexia nervosa" (p. 429).

Thus, at the beginning of the 1980s, the evolution of

eating disorders definitions focused on anorexia nervosa as the central diagnostic category. Overeating episodes followed by purging were considered a symptom which might or might not be part of the anorexic pathology. The criteria used to classify an individual as anorexic came from two major sources: Russell (1970) and DSM-III (American Psychiatric Association, 1980). In Table 5, Russell's (1985a) criteria for the symptoms of bulimia are presented.

Meanwhile, Stunkard's work was largely overlooked by eating disorders researchers while they focused largely on anorexia nervosa and its variants. Perhaps Stunkard was overlooked due to his identification of disturbed eating patterns within an obese population, not in the low weight group which was the focus of the majority of the research that followed soon after. However, some researchers were not satisfied with the subclassification of binge eating and purging behaviors as a variation of anorexia nervosa. Their view is supported by Stein and Laakso's (1988) review of historical medical literature which concludes that, "while bulimia has recently been viewed as an emergent variant of anorexia nervosa, historical evidence suggests that earlier conceptualizations of the term describe a symptom as well as a discrete syndrome" (p. 201). The subclassification of bulimia excluded a large group of individuals who were not underweight, and did not have a history of being underweight, but engaged in binge eating and/or purging

Table 5

Russell's Bulimia Nervosa Criteria

1. The patient is much preoccupied with thoughts about food, and succumbs to episodic gorging.

2. She attempts to mitigate the "fattening" effects of food by one or more of the following: self-induced vomiting, purgative abuse, alternating starvation, appetite suppressant drugs or other devices with a similar aim.

3. The psychopathology of the disorder is a morbid dread of fatness. This is usually shown by the patient setting herself a sharp weight threshold that is below her optimum of "healthy" weight.

4. She has experienced an earlier episode of anorexia nervosa, which may have been fully expressed, or may merely have assumed a cryptic form with loss of weight and/or amenorrhea lasting a few months.

Note: From "The changing nature of anorexia nervosa: An introduction to the conference" by G.F.M. Russell, 1985, Journal of Psychiatric Research, 19, p. 106.

behaviors, from being classified as eating disordered (Garner, Olmsted, & Garfinkel, 1985; Lacey, Coker, & Birtchnell, 1986; Thompson, 1988). Aside from excluding too many subjects, several researchers argued that weight should not be the central criteria with which to classify individuals as eating disordered (Garner, Olmsted, & Garfinkel, 1985; Thompson, 1988; Wardle & Beinart, 1981), including the obese (Rau & Green, 1975). Empirically, support for this view can be found in Garner, Olmsted, & Garfinkel (1985) and in Thompson's replication (1988) of that work.

Garner, Olmsted, and Garfinkel (1985) compared four groups of "bulimic" subjects on the following variables: current weight history, past weight history, and a variety of dependent variables including the Eating Disorders Inventory (EDI ; Garner, Olmsted, & Polivy, 1983) the Eating Attitudes Test (EAT ; Garner, Olmsted, Bohr, & Garfinkel, 1982) and eating behavior. The groups were subjects who were currently anorexic and bulimic, those with bulimia nervosa by Russell's criteria (Russell, 1979) who had a history of anorexia nervosa, bulimics by DSM-III criteria with a history of at least a 25% weight loss of their maximum weight but no emaciation, and bulimics by DSM-III criteria who had never been emaciated and had never lost 25% of their maximum weight. They found the "imposition of weight history criteria to form four groups of bulimic

patients failed to yield groups which were distinct in terms of attitudes related to food, eating and body dissatisfaction as well as other traits which have been identified as relevant to eating disordered patients" (Garner, Olmsted, & Garfinkel, 1985, p. 133). They then concluded that "diagnostic categories for bulimia formed solely on the basis of weight variables may not be clinically useful" (p. 129).

Thompson's (1988) replication of the Garner et al. (1985) study lends support for the conclusion that the diagnosis of bulimia be made regardless of the individual's current weight. Using the DSM-III-R criteria for bulimia nervosa, Thompson (1988) found underweight (15% below ideal weight) bulimics, normal weight bulimics with an underweight history, and normal weight bulimics with no underweight history obtained scores which were not significantly different on the EAT, most scales of the EDI and a depression scale.

Beumont (1988) sums up much of the conflict over the weight classification criteria in stating "the problem is that the determining central feature for both obesity and anorexia nervosa is physical, whereas that for bulimia is behavioral," (p. 170).

One prominent researcher in the area of eating disorders has made a case that a psychological variable, the fear of becoming fat, should be considered the central

determining feature of anorexia nervosa and bulimia nervosa (Russell, 1979; Russell, 1985b). Russell (1985b) claims the core of anorexic psychopathology is "the morbid preoccupation with body weight and the dread of fatness" (p. 102). In a similar vein, he states bulimia nervosa's core of pathology is "an overvalued idea that it is essential to keep below a self-imposed and specific weight threshold" (Russell, 1979, p. 443).

Another researcher considers the pathological eating behavior itself as the central feature of eating disorders (Halmi, 1985), and goes on to dismiss the notion of eating disorders as "diseases," instead calling anorexia nervosa and bulimia nervosa "appetite behavioral disorders" (p. 113).

No matter what is considered the central determining feature in the classification of various eating disorders, the most widely used classification systems, DSM-III-R and Russell, have consistently used a number of criteria areas including weight, behavioral, and psychological variables. Therefore, most researchers in the field would agree reliance on one of these criteria areas alone will not produce an eating disorders population be it obese weight (Beumont, 1988) or vomiting alone (Olmsted & Garner, 1986).

DSM-III and DSM-III-R Criteria

The DSM-III criteria attempted to clarify the loosely used terms into two meaningful diagnostic groups, but it failed in several ways. The anorexia nervosa criteria can be criticized for requiring a 25% weight loss from original body weight, meaning an obese person might lose a great deal of weight, but remain close to a normal weight, while refusing to want to maintain that normal weight, thus producing a heterogenous group meeting the criteria. The DSM-III bulimia criteria highlighted the eating binge, yet were often misinterpreted as requiring a form of purging and/or restricting behavior to meet the criteria (Schleisier-Stropp, 1984). Upon close inspection it becomes clear that purging/restricting behavior is only an optional symptom, not a required symptom, of bulimia (see Table 2).

Several researchers have cited the diagnostic "confusion" (Lacey, Coker, & Birtchnell, 1986; Russell, 1985a) mentioned above as prompting attempts to create a distinction between bulimia with purging behavior or bulimia with restricting behavior. Russell (1985a), whose criteria for bulimia nervosa does require purging or restricting behavior, commented on the difficulty studying bulimic disorders as operationalized by DSM-III because of the heterogeneity and severity of its different forms.

Russell's distinction is supported by Rosen, Leitenberg, Fisher, and Khazam (1986), who studied 20

bulimics by Russell's criteria and offer their rationale for further subtyping bulimia as it appears in DSM-III:

> In any study of bulimia, there is good reason to consider these two subtypes, binge eating with and without vomiting, separately: they may have somewhat different etiologies, the course of the disorder may be different, the degree of associated pathology is different, and the type of treatment that is likely to be effective may be different (Rosen et al., 1986, p.257).

Another researcher in this area has attempted to clarify diagnostic considerations. The term "bulimarexia" was coined by Boskind-Lodahl (1976) to identify this subgroup of DSM-III bulimics who engaged in purging and/or restricting. Bulimarexia is defined as describing those who alternately binge and then purge by self-induced vomiting, the abuse of laxatives and diuretics, or severe fasting (Boskind-Lodahl, 1978).

Disagreement has also surfaced over the distinction between bulimia with and without anorexia nervosa and whether one diagnosis should supersede the other. Halmi (1985) concludes

> although there is not enough evidence to justify bulimic anorectics as a separate clinical entity, there is enough evidence ... to justify subtyping anorexia nervosa patients into those who exclusively starve, and those who starve and purge but do not binge, and those who binge and purge" (p. 116).

Johnson, Stuckey, Lewis, and Schwartz (1982) find many of the same clinical differences cited by Halmi, yet while she hesitates to differentiate the bulimics as a separate group, Johnson et al. recommend a clear

distinction. A potentially important difference between the studies, and hence the conclusions, is that Halmi limited her subjects to those who were underweight, while Johnson et al. (1982) drew their very large sample (N=316 females) from a normal weight group.

Additional evidence for separating anorexia nervosa and bulimia is provided by Garner, Garfinkel, and O'Shaughnessy (1985). In using the DSM-III bulimia criteria, their bulimic subjects can be assumed distinct from the pure anorexics only in regard to binge eating, not purging or restricting methods following a binge eating episode. Garner, Garfinkel, & O'Shaughnessy (1985) empirically addressed the distinction between binge eaters and non-binge eaters by comparing "anorexic restricters," anorexics with bulimia, and normal weight bulimics. They found that those with bulimic symptoms, regardless of weight, were most similar to each other and were not similar to the restricting anorexics.

Still, Russell (1985a) insists on the need to identify bulimics with past or present anorexia nervosa as a separate group from other bulimics. Fairburn and Garner (1986) dispute Russell's fourth criteria, arguing that the research shows bulimics with and without anorexia have different natural histories and respond differently to treatment.

Similarly, Fairburn and Garner (1986) recommend

anorexia nervosa (as at that time the soon-to-be-released DSM-III-R defined it) should override the diagnosis of bulimia nervosa when both are present because of the primary treatment importance of increasing the anorexic's weight. Prior to its publication, the authors criticized the soon-to-be-released DSM-III-R for not addressing the relationship between bulimia nervosa and anorexia nervosa.

Not only did DSM-III-R not address the relationship between anorexia nervosa and bulimia nervosa, it also did not prescribe one diagnosis to supersede the other. Both diagnoses should be given if both criteria are met. However, other problems with the DSM-III criteria were addressed. The DSM-III-R criteria for anorexia nervosa require a 15% body weight loss, instead of the very severe 25% loss required by DSM-III. Also, DSM-III-R added the three-month menses cessation criteria for anorexia nervosa which indicates severe emaciation in women against a more objective standard and is invariably present in anorexia nervosa (Mitchell, 1986). And probably more importantly, the new bulimia nervosa diagnostic criteria created a more homogenous group similar to the bulimarexic group defined by Boskind-Lohdahl (1976). Part C of the criteria (see Table 4) requires some form of purging or restricting behavior to counteract the caloric effects of the binge eating episodes. Also, the DSM-III-R criteria for bulimia nervosa added a frequency criteria for the binge eating episodes, part D,

(see Table 4), again probably following the lead of researchers in the area (e.g., Pyle, Mitchell, Eckert, Halvorson, Neuman, & Goff, 1983). Some researchers have gone beyond the binge eating frequency requirement to specify a minimum weekly purging criteria (Olmsted & Garner, 1986). All of these efforts serve to standardize and homogenize the clinical group of study.

The DSM-III-R eating disorder diagnoses are an improvement on the previous versions, but additional clarification to distinguish groups and the relationships between the groups is still needed. These improvements will most likely follow the current surge of research in the eating disorders area.

Confusions and Omissions

Clearly, there are many confusing and even conflicting aspects to the study of eating disorders. Additionally, there are some obvious omissions in the accepted diagnostic classification systems and in the samples selected for study.

First, an attempt to clarify some of the terms will be made. Bulimia is used to describe a symptom and a syndrome (Beumont, 1988; Fairburn & Garner, 1986). The symptom refers to gross overeating which is also called binge eating. To avoid confusing the syndrome with the symptom, binge eating will be used in this paper to

describe the symptom. Another term often misunderstood is purging. Purging refers to any method used by an individual to rid the body of food or water weight, so it includes self-induced vomiting and the use of laxatives, diuretics, or enemas (Beumont, 1977; Grace, Jacobson, & Fullager, 1985; Killen, Taylor, Telch, Robinson, Maron, & Saylor, 1987; Ousley, 1987). Finally, for the purpose of the present study, the term substance use is used to denote alcohol and drug use.

An additional source of confusion in the eating disorders literature surrounds the content of an eating binge. DSM-III (American Psychiatric Association, 1980) and DSM-III-R (American Psychiatric Association, 1987) define it as "rapid consumption of a large amount of food in a discrete period of time" (p. 70 and p. 68 respectively). Yet "large" is not defined, so it is left up to the researcher to pick a criterion or to the subject to interpret "large" for himself or herself. Either method leaves a lot to be desired in terms of standardization.

> A key issue in determining rates of bulimia lies in deciding what constitutes a "binge," a term subject to large cultural variation in meaning. When comparisons are made between specific characteristics of binges, the discrepancies in reported prevalence diminish (Rand & Kuldau, 1986, p. 82).

More complete definitions of an eating binge have been offered from several sources. Stunkard (1959) defined an eating binge as possessing an orgasmic quality, occurring during life stress, possessing symbolic meaning to

the eater, and being followed by self-condemnation. DSM-III utilized the last criterion but dropped it for DSM-III-R.

Rosen et al. (1986) attempted to empirically define a binge eating episode. A prospective study of 20 females with bulimia nervosa, as defined by Russell, revealed a binge eating episode entailed consuming four and one half times more calories than a non-binge eating episode. Further, there were two additional influences on whether it was a binge episode or a non-binge episode: the type of food consumed, snacks and desserts being more likely classified as binge episodes, and the subject's prior eating that day. An additional eating episode was more likely to be considered a binge eating episode.

In a lab study comparing the eating patterns of DSM-III-R bulimics to those of controls, the authors found bulimics consumed significantly more calories regardless of meal type than did the controls. After meals, the bulimics reported being hungrier than were the controls.

Omissions in the accepted diagnostic classification systems are of several types. A major omission has been created by the DSM-III-R additions to the bulimia nervosa criteria. The new criteria created a more homogenous group by requiring some sort of purging and or restricting behavior for classification, but it also did not account for the DSM-III bulimics who do not purge or restrict. In the research literature, this group is called by various names

including binge eater (Prather & Williamson, 1988), compulsive overeater (Cullari & Redmon, 1983), and a "type of obesity" (Stunkard, 1959).

The new criteria strengthen post-DSM-III-R group homogeneity, but comparisons with earlier research are difficult. Two authors summarize this dilemma for the obesity literature: "one potential problem in earlier research on psychopathology associated with obesity is that none distinguished obese bulimics (binge-eaters) and more traditional overweight individuals" (Prather & Williamson, 1988, p. 178).

Another group which may frequently go undetected are the "subclinical" or "subfrequency" cases of anorexia nervosa and bulimia nervosa (Fairburn & Garner, 1986; Szmukler, 1985). Szmukler (1985) attributes the frequent underdetection of these cases to the variable course of the illnesses, and to the way in which cases of eating disorders encountered clinically may vastly underestimate the full spectrum of the disorders. Fairburn and Garner (1986) recommended the "atypical eating disorders" diagnoses for these cases, but other researchers offer evidence some in that the group may be "recovered" eating disordered individuals (Drewnowski, Yee, & Krahn, 1988).

Several other potential eating disorder groups are those who purge without binge eating, who may represent a more advanced stage of bulimia or anorexia (Drewnowski, Yee,

& Krahn, 1988; Killen et al., 1987; Mintz, 1987) and those who chronically diet, such as the "restrained eaters" described by Rand and Kuldau (1986). A restrained eater is "a person who is overly concerned with food, eating, and dieting, and consciously eats less than desired" (Rand & Kuldau, 1986, p. 76).

Some researchers have excluded subjects over an arbitrary age criteria (Eckert, Goldberg, Halmi, Casper, & Davis, 1979; Healy, Conroy, & Walsh, 1985). Mitchell and Eckert (1987) and Halmi (1985) argue against the arbitrary age cut-off. Halmi (1985) asserts "the occurrence of anorexia nervosa in patients over the age of 25 or even 30 is not uncommon" (p. 113).

And finally, some studies have arbitrarily excluded subjects with a concurrent substance use disorder (Hatsukami, Owen, Pyle, & Mitchell, 1982).

A more productive and informative approach to these seemingly arbitrary exclusion criteria would be to include any and all potential subjects and address the differences within the research question.

Prevalence Estimates and Historical Evidence

Prevalence estimates in the United States, Great Britain and Australia for bulimia range from 2.7% to 18.6% for women (Healy, Conroy, & Walsh, 1985; Pope, Hudson, Yurgelun-Todd, & Hudson, 1984) and .5% to 4.2% for women for

anorexia nervosa (Crisp, Palmer, & Kalucy, 1976; Pope, Hudson, Yurgelun-Todd, & Hudson, 1984). Estimates of the prevalence of eating disorders are consistent among the nations cited.

Females appear to be highly overrepresented in the anorexia nervosa and bulimia nervosa clinical groups (American Psychiatric Association, 1980; American Psychiatric Association, 1987; Fairburn & Cooper, 1984; Fairburn, Cooper, & Cooper, 1986; Herzog, 1982a; Mitchell, Davis, & Goff, 1985; Pyle, Mitchell, & Eckert, 1981; Russell, 1979) and community samples (Fairburn & Cooper, 1982; Fairburn & Cooper, 1984; Johnson, Stuckey, Lewis, & Schwartz, 1982) with estimates ranging from 93% female to 100% female.

The sample sizes have been small with one exception; a study that took a different approach to sampling. Jonas et al. (1987) conducted a survey of 259 callers to a cocaine abuse hotline to detect eating disorders pathology, thereby sampling from a different vantage point than most clinical or community studies of eating disorders. They found as many as 44% of the identified eating disorder subjects were male, suggesting some important differences between samples initially identified as eating disordered or substance use disordered.

The age of onset for anorexia nervosa is expected to be in early or late adolescence, and for bulimia nervosa it

is expected in adolescence or early adult life (American Psychiatric Association, 1980; American Psychiatric Association, 1987). In their review of the literature, Herzog and Copeland (1985) provided some support for these figures. They found the range for the mode age of onset for bulimia is 17 to 25 years. The age of onset figures for anorexia nervosa produce a bimodal distribution with modes at 13 to 14 years and 17 to 18 years. Several others cite similar figures (Beumont, 1977; Fairburn, Cooper, & Cooper, 1986; Garner, Garfinkel, & O'Shaughnessy, 1985; Lacey, Coker, & Birtchnell, 1986).

Some researchers appeared to have taken the mode age range of onset as the restrictive range of onset (Eckert et al., 1979), and have established an arbitrary age cut-off for onset at age 30. Yet most studies contraindicate such restrictions with a steady proportion of the samples first meeting eating disorder diagnostic criteria well over 30 years (Fairburn, Cooper, & Cooper, 1986). Hsu and Zimmer (1988) describe five case studies of anorexia nervosa and/or bulimia nervosa onset at age 55 or older.

Socio-economic status (SES), race, and marital status are infrequently reported in the eating disorders literature, yet where it has been done, subjects are mostly caucasian, from high SES groups and unmarried (Fairburn, Cooper, & Cooper, 1986; Johnson & Connors, 1987).

Some argue that reported prevalence rates are too

high, citing the loose operational definitions of the criteria used by studies gathering prevalence data (Healy et al., 1985). Others conclude anorexia nervosa and bulimia nervosa are increasing in prevalence. In their recent review of the eating disorders literature, Mitchell and Eckert (1987) cite research supporting the increasing prevalence rate while adding that a general population sample should be studied and a prospective study of eating disorders should be undertaken.

A third line of reasoning suggests that the occurrence of eating disorders probably has not changed in frequency, but that current interest in the disorder has prompted clinicians and researchers to ask the questions necessary to substantiate the diagnoses. Kutcher, Whitehouse, & Freeman (1985) present empirical evidence to support this view. They studied 146 psychiatric inpatients, focusing on establishing or ruling out an eating disorder by DSM-III criteria.

> Of all patients diagnosed according to DSM-III criteria as having eating disorders, 68% (13 of 19) had not been so identified by hospital diagnosis: 80% (eight of 10) of those with bulimia, 20% (one of five) of those with anorexia, 100% (four of four) of those with atypical disorder." (Kutcher et al., 1985, p. 1476).

None of the unidentified patients "had been specifically asked about possible current or past eating disturbance at any time during their hospital admissions" (Kutcher et al., 1985, p. 1477). Eating disorders are not "new" but newly discovered. A very thorough review of historical medical

literature by Stein and Laakso (1988) found that while the name has changed over the years, the hallmark symptom and syndrome of bulimia has been described again and again for several hundred years. References to bulimia and case examples date back to 1708 and translations of early works describe bulimia from as far back as 130 A.D. to 500 A.D. A description of anorexia nervosa appeared in the medical literature as far back as 1689 in Phthisiologia: Or a Treatise of Consumption, a book by Morton (Nemiah, 1950). Morton vividly describes a syndrome seemingly identical to the current definition of anorexia nervosa.

Etiology of Eating Disorders

Causative models of eating disorders are the subject of many lengthy journal articles, books and other sorts of publications. A thorough review of these publications is beyond the scope of this project, however a narrower review of the literature which focuses mainly on concurrent eating disorders and substance use disorders shall be provided. For broader review of the etiology of eating disorders, the reader is referred to the following sources: Handbook of Eating Disorders: Physiology, Psychology, and Treatment of Obesity, Anorexia, and Bulimia edited by Brownell and Foreyt (1986), and The Eating Disorders: Medical and Psychological bases of Diagnosis and Treatment edited by Blinder, Chaitin, and Goldstein (1988).

Addiction: Foremost among the etiological factors discussed in this subset of the literature is the notion that eating disorders, like substance use disorders, are addictive disorders. Citing the empirical link between the disorders, Jonas, Gold, Sweeney, and Pottash (1987) suggest the possibility that "both eating disorders and substance abuse are manifestations of an underlying addictive disorder" (p. 47). Further empirical support for the hypothesized commonality of the disorders is provided by a variety of approaches to the question. Dunn and Ondercin (1981) and Kagan and Squires (1984a) conclude that each disorder is addictive in that it "serves as a way of escaping intolerable feelings" (Dunn & Ondercin, 1981, p. 48) and is "related to a tendency to suppress a direct expression of displeasure" (Kagan & Squires, 1984a, p. 218) through the abuse of food and drugs or alcohol.

Others have drawn theoretical and functional behavior parallels between alcohol use, drug use, overeating, bulimia, and anorexia (Bemis, 1985; Chalmers, Marcus, Aaronson, & Engstram, 1979; Channon, 1987; Lacey & Moureli, 1986). In his comparison between "abstinence" and "non abstinence" models for bulimia, Bemis (1985) applies the abstinence model of treatment for substance abuse to highlight the similarities between bulimia and substance abuse from this viewpoint. The disorders both have impulse control problems, similar personality profiles as measured

by the Minnesota Multiphasic Personality Inventory (MMPI) (Hatsukami, Owen, Pyle, & Mitchell, 1982), and occur together with high frequency, which leads to the reasoning that bulimia "represents just one manifestation of a more generalized pattern of addictive behavior" (Bemis, 1985, p. 415). Garfield (1986) also cites MMPI profiles of bulimics and binge eaters as evidence supporting the "possibility that binge eating, bulimia and alcoholism are substance abuse disorders" (p. 1721-B). In both studies, bulimics obtain elevated scores on MMPI scales 2, 4, 7, and 8, indicating multiple difficulties with depressive affect, acting out, anxiety and unusual thought content.

Functional behavioral and treatment parallels have highlighted the loss of control, craving, and compulsive aspects of eating disorders and substance use disorders. Bemis (1985) argues that bulimia meets the criteria for an addictive disorder in its own right: loss of control, preoccupation with the abused substance, use to cope with stress and negative feelings, secrecy about the behavior, and maintenance of the addictive behavior despite adverse consequences. Treatment of bulimia from the abstinence model focuses on abstaining from purging, restricting behaviors, and binge eating behavior. Normal eating and dietary food plans are instituted to bring eating under control.

Channon (1987) adds the following parallel aspects

for anorexics: increased tolerance to starvation, distress when the addictive behavior is disrupted, and relief or avoidance of withdrawal symptoms by maintenance of starving. For bulimia, Channon (1987) builds on Bemis' parallels by adding the following parallel aspects: recurrent episodes of rapid intake in large quantities, and increased tolerance resulting in consumption of higher-calorie foods.

Several researchers have further highlighted similarities between binge eaters, overweight persons, and alcoholics. They describe commonalities such as craving, loss of control, sense of degradation, and attempts to sedate oneself to "quash" anxiety that this type of eating disordered subject has in common with alcoholics (Chalmers et al., 1979; Lacey & Moureli, 1986). Chalmers et al. (1979) conclude the overeaters and substance abusers "share a common motivational base, with different substances (or activities) selected for addiction" (p. 399), the motivation being to self-medicate oneself in an attempt to escape psychological distress.

Studies of familial incidence of alcoholism in eating disorder individuals have hypothesized that eating disorders are addictions. Henzel (1984) explored the familial pathology of anorexic patients and found a very high (67%) incidence of drinking problems in at least one family member, 67% of patients reported depression in a relative, and 40% reported suicide attempts by at least one

relative.

Others have made more specific hypotheses concerning the connection between eating disorders and familial alcoholism. Collins, Kotz, Janesz, Messina, and Ferguson (1985) speculate "bulimia might be a reaction to the stress of living with an alcoholic parent" (p. 67), while another group hypothesized the binge-purge syndrome is an expression of the substance abuse pattern in the individual and the family (Leon, Carroll, Chernyk, & Finn, 1985).

Mansfield (1984) described eating disorder subjects in her clinical practice who are also adult children of alcoholics (ACOA). She describes the families as rigid, isolative, enmeshed, overprotective, not allowing open conflict, and with the child overinvolved in potential conflict. Mansfield asserts the ACOAs have fewer psychological resources to deal with the pain from their family systems and turn to the method used to cope within their family, self-medicating. Yet, the child often first turns to food as the addictive behavior of choice, and later frequently develops a substance abuse problem as well.

Addictive Personality Disorders: The proposal that there is an "addictive personality" type which underlies both disorders is closely related to the etiological connection between eating disorders and substance use disorders. This is a notion popular in the lay press

(Gelman, Drew, Hager, Miller, Gonzalez, & Gordon, 1989) yet it has little empirical support.

Kagan and Albertson (1986) investigated whether there is an addictive personality regardless of specific addiction by examining MMPI MacAndrew factor (MacAndrew, 1965) scores of alcoholics, compulsive gamblers, smokers, bulimics and control subjects. They found no conclusive evidence that bulimia is an addiction as measured by the MacAndrew scale and also caution against the use of the term addictive personality.

Leon, Kolotkin, and Korgeski (1979) also found little evidence to support the addictive personality concept in their investigation of obese persons, anorexics and cigarette smokers. However, they did find support for the similarities between anorexia, massive obesity (more than 100 pounds above ideal body weight) and other types of addictions as measured by the MacAndrew addiction scale and other MMPI scales.

Impulse Control: Another major etiological factor proposed as essential in the understanding of eating disorders, especially bulimics, is "underlying difficulties in impulse control" (Mitchell, 1987, p. 250). In their study of 34 bulimics, Pyle, Mitchell, and Eckert (1981) conclude "the most striking personality characteristic seen in many of these patients was the problem of impulse

control" (p. 64). The authors cite the subjects' history of stealing and substance abuse, and clinically elevated MMPI Scale 4 (psychopathic deviant) scores as evidence supporting their conclusions.

Others cite a history of suicide attempts (Bulik, 1987a; 1987b), stealing behavior (Herzog & Copeland, 1985; Pyle et al., 1983) sexual promiscuity (Herzog & Copeland, 1985) self-mutilation (Halmi, 1985), and drug and alcohol use (Bulik, 1987a; 1987b; Halmi, 1985; Herzog & Copeland, 1985; Lacey & Evans, 1986; Pyle et al., 1983). Grace, Jacobson and Fullager (1985) conclude the bulimic's core psychological difficulty is in mastering impulses.

Lacey and Evans (1986) acknowledge a relationship between "uni-impulsive disorders", such as substance use disorders, eating disorders, and the DSM-III impulse control disorders. Yet, the authors say the root of these disorders is an impulse control deficit. The authors propose persons with multiple impulse control problems, such as an eating disorder and a substance use disorder, may be a variant of the borderline personality disorder or they may require formation of a new disorder tentatively called the "multiple impulsivity disorder". A similar conclusion was drawn by Halmi (1985) in her review article of the literature on bulimia and anorexia nervosa. She states,

> since a higher association of impulsive behaviors such as suicide attempts, self-mutilation, stealing and substance abuse including alcohol abuse, are present in binging and purging anorexics, one may expect a higher

prevalence of well defined personality disorders in bulimic anorexics (p. 116).

Depression: Depression may be the underlying etiological factor in eating disorders. A number of empirical investigations have found support for some sort of relationship between the disorders. A family history of depression in bulimics and anorexics has been found to range from 7% to 36% (Bulik, 1987b; Herzog, 1982b). Bulimics were found to have a history of major depression with a suicide attempt in one third of the cases studied (Bulik, 1987b). Similarly, 40.5% of bulimic subjects in a clinical treatment group reported prior treatment for depression (Pyle et al., 1983). Also, obesity was found to correlate with depressive symptoms (Cohen, 1977).

Pope and Hudson (1988) speculate that at least one of the eating disorders, bulimia nervosa, is caused by the same abnormality that causes major depression, and is not a heterogenous disorder. To support their argument, Pope and Hudson (1988) cite the concurrent affective illness in eating disorder patients, a family history of affective illness, and Ockham's razor, plurality should only be utilized when necessary.

Sociocultural Ideal: The changing social and cultural body ideal for females and males is considered a major etiological factor by those who conclude the

prevalence of eating disorders is on the rise. "The apparent increasing prevalence of anorexia nervosa and related eating disorders may well be linked to current cultural demands on women to be thinner" (Garner, Garfinkel, Schwartz, & Thompson, 1980, p. 484). Beumont dismisses the notion that weight preoccupation is at the core of eating disorders like bulimia. He says, "rather, it could be said that bulimia is a response of some individuals to a predicament which has become universal among young women in modern, technologically developed societies" (Beumont, 1988, p. 173-174).

Garner et al. (1980) quantified the cultural shift towards a thin female ideal by examining Miss America contestants' height and weight ratio from 1959 to 1978, Playboy centerfolds' height and weight ratio for 20 years, and the number of diet articles in six popular women's magazines. Their results suggest there has been a downward shift in the ideal weight to height ratio for females despite an increase in the normal female weight to height ratio over the corresponding years. The authors speculate the female ideal has become more and more difficult for women to achieve, and may force some to utilize disordered eating behaviors to achieve the ideal.

Psychodynamic Origins: Psychodynamic conceptualizations of eating disorders take several forms.

Brenner (1981) proposes that each type of eating disorder represents a "boundary" issue between the person's self and other persons. The anorexic fears merging of his or her boundaries with others, and therefore refuses to allow things to cross the boundaries by taking in food. The bulimic (binge/purge) shares this fear of merging, but expresses his or her ambivalence by taking food in, then expunging it, sometimes violently. The obese overeater, "motivated by a wish to recreate symbiotic union" (p. 4653-B), eats as much as possible in an attempt to engulf the boundaries between him or her and others. Brenner (1981) found some empirical support for her hypotheses: the overeaters in her sample were significantly more needy than the bulimics, anorexics and controls, and the bulimics were significantly more fearful and avoidant than the other groups.

Brisman and Siegel (1984) also interpret binge eating and purging behavior as highly symbolic of internal conflicts. "Binge eating is frequently experienced and described by clients as a way of ignoring, binding, or controlling emotions" (p. 115) and is considered the childlike, needy and compulsive aspect of the person's internalized conflict. No explanation of the purging behavior is offered here. Johnson and Flach (1985) interpret the bulimic binge/purge cycle as symbolizing the separation-individuation conflict for bulimics and their

families who are "enmeshed but disengaged, with high conflict and low emphasis on self-expression -- particularly expression of conflicting issues" (p. 1323).

A combination of the psychodynamic and sociocultural etiological factors is presented by Wooley and Wooley (1986). The authors draw a parallel between bulimia as a product of modern conflict over women's social roles and the Victorian conflicts Freud saw symbolized in hysteria. They hypothesize the female's fear of body development at puberty, which is often evident in eating disorder females, is not a fear of sexuality, but a fear of the mother's powerlessness in her relationship to her dominating husband. Weight control and body shape come to represent strength, independence, achievement and attractiveness. The young woman today is under pressure to grow up to be more like her father than mother, i.e., to be "strong".

Dietary Restraint: The last etiological factor to be discussed arises from a series of laboratory experiments which investigated degree of eating restraint exhibited by subjects of different weights under various conditions (Polivy, 1976; Polivy & Herman, 1976a; 1976b; Herman & Mack, 1975; Spencer & Fremouw, 1979). Restraint is defined as a restriction of dietary intake (Johnson, Corrigan, Crusco, & Schlundt, 1986). The restrained eaters, those who frequently diet, react in the same way alcoholics do,

according to Marlatt's Abstinence Violation Effect (Marlatt & Gordon, 1985), once they have consumed a high calorie preload (Greenberg, 1986; Peele, 1982; Scott, 1983). The restrained eaters eat up to twice as much as normal unrestrained eaters following a high calorie preload (Herman & Mack, 1975; Spencer & Fremouw, 1979). Likewise, meals do not suppress the urge to eat in bulimics as they do in normals (Russell, 1985a). "It was demonstrated that a restrained person's belief that he or she has overeaten may be sufficient to trigger an eating binge." (Spencer & Fremouw, 1979, p. 266)

The significance of the laboratory findings to the understanding of the clinical phenomena of bulimia is offered by Johnson et al. (1986) who state bulimia "is thought to develop from unsuccessful efforts to control weight by increasingly severe restrictions on food intake which cannot be maintained." (p. 351). The authors find empirical support for this hypothesized degree of restraint in bulimics, but also find a similar degree of restraint in obese dieters who may be like bulimics (by DSM-III criteria) except for a biological disposition for a different weight (Johnson et al., 1986).

Further support for the application of the dietary restraint model to the etiology of eating disorders has been found. Wardle and Beinart (1981) found a pattern of dietary restraint preceded regular binge eating regardless

of weight group. Similarly Lacey, Coker, and Birtchnell (1986) found bulimics follow a typical historical progression leading to the binge/purge cycle. First, they engage in strict carbohydrate-restricted dieting for approximately one year, followed by intermittent binge eating episodes with associated carbohydrate craving for one year, then they begin self-induced vomiting or other purging methods, and eventually develop a pattern of binge eating and purging.

Clinical Characteristics of Eating Disorders

There has been quite a volume of descriptive research on eating disordered individuals over the last two decades, but some major problems exist within this body of literature. Just as the diagnostic categories and diagnostic criteria have changed over the years, so then must the interpretations and conclusions drawn from the studies. As well as lacking a systematic approach to diagnosis, the eating disorder literature also lacks consistent utilization of assessment devices, age cut-off criteria and inclusion of individuals with subclinical pathology.

Eating Habits and Weight Control: Daily caloric intake for persons with an eating disorder varies widely, as is expected by the differing natures of the various

disorders. Anorexics consume very few calories each day, as little as several hundred calories (Robin, 1989), while bulimics can consume about 1,400 calories, the size of a normal meal (Rosen, Leitenberg, Fisher, & Khazam, 1986; Wardle & Beinart, 1981) or up to 20,000 calories per binge eating episode (Russell, 1979).

The frequency of binge eating episodes per week appears to vary greatly. In their summary of the recent literature, Johnson and Connors (1987) found about 50% of those who binge eat also do so more than once a day. Another 35% do so more than once a week. For bulimics, the food is usually eaten while alone and in secret, and the binge episode occurs in a "discrete period of time" (American Psychiatric Association, 1987; Mitchell, Hatsukami, Eckert, & Pyle, 1985; Pyle, Mitchell, & Eckert, 1981) usually less than two hours (American Psychiatric Association, 1980), although the range has been described as 15 minutes to three weeks (Abraham & Beumont, 1982).

Just as there is a wide range of binge eating frequency among bulimics, there is also a range in the number of normal meals that are eaten per week by a bulimic. Some bulimics eat normal meals, but many do not eat normally when they are not binge eating (Pyle, Mitchell, & Eckert, 1981). Often the bulimic will fast or eat very little between binge eating episodes (Mitchell & Pyle, 1988).

The data that does exist describing binge eating

among those who do not extensively purge or restrict is clouded by the heterogenous DSM-III bulimia categories. As discussed earlier, some of the subjects classified as bulimics by DSM-III purge and/or restrict and some do not, but no differentiation was made. Likewise, data on obese subjects is not very useful in describing binge eaters because the two categories are overlapping, but not completely. "Studies of the eating patterns of obese patients reveal that eating binges are to be found in some cases" but not all (Wardle & Beinart, 1981, p. 101).

Weight control for the anorexic is obviously maintained by the lack of caloric intake, as well as the increased amount of energy expenditure exhibited by these patients. Many anorexics exercise for hours each day (Robin, 1989). And weight is often not controlled for those binge eaters who do not restrict or purge, as do bulimics.

Bulimics utilize many different weight control methods at varying frequencies, and therefore present at various body weight levels. One review of the literature concluded approximately 70% of bulimics are $\pm$10% of their ideal weight with half of the remaining 30% overweight and half underweight (Johnson & Connors, 1987). The same survey of the research found vomiting is clearly the preferred method for ridding the body of unwanted calories, "with approximately 50 percent of the individuals in all samples reporting vomiting at least daily and an additional

25 percent reporting vomiting weekly or greater" (Johnson & Connors, 1987, p. 40). Laxatives appear to be used less frequently. Johnson and Connors suggest only 12 percent of subjects use them daily and another 20 percent use them more than once a week. Mitchell and Pyle (1988) suggest as many as 20 percent of bulimics abuse laxatives on a daily basis. Other purging methods have been studied less extensively, yet some prevalence data is available. Approximately 33.1% abuse diuretics and 7% use enemas excessively (Mitchell & Pyle, 1988). Data on prevalence of restricting methods and frequency among bulimics were not found.

The onset of bulimic symptoms often follows a period of dietary restriction and a low carbohydrate diet (Abraham & Beumont, 1982; Lacey, Coker, & Birtchnell, 1986; Pyle, Mitchell, & Eckert, 1981; Wardle & Beinart, 1981). The individual experiences carbohydrate craving (Lacey, Coker, & Birtchnell, 1986), loses control of the restraint, and binge eats. Typically later in the syndrome, purging and/or restricting behavior begins in an attempt to counteract the caloric intake during the binge eating episodes.

The onset of anorexia nervosa also typically follows a period of strict dieting wherein the dieting progresses to starvation. However, the reasons why some individuals develop anorexia nervosa and others develop bulimia nervosa remain unclear. "The mechanisms involved are not clear, but the most parsimonious hypothesis appears to be that dieting

will lead in some vulnerable individuals to the development of anorexia nervosa (Szmukler, 1985, p. 150-151).

Alcohol and Drug Use: Excessive use of substances such as alcohol and drugs among eating disordered subjects appears to be commonplace, especially among bulimics. Hatsukami, Eckert, Mitchell, and Pyle (1984) report the following percentages of female bulimic subjects (N=108) (DSM-III criteria) who abuse drugs and alcohol: 16.8% report daily use of alcohol; 30.7% report at least daily use of stimulants; 9.0% report daily use of sedatives; and 8.0% report daily use of caffeine pills. Leon et al. (1985) found 61.1% of bulimic college students used alcohol excessively at some time, 46% had used drugs excessively at some time, 21.2% currently used drugs, and 6.7% had been diagnosed as chemically dependent in the past. Pyle et al. (1983) found that of a clinical group of bulimics, 27% had a history of substance abuse, 21% had been treated for alcohol abuse and 10.9% had been treated for drug abuse. Anorexic students did not fare much better: 13.3% had a history of substance abuse, 6.7% had a history of alcohol abuse treatment and 8.0% had a history of drug abuse treatment. Russell (1979) reported amphetamine abuse in one of 30 bulimics subjects. Pyle et al. (1981) report eight of 34 bulimic subjects had a history of treatment for chemical dependency. Bulik (1987a; 1987b) reports similar

percentages for female bulimics, as do Mitchell and Goff (1984).

A similar phenomenon is found among anorexics, although to a somewhat lesser degree. Herzog (1982a) found 33% of bulimics were alcohol abusers while 20% of anorexics were alcohol abusers. "Restricting subtype" anorexics used nonprescription drugs in 19% of the cases while 51% of bulimics did so (Garner, Garfinkel, & O'Shaughnessy, 1985). In another study, 40% of anorexics abused alcohol and an additional 10% used alcohol to excess (Beary, Lacey, & Merry, 1986). Similarly, Henzel (1984) reports 33% of the anorexics studied are "likely" alcoholics and 53% received elevated scores on the Brief Michigan Alcohol Screening Test.

In a study of anorexia nervosa patients who met Russell's diagnostic criteria, Beumont (1977) found 18% of the "dieters" reported at least moderate use of alcohol. Also, two published case studies detail the coexistence of anorexia nervosa and alcoholism (Lobb & Schaefer, 1972; Singh, 1969).

Three non-clinical sample studies also point to the common co-occurrence of eating disorders and substance use. In 1987, Killen, Taylor, Telch, Robinson, Maron, and Saylor surveyed 646 tenth grade females. They found 10.3% met the DSM-III criteria for bulimia and an additional 10.4% purged, without binge eating, to control their weight. The bulimics

and purging students reported significantly greater drunkenness, marijuana use, and cigarette use than the subjects who did not report eating-related problem behaviors. Similarly, in a study of 200 college females, Erickson (1986) found bulimics (by DSM-III criteria) reported more alcohol use and were more likely to binge on alcohol than were the "eating appropriate" females. Finally, in a study of 200 medical students, six females were found to be at risk for an eating disorder and a substance abuse disorder (Herzog, Borus, Hamburg, Ott, & Concus, 1987).

Researchers have also found a high incidence of substance abuse in the families of eating disordered persons. In a retrospective study of patients with anorexia nervosa and bulimia who were treated at a large midwestern hospital, records show 21.9% of the patients' fathers were alcoholic and 2.7% of mothers were alcoholic (Collins, Kotz, Janez, Messina, & Ferguson, 1985). In comparison to national prevalence rates, fathers and mothers of anorexics were respectively four and two times as likely to be alcoholic as the average male and female. Herzog (1982a) found 20% of anorexics and 33% of bulimics had a first-degree relative with a history of alcoholism. In an investigation which hypothesized alcoholism and "bulimic anorexia" are related disorders (Collins et al., 1985), the authors found 30.2% of the subjects' fathers were alcoholic

as were several siblings and one patient's mother.

Research findings suggest an even stronger link between bulimia (DSM-III) and familial alcohol abuse. Fully 50% of 34 bulimics reported alcoholism in at least one first-degree relative, including seven fathers, in one study (Pyle et al., 1981). In another study, the authors found 51% of bulimic subjects had one or more relatives who had been diagnosed as chemically dependent (Leon et al., 1985). Bulik (1987b) reports 36.6% of bulimic patients have an alcoholic first-degree relative and 81.8% have an alcoholic second-degree relative. Mitchell and Goff (1984) found one-third of male bulimics have a first-degree relative with a substance abuse disorder. In comparing bulimics to control subjects, Bulik (1987a) found a greater incidence of familial alcoholism and drug abuse among first- and second-degree relatives of bulimics.

Similar incidence rates of familial substance abuse are found among binge eaters who do not restrict or purge, and obese persons. Leon et al. (1985) found 43% of female binge eaters report at least one family member with a history of substance abuse. Lockwood (1986) presents an extensive case history which spans three generations and details the members' difficulties with multiple addictions to alcohol, drugs and food (i.e., anorexia and obesity). By taking a somewhat different approach, Claydon (1987) found adult children of alcoholics (ACOA) are twice as likely to

have an eating disorder (anorexia nervosa, bulimia, or binge eating) than non-ACOA respondents.

Still another approach to the study of substance use disorders and eating disorders has found support for a link between the disorders. By gathering their study sample from callers to a cocaine hotline, Jonas et al. (1987) provide empirical data to support their hypothesized link between the disorders which illustrates that the high overlap of the disorders exists whether the sample is gathered from an eating disorders population or a substance abuse population. Others found female alcoholics have a high incidence of a concurrent eating disorder. In a British sample, 40% of female alcoholics gave a present or past history of bulimia, binge eating and purging, (Lacey & Moureli, 1986). The bulimic alcoholics were younger, heavier, and responded more poorly to outpatient treatment than did the female alcohol-only patients. The authors found the eating disorder tended to precede the problem drinking. And finally, Mitchell (1987) presents the case study of a female heroin abuser who developed bulimia after vomiting due to her use of heroin. She subsequently began binge eating and continued to use heroin to deliberately induce vomiting after meals to lose weight. As her illness progressed, the heroin lost its effectiveness at inducing vomiting, whereupon the patient began manually inducing vomiting and continued her binge eating.

There is a great deal of evidence which supports a connection between eating disorders and substance abuse. The co-occurrence of the disorders is higher than the national estimates of substance abuse or dependence among females, which ranges from 3.8% to 5.1%, depending on the region surveyed (Robins, Helzer, Weissman, Orvaschel, Gruenberg, Burke, & Reigier, 1984). The co-occurrence is high whether the sample is of eating disorder subjects or their families, a clinical or community sample, or a primarily eating disorder sample or substance use sample.

Depression: A high incidence of depressive symptoms among eating disordered subjects has been documented by a number of researchers. Herzog (1982a) found more than 75% of 30 bulimic patients reported "significant depressive symptoms (meeting at least three DSM-III criteria for depression)" (p.482). Bulimics have a significantly higher incidence of depressive symptoms and diagnoses of major depression than controls (Allerdissen, Florin, & Rost, 1981; Bulik, 1987b; Johnson et al., 1982; Killen et al., 1987). More specifically, the higher the frequency of binge eating among bulimics, the greater the severity of depression (Greenberg, 1986). The high incidence of attempted suicide among bulimics is further indication of affective illness in this group. In a study of 108 normal weight bulimic females, researchers found 43.5% had a history of affective

disorder and 16% had attempted suicide (Hatsukami et al., 1984). In another study, four of 12 bulimic females were diagnosed with major depression and a history of suicide attempts (Bulik, 1987b). Other researchers report suicide attempts in 16% (Garner, Garner, & O'Shaughnessy, 1985) and 45.7% (Bulik, 1987a) of their bulimic samples.

There is also a high incidence of affective illness among anorexic patients. Cantwell, Struzenberg, Burroughs Salkin & Green (1977) found 33% of patients with anorexia nervosa (DSM-III criteria) experienced a recurrent affective illness and approximately 2% to 5% of anorexics complete suicide (Swift, 1982). Garner, Garfinkel, & O'Shaughnessy (1985) found 25% of anorexia nervosa subjects with concurrent bulimia and 12% of restricting anorexics had attempted suicide. Among a sample of mixed eating disordered subjects (anorexic, bulimic, and binge eaters) in 89% of the cases "depression has been a serious problem" (Jones, Cheshire, & Moorhouse, 1985, p.379). In addition, 52% had a history of treatment for clinical depression and 37% had attempted suicide. Those figures suggest a higher rate of depressive disorder in anorexics than in the general population of females in the United States, where major depression occurs in 4.9% to 8.7% of females (Robins et al., 1984).

A study of the morbidly obese (at least 100% over desired weight for height and frame size) suggests a

relationship between another type of eating disorder and depression. Seventy morbidly obese overeaters were studied by Halmi, Long, Stunkard, and Mason (1980). The mean degree to which subjects were overweight was 236% of ideal weight. Findings show 28.7% have a depressive disorder while incidence of no other diagnosis exceeded a 2.5% frequency.

As with substance use disorders, there is evidence for high familial incidence of depression in eating disorder subjects. In one sample, 10% of bulimic patients and 7% of anorexic patients had first order relative with an affective disorder (Herzog, 1982a). In a comparison of restricting anorexics and bulimic anorexics, the latter reported a significantly higher incidence of affective disorders in first- and second-degree relatives (Strober, Salkin, Burroughs, & Morrell, 1982). Eckert et al. (1979) report five of seven anorexic alcohol abusers had a depressed first-degree relative.

One research project has attempted to compare female patients with bulimia only to those with a history of affective disorders or a history of substance abuse (Hatsukami, Mitchell, Eckert, & Pyle, 1986). They found subjects with dual diagnoses (bulimia and affective disorder or bulimia and substance use disorder) had a later age of onset, attempted suicide more frequently, and had more inpatient psychiatric hospitalizations than the bulimic only subjects.

Impulsive Behavior: Another important characteristic of eating disorder patients is their tendency to engage in impulsive behaviors such as stealing, alcohol and drug use, excessive sexual activity and some suicide attempts.

Herzog (1982a) reports bulimics often resort to stealing money or shoplifting food to support their habitual binge eating. In a clinical sample of female bulimics, 56.8% had a history of stealing and in a non-clinical sample of bulimic students, 13.3% had stolen (Pyle et al., 1983). Hatsukami et al. (1986) report the following incidence of stealing rates among their sample: bulimics only, 43.5%; bulimics with an affective disorder, 32.4%; and bulimic substance abusers, 67.6%.

Stealing occurs significantly more frequently in bulimics than in anorexics (Casper, Eckert, Halmi, Goldberg, & Davis, 1980; Johnson et al., 1982). Yet in eight cases of anorexia concurrent with bulimia, six of the subjects engage in kleptomania (Eckert et al., 1979) The authors characterized these subjects as having major difficulty with "loss of control".

Additional evidence for impulse control difficulties comes from Jones et al. (1985) who report three cases of self-mutilation among a mixed diagnostic group of 27 eating disorder subjects. Also, Dykens and Gerrad (1986) offer

evidence which suggests bulimics (whether current or in remission) engage in more sexual activity and at an earlier age than "repeat dieters" and controls, and that bulimics use substances more frequently and at an earlier age than the other groups.

Some Characteristics Measured Psychometrically: The most frequently used personality assessment device to study eating disorder subjects is the Minnesota Multiphasic Personality Inventory, MMPI, (Hathaway & McKinley, 1966). The MMPI scales which are most consistently elevated among eating disorder subjects are 2 (depression), 4 (psychopathic deviance), 7 (psychasthenia) and 8 (schizophrenia). In a study of 34 bulimics, Pyle et al. (1981) found clinically elevated means on the following MMPI scales: 4, measuring impulsivity; 2, measuring depression; 7, measuring anxiety, worry and compulsivity; and 8, measuring rumination and alienation. Garfield (1986) reports similar findings for bulimics and adds calculation of the most frequent two-point code for bulimics and binge eaters who do not purge. Bulimics most frequently obtain 8/4 two-point codes, while binge eaters are most frequently 4/8. Both groups obtain low 5 scale scores (masculinity/femininity). Leon, Carroll, Chernyk, and Finn (1985) found the mean score of 30 bulimic subjects reached clinically elevated levels on MMPI scales 2, 3, 4, 6, 7, 8, and 9.

Several studies have investigated the similarities and differences between bulimia and substance abuse as measured by the MMPI. Virtually identical MMPI profile patterns were obtained by female bulimics and female substance abusers (Hatsukami, Owen, Pyle, & Mitchell, 1982) with clinically elevated scores on scales 2 and 4 for both groups. Scale 5 was also clinically depressed for both groups. Fechner-Bates, Filstead, & Pedone (1987) found female substance abusers and female substance abusers with bulimia nervosa had similar, yet not parallel, MMPI profiles. Also, those with concurrent disorders obtained elevated scores on scales 1 through 4 and 6 through 0, with their scores higher on all but two scales, 5 and 9, than those with a substance use disorder.

In one comparison of MMPI scale scores for anorexic fasters and anorexic bulimics, the authors fail to report the mean scores for each group, therefore preventing comparisons to other findings. But they do report that significant differences between the two groups were obtained for scales 2, 4, 6 (paranoia), and 7 with the anorexic bulimics obtaining higher scores (Casper et al., 1980).

A study of the morbidly obese, defined as persons 100 pounds or more above ideal body weight, found that they "seem to exhibit personality or behavioral characteristics that are similar to those found in persons with other types of addictions" (Leon et al., 1979, p. 406) as measured by

the MMPI clinical scales. Morbidly obese persons obtained elevated mean scores on scales 2, 3, and 4.

A smaller number of studies have attempted to assess current symptomotology among eating disordered subjects with instruments such as the Symptom Checklist 90 (SCL-90) (Derogatis, 1977). Two studies compared SCL-90 scores for female bulimic subjects to normal controls. Weiss and Ebert, (1983) compared 15 bulimics classified by DSM-III criteria, with 15 normal controls. The bulimics scored significantly higher on all nine of the SCL-90 scales. Ordman and Kirschenbaum (1986) compared the SCL-90 scores of female bulimic purgers with normal controls and found bulimic purgers obtained significantly higher scores on all nine of the SCL-90 scales and on all three of the SCL-90 global indices.

A broader range of eating disorder subjects was studied by Prather and Williamson (1988) who compared SCL-90 scores of bulimia nervosa subjects, binge eaters, clinically obese subjects seeking treatment, obese controls (not seeking treatment), and normal controls. They found the bulimia nervosa group scored higher than the other groups on all but two of the SCL-90 scales. The clinically obese group obtained the same score as the bulimic subjects on the depression scale and a slightly higher score on the hostility scale.

Spectrums and Continua of Eating Disorders:

Various authors have pinpointed several major deficiencies with the eating disorders classification systems as prescribed by the American Psychiatric Association. The seemingly arbitrary, non-empirical basis for both diagnostic systems has led to the development of additional diagnostic categories of eating disorders and to proposed spectrums or continua of eating disorders.

The first major development along these lines occurred in 1977 when Boskind-Lodahl proposed a new eating disorder diagnostic category, "bulimarexia" (Boskind-Lodahl, 1978). Bulimarexia is defined as a syndrome consisting of gorging or binge eating as in bulimia, and restricting behavior as in anorexia nervosa or purging behavior. Therefore, bulimarexia shares symptoms with bulimia and anorexia nervosa as proposed by DSM-III, but was a unique combination of symptoms at that time. After DSM-III-R, bulimarexia is nearly identical to bulimia nervosa.

Boskind-Lodahl and colleague White produced a number of papers exploring bulimarexia through its definition, the theoretical base, and the treatment issues (Boskind-Lodahl, 1976; and 1978; Boskind-Lodahl & White, 1978; Boskind-White, 1981). Cullari and Redmon (1983) provide the following summary of their diagnostic viewpoint: "Boskind-Lodahl and White view anorexia and bulimia as opposite sides of a continuum with bulimarexia in the middle" (p. 400).

In 1985, several authors suggested continua along which to classify eating disorders and added a new component to the continuum. Russell (1985a) called for the need to find a "dimension of severity" within various forms of bulimia.

Russell (1985a) offered a compromise to the many eating disorder categories and the differing views within the classification of eating disorders (see Figure 1). Russell's eating disorder categories are a combination of DSM-III groups, his own bulimia nervosa group, Stunkard's (1959) binge-eating syndrome, and the obese. Anorexia nervosa, bulimia and obesity are considered separate disorders, and their intersections represent a combined symptom picture. Russell also suggested one potential dimension useful in quantifying and predicting the severity of a bulimic disorder: the degree to which the patient needs to stay below a self-imposed weight threshold. Therefore, the bulimia nervosa group, by Russell's criteria, who must engage in purging and/or restricting behavior, would be considered more disturbed than the bulimia group (non-overlapping area, see Figure 1). Likewise, the dimension predicts the obese bulimics, who supposedly have less need to stay below a self-imposed weight threshold, would exhibit even less severe pathology than the non-overlapping bulimic group. Unfortunately, the level of predicted pathology among the anorexia nervosa and obese

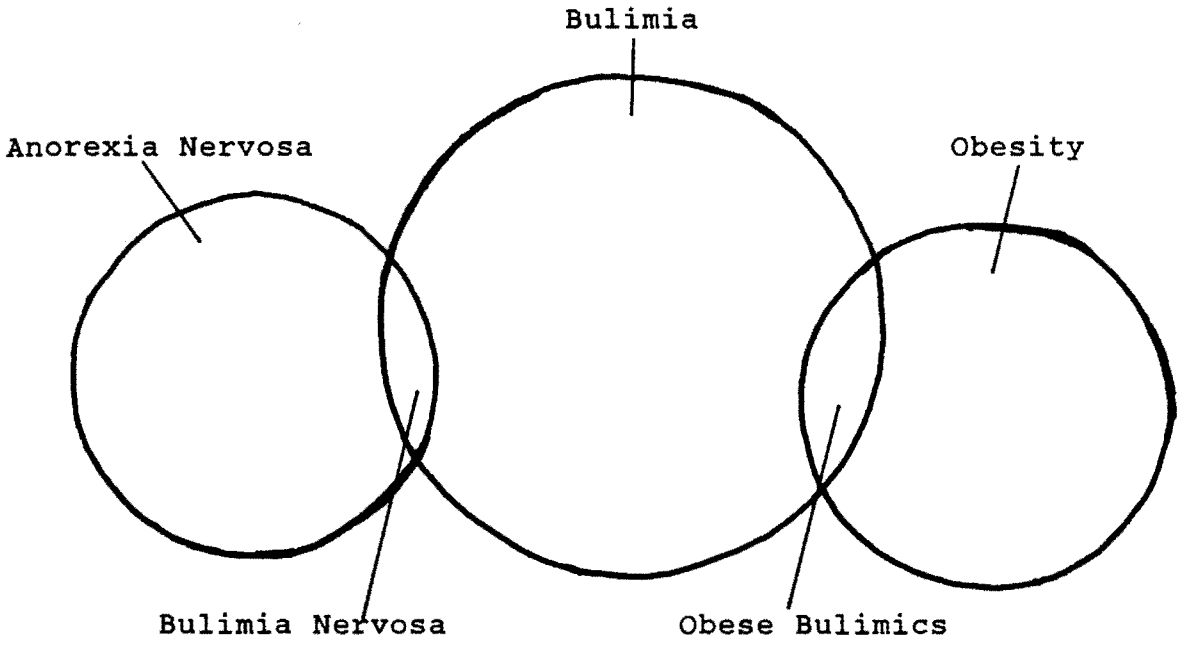

Figure 1. Russell's Schematic Representation of Eating Disorders Classification

Note: From "The changing nature of anorexia nervosa: An introduction to the conference" by G.F.M. Russell, 1985, Journal of Psychiatric Research, 19, p. 106.

patients is unclear in this scheme.

Agras (1987) proposed another one-dimensional spectrum of eating disorders which is based on the degree of dissatisfaction with one's body image and the extent of restricted eating. He proposed that these are key cognitive and behavioral aspects of binge eating, bulimia,anorexia nervosa and some cases of obesity. Agras proposes the following sequence for the formation of an eating disorder: Initially, a self-perceived fatness leads to dieting and possibly binge eating after a period of excessive dietary restriction. Continued excessive dieting or dieting with binge eating results in various degrees of body image dissatisfaction and restricting eating, the dimension underlying Agras' spectrum of eating disorders. In this scheme, anorexics are most extreme, followed by, in descending order, bulimics, obese binge eaters, and obese non-binge eaters.

Like Russell, Beumont (1988) considers anorexia nervosa, bulimia and obesity the primary eating disorders. But unlike Russell, Beumont refutes the notion that there is a clear distinction between the various forms of eating disorder. Instead, he asserts eating disorders "appear to lie on a continuum spread across a number of parameters which are partially independent of each other" (Beumont, 1988, p. 172). Also, Beumont replaces the single dimension of severity or underlying disturbance with a multitude of

dimensions including under- versus over-nutrition, restriction versus indulgence, activity versus inactivity, abstinence behaviors like dieting versus purging behavior, and persistent restrained eating versus intermittent reactive hyperphagia.

Still another theoretical conceptualization of eating disorder pathology is presented in two-dimensional form by Schlundt (1987) (see Figure 2). Like Beumont, these authors do not suggest severity of pathology is the underlying dimension along which the eating disorders lie. Instead, they propose that "fear of fat" is the central feature in all eating disorders and that control over food intake and body weight are the two dimensions. The authors allow that some obese individuals may not fear fat and they are not considered eating disordered.

Russell (1985a), Agras (1987), and Schlundt (1987) incorporated a much wider range of eating problems within the scope of eating disorders than the DSM categories or than in the spectrum first proposed by Boskind-Lodahl (1978). Advances in the DSM-III-R (1987) have incorporated bulimarexia, now named bulimia nervosa, but have excluded binge eaters who do not purge/restrict from eating disorder classification. Other types of eating problems which are excluded from the standard classification system are incorporated in the proposed spectrums and continua of eating disorders.

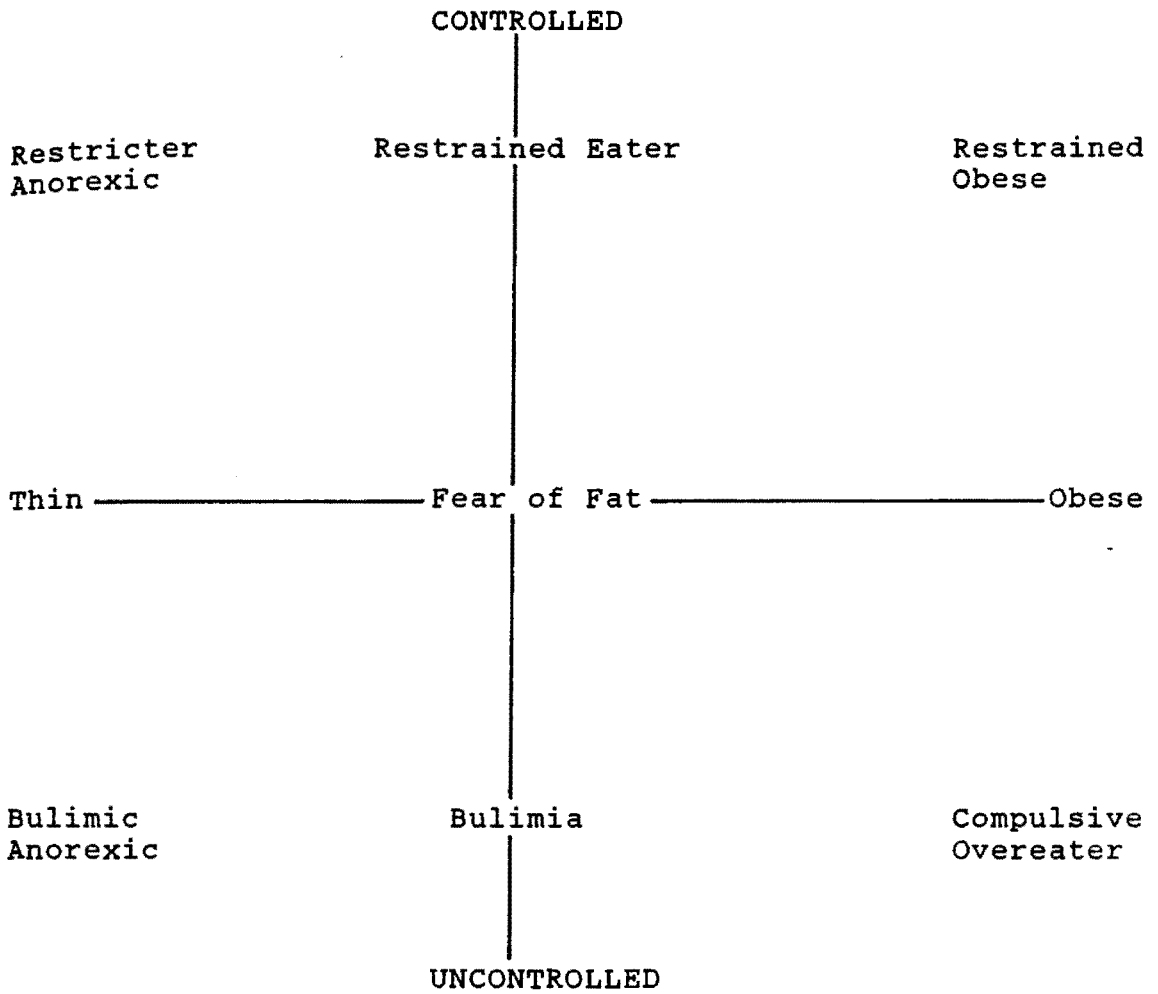

Figure 2. Schlundt's Two-Dimensional Model of Eating Disorders

Note. From "Assessment and treatment of eating disorders" by D.G. Schlundt, August 1987, Paper presented at the American Psychological Association Health Psychology Workshop.

Obese binge eaters, also called persons with the binge-eating syndrome (Stunkard, 1959), and the compulsive overeater (Schlundt, 1987), are included in several schemes (Agras, 1987; Schlundt, 1987; Russell, 1985a). Likewise, the obese non-binge eater is incorporated into the same schemes. The most inclusive model of eating disorder pathology is presented by Schlundt (1987), who also add the following eating-related problem types: the very thin yet normal eater; the restrained (or dieting) normal weight eater; and the restrained obese eater.

Schlundt (1987) stated the restrained eater type is an important and interesting group. He hypothesized this is the point at which individuals enter the model through the initiation of dieting and then often move on the control dimension towards bulimia. His hypothesis points to the potential importance of studying an extended range of eating-related behaviors.

Empirical support for this notion is found in a study of bulimic behaviors in college women (Drewnowski et al., 1988). In a longitudinal study, the authors found the clinical course of bulimia included periodic exacerbation and remissions, so that some women fulfilled the DSM-III-R criteria only at one sampling time. Yet, bulimic behaviors, without the full-blown syndrome, often predated bulimia and sometimes followed a partial recovery. Therefore, studies which sample at a single point in time and those that

exclude subfrequency (Harju, 1987; Mintz, 1987) and recovered cases of eating disorders are providing a very incomplete picture of eating pathology. Drewnowski et al. (1988) suggest a "continuous scale might better assess the extent of pathological efforts at weight control and their changes with time" (p. 755).

A number of other research papers support a broad view of eating disorders, as well as the spectrum/continuum concept. Mintz (1987) and Harju (1987) include subfrequency bulimics within their proposed spectrums. Harju also includes recovered anorexia nervosa and bulimia cases, utilizing a notion similar to Russell's (1985a) dimension of severity. Harju found support for her hypothesis, "that a declining spectrum of difficulties in adjustment would be found for ... [bulimia nervosa patients, subfrequency bulimia nervosa patients, recovered anorexia nervosa and bulimia patients and control subjects] with most severe problems for the bulimia nervosa group" (Harju, 1987, p. 1).

Mintz (1987) also found general support for a continuum based on a dimension of severity with a broader range of eating disorder types. The continuum in declining order of severity is as follows: bulimia nervosa subjects; subfrequency bulimics and binge eaters; purgers without binge eating; chronic dieters; and normals.

Another research team utilized a dimension of severity, as did Russell, but they also incorporated

anorexia nervosa into the spectrum (Mickalide & Andersen, 1985). The authors investigated the following groups: restricting anorexia nervosa; anorexia nervosa with bulimic complications; normal weight bulimia with a history of anorexia nervosa; and normal weight bulimia without a history of anorexia nervosa. Their empirical investigation supports the proposed spectrum concept of eating disorders, namely "individuals presenting with 'pure cases' of anorexia or bulimia are less psychiatrically and/or behaviorally distressed" (Mickalide & Andersen, 1985, p. 127) than are those with both disorders in the present or with bulimia and a history of anorexia nervosa.

Ousley (1987) proposed that purging behavior suggests more psychopathology before and/or after the onset of an eating disorder. Therefore, she separates bulimics with and without purging into bulimic-restricters and bulimic-purgers. Ousley incorporates this distinction and two others into her proposed continuum of severity for binge eating and bulimic symptoms: a frequency of symptom occurrence measure, and a distinction between types of restricting behavior. Ousley judges fasting to be more pathological than dieting. Therefore, the resulting continuum of severity falls in the following order, beginning with the most severe: daily binge-purger; regular binge-purger; occasional binge-purger; regular binge-faster; regular binge eater-chronic dieter; occasional binge eater;

occasional dieter; and normal eater (Ousley, 1987). An empirical investigation of a portion of the continuum found support for differences in the predicted direction between purging bulimics, restricting bulimics, binge eaters and normal eaters.

Two other investigations have attempted to find support for the hypothesis that purging behavior suggests a greater degree of pathology than the absence of purging. Grace, Jacobson, and Fuller (1985) did not find significant differences in level of pathology between purging bulimics and restricting bulimics, but they do suggest it may be fruitful to compare the "personality types that develop for each pattern of eating and to the roles of both the binging and the purging behaviors in the perpetuation of the disorder" (Grace et al., 1985, p. 173).

However, Prather and Williamson (1988) did find support for the proposed relationship between purging and pathology. Their results "suggested a continuum of severity, with the binge-purger group showing the highest level of psychopathology, and the binge-eaters and clinically obese showing significantly more distress than the two control groups" (Prather & Williamson, 1988, p. 177).

The author's integration of the various spectrums is presented below.

Statement of the Problem

While there are a number of theoretical and etiological proposals on the nature of concurrent eating disorders and substance use disorders, and there is quite a volume of information describing these individuals, the application of the spectrum concept of eating disorders existing along a dimension of severity has not yet been explored within this clinical subgroup. In addition to describing the clinical subgroup of eating disorder subjects who have a concurrent substance use disorder, the purpose of the present study is to fill this gap by proposing a spectrum of eating disorder pathology in an attempt to predict comparative severity of pathology between the eating disorder groups as measured by a variety of psychosocial and clinical variables.

The spectrum of eating disorders for the present study is assumed to consist of eating disorder types that form a continuous series, but that shall be defined and investigated as discrete points along the spectrum so that results may be compared to other investigations. The proposed spectrum will incorporate a wide range of eating disorder pathology, extending beyond the classic categories, to incorporate subclinical types of eating-related problems.

It is hypothesized that the proposed spectrum lies along a dimension of severity which will be reflected in personality characteristics, current general psychological

symptomatology and substance use behavior.

To this author's knowledge, one research project has examined between-group differences among eating disorders and substance use disorders along a proposed dimension of severity (Schnaps, 1985). That is normals, substance use disorders only, bulimics by DSM-III criteria, bulimics with anorexia (both DSM-III criteria), and bulimic substance users with or without anorexia nervosa were compared on the basis of the MMPI. Results suggest the subjects with concurrent eating and substance abuse disorders are most disturbed, followed by the bulimic anorexics who were followed by the bulimic-only group. Disturbance was operationalized by elevated MMPI clinical scales, engaging in alcohol and drug-related behaviors to a greater degree, and lower-self esteem. The variables which best discriminated the groups were MMPI scales 2 and 7.

In some respects, Schnaps' (1985) study appears quite similar to the present study, yet there are several critical differences. First and foremost, all of the subjects in this project have eating and substance use problems. Comparisons in Schnaps' study are based on the presence or absence of either an eating disorder or a substance use disorder. In contrast, comparisons between groups in the present project are based solely on the eating disorder categorization. Substance use behaviors are considered dependent variables. Also, a much wider range of eating

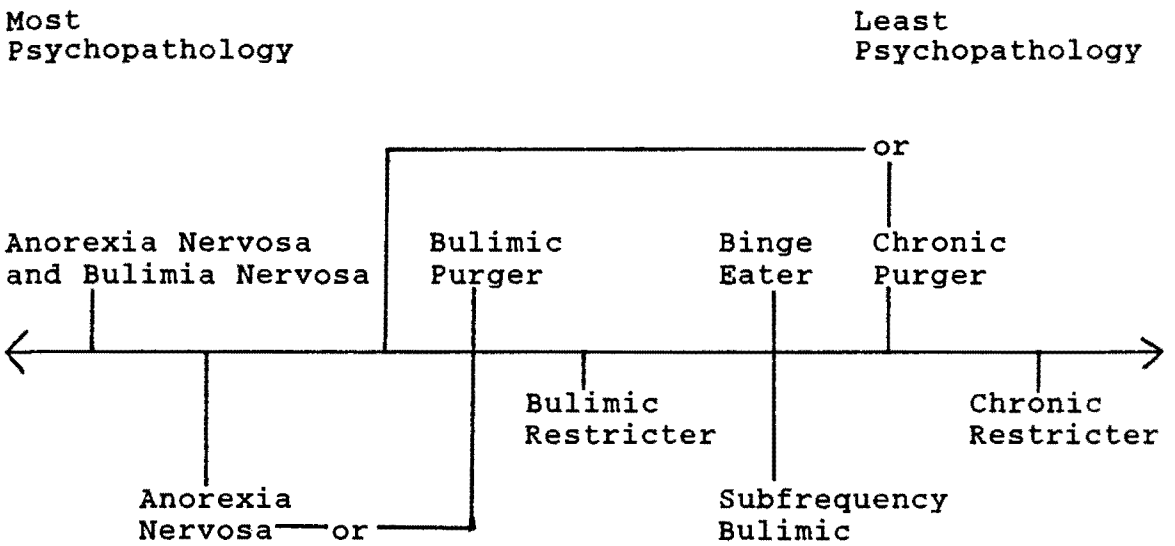

Figure 3. Summary of the Research Findings Investigating Some or All of the Groups and Their Placement Along the Dimension of Severity.

disorder types is examined in this project, and a wider variety of dependent variables is used, including substance use behaviors as mentioned above, and including current psychological symptomatology.

Based on the theoretically conceived and empirically validated spectrums and continua, the following eating disorder group placements along a dimension of severity appear fairly consistent (see Figure 3). Equivocal results indicate some uncertainty about the placement of anorexia nervosa along the spectrum (Agras, 1987; Boskind-Lodahl & White, 1981; Mickalide & Andersen, 1985; Russell, 1985a). And, on the basis of one study (Mintz, 1987), the subfrequency bulimia nervosa subjects and the binge eaters are quite similar in degree of psychopathology. But in accordance to Ousley's hypothesis that purging behavior indicates increased psychopathology and support for this hypothesis, the subfrequency bulimics are hypothesized to exhibit more pathology than the binge eaters.

The present research does not presume to study the causal link between eating disorders, substance use disorders and psychopathology. Inferential ability is limited, if not impossible, in complex interactions involving multiple forms of psychopathology (Tjeltveit, 1987), particularly in designs which are not longitudinal. Such multiple pathologies are multidirectional and systematic rather than linear, therefore it is helpful, but

not conclusive, to assess which disorder preceded the other. One study found that "eating disorders commonly start significantly earlier than alcohol abuse" in females with concurrent disorders (Beary et al., 1986, p. 688). An accurate assessment of causality will not be attempted here and will probably elude the present research questions, as is often the case of a substance use disorder exacerbating other psychopathology which exists independent of the substance use (Tjeltveit, 1987). And a third, as yet unassessed, factor may be the underlying cause of both disorders. However, this author agrees with Beary et al. (1986) who concludes, "whether the eating disorder leads on to alcoholism or whether the patients would have developed alcoholism anyway is not clear, but that does not detract from the clinical importance of the association" (p. 689).

In sum, the purposes of this project are to describe the clinical subgroup of eating disorders with concurrent substance use disorders and to test the validity of the proposed spectrum of eating disorders along a dimension of severity. The focus shall be on individuals identified as eating disordered and not on their families, although further research incorporating data on family members is considered an important step for future research to take. While not allowing causal inferences, both purposes shall aid in furthering understanding of a very interesting clinical subgroup.

Hypotheses

The initial purpose of this study is to describe a clinical population of eating disorder subjects or subjects with subclinical eating-related problems and a co-occurring substance use disorder in terms of eating-related and associated behavior. The validity of the eating disorder group classification will be tested.

A proposed spectrum of eating disorders is hypothesized along a dimension of severity and will be addressed by the following hypotheses. A summary is presented in Figure 4.

Hypothesis 1: The anorexic bulimic group will obtain the highest number of elevated MMPI scale scores, SCL-90 scales scores, and the highest summary MMPI scores, including number of elevated clinical scales and mean clinical scale score and highest three SCL-90 global indices scores. The anorexic bulimic group will engage in substance use behavior at an earlier age than all other subject groups examined here.

Hypothesis 2: The chronic purgers will obtain scores indicating less severity than the anorexic bulimics, but more severity than the other groups on the MMPI, SCL-90, and age-related alcohol and drug dependent variables.

Hypothesis 3: The bulimic purgers will obtain scores indicating less severity than the anorexic bulimics and chronic purgers, but more severity than the other groups on the MMPI, SCL-90, and age-related alcohol and drug dependent variables.

Hypothesis 4: The bulimic restricters will obtain scores indicating less severity than the anorexic bulimics, chronic purgers, and bulimic purgers, but more severity on the MMPI, SCL-90, and age-related alcohol and drug dependent variables.

Hypothesis 5: The subfrequency bulimics and binge eaters will obtain scores indicating less severity than the anorexic bulimics, chronic purgers, bulimic purgers and bulimic restricters, but more severity than the chronic restricters on the MMPI, SCL-90, and age-related alcohol and drug dependent variables. Subfrequency bulimics may obtain scores indicating a slightly more severe level of psychopathology than binge eaters.

Hypothesis 6: Chronic restricters will obtain scores indicating the least amount of severity as compared to the other groups on the MMPI, SCL-90, and age-related alcohol and drug dependent variables.

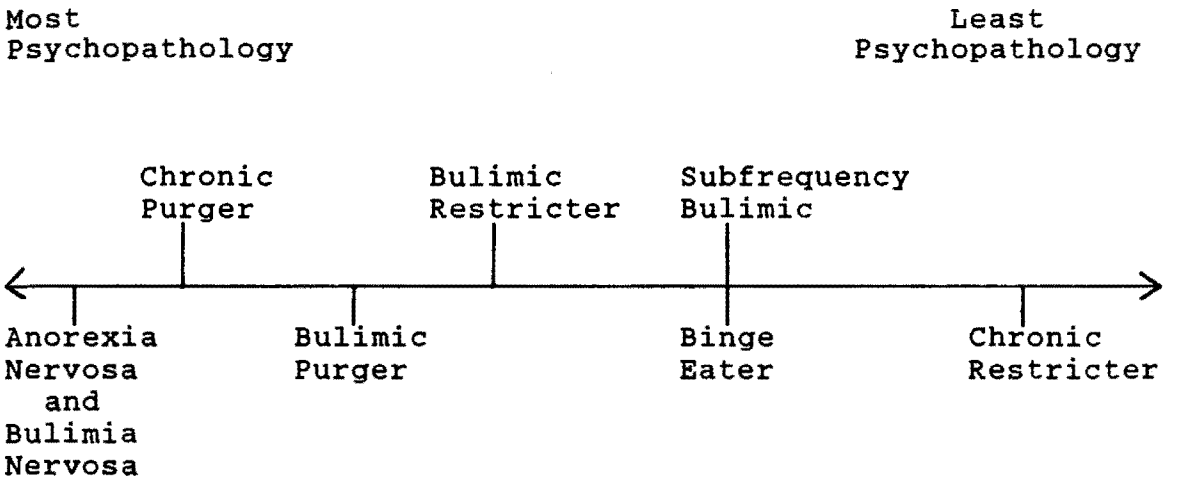

Figure 4. Proposed Spectrum of Eating Disorders Along a Dimension of Severity to be Utilized for This Study.

METHOD

Subjects

The subjects were 223 females who were hospitalized in an inpatient treatment facility for addictive behavior(s) at the time of their participation in the study. All persons identified as having an eating-related problem by the clinical intake team were contacted and asked to participate in the study. All participation was voluntary, did not affect treatment in any way, and could be discontinued by the subject at any time. Overall, the mean age of subjects was 29.96 years, with a range of 15 to 61 years and standard deviation of 9.29 years. Age data was missing for one subject. Two hundred and sixteen subjects were White, three were Black, one was Hispanic and race data was missing for three subjects. Additional demographic data are presented in Table 6.

The seven subject groups were as follows: bulimic purgers, bulimic restricters, anorexic bulimics, subfrequency bulimics, binge eaters, chronic purgers and chronic restricters. Classification criteria for each group are outlined below. The number of subjects in each group are as follows: 91 bulimic purgers, 21 bulimic restricters,

Table 6

Demographic Data on all Female Eating Disorder Subjects Regardless of Substance Abuse Type

Demographic Variables	N	Percent of Total N
RELIGION		
Catholic	70	31.4
Protestant	70	31.4
Jewish	19	8.5
None	31	13.9
Other	30	13.5
(Missing)	3	1.3
MARITAL STATUS		
Single	123	55.2
Married	55	24.7
Divorced	28	12.6
Widowed	2	0.9
Separated	11	4.9
Other	1	0.4
(Missing)	3	1.3
OCCUPATIONAL ROLE		
Wage Earner	132	59.2
Housewife	29	13.0
Student	29	13.0
Retired	1	0.4
Other	24	10.8
(Missing)	8	3.6
LIVING SITUATION		
With Parents	68	30.5
Dorm or Apartment	25	11.2
Conjugal	74	33.2
Alone	52	23.3
(Missing)	4	1.8

(continued)

Table 6 (continued)

Demographic Data on all Female Eating Disorder Subjects Regardless of Substance Abuse Type

Demographic Variables	N	Percent of Total N
EDUCATION		
Grade School	6	2.7
Some High School	18	8.1
H.S. Grad or G.E.D.	31	13.9
Trade/Commercial	9	4.0
Some College	100	44.8
College Graduate	39	17.5
Graduate School	18	8.1
(Missing)	2	0.9

Table 7

Means, Standard Deviations and Ranges of Subject Age By Eating Disorder Group

Subject Group	N	Mean	SD	Range
Bulimic Purgers	90	27.28	(7.76)	16 to 58
Bulimic Restricters	21	32.19	(12.31)	18 to 58
Bulimic Anorexics	15	32.33	(6.14)	24 to 40
Subfrequency Bulimics	32	32.72	(10.22)	21 to 61
Binge Eaters	14	36.86	(11.68)	19 to 56
Chronic Purgers	31	30.90	(8.89)	15 to 48
Chronic Restricters	19	27.00	(6.79)	19 to 49

Table 8

Demographic Data on Female Eating Disorder Subjects By Eating Disorder Type

Demographic Variables	Eating Disorder Subject Type N (%)		
	Bulimic Purger	Bulimic Restricter	Anorexic Bulimic
RACE			
White	90 (98.9)	20 (95.2)	15 (100)
Black	0 --	0 --	0 --
Latino	0 --	0 --	0 --
(Missing)	1 (1.1)	1 (4.8)	0 --
RELIGION			
Catholic	29 (31.9)	8 (38.1)	2 (13.3)
Protestant	26 (28.6)	4 (19.0)	8 (53.3)
Jewish	11 (12.1)	3 (14.3)	1 (6.7)
None	10 (11.0)	4 (19.0)	1 (6.7)
Other	14 (15.4)	1 (4.8)	3 (20.0)
(Missing)	1 (1.1)	1 (4.8)	0 --
MARITAL STATUS			
Single	61 (67.0)	14 (66.7)	6 (40.0)
Married	15 (16.5)	4 (19.0)	2 (13.3)
Divorced	8 (8.8)	1 (4.8)	6 (40.0)
Widowed	0 --	1 (4.8)	0 --
Separated	5 (5.5)	0 --	1 (6.7)
Other	0 --	0 --	0 --
(Missing)	2 (2.2)	1 (4.8)	0 --

(Continued)

Table 8 (Continued)

Demographic Data on Female Eating Disorder Subjects

By Eating Disorder Type

Demographic Variables	Eating Disorder Subject Type N (%)		
	Bulimic Purger	Bulimic Restricter	Anorexic Bulimic
OCCUPATIONAL ROLE			
Wage Earner	52 (57.1)	10 (47.6)	11 (73.3)
Housewife	9 (9.9)	1 (4.8)	1 (6.7)
Student	16 (17.6)	3 (14.3)	1 (6.7)
Retired	0 --	0 --	0 --
Other	11 (12.1)	4 (19.0)	2 (13.3)
(Missing)	3 (3.3)	3 (14.3)	0 --
LIVING SITUATION			
With Parents	36 (39.6)	6 (28.6)	2 (13.3)
Dorm or Apt.	12 (13.2)	4 (19.0)	2 (13.3)
Conjugal	22 (24.2)	6 (28.6)	4 (26.7)
Alone	19 (20.9)	4 (19.0)	7 (46.7)
(Missing)	2 (2.2)	1 (4.8)	0 --

(Continued)

Table 8 (Continued)

Demographic Data on Female Eating Disorder Subjects

By Eating Disorder Type

Demographic Variables	Eating Disorder Subject Type N (%)		
	Bulimic Purger	Bulimic Restricter	Anorexic Bulimic
EDUCATION			
Grade School	2 (2.2)	0 --	1 (6.7)
Some H.S.	8 (8.8)	1 (4.8)	1 (6.7)
HS Grad/G.E.D.	7 (7.7)	3 (14.3)	0 --
Trade/Comm.	3 (3.3)	0 --	0 --
Some College	42 (46.2)	11 (52.4)	6 (40.0)
College Grad	20 (22.0)	4 (19.0)	2 (13.3)
Grad. School	7 (7.7)	2 (9.5)	5 (33.3)
(Missing)	2 (2.2)	0 --	0 --

(Continued)

Table 8 (Continued)

Demographic Data on Female Eating Disorder Subjects

By Eating Disorder Type

Demographic Variables	Eating Disorder Subject Type N (%)			
	Subfreq. Bulimic	Binge Eater	Chronic Purger	Chronic Restrict.
RACE				
White	30 (93.8)	12 (85.7)	30 (96.8)	19 (100)
Black	0 --	2 (14.3)	1 (3.2)	0 --
Latino	3 (3.1)	0 --	0 --	0 --
(Missing)	3 (3.1)	0 --	0 --	0 --
RELIGION				
Catholic	6 (18.8)	7 (50.0)	11 (35.5)	7 (36.8)
Protestant	12 (37.5)	3 (21.4)	12 (38.7)	5 (26.3)
Jewish	1 (3.1)	1 (7.1)	2 (6.5)	0 --
None	6 (18.8)	1 (7.1)	3 (9.7)	6 (31.6)
Other	6 (18.8)	2 (14.3)	3 (9.7)	1 (5.3)
(Missing)	1 (3.1)	0 --	0 --	0 --
MARITAL STATUS				
Single	12 (37.5)	5 (35.7)	14 (45.2)	11 (57.9)
Married	10 (31.3)	7 (50.0)	12 (38.7)	5 (26.3)
Divorced	7 (21.9)	0 --	5 (16.1)	1 (5.3)
Widowed	0 --	1 (7.1)	0 --	0 --
Separated	2 (6.3)	1 (7.1)	0 --	2 (10.5)
Other	1 (3.1)	0 --	0 --	0 --
(Missing)	0 --	0 --	0 --	0 --

(Continued)

Table 8 (Continued)

Demographic Data on Female Eating Disorder Subjects

By Eating Disorder Type

Demographic Variables	Eating Disorder Subject Type N (%)			
	Subfreq. Bulimic	Binge Eater	Chronic Purger	Chronic Restrict.
OCCUPATIONAL ROLE				
Wage Earner	23 (71.9)	7 (50.0)	16 (51.6)	13 (68.4)
Housewife	5 (15.6)	3 (21.4)	6 (19.4)	4 (21.1)
Student	2 (6.3)	1 (7.1)	4 (12.9)	2 (10.5)
Retired	0 --	0 --	1 (3.2)	0 --
Other	2 (6.3)	3 (21.4)	2 (6.5)	0 --
(Missing)	0 --	0 --	2 (6.5)	0 --
LIVING SITUATION				
With Parents	9 (28.1)	4 (28.6)	7 (22.6)	4 (21.1)
Dorm or Apt.	2 (6.3)	2 (14.3)	1 (3.2)	2 (10.5)
Conjugal	13 (40.6)	7 (50.0)	14 (45.2)	8 (42.1)
Alone	8 (25.0)	1 (7.1)	9 (29.0)	4 (21.1)
(Missing)	0 --	0 --	0 --	1 (5.3)

(Continued)

Table 8 (Continued)

Demographic Data on Female Eating Disorder Subjects By Eating Disorder Type

Demographic Variables	Eating Disorder Subject Type N (%)							
	Subfreq. Bulimic		Binge Eater		Chronic Purger		Chronic Restrict.	
EDUCATION								
Grade School	1	(3.1)	0	--	2	(6.5)	0	--
Some H. S.	3	(9.4)	0	--	3	(9.7)	2	(10.5)
HS Grad/G.E.D.	8	(25.0)	3	(21.4)	8	(25.8)	2	(10.5)
Trade/Comm.	1	(3.1)	2	(14.3)	3	(9.7)	0	--
Some College	13	(40.6)	6	(42.9)	12	(38.7)	10	(52.6)
College Grad	5	(15.6)	3	(21.4)	2	(6.5)	3	(15.8)
Grad. School	1	(3.1)	0	--	1	(3.2)	2	(10.5)
(Missing)	0	--	0	--	0	--	0	--

15 bulimic anorexics, 32 subfrequency anorexics, 14 binge eaters, 31 chronic purgers, and 19 chronic restricters. Demographic data by group are presented in Tables 7 and 8. There were no significant differences among the seven groups in stated religion, occupational role, living situation or level of education.

However, there were several significant differences between the eating disorder groups on other demographic variables. There was a significant difference in age between the subject groups, $F(6,215) = 4.06$, $p<.0007$, with Duncan Multiple Range Post-hoc analyses at a $p=.05$ indicating significant age differences between the following groups: the younger bulimic purgers and the older subthreshold bulimics, the younger bulimic purgers and the older binge eaters, and the older binge eaters and the younger chronic restricters.

Pearson Chi-Square tests of Independence show there were also significant differences between the groups in terms of race, $X^2(12) = 26.70$, $p<.009$, and marital status, $X^2(30) = 54.27$, $p<.004$. Black subjects were disproportionately categorized as binge eaters ($N=2$) and chronic purgers ($N=1$), while the one Hispanic subject was categorized as a subfrequency bulimic, the group with the second highest number of subjects. But the small number of subjects in each group do not allow for conclusions to be drawn on the basis of these differences. Marital status

differed from the expected pattern in several ways. Bulimic purgers were more likely to be single and less likely to be married or divorced, whereas chronic purgers were more likely to be married and less likely to be single. Bulimic anorexics and subfrequency bulimics were more likely to be divorced. Subfrequency bulimics were also less likely to be single. Last, binge eaters were married more often than expected and single less often than expected.

Following collection of all of the research materials, subjects were assigned to one of the seven experimental groups. Subjects who did not meet criteria for any of the groups were categorized as eating disordered--not otherwise specified (American Psychiatric Association, 1987) or not eating disordered ($\underline{N}$=64), and were not included in the study sample. A small number of subjects ($\underline{N}$=3) met the classification criteria for anorexia nervosa alone, but this number was considered too small to allow for adequate comparisons between this group and the seven other eating disorder groups. Therefore, the anorexic-only group and the mixed group were excluded from this study. The resultant subject group was comprised of the aforementioned 223 subjects.

The eating disorder group categorization followed the decision tree in Figure 5; the group criteria conform to the DSM-III-R criteria (American Psychiatric Association, 1987), and are more stringent in some respects. Listed below are

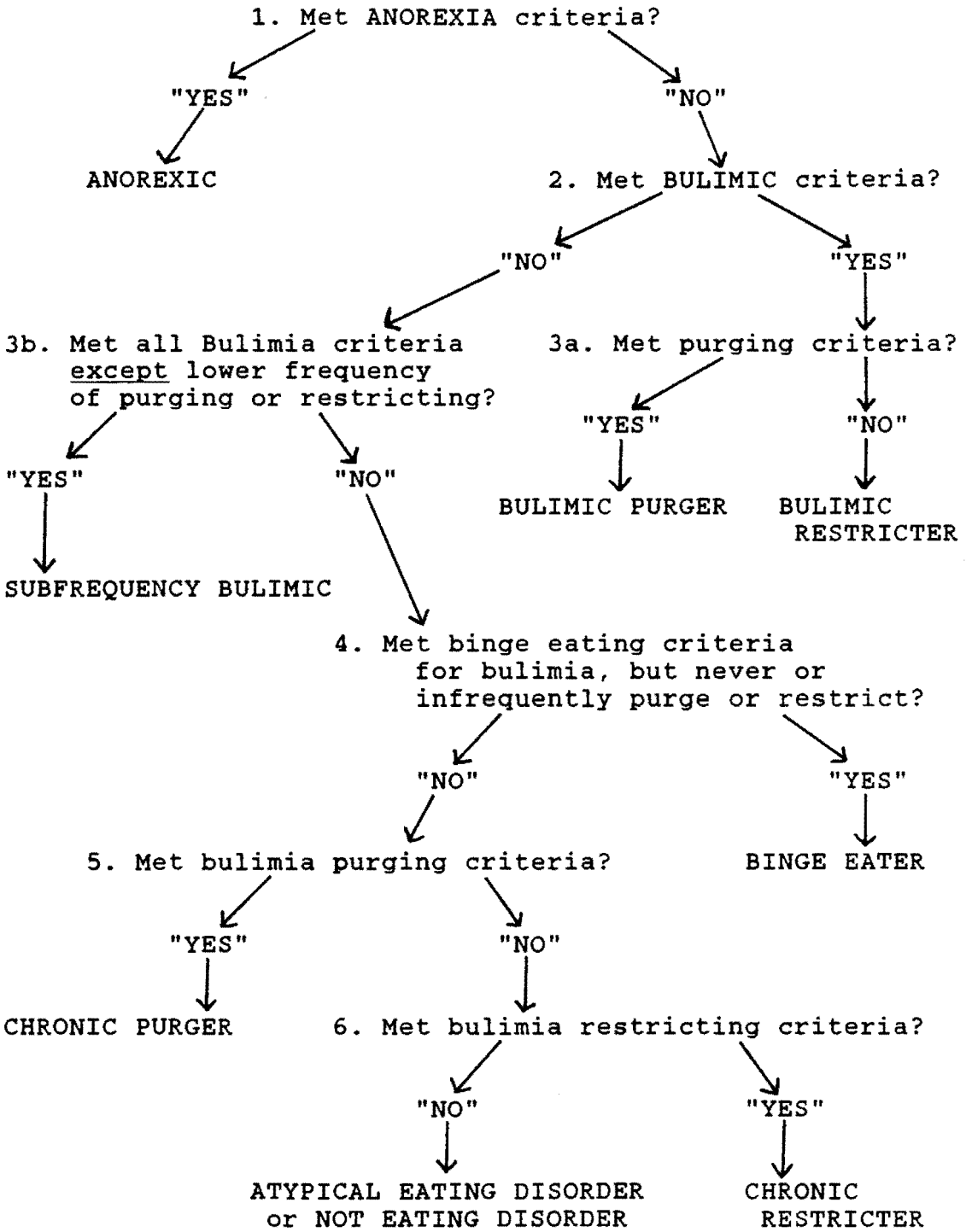

Figure 5: Decision Tree for Eating Disorder Diagnosis

the group criteria and how they were operationalized for this study.

Anorexia Nervosa Categorization Criteria:

1. Subject is 15% below normal body weight, or subject fails to make expected body weight gain. Self-reported height and weight measures were compared to the Metropolitan Life Insurance (1983) normal weight chart. The difference between expected or normal weights and current weight were calculated for each subject assuming medium frame and adjusting for heel height and clothing weight as required by the Metropolitan chart.

2. Intense fear of gaining weight or becoming fat.

3. Body image disturbance: "feel fat" even though subject meets criterion one above.

4. Absence of at least three consecutive menstrual cycles.

Bulimia Nervosa Categorization Criteria:

1. Recurrent binge eating episodes, defined as eating a large amount of food in a short period of time.

2. Subjective lack of control during eating binge episodes.

3. At least one of the following purging or restricting behaviors:
   a. vomiting an average of at least once a week for the last six months.
   b. laxative use an average of at least once a week for the last six months.
   c. diuretic use an average of at least once a week for the last six months.
   d. enema use an average of at least once a week for the last six months.
   e. dieting "always" in the last six months.
   f. fasting an average of at least once a week for the last six months.
   g. exercising 120 minutes or more each day currently.

4. A minimum average of two binge eating episodes per week for at least three months.

5. Overconcern with body shape and weight, in terms of preoccupation with being thinner or an intense fear of gaining weight.

Bulimia Nervosa Purging Criteria:

1. Meets bulimia nervosa criterion three, above, by engaging in one or more of the following: vomiting, laxative use, diuretic use, or enema use.

2. If subject engages in purging behavior and engages in restricting behavior (i.e. dieting, fasting, or excessive exercising), subject is still considered a "purger".

Subfrequency Bulimia Nervosa Criteria

1. Meets bulimia nervosa criteria numbers one, two, four and five, above.

2. At least one of the following purging or restricting behaviors, but at a frequency lower than the bulimia nervosa criteria.
   a. vomiting several times a month but less than once a week for the last six months.
   b. laxative use several times a month but less than once a week for the last six months.
   c. diuretic use several times a month but less than once a week for the last six months.
   d. enema use several times a month but less than once a week for the last six months.
   e. dieting "often" in the last six months.
   f. fasting several times a month but less than once a week in the last six months.
   g. exercising at least 60 minutes a day, but less than 120 minutes a day currently.

Instruments and Dependent Variable Measures

The eating disorders packet includes the Diagnostic Survey for Eating Disorders (DSED; Johnson, 1985), the Eating Disorder Inventory (EDI; Garner, Olmsted, & Polivy, 1983), and the Symptom Checklist 90-Revised (SCL-90;

Derogatis, 1977). The DSED addressed historical and developmental aspects of various eating situations, experiences, events, and consequences. It may be considered an eating behavior biography (Schlundt, 1987). The DSED also gathers some biographical information not directly related to eating behavior.

The EDI is a self-report device which assesses some common psychological and behavioral traits in anorexia nervosa and bulimia. It is not considered a diagnostic instrument, but a clinical and research tool (Garner, et al., 1983). The EDI consists of 64 items to be rated on a six-point scale. Answer choices include "always", "usually", "often", "sometimes", "rarely", and "never".

The eating-related information gathered by examination of specific items on the DSED and EDI was used to form the eating disorder groups, the independent variable.

The SCL-90 is a psychological symptom self-report inventory which focuses on recent signs of psychopathology and symptom patterns, over the last two weeks in this case. The SCL-90 requires subjects to rate each of 90 individual test items on a five-point scale (zero to four). Subjects rate the amount of distress each potential symptom causes him or her, ranging from "not at all" (zero-point score) to "extreme" (five-point score). The scale is scored and interpreted for nine primary symptom dimensions and three

global summary measures. The nine symptom scales are 1) somatization, 2) obsessive-compulsive, 3) interpersonal sensitivity, 4) depression, 5) anxiety, 6) hostility, 7) phobic anxiety, 8) paranoid ideation, and 9) psychoticism. The three global indices of distress are 1) the global severity index (GSI), 2) the positive symptom distress index (PSDI), and 3) the positive symptom total (PST). These nine scales and three indices are dependent variables for this study.

The BIO is a 12 section, self-report alcohol and drug experience questionnaire that taps age-related substance use events, type and quantity of substance used, behavioral and social consequences due to use, and psychological signs of distress associated with substance use. The BIO assesses for two general indices: a 30-day impairment index and a six-month impairment index. The 30-day index assesses for the occurrence of several consequences of use over the 30 days prior to admission (see Table 9). The six-month impairment index assesses for disturbance in affective state for the six months prior to admission (see Table 9). The BIO also gathers information on basic demographic variables such as age, sex, educational level, marital and employment status. Dependent variables for this study from the BIO will include indices of substance abuse and dependence, as well as poly-drug-alcohol abuse information.

Table 9

Items from the Substance Use Biography (BIO) Which are Summed to Comprise the 30-Day Impairment Index and the Six-Month Impairment Index

30-Day Impairment Index

Item	Subject's Answer
"Had shakes or jitters"	Yes = 1 No = 0
"Used as soon as woke up"	Yes = 1 No = 0
"Tried to stop using but couldn't"	Yes = 1 No = 0
"Had blackouts"	Yes = 1 No = 0
"Missed a meal due to drinking/using"	Yes = 1 No = 0
"Fight with others under the influence"	Yes = 1 No = 0
"Difficulty sleeping"	Yes = 1 No = 0
"Drunk or high"	Yes = 1 No = 0
"Missed meeting responsibilities"	Yes = 1 No = 0
"Used more than planned"	Yes = 1 No = 0
	Sum = 30-Day Impairment Index

Six-Month Impairment Index

Item	Subject's Answer
"Enjoyed what you did"	Yes = 1 No = 0
"Felt tense"	Yes = 1 No = 0
"Had trouble concentrating or with memory"	Yes = 1 No = 0
"Felt depressed"	Yes = 1 No = 0
"Felt anxious"	Yes = 1 No = 0
	Sum = Six-month Impairment Index

The MMPI personality test (Hathaway & McKinley, 1966) was designed to differentiate between normal persons and several traditional diagnostic groups, but the scales have been utilized as approximate linear measures of personality traits (Anastasi, 1982). The MMPI consists of 550 items or statements. The subject is asked to answer "true" or "false" to each item. Scores for 10 clinical scales and three validity scales are produced. The clinical scales include 1) hypochondriasis, 2) depression, 3) hysteria, 4) psychopathic deviate, 5) masculinity-femininity, 6) paranoia, 7) psychasthenia, 8) schizophrenia, 9) hypomania, and 0) social introversion. The dependent variables for this study that were derived from the MMPI include nine of the 10 clinical scales and two summation indices; the number of elevated clinical scales for each subject (i.e., T-score $\geq$ 70) and the mean of nine clinical scale scores (1-4 and 6-0) for each subject. Scale 5 will not be used because it does not operate on the same underlying principle as the other scales. As each of the other scales increases in score, level of psychopathology theoretically also increases. However, scale 5 measures degree of masculine or feminine traits, and high versus low scores hold a different meaning for each sex (Graham, 1987; Lachar, 1974).

Design

The design of the study conforms to a natural groups design, with type of eating-related problem being the "natural treatment" (Shaughnessy & Zechmeister, 1985). The independent variable, or subject variable, is not manipulated, but each group represents a different condition as defined by the level of the independent variable. This project selected the various levels of the independent variable, eating-related problems, and will look for systematic relationships between the groups and the dependent variables. As is consistent with the limitations of this design, a type of correlational design, the goals are to describe the groups and predict between group differences. However, causal inference is beyond the scope of this project.

Procedure

Subjects were introduced to the data collection procedure with a brief oral description of the functions and general aims of the research project(s) in process at a suburban Chicago inpatient treatment center in which he or she might choose to participate. Oral consent for participation was obtained before any testing was completed. Subjects were informed they could discontinue participation at any time.

Subjects were then randomly assigned to test

sequence, i.e., MMPI in the psychology laboratory first, or the interview and BIO in the research center first. Immediately following completion of the BIO subjects were asked to participate in the eating disorders project by completing the eating disorders packet. After oral consent was obtained, a brief introduction to the questionnaire materials was given. Subjects were asked to complete the packet's contents at their own pace and return the completed materials to research staff the following day. Any questions were answered at the time of distributing the packet and upon its return.

Subjects were asked to complete a set of questionnaires termed the "eating disorders packet" approximately three to seven days after admission. The packet includes three measures which will be utilized in this study and will be described in the following section. The packet was given to subjects to complete at their own pace and returned to research staff in about one day. A brief introduction to the test materials was given when the packet was handed out. Any questions were answered at that time and again upon return of the packet.

In addition to the eating disorders packet, subjects completed two additional assessment devices. Immediately prior to receiving the packet, each subject was interviewed concerning his/her use of substances (alcohol and drugs). Subjects were then asked to complete a self-report measure

termed the substance use biography (BIO). Also, subjects took the Minnesota Multiphasic Personality Inventory (MMPI) which was administered by a psychology technician. Randomization of a portion of the testing sequence was achieved by assigning half of the subjects to be interviewed for the substance use information first, and half to take the MMPI first. The substance use data were collected before the eating disorder packet was administered.

The eating disorder type of the subject was the independent variable. Classification into each group was achieved by the process described above. Each subject's eating-related problems were evaluated as defined by the DSM-III-R diagnostic criteria (American Psychiatric Association, 1987) and by several researchers in the area of eating disorders (Harju, 1987; Mintz, 1987; Ousley, 1987).

RESULTS

Descriptions of the subject characteristics of the eating disorder groups and tests of the hypotheses will be presented in sections following several preliminary analyses. In an attempt to validate the eating disorder classification and to rule out several potential rival hypotheses for any differences between the eating disorder groups, the following preliminary analyses were conducted.

Eating Disorder Group Validity

The classification of subjects into their respective eating disorder groups was achieved by matching subjects behavioral self-reports with eating disorder criteria from DSM-III-R and several alternate systems proposed by researchers in the area (Agras, 1987; Beumont, 1988; Boskind-White, 1981; Harju, 1987; Schlundt, 1987; Mickalide & Andersen, 1985; Mintz, 1987; Ousley, 1987; Prather & Williamson, 1988; Russell, 1985a).

In an attempt to establish concurrent criterion-related validity or diagnostic utility (Anastasi, 1982), the following analyses are presented to compare the eating disorder groups to each other on several behavioral and

psychological variables which have been found to be associated with or not associated with the different eating disorder types. Anastasi asserts, "psychiatric diagnoses may serve as a satisfactory criterion provided that it is based on prolonged observation and a detailed case history" (1982, p. 141). While this study did gather a detailed self-report history for each subject, the concurrent criterion-related validity will be strengthened by the contrasted group method. This method examines test items on which various groups are expected to score differently based on group differences established by prior research and/or logical reasoning. The items chosen to validate the subjects' eating group classification and the predicted groups differences are presented in Table 10.

Several weight variables were chosen to differentiate the groups. First, there were no group differences in the subjects' height, $F(6,211) = 1.82$, $p = .10$, it appears unlikely weight differences are due to height differences. It was expected the groups would differ significantly in terms of current weight, highest adult weight and lowest adult weight. All three one-way analysis of variance tests (ANOVA) reached significance and provide support for the pattern of expected group differences. Current weight differed significantly, $F(6,213) = 15.79$, $p<.0001$, with the Post-hoc Duncan Multiple Range test indicating the formation of three subgroups by weight. As hypothesized, due to the

Table 10

Items from the Diagnostic Schedule for Eating Disorders (DSED) Chosen to Validate the Eating Disorder Group Classification

Item	Predicted Group Differences
Current Weight	*BA < CP < BP, CR < BR, SUB < BE
Highest Adult Weight	BA < CP < BP, CR < BR, SUB < BE
Lowest Adult Weight	BA < CP < BP, CR < BR, SUB < BE
Binge Eat Alone More	BP, BR, BA > SUB, BE, CP, CR
Eat Sensible or Splurge More	BP, BR, BA, SUB > BE, CP, CR
Guilt After Overeat More	BP, BR, BA > SUB > BE > CP, CR
Age of First Intercourse	BP, CP, < BR, CR, BE, SUB
Stealing, Number who Engage In	BP, CP > BA, BR, CR, BE, SUB
Self-Abuse, Number who Engage In	BP, CP > BA, BR, CR, BE, SUB
Suicide Attempts, Number who Engage In	BP, BR, BA, CP, SUB > BE, CR
Prior Hosp. for Depression, Number with History of	BP, BR, BA, CP, SUB > BE, CR
Prior Hosp. for A.N., Number with History of	BA > BP, BR > SUB, CP, CR, BE
Prior Hosp. for Bulimia, Number with History of	BP, BA, BR > SUB > CP, CR, BE

Note. *BA = Bulimic Anorexic
CP = Chronic Purger
BP = Bulimic Purger
BR = Bulimic Restricter
SUB = Subfrequency Bulimic
BE = Binge Eater

existence of restricting and purging, anorexic bulimics differed significantly from all other groups, $\underline{M}$ = 101.87 pounds. It was expected chronic purgers would be the next-lightest group due to the extreme weight reduction method utilized, coupled with limited binge eating. This was also confirmed, $\underline{M}$ = 133.17 pounds, yet the chronic purgers did not differ significantly from the bulimic purgers, $\underline{M}$ = 142.52 pounds, and the chronic restricters, $\underline{M}$ = 149.05 pounds, who were expected to be somewhat heavier due to added binge eating and somewhat less severe reducing methods respectively. And finally, the third and heaviest subgroup consisted of bulimic restricters, subfrequency bulimics, and binge eaters who were about the same weight, but differed from all other groups. These groups weighed 180.10, 197.78, and 194.71 pounds respectively. Binge eaters were not quite the heaviest group as was expected.

The hypothesized group differences for lowest and highest adult weight were also confirmed, $\underline{F}(6,204) = 9.03$, $\underline{p}<.0001$ and $\underline{F}(6,206) = 6.91$, $\underline{p}<.0001$ respectively. The expected patterns were also confirmed except the binge eaters' closer-than-expected similarity to the subfrequency bulimics and the bulimic restricters. It was expected the latter two groups would be slightly lighter because they engage in some form of weight control methods fairly frequently, yet not as frequently or at the level of purging methods.

The fourth validating item examined was the extent to which the subjects binge eat alone in secrecy. As is reported in the literature, it was expected that all formally diagnosed bulimic subjects would binge eat in secrecy more often than the other groups. Analyses confirmed this criterion: $\underline{X}^2$ (12) = 53.07, $\underline{p}$<.0001, and found the bulimic purgers, bulimic restricters and the bulimic anorexics report binge eating alone "often" or "always" more often than the other groups. Also, the other groups all reported binge eating in secrecy less often than the other groups.

On a related but slightly different item, the groups again differed as expected. According to Bemis (1985) and restraint theory proponents, subjects who engage in a binge/purge cycle of behavior maintain fairly strict control of their problematic behavior most of the time, especially when with others, but when they lose control, they splurge. Therefore, subfrequency bulimics were expected to join the bulimic groups identified above in eating sensibly in front of others, but splurging when done. As expected, the bulimic purgers, bulimic restricters, bulimic anorexics and subfrequency bulimics engaged in this behavior "often" or "always" more than expected, and the other groups did so "never" or "rarely" more often than expected, $\underline{X}^2$ (6) = 58.78, $\underline{p}$<.0001.

Stunkard (1959) predicted the affect associated with

overeating includes a great deal of guilt for those who engage in binge eating. DSM-III-R more specifically identified bulimic subjects as experiencing guilt following overeating which leads to an attempt to undo the overeating. Therefore, the binge eaters were expected to experience less guilt following a binge eating episode than the bulimic groups. It should be noted that some subjects in each of the eating disorder groups engage in binge eating behavior and have rated this affective item. Guilt following overeating was assessed via the DSED by asking subjects to rate whether they "never", "rarely", "often", or "always" have feelings of guilt after overeating.

Guilt following overeating did differ significantly between the groups, $\underline{X}^2(6) = 24.93$, $\underline{p}<.0004$. As predicted, the binge eaters, chronic restricters, and chronic purgers answer that they "never" or "rarely" experienced guilt after overeating more often than expected by the Chi-Square test of Independence. The other groups experience guilt "often" or "always". However, the findings are not very robust for three groups: bulimic anorexics, binge eaters and chronic restricters. Most subjects (91.8%) frequently experience guilt after overeating, therefore guilt following overeating may not be a very useful variable in distinguishing these groups.

The seventh, eighth and ninth group-validating items chosen assess the impulse deficit found in bulimics,

particularly those who engage in purging behavior. Contrary to expectations, the subjects did not differ in the age at which they first engaged in sexual intercourse, $F(6,189) = .74$, ns. A variable which would better reflect the research findings would assess the degree of sexual promiscuity, however this information was not available.

Reported stealing since the onset of the eating problems did differ significantly between the groups, $X^2(6) = 33.91$, $p<.0001$. However, the expected pattern of differences was only partially supported. Bulimic purgers engage in stealing frequently and more often than bulimic restricters. Also, chronic restricters engage in stealing infrequently, as expected. However, the other groups do not follow the expected patterns.

Reports of self-abusive behavior reached near-significant levels, $X^2(6) = 11.91$, $p=.064$, but like the other impulse control-related behaviors, did not differ as much as hypothesized, and did not confirm expected group differences. Nearly 30% of bulimic purgers engage in self-abuse, yet bulimic restricters, bulimic anorexics, chronic purgers and chronic restricters all have a higher within group percentage of subjects who self-abuse.

The tenth validating item, suicide attempts, serves to assess group differences in impulse control deficits and depression. The number of prior hospitalizations for depression was also examined. Based on the research

literature, binge eaters and chronic restricters would be less likely to have attempted suicide or have been hospitalized for depression than the other groups. Neither variable reached significance, $\underline{X}^2(6) = 9.16$, ns for suicide and $X^2(6) = 2.81$, ns for depression hospitalization. Although there were no significant group differences, the pattern of scores partially supports the expectations. Bulimic restricters, bulimic anorexics, and chronic purgers have attempted suicide and been hospitalized for depression more often than the other groups. Also, binge eaters have done so less frequently than the other groups. Unexpectedly, the bulimic purgers and subfrequency bulimics have endorsed these items less frequently than predicted by the literature as compared to the other groups.

The last two group-validating items utilized have more face validity than the preceding items, but aid in clarifying the identity of group members to a large degree. Due to the limited assessment of prior eating disorder diagnoses, the following analyses are considered very important.

Prior hospitalizations for anorexia nervosa did differ significantly between the groups, $\underline{X}^2(6) = 16.13$, $\underline{p}<.01$. As expected, bulimic anorexics more frequently had been hospitalized for anorexia and most of the other groups had been so less frequently. Interestingly, a number of the chronic purgers had been hospitalized for anorexia, although

prior bulimia nervosa was mentioned as a potential prior diagnosis in the literature. And, in fact, some of the chronic purgers did have a prior hospitalization history for bulimia, but less frequently than the other groups. There were near-significant group differences in presence or absence of prior hospitalizations for bulimia, $\underline{X}^2(6) = 11.50$, $\underline{p}=.074$. As predicted, bulimic purgers and bulimic anorexics had been previously hospitalized more frequently than the other groups. None of the bulimic restricters had been hospitalized for bulimia, which may be due to the comparatively less flagrant reducing methods typically used by the restricters.

Overall, there is support for the eating disorder group classification utilized in the present study. The weight items, psychological items related to eating and reducing, and prior hospitalizations for eating-related problems support the classification scheme. Items targeting impulse control and depression do not consistently support the group classification scheme, yet none of the prior research in these areas has utilized the full range of eating problem groups. Nor has the research discriminated within eating problem group differences; the focus has been on eating problem groups versus normal controls groups. Interpretation of the succeeding results will consider the aspects of the validation method which did not support the group classification. Yet, overall concurrent criterion

Table 11

Concurrent Criterion-Related Validity for the Eating Disorder Group Classification

Item	Resultant Group Differences
Current Weight	*BA < CP, BP, CR < BR, BE, SUB
Highest Adult Weight	BA < BP, CR, CP < BR, BE, SUB
Lowest Adult Weight	BA < CP, BP ≈ CR ≈ SUB, BR, BE
Binge Eat Alone More	BP, BR, BA > BE, CR, SUB, CP
Eat Sensible or Splurge More	BP, BR, SUB, BA > BE, CR, CP
Guilt After Overeat More	BP, SUB, BR > BA, CR, BE > CP
Age of First Intercourse	BP, SUB, BR > BA, CR, BE > CP
Stealing, Number who Engage In	BP, BA, SUB > BE > CR, BR > CP
Self-Abuse, Number who Engage In	CP, BR, BA > CR > BE, BP, SUB
Suicide Attempts, Number who Engage In	CP, BA, BR > CR > BE, BP, SUB
Prior Hosp. for Depression, Number with History of	CP, BR, BA, CR > BE, SUB, BP
Prior Hosp. for A.N., Number with History of	BA, CP > BP, CR > BE, BR, SUB
Prior Hosp. for Bulimia, Number with History of	BP, BA, > SUB, CP > CR, BE, BR

Note. *BA = Bulimic Anorexic
CP = Chronic Purger
BP = Bulimic Purger
BR = Bulimic Restricter
SUB = Subfrequency Bulimic
BE = Binge Eater

related validity has been established with the eating disorder group classification method. The findings are summarized in Table 11.

Substance Abuse Type

In an effort to narrow the number of potential rival hypotheses to the test of the proposed eating disorder spectrum, the subjects' self-reported substance use patient-type was compared to the eating disorder classification. Pearson Chi-Square test of Independence indicated the eating and substance use classifications were not independent, $X^2(12) = 24.45$, $p<.018$.

Therefore, in order to distinguish between psychopathology related to substance use versus eating pathology and to provide an unconfounded test of the proposed spectrum of severity for eating disorders, the following analyses were conducted to test the hypotheses using the poly-alcohol-drug abusers. This group was selected because each of the eating disorder types contains a fair number of subjects, allowing for a full test of the spectrum, and as has been stated in the substance abuse literature, those who abuse substances most often use a combination of chemicals (Donovan & Marlatt, 1988).

The final subject group consists of 53 bulimic purgers, 11 bulimic restricters, eight bulimic anorexics, nine subfrequency bulimics, eight binge eaters, 14 chronic

purgers, and 12 chronic restricters. The eating disorder groups did not differ significantly by religion, $X^2(24) = 22.45$, ns, occupational role, $X^2(18) = 18.78$, ns, living situation, $X^2(18) = 17.07$, ns, or level of education, $X^2(36) = 26.91$, ns. The marital status of the groups did differ significantly, $X^2(24) = 41.46$, $p<.015$. There was a weak, but nonsignificant, trend towards a difference between the groups by race, $X^2(12) = 18.78$, $p = .094$. Bulimic purgers and bulimic restricters were single more often than the other groups. Chronic purgers, chronic restricters and subfrequency bulimics were more often married than the other groups. Bulimic anorexics were divorced more often than the other groups.

Analyses designed to test hypotheses one to six shall follow, utilizing the poly-substance using eating disorder groups.

Subject Characteristics: Eating and Related Behavior

There were no age differences between the seven eating disorder groups when all subjects also have a poly-alcohol-drug use history, $F(6,107) = 1.81$, $p=.105$, this may indicate the age differences found between the eating disorder groups regardless of substance use type was an artifact of the substance use type or of the decreased number of subjects. It is known that poly-substance abusers are significantly younger than other substance abusers

(Parrella & Filstead, 1988).

Comparisons of the seven subject groups revealed a number of significant differences in eating-related behavior, as well as other behaviors and characteristics often associated with eating disorder subjects. The following analysis of variance and Chi-Square test results specify these between-group differences. The groups did not differ significantly in height, $F(6,105) = 1.49$, $p=.19$, however, they did differ significantly in current weight $F(6,106) = 5.63$, $p<.0001$ (Table 12). The seven groups formed three subgroups by weight according to the Duncan Multiple Range post-hoc procedure. Anorexic bulimics, the lightest group, differed significantly from all other groups in terms of current weight, $M = 104.84$ pounds. Chronic purgers, bulimic purgers and chronic restricters are about the same weight, but differ from all other groups significantly. Their weights were $M = 139.36$, $M = 141.84$, and $M = 149.00$ pounds respectively. The third and heaviest subgroup consists of bulimic restricters, binge eaters and subfrequency bulimics who are about the same weight, but, with one exception, differ significantly from both of the purger groups, chronic restricters and anorexic bulimics. Current weight of the bulimic restricters, binge eaters and subfrequency bulimics are $M = 163.55$, $M = 186.75$, and $M = 183.00$ pounds respectively. Bulimic restricters are not significantly different from subjects in the middle weight

groups.

As expected by the definition of the subject groups, the groups differed significantly on many of the eating, purging, and restricting behaviors. Frequency of binge eating in the last six months differed significantly between the groups, $X^2(36) = 100.57$, $p<.0001$. Bulimic purgers accounted for approximately 60% of those who binge once a day or more. The bulimic purgers and bulimic anorexics were more likely than expected to binge eat once a day or more. On the average, bulimic restricters binge eat less frequently than bulimic purgers and bulimic anorexics. The bulimic restricters are more likely to binge eat several times a week but not each day of the week. The frequency of binge eating patterns for the chronic purgers and chronic estricters is nearly opposite the pattern for bulimic purgers. These groups are more likely to never binge eat or do so very infrequently. There are subjects from each group that acknowledge some type of binge eating behavior. There was no significant difference in the grouped number of normal meals the groups ate in the last six months, $X^2(30) = 31.90$, ns.

Differences in the frequency of purging and restricting are also expected by group definition. The groups did differ significantly in the average frequency with which they engaged in vomiting over the last six months, $X^2(36) = 85.55$, $p<.0001$. Within the whole subject

Table 12

Means and Standard Deviations of Subject Weight and Height by Eating Disorder Group of Poly-Substance Abusers

Eating Disorder Group	Current Weight in Pounds	Current Height in Inches
Bulimic Anorexics M(SD)	104.25 (7.6)	62.00 (3.4)
Chronic Purgers	139.4 (20.4)[a]	63.86 (2.7)
Bulimic Purgers	141.84 (37.2)[a]	64.31 (2.8)
Chronic Restricters	149.00 (36.6)[a]	65.25 (3.1)
Bulimic Restricters	163.55 (35.9)a,[b]	63.73 (2.5)
Subfrequency Bulimics	183.00 (47.5)[b]	65.11 (2.0)
Binge Eaters	186.75 (49.7)[b]	63.29 (2.8)

Note. Superscript letters indicate groups which are not significantly different from each other at the .05 level.
The remaining group is significantly different at the .05 level.

sample, more than 35% of the subjects report vomiting at least once a day, and more than 25% report vomiting an average of more than once a day.

As is expected by definition, only three groups engage in vomiting behavior once a week or more. These groups are the bulimic purgers, bulimic anorexics and chronic purgers. The bulimic purgers engage in vomiting more frequently than other groups. Of those subjects who vomit once a day, 81.8% are bulimic purgers, and of those who vomit more than once a day, 67.9% are bulimic purgers (see table 13).

There were near significant differences in the reported frequency of laxative use in the last six months, $X^2(36) = 45.41$, $p=.135$. Chronic purgers, bulimic purgers and bulimic anorexics abuse laxatives more often than other groups (see Table 14). No significant group differences were found for the remaining purging methods: diuretic use, $X^2(36) = 27.25$, ns, and enema use $X^2,(36) = 20.87$, ns.

One measure of restricting behaviors differed significantly between the groups: dieting, $X^2(36) = 46.45$, $p<.004$. Subfrequency bulimics and binge eaters diet infrequently, while the majority of bulimic purgers, chronic purgers and chronic restricters diet "often" or "always" (see Table 15). There were no significant group differences in frequency of fasting, $X^2(36) = 47.30$, ns, or minutes of daily exercise, $F(6,84) = .895$, ns.

Table 13

Frequency of Vomiting of Poly-Substance Abusers by Eating Disorders Group

Eating Disorder Group		Vomiting Frequency			
		Never	1/Mo. or less	Several /Month	Once /Week
Bulimic Anorexics	%*	12.5	0	0	0
	R**	-2.0	-.4	-.3	-.4
Chronic Purgers		35.7	0	0	14.3
		-.2	-.8	-.5	1.4
Bulimic Purgers		15.1	5.7	0	5.7
		-11.6	.1	-2.0	.5
Bulimic Restricters		70.0	10.0	20.0	0
		3.3	.4	1.6	-.5
Subfrequency Bulimics		100.0	0	0	0
		5.0	-.4	-.3	-.4
Binge Eaters		100.0	0	0	0
		2.5	-.2	-.1	-.2
Chronic Restricters		63.6	18.2	18.2	0
		2.9	1.4	1.6	-.5

(Continued)

Table 13 (Continued)

Frequency of Vomiting of Poly-Substance Abusers by Eating Disorders Group

Eating Disorder Group	Vomiting Frequency		
	Several /Week	Once /Day	More than Once/Day
Bulimic	0	12.5	75.0
Anorexics	-2.0	.2	3.9
Chronic	21.4	7.1	21.4
Purgers	1.2	-.4	-.6
Bulimic	20.8	17.0	35.8
Purgers	4.1	3.6	5.3
Bulimic	0	0	75.0
Restricters	-1.3	-1.0	3.9
Subfrequency	0	0	0
Bulimics	-1.0	-.8	-2.1
Binge	0	0	0
Eaters	-.5	-.4	-1.0
Chronic	0	0	0
Restricters	-1.4	-1.1	-2.9

Note. *Percentages are expressed as raw percentages.
** Residuals are the value of the observed cell count minus the expected value, which is the number expected in each cell if the two variables were statistically independent.

Table 14

Frequency of Laxative Abuse of Poly-Substance Abusers by Eating Disorders Group

Eating Disorder Group		Laxative Abuse Frequency			
		Never	1/Mo. or less	Several /Month	Once /Week
Bulimic Anorexics	%*	25.0	12.5	12.5	0
	R**	-2.2	-.9	.6	-.3
Chronic Purgers		30.8	30.8	0	15.4
		-2.9	.9	-.6	1.5
Bulimic Purgers		46.2	25.0	7.7	3.8
		-3.5	.7	1.5	.0
Bulimic Restricters		60.0	40.0	0	0
		.7	1.6	-.5	-.4
Subfrequency Bulimics		75.0	25.0	0	0
		1.8	.1	-.4	-.3
Binge Eaters		100.0	0	0	0
		1.9	-.9	-.2	-.2
Chronic Restricters		90.0	9.1	0	0
		4.2	-1.6	-.5	-.4

(Continued)

Table 14 (Continued)

Frequency of Laxative Abuse of Poly-Substance Abusers by Eating Disorders Group

Eating Disorder Group	Laxative Abuse Frequency		
	Several /Week	Once /Day	More than Once/Day
Bulimic	25.0	25.0	0
Anorexics	1.5	1.7	-.4
Chronic	7.7	0	15.4
Purgers	.1	-.5	1.4
Bulimic	7.7	3.8	5.8
Purgers	.6	.0	.5
Bulimic	0	0	0
Restricters	-.7	-.4	-.5
Subfrequency	0	0	0
Bulimics	-.5	-.3	-.4
Binge	0	0	0
Eaters	-.3	-.2	-.2
Chronic	0	0	0
Restricters	-.7	-.4	-.5

Note. *Percentages are expressed as raw percentages. **Residuals are the value of the observed cell count minus the expected value, which is the number expected in each cell if the two variables were statistically independent.

Personality Characteristics

To assess the hypothesis that the eating disorder groups' personality characteristics fall outside the normal range by different degrees according to the proposed spectrum, and differ from each other, several multivariate analysis of variance tests (MANOVA) were performed. The first MANOVA set out to assess the group differences in validity scale scores of the MMPI. The Bartlett test of sphericity indicated that the three validity scales were correlated and are thus not independent. Therefore, the MANOVA analysis proceeded. MANOVAs will be used for correlated dependent variables, unless otherwise specified.

Results indicate no significant group differences in MMPI validity scale scores, $F(18,266) = 1.11$, $p=.337$. Examination of the individual validity profile patterns, including the elevations of the validity scale T-scores and the F-scale minus K-scale ratio (Lachar, 1974), indicate three subjects met one of the MMPI interpretive system's criteria for an invalid profile. These subjects, one bulimic purger, one bulimic restricter, and one chronic

Table 15

Frequency of Dieting of Poly-Substance Abusers by Eating Disorders Group

Eating Disorder Group		Dieting Frequency				
		Never	Rarely	Some-times	Often	Always
Bulimic Anorexics	%*	25.0	0	25.0	12.5	37.5
	R**	1.5	-1.2	.8	-1.2	.1
Chronic Purgers		0	7.1	7.1	35.7	50.0
		-.9	-1.1	-1.1	1.2	1.8
Bulimic Purgers		1.9	19.2	7.7	28.8	42.3
		-2.2	2.2	-3.8	.9	2.8
Bulimic Restricters		9.1	9.1	45.5	0	36.4
		.3	-.6	3.4	-3.0	-.1
Subfrequency Bulimics		22.2	11.1	11.1	55.6	0
		1.4	-.3	-.3	2.6	-3.3
Binge Eaters		12.5	37.5	37.5	12.5	0
		.5	1.8	1.8	-1.2	-2.9
Chronic Restricters		0	8.3	8.3	33.3	50.0
		-.7	-.8	-.8	.7	4.6

Note. *Percentages are expressed as raw percentages. **Residuals are the value of the observed cell count minus the expected value, which is the number expected in each cell if the two variables were statistically independent.

purger, obtained scale F scores in excess of 99T and scale L and K scores below 66T. Although it is likely these subjects are presenting an exaggerated picture of their symptoms, their scores were included in further analyses. This choice was made because regardless of profile validity, the profile as a whole conveys important information, and similar profiles will be encountered by clinicians as well as researchers.

The second MANOVA was performed to assess group differences in the MMPI clinical scale scores. Scales 1 to 4 and 6 to 0 were utilized. Scale 5 was excluded from this analysis because it does not operate on the same principle as the other scales, namely that a higher score indicates a greater degree of pathology.

The expected group differences were not confirmed, $F(54,458) = .980$, $p=.519$. However, examination of the group means for the MMPI clinical scales does reveal some support for the ordering of the groups from most to least pathological and the proposed spectrum. Means and standard deviations for the eating disorders groups' MMPI scores are presented in Table 16.

For five of the nine clinical scales examined, the bulimic anorexics obtained the highest mean score, as predicted by the proposed spectrum. On two scales, Scales 1 and 9, the chronic purgers obtained the highest score. Contrary to the proposed spectrum, the subfrequency bulimics

Table 16

Means and Standard Deviations of MMPI Scores of Poly-Substance Abusers by Eating Disorder Group

MMPI Scale	Subject Group: Bulimic Anorexic	Chronic Purgers	Bulimic Purgers	Bulimic Restricters
L Validity M	43.14	47.23	44.32	44.70
SD	(2.1)	(6.9)	(5.7)	(4.9)
F Validity	69.71	67.54	66.57	64.50
	(12.9)	(18.7)	(10.8)	(6.6)
K Validity	49.14	53.23	48.66	47.10
	(6.7)	(9.0)	(8.7)	(6.3)
Scale 1 (HS)	64.14	66.00	63.98	63.50
	(15.0)	(14.3)	(14.9)	(13.0)
Scale 2 (D)	79.29	70.79	75.78	76.20
	(16.5)	(16.4)	(12.6)	(15.7)
Scale 3 (Hy)	65.71	69.29	67.43	71.70
	(9.9)	(11.5)	(11.3)	(11.4)
Scale 4 (Pd)	81.43	80.36	79.71	84.00
	(13.6)	(11.5)	(9.1)	(9.6)
Scale 6* (Pa)	72.00	69.79	67.64	71.70
	(11.9)	(12.2)	(11.0)	(11.8)
Scale 7 (Pt)	78.43	71.71	73.39	72.00
	(16.5)	(13.3)	(11.4)	(13.0)
Scale 8 (Sc)	77.43	73.40	74.34	72.60
	(22.2)	(20.9)	(14.5)	(14.4)
Scale 9 (Ma)	65.29	70.14	62.04	60.60
	(11.4)	(12.4)	(9.9)	(10.5)
Scale 0 (Si)	66.57	56.57	62.89	61.80
	(17.9)	(13.0)	(11.1)	(10.9)

(Continued)

Table 16 (Continued)

Means and Standard Deviations of MMPI Scores of Poly-Substance Abusers by Eating Disorder Group

MMPI SCALE		Subject Group: Subfreq. Bulimics	Binge Eaters	Chronic Restricters
L Validity	M	44.00	46.00	48.67
	SD	(2.7)	(7.9)	(8.1)
F Validity		64.00	58.88	66.17
		(9.0)	(5.6)	(14.2)
K Validity		50.44	55.63	55.33
		(7.2)	(8.8)	(12.1)
Scale 1 (HS)		57.56	58.75	64.33
		(10.2)	(8.3)	(16.2)
Scale 2 (D)		72.78	68.50	67.92
		(10.9)	(13.3)	(10.4)
Scale 3 (Hy)		65.22	63.50	61.67
		(11.8)	(7.0)	(6.7)
Scale 4 (Pd)		82.56	76.50	78.00
		(11.6)	(10.1)	(10.6)
Scale 6* (Pa)		69.89	65.50	67.25
		(8.3)	(8.2)	(10.0)
Scale 7 (Pt)		71.11	64.63	66.92
		(14.5)	(7.5)	(11.1)
Scale 8 (Sc)		75.67	67.50	73.42
		(16.4)	(4.8)	(15.3)
Scale 9 (Ma)		64.89	65.75	63.67
		(13.8)	(12.2)	(8.1)
Scale 0 (Si)		60.33	56.88	54.75
		(14.1)	(9.0)	(10.5)

(Continued)

Table 16 (Continued)

Means and Standard Deviations of MMPI Scores of Poly-Substance Abusers by Eating Disorder Group

	Subject Group			
Composite Measure	Bulimic Anorexic	Chronic Purgers	Bulimic Purgers	Bulimic Restricters
Mean Number of Elevated (I≥70) Clinical Scales	4.50 (3.3)	4.79 (3.2)	3.89 (2.9)	4.73 (3.0)
Mean of 9 Clinical Scales	72.25 (12.4)	69.78 (10.7)	69.69 (7.9)	70.06 (9.2)

	Subject Group		
Composite Measure	Subfreq. Bulimics	Binge Eaters	Chronic Restricters
Mean Number of Elevated (I≥70) Clinical Scales	4.33 (2.7)	2.63 (1.8)	3.25 (2.9)
Mean of 9 Clinical Scales	68.89 (7.7)	65.28 (4.6)	66.44 (8.0)

Note. *Scale 5 was excluded because it does not have the same underlying dimension of pathology.

scored highest on Scale 4 and the bulimic restricters obtained the highest score on Scale 3.

As predicted, bulimic purgers and bulimic restricters obtain lower scale scores than the bulimic anorexics on all but Scale 3. On Scales 2,3,4 and 6, the bulimic restricters slightly outscore the bulimic purgers. The bulimic purgers score quite a bit lower than expected relative to the other groups on Scales 4, 6, and 9, and the bulimic restricters score lower than expected on Scales 8 and 9.

At the lower end of the proposed spectrum, the groups also conform weakly to their hypothesized placement. Binge eaters consistently obtain the lowest or second lowest scale score on eight of the clinical scales. Surprisingly, on Scale 9, the binge eaters scored highly. The chronic restricters also conform to the pattern as expected, except for a high score on Scale 1. Subfrequency bulimics do not conform to the spectrum as frequently as the other low-end groups. Subfrequency bulimics score higher than expected on Scales 4, 6, and 8.

Therefore, some weak support for the proposed spectrum was found. Specifically, Scale 7 nearly replicates the proposed spectrum. Scales 1, 2, 8, and 0 conform to the expected pattern with one major deviation.

General Psychiatric Symptoms

Group differences in current psychiatric symptomatology were assessed using a MANOVA, with the SCL-90 scales as the dependent variables. Results of the MANOVA confirm the hypothesis that the groups differ in degree of reported symptomatology over the two weeks prior to participation in the study, $F(54,443) = 1.36$, $p<.054$. Subsequent univariate F-tests revealed trends toward significant differences on three scales: interpersonal sensitivity, $F(6,94) = 2.05$, $p<.066$, paranoid, $F(6,94) = 1.58$, $p<.161$, and psychoticism, $F(6,94 = 1.82$, $p<.104$. Means and standard deviations for the SCL-90 scores for each group are presented in Table 17.

Evaluation of the group's mean scale scores once again reveals some support for the proposed spectrum of eating disorders. Groups at the more disturbed end of the proposed spectrum do obtain greater scores on all but one of the SCL-90 scales, indicating greater disturbance. As proposed, bulimic anorexics score the highest on a number of the scales, including obsessive-compulsive, depression, anxiety, and phobic scales, and chronic purgers score highest on the somatization, paranoid and psychoticism scales. Bulimic anorexics scored unexpectedly low on the somatization scale while chronic purgers scored lower than expected on the depression scale and a little lower than expected on the interpersonal sensitivity scale.

Table 17

Means and Standard Deviations of SCL-90 Scale Scores of Poly-Substance Abusers by Eating Disorder Group

SCL-90 Scale		Subject Group: Bulimic Anorexics	Chronic Purgers	Bulimic Purgers	Bulimic Restricters
Somatization	M	13.62	15.08	14.64	14.06
	SD	(10.1)	(9.1)	(10.9)	(5.6)
Obsessive-Compulsive		21.61 (10.4)	20.51 (10.1)	19.03 (8.5)	20.12 (6.5)
Interpersonal Sensitivity		23.32 (8.9)	18.74 (6.8)	20.27 (6.3)	21.82 (5.7)
Depression		33.96 (10.9)	28.81 (9.2)	31.50 (10.2)	33.37 (8.0)
Anxiety		19.72 (6.0)	18.34 (10.2)	17.92 (8.9)	18.16 (8.5)
Anger		7.79 (4.2)	6.86 (4.8)	8.38 (5.2)	9.53 (4.3)
Phobic		8.52 (5.0)	5.00 (6.8)	6.96 (7.0)	4.60 (5.4)
Paranoid		8.23 (5.0)	9.92 (4.6)	8.23 (4.6)	7.78 (4.7)
Psychoticism		13.61 (8.5)	13.79 (9.3)	13.47 (7.7)	11.42 (7.7)
General Symptom Index		2.00 (0.7)	1.78 (0.7)	1.87 (0.8)	1.98 (0.6)
Positive Symptom Total		63.75 (15.2)	61.14 (18.6)	64.65 (15.8)	66.82 (12.3)
Positive Symptom Distress Level		2.76 (0.6)	2.54 (0.6)	2.52 (0.6)	2.63 (0.5)

(Continued)

Table 17 (Continued)

Means and Standard Deviations of SCL-90 Scale Scores of Poly-Substance Abusers by Eating Disorder Group

SCL-90 Scale	Subject Group: Subfreq. Bulimics	Binge Eaters	Chronic Restricters
Somatization	7.78 (3.7)	12.01 (11.9)	11.57 (9.8)
Obsessive-Compulsive	19.55 (10.3)	19.64 (11.3)	16.09 (8.6)
Interpersonal Sensitivity	14.61 (6.4)	16.46 (11.1)	15.53 (7.8)
Depression	29.20 (8.9)	28.60 (13.6)	24.66 (9.9)
Anxiety	14.01 (8.2)	17.44 (12.2)	13.63 (8.4)
Anger	10.00 (5.2)	7.73 (5.3)	6.86 (4.8)
Phobic	2.13 (2.6)	5.29 (5.2)	4.20 (5.4)
Paranoid	4.67 (3.2)	5.02 (5.7)	6.97 (5.2)
Psychoticism	8.90 (4.0)	5.43 (6.0)	11.40 (5.9)
General Symptom Index	1.49 (0.5)	1.55 (1.0)	1.50 (0.7)
Positive Symptom Total	54.75 (11.1)	48.88 (25.7)	55.91 (16.7)
Positive Symptom Distress Level	2.41 (0.4)	2.67 (0.7)	2.28 (0.5)

The scores of bulimic purgers did not consistently conform to the expected pattern in two ways. First, bulimic restricters scored higher than bulimic purgers on five of the nine scales. Second, bulimic purgers scored lower than expected on the obsessive-compulsive scale. However, on the remaining eight SCL-90 scales the bulimic purgers' scores almost always placed them in exactly the hypothesized place on the spectrum relative to groups other than the bulimic restricters.

As proposed, at the low end of the proposed spectrum, the chronic restricters consistently received relatively low scores, in fact they received the lowest score on four of the nine scales. The subfrequency bulimics scored higher than expected on the anger scale. The binge eaters scored higher than expected on the phobic scale, but conformed to the proposed spectrum on the other nine scales.

Overall, there is some support for the proposed spectrum. The predicted pattern is almost exactly replicated on the anxiety, paranoid and psychotic scales, and the somatization, obsessive-compulsive, interpersonal sensitivity, depression and phobic scales deviate from the expected pattern by the misplacement of only one group. The anger scale deviates by two groups. Overall, deviations from the expected pattern are due mainly to depressed scores for the chronic purgers in three cases and to slightly elevated scores for the chronic restricters on two scales.

Alcohol and Drug Use

The hypothesized concordance of degree of alcohol and drug use to the proposed spectrum of eating disorders was assessed using two MANOVAs, three ANOVAs, and series of Pearson Chi-Square test of Independence for the categorical dependent variables. The first MANOVA addressed group differences in alcohol use. Three estimates of the extent of alcohol use were used as dependent variables: the age the subject first took an alcoholic drink; the age the subject began to drink alcohol regularly; and the age the subject began to get drunk regularly.

Results of the MANOVA do not find support for the degree of expected group differences, $F(18,255) = 1.26$, $p=.213$. Nor do all of the groups at the more severe end of the proposed spectrum consistently engage in alcohol related behaviors at an earlier age than the groups at the less severe end of the spectrum. The pattern of group means for the age at which subjects first drank an alcoholic beverage was nearly opposite the proposed pattern. Bulimic anorexics and chronic purgers began drinking regularly and getting drunk regularly at a much later age than expected (see Table 18).

Likewise, expected group differences in the age of onset of drug related behaviors was not supported, $F(18,243) = .637$, $p=.869$. Also, little correspondence was found between the group means and their predicted placement on

Table 18

Means and Standard Deviations of Alcohol and Drug-Related Behaviors and Impairment Indices of Poly-Substance Abusers by Eating Disorder Group

Alcohol and Drug Related Variables	Subject Group			
	Bulimic Anorexics	Chronic Purgers	Bulimic Purgers	Bulimic Restricters
Age 1st Drink M	13.13	14.80	13.44	13.33
SD	(3.6)	(4.5)	(3.0)	(3.2)
Age Drink Regularly	17.75 (4.0)	21.10 (7.5)	16.60 (2.7)	16.89 (5.0)
Age Drunk Regularly	20.50 (5.9)	25.10 (10.5)	17.58 (3.0)	18.56 (5.0)
Age 1st Use Substances	16.83 (3.7)	17.50 (4.3)	15.17 (2.8)	17.00 (5.6)
Age Use Regularly	18.17 (5.3)	19.71 (5.9)	16.81 (3.3)	18.78 (7.5)
Age High Regularly	19.83 (5.6)	21.00 (7.0)	17.81 (3.9)	20.44 (8.4)
30-Day Impair. Index	29.83 (6.7)	32.83 (10.1)	20.84 (8.7)	29.70 (11.2)
Six-Month Impair. Index	15.57 (3.2)	14.57 (3.3)	13.50 (2.5)	15.18 (3.0)
# Days Drinking in Past 30	15.40 (11.7)	22.20 (10.6)	11.09 (9.3)	13.33 (9.6)

(Continued)

Table 18 (Continued)

Means and Standard Deviations of Alcohol and Drug-Related Behaviors and Impairment Indices of Poly-Substance Abusers by Eating Disorder Group

Alcohol and Drug Related Variables	Subject Group: Subfreq. Bulimics	Binge Eaters	Chronic Restricters
Age 1st Drink M	12.78	13.33	12.58
SD	(3.4)	(3.4)	(3.6)
Age Drink Regularly	17.33	18.00	19.08
	(5.1)	(4.9)	(6.2)
Age Drunk Regularly	20.67	20.17	20.92
	(7.2)	(5.0)	(6.7)
Age 1st Use Substances	16.00	18.00	16.00
	(2.6)	(5.9)	(3.9)
Age Use Regularly	17.90	21.71	17.44
	(4.2)	(13.3)	(5.7)
Age High Regularly	18.40	22.14	20.00
	(5.9)	(13.0)	(6.5)
30-Day Impair. Index	19.38	13.86	28.11
	(12.4)	(4.3)	(8.5)
Six-Month Impair. Index	12.56	11.67	13.20
	(3.6)	(3.1)	(3.3)
# Days Drinking in Past 30	13.40	2.00	14.33
	(13.2)	(0.0)	(11.1)

the severity dimension of the proposed spectrum (see Table 18).

Although the proposed spectrum of eating disorder groups was not supported for age of onset alcohol and drug questions, there are some interesting consistencies across the questions. Bulimic purgers engaged in substance use behaviors quite a bit sooner than the other groups and with very little within-group variation compared to the other groups on all but the age of first drink variable. Bulimic restricters began drinking earlier relative to the other groups and began using drugs relatively later than the other groups. Bulimic anorexics began drinking and using at a mid-range age relative to the other groups. Chronic purgers were oldest at the time of the alcohol-related age questions and second oldest at the onset of the drug-related behaviors. Finally, subfrequency bulimics and chronic restricters engaged in these behaviors at relatively young ages compared to the other groups (see Table 18).

Group differences in the remaining three continuous alcohol/drug-related variables were assessed with three one-way ANOVAs because the units of measure are different from each other and from the age-related variables assessed with the preceding ANOVAs. A Bonferroni $\underline{t}$ of $\alpha = .017$ was utilized to avoid increasing the likelihood of committing a Type I error.

The expected group differences in the number of days

each subject spent drinking alcohol in the 30 days prior to admission were not confirmed, although the ANOVA reached near significant levels, $F(6,94) = 2.15$, $p=.075$. The hypothesized pattern of group means was nearly approximated. As the proposed spectrum hypothesized, the chronic purgers and anorexic bulimics spent a large number of the 30 days prior to admission drinking alcohol. Also as expected, the subfrequency bulimics and binge eaters drank relatively few days and the bulimic restricters were somewhere in the middle. Contrary to the proposed spectrum, the chronic restricters drank alcohol for many days and the bulimic purgers drank alcohol for few days than expected (see Table 18).

The groups did not differ as predicted in the number of drugs tried, $F(6,182) = .59$, $p=.74$. And little correspondence to the spectrum was found.

Two Pearson Chi-Square tests of Independence were performed to compare group differences on two categorical dependent variables: the degree of substance dependence and the order of eating disorder versus substance disorder onset. The degree of substance dependence variable was calculated utilizing the subject's answers to several items on the BIO which assessed physiological indicators of substance dependence, tolerance, and withdrawal, as defined by DSM-III (American Psychiatric Association, 1980). The order of onset for eating-related problems versus substance

use problems was assessed by an item on the DSED which asked subjects to specify which disorder(s) occurred first.

The first Pearson Chi-Square test of Independence did not confirm predicted group differences in the degree of dependence reported by subjects, $X^2(18) = 15.09$, ns. Dependence was operationalized via DSM-III tolerance and withdrawal symptoms, and the degree of dependence was categorized into four types depending on the absence or presence of tolerance and withdrawal symptoms. Despite a lack of significant group differences, there was some support for the proposed spectrum. As predicted by the spectrum, the chronic purgers, the bulimic anorexics and the bulimic purgers experienced both tolerance and withdrawal symptoms from alcohol and/or drugs more often than the other groups (see Table 19).

The second Chi-Square test also did not find group differences in order of problem onset, $X^2(24) = 25.42$, ns. However, group trends suggest bulimic purgers experience the onset of eating and substance abuse problems all at the same time more often than the other groups. Chronic purgers often begin using alcohol and drugs prior to the onset of the eating disorder. Subfrequency bulimics and chronic restricters have eating problems before alcohol and drug problems more often than the other groups (see Table 20).

Table 19

Degree of Substance Dependence of Poly-Substance Abusers by Eating Disorder Group

Eating Disorder Group		Degree of Substance Dependence			
		No Tol. or W/D	Tolerance	Withdrawal	Both Tol. and W/D
Bulimic Anorexics	%*	12.5	25.0	0	62.5
	R**	-.2	-1.3	-.2	1.8
Chronic Purgers		16.7	33.3	0	50.0
		.2	-1.0	-.3	1.1
Bulimic Purgers		17.0	41.5	0	41.5
		.9	.0	-1.4	.5
Bulimic Restricters		18.2	45.5	0	36.4
		.3	.4	-.3	-.5
Subfrequency Bulimics		22.2	44.4	11.1	22.2
		.6	.3	.8	-1.6
Binge Eaters		12.5	50.0	12.5	25.0
		-1.5	.7	.8	-1.2
Chronic Restricters		0	50.0	10.0	40.0
		-1.5	.9	.7	-.1

Note. *Percentages are expressed as raw percentages. **Residuals are the value of the observed cell count minus the expected value, which is the number expected in each cell if the two variables were statistically independent.

Table 20

Order of Problem Onset of Poly-Substance Abusers by Eating Disorder Group

Eating Disorder Group		Order of Onset: Alcohol & Drug First	Eating First	All Same Time	No Eating Problem	No Alc./Drug Problem
Bulimic Anorexics	%*	28.6	42.9	28.6	0	0
	R**	.2	-1.0	1.1	-.1	-.2
Chronic Purgers		50.0	42.9	7.1	0	0
		3.3	-2.0	-.8	-.1	-.4
Bulimic Purgers		21.6	54.9	17.6	0	3.0
		-2.4	-1.2	2.5	-.5	5.9
Bulimic Restricters		30.0	50.0	10.0	10.0	0
		.4	-.7	-.3	.9	-.3
Subfrequency Bulimics		11.1	77.8	11.1	0	0
		-1.4	1.8	-.1	-.1	-.2
Binge Eaters		28.6	71.4	0	0	0
		.2	1.0	-.9	-.1	-.2
Chronic Restricters		25.0	75.0	0	0	0
		-.2	2.1	-1.5	-.1	-.3

Note. *Percentages are expressed as raw percentages. **Residuals are the value of the observed cell count minus the expected value, which is the number expected in each cell if the two variables were statistically independent.

Summary Dependent Variables

Group differences were assessed in three of the four areas already discussed via the use of summary variables. A series of one-way analysis of variance tests (ANOVA) were performed, using the Bonferroni *t*. Due to the use of multiple tests, the level of significance at which the null hypothesis would be rejected was made more stringent to avoid incorrectly rejecting the null hypothesis, i.e., making a Type I error. Therefore an experimenter alpha level of .007 shall be used.

For the MMPI, the two summary variables used were the number of elevated MMPI clinical scales ($T \geq 70$ for Scales 1 to 4 and 6 to 0) and the mean of nine clinical scales. Two one-way ANOVAs fail to confirm the degree of differences between the groups: for the number elevated $F(6,108) = .797$, $p = ns$ and for the mean of the clinical scales $F(6,97) = ns$, $p = .ns$. However, there was some confirmation for the proposed spectrum in the pattern of the observed scores for these two variables. For both MMPI summary variables, the bulimic anorexics obtained the highest and most pathological score and the chronic purgers obtained scores at the higher and more pathological end of the group range. Also as expected, the binge eaters and the chronic restricters obtained relatively low scores for both variables. Unexpectedly, the bulimic purgers scored relatively lower than expected on the number of elevated scales and the

bulimic restricters scored relatively higher than expected according to the proposed spectrum (see Table 16).

Three summary variables for the SCL-90, the general symptom index, the positive symptom total, and the positive symptom distress level, were used to evaluate group differences. The ANOVAs failed to confirm the hypothesized degree of group differences: $F(6,105) = 1.02$, $p=ns$; $F(6,105) = 1.74$, $p=ns$; and $F(6,105) = .81$, $p=ns$, respectively. However, once again there was some support for the proposed spectrum in the pattern of the group means.

As hypothesized, the bulimic anorexics obtained the highest mean score for two of the three SCL-90 summary scores. However, the bulimic restricters scored surprisingly high on all three of the indices. Results more clearly support the placement of the group at the more pathological end of the proposed spectrum of eating disorders. As predicted, chronic restricters obtained the lowest score on two of the three indices, indicating this group is currently experiencing the least amount of distress. Also, consistent with the proposed spectrum, the subfrequency bulimics and the binge eaters obtained low scores for the general symptom index and the positive symptom total. The subfrequency bulimics also obtained a relatively low score on the positive symptom distress level index.

Inconsistent with the predicted pattern, binge eaters

scored higher than expected on the positive symptom distress level and the bulimic purgers scored a little higher than expected on the positive symptom total (see Table 17).

Two impairment indices were calculated from answers to items on the BIO to provide measures of the effects of using substances on a person's functioning. The six month impairment index, a measure of disturbance in affective state, did not differ significantly between the groups, $F(6,100) = 1.93$, $p=.084$. The 30 day impairment index, a measure of the behavioral consequences of substance use, did differ significantly between the groups, $F(6,89) = 5.80$, $p<.0001$ with $\alpha_E = .007$ (see Table 18).

The pattern of the group means lends support to the proposed spectrum. The chronic purgers and the bulimic anorexics consistently obtained high scores on this index. Also as predicted, the binge eaters and the subfrequency bulimics obtained relatively low scores. The bulimic restricters and the chronic restricters scored higher than expected. A Post-hoc Duncan Multiple Range test on the 30 day impairment index indicates significant differences between the four highest scoring groups and the remaining three groups. Contrary to the expected pattern of scores, the bulimic purgers scored lower than expected and the chronic restricters scored higher than expected.

Summary of the Findings

The first purpose of this study was to describe a clinical population of subjects with eating-related problems and co-occurring substance use problems in terms of demographic variables, eating-related behavior, and behavior often associated with eating disorder subjects. In the process, the eating disorder classification was validated. Variables of weight and eating-related behavior conformed to the predicted patterns of group differences.

However, behavior related to impulse control deficits did not differentiate the groups as predicted and provided no clear pattern. Variables related to depression partially support the predicted pattern of differences between the groups with some notable exceptions. Bulimic purgers and subfrequency bulimics appear to be less impulsive and depressed than predicted by previous research. However, chronic purgers appear to be depressed and impulsive according to one measure in the way in which bulimic purgers were predicted to do so. Also, chronic purgers were much more likely to have a history of hospitalizations for anorexia nervosa and bulimia than predicted. Considering these findings together may indicate the chronic purgers are, in fact, at a more advance eating disorder stage as is suggested by some research and thus incorporated into the proposed spectrum.

The proposed spectrum of eating disorders and the

resultant hypotheses addressed in two ways. The first was to assess for significant group differences on the various dependent variables measuring substance use, personality characteristics and current symptomatology using appropriate statistical tests; these tests included ANOVAs and MANOVAs for continuous variables, and Chi-Square tests of Independence for the categorical variables. The results of these statistical tests suggest the eating disorder groups are seldom significantly different from one another when testing group differences between all of the groups. The exceptions are the SCL-90 scales and the 30-Day Impairment Index, which found significant group differences, and the Six-Month Impairment Index, which found nearly significant group differences. Thus, the test of the full spectrum of eating disorder types along a dimension of severity provides little support for a difference between the groups in magnitude of psychopathology (see Table 21).

However, the second way in which the proposed spectrum was assessed does provide support for the predicted pattern of the groups along a dimension of severity. The predicted pattern is replicated or nearly replicated in five of the twelve tests assessing an area of psychopathology described above. In addition, the predicted pattern receives some support in three of the remaining seven tests, and weak support in two of the remaining four tests. In only two of the tests assessing group differences

Table 21

Summary of Significant Group Differences and Agreement with the Proposed Dimension of Severity

Dependent Variables and Variable Sets	Finding: Significant Group Differences	Finding: Predicted Pattern
MMPI Clinical Scales	---	Weak Pattern
SCL-90 Clinical Scales	Significant	Moderate Pattern
Alcohol Ages	---	---
Drug Ages	---	---
SCL-90		
GSI	---	Strong Pattern
PST	---	Strong Pattern
PSDL	---	Weak Pattern
MMPI		
# Elevated	---	Moderate Pattern
Mean of Scales	---	Strong Pattern
30-Day Index	Significant	Moderate Pattern
6-Month Index	Near Signif.	Strong Pattern
Degree of Dependence	---	Strong Pattern

in an area of psychopathology is there no support for the predicted pattern of eating disorder groups along a dimension of severity (see Table 21). Further implications for these findings will be discussed in the next chapter.

Finally, a simple count of the compliance of the results to the predicted pattern of group means and the approximate strength of the compliance is presented in Table 22. The following assumes almost no support is found among the substance-use age of onset variables. Tabulating across hypotheses and starting with Hypothesis 1, the placement of the bulimic anorexics at the most pathological end of the dimension of severity is supported. Hypothesis 2, the placement of the chronic purgers, also finds support. However, the support for Hypothesis 2 is weaker than Hypothesis 1 when considering the SCL-90 summary scales. Hypotheses 3 and 4 also find little to no support on the SCL-90 summary scales. Yet, some support is found in other areas, including strong to moderate support on many of the SCL-90 scales, the MMPI scales, and the measure of the physiological indicators of substance dependence. Hypothesis 5 obtains strong to moderate support. And like Hypothesis 1, Hypothesis 6 obtains strong support.

Therefore, it appears as if the predicted pattern of group placement along a dimension of severity is supported strongly for the ends of the spectrum, while more mixed support is obtained for the center of the spectrum.

Table 22

Summary of the Hypotheses, Ratio of Fit, Strength of Fit

Dependent Variables and Variable Sets	Hypotheses #1 BA> Other	#2 BA>CP> Other	#3 BA;CP>BP> Other
MMPI Clinical Scales	5/9 Strong	3/9 Moderate	5/9 Moderate
SCL-90 Scales	5/9 Strong	2/9 Strong	2/9 Strong
	2/9 Moderate	3/9 Moderate	4/9 Moderate
Age Alcohol	0/3 None	0/3 None	0/3 None
Age Drug	0/3 None	0/3 None	0/3 None
SCL-90 GSI	1/1 Strong	1/1 Weak	1/1 Weak
PST	1/1 Moderate	1/1 Weak	None
PSDL	1/1 Strong	1/1 Weak	None
MMPI # Elevated	1/1 Moderate	1/1 Moderate	None
MMPI Mean of Clinical Scales	1/1 Strong	1/1 Moderate	1/1 Moderate
30-Day Impair. Index	1/1 Moderate	1/1 Moderate	None
6-Month Impair. Index	1/1 Strong	1/1 Moderate	1/1 Moderate
Degree of Dependence	1/1 Strong	1/1 Strong	1/1 Strong

(Continued)

Table 22 (Continued)

Summary of the Hypotheses, Ratio of Fit, Strength of Fit

Dependent Variables and Variable Sets	Hypotheses #4 BA,CP,BP> BR> Other	#5 BA,CP,BP,BR> SUB≈BE>CR	#6 Other> CR
MMPI Clinical Scales	2/9 Moderate	2/9 Strong	3/9 Moderate
		3/9 Moderate	3/9 Moderate
SCL-90 Scales	2/9 Strong	1/9 Strong	4/9 Strong
	2/9 Moderate	6/9 Moderate	3/9 Moderate
Alcohol Ages	None	None	2/3 Moderate
Drug Ages	None	None	None
SCL-90 GSI	None	1/1 Strong	1/1 Strong
PST	None	1/1 Moderate	1/1 Moderate
PSDL	1/1 Weak	None	1/1 Strong
MMPI # Elevated	None	1/1 Weak	1/1 Moderate
MMPI Mean of Clinical Scales	None	1/1 Moderate	1/1 Moderate
30-DAY Impair. Index	None	1/1 Moderate	None
6-MONTH Impair. Index	None	1/1 Moderate	1/1 Moderate
Level of Dependence	1/1 Moderate	1/1 Moderate	1/1 Weak

DISCUSSION AND CONCLUSIONS

The findings of this study serve to describe eating disorder groups and groups with subclinical eating-related disturbances all of whom have a co-existing poly-alcohol-drug substance use disorder. The findings support the existence of a dimension of severity as an underlying organizing principle useful in predicting degree of psychopathology in various forms of eating disorders.

The spectrum of eating disorder severity gleaned from previous research supported the following order of group placement from most severely disturbed to least disturbed: bulimic anorexics, chronic purgers, bulimic purgers, bulimic restricters, subfrequency bulimics/binge eaters, and chronic restricters. The between-group differences are small and often nonsignificant, but importantly, the differences are in the predicted directions.

Major findings and Implications

Eight eating disorder groups in a clinical sample subgroup of subjects with eating and substance related problems were described and validated. The number of anorexics was considered too small (N=3) and was not

included in the analyses, leaving seven subject groups. The groups differ as expected on current weight, highest adult weight and lowest adult weight, with those subjects who engage in multiple and more severe purging and restricting tactics obtaining the lowest weights. Bulimic subjects often binge eat in secrecy, they eat sensibly in front of others and splurge when alone, and they often experience guilt following overeating.

Contrary to findings in the research literature (Halmi, 1985), subjects who engage in purging are not more likely to engage in impulsive behaviors than the other eating disorder types. Overall, a high number of subjects have stolen, self-abused, and attempted suicide, indicating difficulties with impulse control in the sample as a whole. Likewise, depressive episodes requiring hospitalization are common among all of the subject groups. Thus, while impulse control deficits and depressive symptoms are common among the eating disorders subjects, these problems do not differentiate the type of eating disorders from one another.

Importantly, prior hospitalizations for anorexia nervosa and bulimia among subjects not currently meeting those diagnostic criteria support what has been observed in a longitudinal study of eating disorders (Dwenowski et al., 1988) i.e., there is movement over time from clinically diagnosable eating problems to subclinical ones. Also, the findings may indicate the discontinuation of a symptom such

as binge eating, while a symptom such as purging remains in operation. The findings may imply and support those researchers like Russell (1979) who require the examination of historical eating-related behavior in order to diagnose an eating disorder.

The level of eating-related pathology among the subject groups as a whole is similar to previous research findings (Johnson & Connors, 1987) and many subjects easily meet and exceed the minimum frequency criteria for the diagnosis of an eating disorder for their respective groups. The subjects binge eat, purge, and restrict at similar frequencies compared to other samples with three important exceptions: the bulimic purgers, bulimic anorexics and chronic purgers engage in purging behavior at a higher frequency than is presented in the research literature (Johnson & Connors, 1987). It appears as if this clinical subgroup of eating disorder subjects who have a coexisting substance use disorder are engaging in problematic eating-related behaviors at more frequent rates than the total sample of eating disorder subjects.

The proposed spectrum of eating disorders lying along a dimension of severity is supported by this study. The predicted pattern of differences was supported for personality characteristics as measured by the MMPI; current psychiatric symptoms as measured by the SCL-90; summary scores for the MMPI and SCL-90; indices assessing the

adverse psychosocial and affective effects of alcohol and drug use; and a measure of physiological dependence to alcohol and drugs.

Support was not found for the earlier age of onset for alcohol and drug-related behaviors among the groups at the more severe end of the spectrum and a later age of onset for the groups predicted to be less pathological. Perhaps the lack of support for the predicted pattern is due to the type of substance abuser in the subject sample, the poly-substance abuser, who is known to begin using at an earlier age than those who abuse alcohol only or drugs only (Parrella & Filstead, 1988). While these subjects all engage in substance use related behaviors at relatively early ages compared to non-poly-substance abusers, differentiation between the eating disorder groups conforming to the spectrum was found for degree of physiological dependence and adverse psychosocial effects of substance use.

The majority of sujects in all of the eating disorder subject groups, except the chronic purgers, engage in eating related problem behaviors prior to the development of a substance use problem. Therefore, a self-medication hypothesis, wherein persons use substances to medicate another psychological problem, may be operating for these groups. Examination of the distinction between the chronic purgers and other groups on this variable should also be

addressed.

Support for the spectrum of eating disorders indicates the need to widen the focus of research in this area to include a wide array of eating pathology, and perhaps to broaden the eating disorder categories considered psychiatric disorders by our classification systems. Support for the spectrum also suggests the need to create homogenous eating disorder groups, thereby narrowing the type of behaviors engaged in by any one set of persons with eating-related problems. Support for the spectrum provides some impetus to study the eating patterns of a non-clinical sample in order to test whether the spectrum represents a continuum from normal eating to highly pathological eating. But perhaps the spectrum is useful only when applied to those whose eating-related problems have necessitated inpatient treatment.

While the lack of significant differences between the groups may be initially somewhat surprising, it could be that the number of subject groups and the small number of subjects in some groups has limited this study's chances at finding significant group differences. Most studies in the research literature investigate two or three groups at once, and thus may increase their chances at finding differences, especially when the groups lie at opposite ends of the spectrum. In support of this speculation Harju (1987) did not find support for group differences as measured by the

MMPI clinical scales, except when comparing the eating disorder groups she studied (i.e., bulimics, subthreshold bulimics, and recovered bulimics and anorexics) to a control group who had no eating problems. Likewise, Mintz (1987) obtained similar results with the following groups: bulimics, subthreshold bulimics, purgers, binge eaters, and chronic dieters.

More importantly, the lack of significant differences between the eating disorder groups is not surprising when one considers two issues. First, any spectrum, like a spectrum of light, has some parts which lie close to the line between two distinct groups. So, as one looks closer and discriminates further, a new group actually emerges, just as orange light becomes identifiable between red and yellow light. Therefore, the level of distinction is a very important factor which can serve to create many distinct groups or meld somewhat heterogeneous groups into one. Often, past research has taken too much of a macro approach, combining disparate groups such as bulimic purgers and binge eaters.

This study has attempted to define the group differences at another level. Yet, this level of analysis may also require some additional fine-tuning such as redefining several of the groups towards the center of the spectrum where the least support for the pattern was found.

A second issue complicating the categorization for

eating disorder type is historical information. This study utilized current eating-related behaviors to classify the subjects, therefore tapping a static point in time. However, this study found some subjects had a history of hospitalization for one eating disorder and were currently categorized as another. One longitudinal study of eating disorders found the diagnoses change over time, including shifts from clinical to subclinical levels and vice-versa (Dwenowski et al., 1988). Therefore, the eating disorder group type may be somewhat diluted by the borderline subjects and by the subjects who have a history of another disorder. An eating disorder classification system which accounts for historical information would aid in creating more homogenous groups such as Harju's (1987) recovered group and Dwenowski et al.'s (1988) subjects who vacillate between clinical and subclinical levels of disturbance.

Despite these potential diluting factors, support was found for a pattern of eating disorder groups along a dimension of severity. Distinct group differences probably should not be the goal when an underlying spectrum is tested. Another, more constructive, means of assessing the spectrum would be to do a within-subjects longitudinal design to discern if level of psychopathology mimics movement along the spectrum of eating disorders, and if individual pre-existing psychopathology leads to the development of a particular type of eating disorder.

Considerations, Limitations and Future Research

The major study limitation appears to be the lack of historical information on eating-related pathology, and as mentioned, a longitudinal study would best fill this gap. Causality would be more clearly assessed. And along these lines a longitudinal study would also be able to address the self-medication hypothesis by following the interaction of the eating problem behaviors and substance use.

A second issue for consideration is the use of poly-substance users versus those who use alcohol only or drugs only. Further research is needed to assess the validity of the spectrum of eating disorders among those eating-substance abuse groups and among eating disorder subjects who do not abuse substances.

Third, the fairly small sample size among some groups and the very different groups sizes reduces the statistical power of the analyses (Hays, 1981; Winer, 1971) and may have limited this study's potential findings. A larger, more evenly distributed sample size would correct this potential limitation.

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

7/24/89
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