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**Bulimia: Prevalence and correlates in high school females**

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**Iowa State University, 1987**

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Bulimia: Prevalence and correlates  
in high school females

by

Nancy Ann Meeuwsen Bennett

A Dissertation Submitted to the  
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# TABLE OF CONTENTS

|  | Page |
|--|------|
| INTRODUCTION   | 1    |
| A RATIONALE FOR THE CURRENT STUDY  | 38   |
| RESEARCH QUESTIONS AND HYPOTHESES  | 42   |
| METHOD   | 44   |
| RESULTS  | 65   |
| DISCUSSION   | 107  |
| REFERENCES   | 125  |
| ACKNOWLEDGMENTS  | 136  |
| APPENDIX A. SURVEY OF EATING HABITS AND RELATED CONCERNS                                       | 137  |
| APPENDIX B. SUMMARY OF PILOT EVALUATION RESPONSES  | 150  |
| APPENDIX C. PROJECT ANNOUNCEMENT   | 152  |
| APPENDIX D. INSTRUCTIONS FOR SURVEY ADMINISTRATION   | 153  |
| APPENDIX E. INFORMED CONSENT STATEMENT   | 155  |
| APPENDIX F. PROJECT ANNOUNCEMENT SUMMARY   | 156  |
| APPENDIX G. RELATIONSHIP OF REMAINING BULIMIA-RELATED BEHAVIORS<br>TO HIGH SCHOOL GRADE LEVELS | 157  |



## LIST OF TABLES

|  | Page |
|--|------|
| Table 1. DSM-III Diagnostic Criteria for Bulimia   | 4    |
| Table 2. DSM-III-R (Revised) Diagnostic Criteria for Bulimia Nervosa   | 6    |
| Table 3. Summary of College Female Prevalence Data for Bulimia (Based on Subject Self-Report)  | 22   |
| Table 4. Summary of High School Female Prevalence Data for Bulimia (Based on Subject Self-Report)  | 25   |
| Table 5. Comparison of the Sample Racial Composition to that of the Geographic Region  | 46   |
| Table 6. Comparison of Sample Parents' Education to that of Adults from the State of Iowa  | 47   |
| Table 7. Income Characteristics for Parents of Subjects Reporting Information  | 48   |
| Table 8. Bulimia Symptom Group Prevalence Data by High School Grade Levels   | 66   |
| Table 9. Relationship of Eight Selected Bulimia-related Behaviors to High School Grade Levels  | 67   |
| Table 10. Relationship of Eight Selected Bulimia-related Behaviors to Bulimia Symptom Groups   | 71   |
| Table 11. Relationship of a Dichotomous Variable for the Use of Diuretics to High School Grade Levels  | 78   |
| Table 12. Relationship of Demographic Data to Bulimia Symptom Groups   | 80   |
| Table 13. Cell Sizes, Means, and Standard Deviations for Demographic Variables on the Total BULIT Score  | 85   |
| Table 14. Relationship of Demographic Variables to the Total BULIT Score: ANOVA F Statistics and Associated <u>p</u> Values for Type III Sums of Squares | 87   |
| Table 15. Cronbach's Alpha Internal Consistency Coefficients for the Dependent Variables   | 89   |

|   | Page |
|---|------|
| Table 16. Correlations Between the Dependent Variables  | 90   |
| Table 17. Cell Sizes, Means, and Standard Deviations (S.D.) for the Overall Sample on the Dependent Variables   | 92   |
| Table 18. Cell Sizes, Means, and Standard Deviations (S.D.) for the Bulimia Symptom Groups on the Dependent Variables                                       | 93   |
| Table 19. Relationship of Bulimia Symptom Groups to the Dependent Variables: ANOVA F Statistics and Associated <u>p</u> Values for Type III Sums of Squares | 94   |
| Table 20. Bulimic Symptomatology as a Function of Five Personality Variables: Multiple Regression Analysis  | 98   |
| Table 21. Hit-Miss Summary Data for Discriminant Analysis   | 101  |
| Table 22. Standardized Discriminant Function Coefficients and Pooled Within-Groups Correlations Between Predictive Variables and the Discriminant Function  | 102  |
| Table 23. Correlations Between Social Desirability (M-C SDS) and the Dependent Variables  | 105  |

## LIST OF FIGURES

|   | Page |
|---|------|
| Figure 1. Profile of dependent variables for three bulimia symptom groups (based on z-score transformations for Table 18) | 96   |
| Figure 2. Group centroids of three bulimia symptom groups in multi-variate space defined by five personality variables    | 103  |

## INTRODUCTION

This research paper is based on a large-scale, community survey of high school females. The primary purpose of the survey study is two-fold: (1) to establish the prevalence of bulimia (the binge eating syndrome) and bulimic behaviors in a diverse, nonclinical population consisting of high school females; and (2) to identify potential predictor variables for screening female students "at risk" by exploring the relationship among certain personality characteristics (anxiety, depression, self-efficacy, and fear of fat) and bulimic behaviors. The summarized literature on bulimia and its definition, onset and prevalence, and personality correlates is presented in separate introductory sections below. Then, conclusions from this literature are drawn together to produce a rationale for the current study, research questions and hypotheses, and a research design for a survey investigating the prevalence and personality correlates of bulimia in a large, non-clinical, adolescent female sample from a midwestern high school population.

### Bulimia and its Definition

Over the past fifteen years, there has been a growing interest in eating disorders. The extreme subgroups on the eating disorders spectrum--anorexia nervosa and obesity--have been previously recognized in the medical and psychological literature, resulting in a proliferation of information regarding the diagnosis, etiology, treatment and prognosis of these syndromes (Bruch, 1973; Hsu, 1980; Stunkard, 1976; Vigersky,

1977; Wilson, 1976).

Within the past decade, another abnormal eating pattern--bulimia--has been recognized by mental health professionals. This binge eating syndrome has been recently described in the psychiatric literature (DSM-III (American Psychiatric Association, 1980); Mitchell & Pyle, 1982) as well as clinically identified most frequently in college women populations (Boskind-Lodahl & Sirlin, 1977; Boskind-Lodahl & White, 1978; Clement & Hawkins, 1980; Ondercin, 1979; Stangler & Printz, 1980), yet there is limited understanding of the nature of this disorder.

The term "bulimia" translates from the Greek language into "ox hunger" and refers to the rapid gorging on large quantities of easily ingested foods known as binge eating. Bulimia has been described as a symptom in overweight and in anorexic individuals (Casper, Eckert, Halmi, Goldberg, & Davis, 1980; Crisp, 1982; Garfinkel, Moldofsky, & Garner, 1980; Loro & Orleans, 1981; Stunkard, 1976; Wilson, 1976) and in those with hypothalamic dysfunction (Green & Raw, 1977). More recently, however, bulimia has been reported to occur in normal weight individuals as part of an abnormal eating syndrome which is characterized by a vigorous effort to diet followed by excessive overeating and purgative abuse (e.g., Boskind-Lodahl, 1976; Boskind-Lodahl & Sirlin, 1977; Bruch, 1974; Fairburn & Cooper, 1982; Halmi, Falk, & Schwartz, 1981) and, as a result, has received growing public and professional awareness. Garner and Garfinkel (1985) claim that "[D]uring the past few years, bulimia has made its appearance as the great new eating disorder" (p. 12).

At present, there is confusion and inconsistency in the terminology,

definition, diagnostic criteria and reporting practices surrounding this eating disorder. In recent years, bulimia has been called by such names as "compulsive eating" (Ondercin, 1979; Orbach, 1977; Rau & Green, 1975), "bulimia nervosa" (Russell, 1979), "bulimarexia" (Boskind-Lodahl, 1977; Lowenkopf, 1982), "dietary chaos syndrome" (Palmer, 1979), "the stuffing syndrome" (Kornhaber, 1970), "the bulimic syndrome" (Mitchell & Pyle, 1982), and "the gorging-purging syndrome" (Boskind-Lodahl & Sirlin, 1977). A consensual definition of the disorder is precluded by this multiple labeling. The definitional issue is further compounded by the fact that the term "bulimia" has assumed a dual meaning in the literature; that is, as a symptom of binge eating in various clinical populations (as described earlier in relationship, for example, to anorexia nervosa and obesity) as well as a larger syndrome.

In 1979, the American Psychiatric Association recognized bulimia as a separate entity due to its occurrence in normal weight individuals and established criteria for its clinical identification (see Table 1 on page 4). The DSM-III (American Psychiatric Association, 1980) criteria are comprehensive and discriminative in nature--bulimia is viewed as a syndrome whose behavioral, cognitive, affective, and motivational parameters are clearly described, and anorexia nervosa and other physical disorders are ruled out as a cause of the binge eating episodes.

There is controversy over whether or not the DSM-III criteria are adequate and truly describe one specific entity (Herzog & Gordon, 1985; Johnson & Love, 1985; Lowenkopf, 1982). Alternative criteria have been developed and utilized with a variety of clinical populations (e.g.,

Table 1

DSM-III Diagnostic Criteria for Bulimia

---

## 307.51 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.
- 

Note. From the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (pp. 70-71) by the American Psychiatric Association, 1980, Washington, D.C.: APA.

Clement, 1980; Nogami & Yabana, 1977; Ondercin, 1979; Rau & Green, 1978; Russell, 1979; Wermuth, Davis, Hollister, & Stunkard, 1977). In fact, since the time of the data collecting for this survey, DMS-III-R (Revised) criteria for bulimia (entitled "bulimia nervosa") have been developed in response to the dissatisfaction with some of the DSM-III criteria (see Table 2 on page 6) (American Psychiatric Association, 1987). Use of these criteria is on an exploratory basis and, depending upon future research findings, may make up the criteria for DSM-IV. The present research, however, is based on the 1980 DSM-III criteria for bulimia in its determination of the prevalence of the disorder in high school females. Also, the term "bulimia" in the present research is used in the broader context, that is, as a syndrome, whereas the term "binge eater" is indicative of just that particular activity.

#### Onset and Prevalence

The onset of bulimia behaviors such as binge eating and/or self-induced vomiting has typically been reported to occur during the adolescent years (Halmi, 1981; Johnson, 1980; Mitchell, Hatsukami, Eckert, & Pyle, 1985; Mitchell & Pyle, 1982; Pyle, Mitchell, Eckert, Halvorson, Neuman, & Goff, 1983), but may range anywhere from 5 to 38 years of age (Mitchell, Hatsukami, Eckert, & Pyle, 1985). It is postulated that the adolescent years allow for the interplay of a number of forces (emotional, physical, psychological, and social) that make young females vulnerable to the development of this eating disorder (Vincent, 1984/1985).



Table 2

DSM-III-R (Revised) Diagnostic Criteria for Bulimia Nervosa

---

## 307.51 Bulimia Nervosa

- A. Recurrent episodes of binge-eating (rapid consumption of a large amount of food in a discrete period of time).
  - B. During the eating binges there is a feeling of lack of control over the eating behavior.
  - C. The individual regularly engages in either self-induced vomiting, use of laxatives, strict dieting, fasting or vigorous exercise in order to prevent weight gain.
  - D. A minimum average of two binge-eating episodes per week for at least three months.
  - E. Persistent over concern with body shape and weight.
- 

Note. From the Diagnostic and Statistical Manual of Mental Disorders, Third Edition--Revised (pp. 68-69) by the American Psychiatric Association, 1987, Washington, D.C.: APA.

Although the literature has described some of the retrospectively reported precipitants to the onset of bulimia such as particular events (transitional phase or separation from a significant other), voluntary dieting, familial stress, or "advice" of a friend (Dyken, 1983; Herzog, 1982; Mitchell, Hatsukami, Pyle, & Eckert, 1986; Pyle, Mitchell, & Eckert, 1981; Wilson, 1976), specific precipitants cannot be conclusively determined since prospective studies have not been conducted. The retrospective data may only be representative of binge eating once such behavior has become an established pattern for an individual. In any case, these data clearly suggest that bulimia usually develops in adolescence, and is often associated with attempts at dieting (either voluntarily or under pressure from family and/or peers), an inability to cope with uncomfortable feelings, or by a disruptive, distressing event.

The true prevalence of bulimia has been and is difficult to establish. Fairburn and Cooper (1982, p. 1153) have suggested that "[I]t is likely that cases will escape detection by conventional epidemiological methods because extreme guilt and secrecy surround the bouts of uncontrolled eating (binge eating) and self-induced vomiting" and "friends and relatives of the patients would be of limited value in detecting cases, since individuals' shape and weight are usually normal and their eating habits in social circumstances may be unremarkable."

The predominant population for the epidemiology and prevalence of bulimia has been adolescent girls and young women (Johnson & Larson, 1982; Nogami & Yabana, 1977; Pyle et al., 1981; Winstead & Willard, 1983). Evidence has accumulated over the past decade that indicates the

prevalence of eating disorders among young women is increasing (Boskind-Lodahl & Sirlin, 1977; Bruch, 1973; Casper, 1983; Duddle, 1973; Dunn & Ondercin, 1981; Halmi et al., 1981; Jones, Fox, Babigan, & Hutton, 1980; Pyle, Halvorson, Neuman, & Mitchell, 1986; Schwartz, Thompson, & Johnson, 1982; Stangler & Printz, 1980). Recent studies have indicated that bulimia is alarmingly becoming a way of life for large numbers of young women (Johnson, 1980). Bulimic behaviors were considered rare only a few years ago. Whether or not the reported increase in prevalence of bulimic behaviors reflects an increase in public awareness of the problem, a better understanding of the patterns of behavior associated with bulimia, and/or better methods of detection, is unknown. The findings of increased incidence, however, may be real, especially when consideration is given to the "sociocultural epidemic" of female thinness (Bruch, 1978) that has invaded the society over the recent years. The societal expectations and emphasis on thinness in women continue to surround the American female throughout her developmental years (Garner, Garfinkel, Schwartz, & Thompson, 1980).

#### Prevalence of bulimia and bulimic behaviors in college females

Bulimia and bulimic behaviors have been recognized as significant problems in college-age students. In development and construct validation of a self-report measure of binge eating tendencies, Hawkins and Clement (1980) administered a nineteen-item questionnaire to 182 female and 65 male college freshmen of normal weight and to 26 overweight college females. Over two-thirds of the female sample (79%) and almost

one-half of the male sample (49%) reported occurrences of binge eating. Binging at least once per week was reported by one-third of the male and female normal weight subjects and by 40% of the overweight subjects. Approximately 4.3% of the total female sample (nine subjects, eight of whom were normal weight) reported that they had at least once induced vomiting after a binge. None of the males reported this phenomenon. Onset of binge eating tendencies for both males and females was reported to occur between the ages of 15-20 years (mean age of the sample was 20 years).

Attention in the literature was first brought to the high frequency of bulimia as a psychiatric diagnosis by Stangler and Printz (1980). The authors, using DSM-III, retrospectively reviewed charts of 500 students at the University of Washington Psychiatric Clinic for Students to check prevalence and associated characteristics of psychiatric diagnoses at intake evaluation. They found that 5.3% of the 318 women in the sample and 1.4% of the 182 men in the sample coming to the clinic for treatment met the DSM-III diagnostic criteria for bulimia. The mean age of the bulimic women was 21.4 years. The authors suggested that their prevalence finding for bulimia was "...a conservative accounting of this syndrome in the university population" since a number of cases were revealed during treatment which were not diagnosed at intake evaluation.

Halmi et al. (1981) surveyed (using a self-report questionnaire) 355 male and female students during the summer session at a suburban liberal arts campus of the State University of New York and found that 13% experienced all of the major symptoms of bulimia as outlined in the DSM-

III. Within the bulimic population, 87% were females, which was 19% of the female sample surveyed. In contrast, 13% of the bulimic population were males, representing only 5% of the male sample surveyed.

Unfortunately, no data were available regarding bingeing episode frequency for either sex. However, 68.1% of the female sample reported having had a binge episode while 35.0% considered themselves binge eaters. The use of self-induced vomiting was reported by 9.9% of the overall sample (representing 11.9% of the females) with 1.7% reporting the behavior on a weekly or more frequent basis. In determining bulimia prevalence, it is important to note that these authors excluded the following criteria: (1) the presence of three or more of the following: ingestion of highly caloric food during a binge, binge eating in private, repeated attempts to lose weight, termination of an eating binge by self-induced vomiting, sleep or social interruption, frequent weight fluctuations; and (2) an awareness that the eating pattern is abnormal.

In another investigation (Thompson & Schwartz, 1983), the prevalence of "anorexic-like" behavior was determined in a recruited sample of 51 females, ages 18-23, at a private, coeducational, liberal arts college in a suburban midwestern community. Results showed that approximately 37% reported severe or moderate binge eating, 27% reported ever voluntarily vomiting for weight control with 18% reporting voluntary vomiting within the past year, and 12% reported ever using laxatives for weight control. Pyle et al. (1983) surveyed a midwestern university population by asking 1355 college freshmen (575 females and 780 males) to complete a self-report questionnaire regarding their eating habits. Overall, 4.1% of the

population met the DSM-III criteria for a probable diagnosis of bulimia, representing 7.8% of the female population and 1.4% of the male population. The percentages dropped to 4.5% of the women and 0.4% of the men with the addition of a frequency variable of at least weekly episodes of binge eating. Binge eating at any time was reported by 61% of all the females while 17% of this group reported the behavior at least weekly. Prevalence of purging behaviors for the females was: Self-induced vomiting--7% at any time, 2% at least weekly; laxative use--10% at any time, 1% at least weekly; and diuretic use--6% at any time, 2% at least weekly.

An unpublished survey of the prevalence of bulimia in a sample of 1172 third term freshman women at The Pennsylvania State University (Sinoway, 1983) revealed 25% of the sample to be bulimic according to predetermined criteria which included: identifying oneself as a binge eater, eating large amounts of food during a binge, being uncertain about being able to stop bingeing, and not feeling completely in control while bingeing. More specifically, 14% of the sample met criteria for bingeing and for purging, fasting, and dieting. In addition, 11% met the bingeing criteria but did not actively attempt to reduce the amount of food in the body following a binge. It is important to note that the author's criteria for bulimia are not necessarily consistent with the DSM-III definition for the diagnosis of bulimia and, therefore, the bulimia prevalence rate reported in this study must be interpreted with extreme caution.

Pope, Hudson, Yurgelun-Todd, and Hudson (1984) sent a confidential questionnaire, covering the DSM-III criteria for both anorexia nervosa and bulimia, to 750 male and female seniors at two colleges (a

prestigious rural college for women and an urban, coeducational institution serving somewhat lower average socioeconomic status students). (These authors also administered their questionnaire to students at a secondary school but those results will be summarized in later paragraphs addressing high school prevalence of bulimia.) A total of 436 questionnaires were completed and returned: 389 were from females and 47 were from males. None of the college male respondents met DSM-III criteria for either anorexia nervosa or bulimia. However, 12.6% of the female respondents at one college and 18.6% at the other met DSM-III criteria for a history of bulimia (1.0% to 4.2% met DSM-III criteria for a history of anorexia nervosa with or without a history of bulimia).

A survey of 485 women in a college introductory psychology class by Katzman, Wolchik, and Braver (1984) revealed that 56% of the women reported eating binges. Estimates for prevalence of bulimia (using DSM-III diagnostic criteria) within the population were made through telephone contact (followed by completion of an additional questionnaire) with 105 of the women and found to be 3.9% with an additional 3.3% having at least eight binges per month but failing to meet one or more of the other criteria for bulimia. No specific data on purging behaviors were reported.

Hart and Ollendick (1985) determined the prevalence of binge eating and bulimia in samples of 139 working women (in a large banking institution) and 234 women who were students at Virginia Polytechnic Institute and State University. The age range for the working women was 18 to 30 years while the age range for the university women was 17 to 25 years. Bulimia criteria were closely matched to the DSM-III definition

of bulimia and included bingeing, self-deprecating thoughts, fear of loss of control, and purging via self-induced vomiting on a weekly basis. Forty-one percent of the working women and 69% of the university women reported ever having a binge eating episode. The syndrome of bulimia was found in 1% of the working women and 5% of the university women. The authors suggested the possibility of a subtle self-selection bias in the working women sample since only 46% of an initial sample of 300 completed the questionnaires and returned them by mail. In contrast, the university women volunteered to participate in a study called "Eating Attitudes" and completed the questionnaires in a class group setting. These differences in sampling and data collection procedures may have biased the resulting prevalence rates.

In a more recent survey study of a nonclinical sample of 907 college freshmen and seniors (representing a 75% questionnaire response rate and including 631 women and 276 men), Zuckerman, Colby, Ware, and Lazerson (1986) found 8% of the women (and 0.7% of the men) classifying as bulimic based on responses to questionnaire items corresponding to the DSM-III definition. When more stringent frequency criteria for binge eating were used (bingeing more than once a week), the prevalence figures were halved--4% for the women and 0.4% for the men. The prevalence of individual symptoms of bulimia was much higher, especially in females: 23% of all the women reported eating binges at least once each week on the average as well as using either fasting, diuretics, laxatives, and/or self-induced vomiting for weight control; 28% stated that they were "often", "very often", or "always" "terrified of gaining weight" and feeling that



their binge eating is "out of control".

Prevalence of bulimia and bulimic behaviors  
in high school females

The extent to which bulimia and bulimic behaviors have filtered down to the high school level has only recently begun to be investigated. Johnson, Lewis, Love, Lewis, and Stuckey (1984) surveyed 1268 females in a single midwestern public high school and found 4.9% of the sample met rigorous criteria (DSM-III) for the diagnosis of bulimia. Inclusion in the bulimic group not only required that the students endorse statements taken from the DSM-III criteria for diagnosing bulimia but also that they be engaged in weekly or more frequent episodes of binge eating. When the frequency criteria of at least weekly bingeing was eliminated, 8.3% of the sample appeared to have bulimia. Their results also revealed that 0.9% of the bulimic students endorsed all of the bulimic behavior statements and were both binge eating and purging (using evacuation techniques such as self-induced vomiting or laxative abuse) on a weekly or greater basis. Among the entire sample (both bulimic and nonbulimic), 4% reported using self-induced vomiting on a weekly or greater basis, 3% reported using laxatives with equal frequency, and 21% reported weekly or more frequent episodes of binge eating. Johnson and his colleagues concluded that the criteria used to identify bulimia probably resulted in a significant number of false negatives, and thus produced a conservatively low estimate of the prevalence.

In a questionnaire survey of 1082 female and 922 male students from four different high schools in metropolitan Phoenix by Kagan and Squires

(1984), it was revealed that 2% of the students (1% of the males and 2% of the females) had "disordered eating habits." "Disordered eating" was defined as bingeing, highly restrictive dieting, emotional eating, or purging. The criteria corresponded only loosely with DSM-III criteria for bulimia. Item endorsement of "eat so much that your stomach hurts" was made by 18% of all the females for at least weekly occurrences and by 26.9% of all the females for once a month occurrence. At least weekly laxative use before or after eating was reported by 2.1% of the female sample while 3.2% reported self-induced vomiting at least weekly after eating. When the frequency of these behaviors was broadened to once a month occurrences, female prevalence rates changed to 2.9% for laxative use and to 3.9% for self-induced vomiting. In addition, approximately 29% of all the females reported "feel(ing) completely out of control when it comes to food" at least weekly while 26% of the females endorsed the same feeling on a once a month basis.

Carter and Duncan (1984) found 9% of their surveyed sample of 421 rural high school females to use self-induced vomiting as a weight control measure. Of these vomiters, 80%, representing approximately 7.1% of the sample, indicated that they binged as part of the syndrome. The frequency of binge eating episodes ranged from more than once a day (14%) to only on special occasions (50%). The number of self-induced vomiting episodes ranged from as often as any food is ingested (9%) to only after a binge episode (40%). For 36% of these females, the vomiting practice had been used for over a year and for 45%, began between the ages of 13 and 14. The authors suggested that their data must be treated with

caution since they are based on self-report and not on direct observation.

A total of 16.6% of the 151 tenth-grade girls surveyed from two public high schools in a small northwest Georgia community reported frequent eating binges; 6.6% reported frequent vomiting episodes after eating; 43.1% were terrified of being overweight; 39.1% were preoccupied with a desire to be thinner; and 35.1% were preoccupied with the thought of having fat on their bodies (Moss, Jennings, McFarland, & Carter, 1984). It was concluded by the authors that a conservative estimate of the frequency of bulimia nervosa in this population would be 6 to 7 percent on the basis of self-induced vomiting, and it may go as high as 16 to 17 percent on the basis of a binge eating criterion. These frequency rates must be treated cautiously since students simply endorsed answers such as "always", "very often", "often" etc. to statements about eating and related behaviors with no specific frequency criteria and without regard for all of the DSM-III criteria necessary for the diagnosis of bulimia.

Pope et al. (1984) included 186 female and 124 male students (ninth through twelfth-graders) from a suburban high school in their survey study of the prevalence of anorexia nervosa and bulimia in three student populations discussed earlier. Results revealed that 6.5% of the female respondents met DSM-III criteria for a history of bulimia (1.9% met anorexia nervosa criteria) while no male respondents met criteria for either disorder. Of the 65 students reporting DSM-III bulimia in their entire survey (representing 10 high school females and 55 college

females), 72.3% reported binge eating at least once a week, and 56.9% reported self-induced vomiting or laxative abuse on at least some occasions. This represented at least weekly bingeing for 10.0% of the women's college females, 12.9% of the coeducational college females, and 5.6% of the high school sample females; and, occasional induced vomiting or laxative use for 6.4% of the entire female (both college and high school) sample.

In a study by Maceyko and Nagelberg (1985), 168 female and 89 male students (grades 9 through 12) in two public high schools in southeastern Georgia were asked to answer a 19-item questionnaire addressing demographic characteristics and eating behaviors related to bulimia. Based on the DSM-III criteria for bulimia, students were assigned to one of three groups: bulimic--reported binge eating at least once weekly and satisfied the other bulimia criteria; binge eater--reported binge eating at least once weekly, but did not satisfy other bulimia criteria; and normal eater--reported binge eating less than once each week and did not satisfy other bulimia criteria. Of all the demographic variables, only gender was significantly related to group membership. Of the twelve students identified as bulimic, all were female, representing 7.1% of the female sample. Five of these students were white (41.7%) and seven were black (58.3%). Two of the bulimic students were freshmen (16.7%), five were juniors (41.7%), and five were seniors (41.7%). Eight of the twelve bulimics were 17 years old (66.7%) while two were 14-15 years old and two were 18 years or older (16.7% in both cases). A total of 34.2% of the entire sample (representing 39.8% of the males and 38.9% of the females)

fell into the binge eater group and 61.1% were classified as normal eaters. The authors suggested that Ondercin's (1979) early observation that occasional binge eating is a fairly typical behavior associated with college life may possibly be applied to high school students as well.

Vincent (1984/1985) administered a 139-item questionnaire directly related to the symptomalogic characteristics of anorexia nervosa and bulimia most cited in the literature and DSM-III to 1613 male and 2210 female high school students ages 13 to 18 from a variety of geographic regions in Illinois. The author classified a subject as "eating disordered" if the individual answered items on the questionnaire that would clinically classify them as either bulimic or anorectic but not both; as "anorectic" if the individual endorsed all items indicative of anorexia nervosa according to DSM-III criteria; and as "bulimic" if the individual endorsed all items that are part of the bulimia syndrome as defined by DSM-III. The incidence of eating disorders was found to be 8.4% in the overall sample with 98.8% of those classified as "eating disordered" being female. Of these, 285 (approximately 12.9% of the total female sample) were classified as "bulimic" and 63 (approximately 2.8% of the total female sample) were classified as "anorectic". The prevalence rate of just binge eating on a weekly or more frequent basis was found to be 23.1% in the total female sample. Evacuation techniques used for weight control were also high with 28.8% of the female sample using self-induced vomiting on a monthly or greater basis and 7.8% using laxatives with equal frequency.

Crowther, Post, and Zaynor (1985) surveyed 363 adolescent girls

(grades 9 through 12) in four demographically diverse Ohio high schools and found that 7.7% met the DSM-III criteria for the diagnosis of bulimia. Forty-six percent of the total sample reported episodes of binge eating (19.9% binged at least weekly and 4.2% binged daily). Weight control measures employed by the overall adolescent group included self-induced vomiting (11.2%), use of laxatives (4.7%), and fasting (36.4%). Specifically, 2.7% forced vomiting one to three times per month, 2.5% forced vomiting at least weekly, 3.3% used laxatives at least monthly, and 0.6% used laxatives at least weekly. The bulimic subgroup reported a mean age of onset of 14.2 years (S.D.=1.5) for binge eating and 14.8 years (S.D.=0.8) for purging. When the DSM-III criteria for the diagnosis of bulimia were modified to require the presence of at least weekly bingeing and purging only via self-induced vomiting or the use of laxatives, the prevalence rate decreased from 7.7% to 2.8%.

A survey of an entire female population of a midwestern suburban high school (N=1093) for the presence of bulimia by VanThorre and Vogel (1985) found female students classified as "probably bulimic" using a bulimia scale as identified by the Eating Disorder Inventory (Garner, Olmsted, & Polivy, 1983) in all age and ethnic groups. The percentages by age were: 14 year-olds = 20.1%; 15-year-olds = 12.5%; 16-year-olds = 19.0%; 17-year-olds = 13.8%; and 18-year-olds = 16.7%. These percentages must be interpreted with caution since they are based on only a seven-item bulimia subscale designed to identify "bulimic" and "restrictor" anorexic individuals; this subscale has not been validated as a means of distinguishing bulimic from normal eaters. It is interesting to note,

however, that the highest percentage was among the 14-year-olds, suggesting further support that the previously reported mean age of 18 for onset of the disorder in surveyed college women may no longer hold in the near future. In addition to the analysis by age, analysis by ethnic groups was done, revealing the distribution to be proportionate across groups: 17% of the Anglos, 17% of the Blacks, and 15% of the Others were classified as "probably bulimic."

Finally, a recent study (Killen, Taylor, Telch, Saylor, Maron, & Robinson, 1986) to detect the presence of coronary heart disease risk factor behaviors in 1728 male and female tenth-graders enrolled in four northern California high schools included items which provided data on the prevalence of purging behaviors. Results indicated that about 13% of the surveyed sample admitted to some form of purging behavior. Male purgers were outnumbered 2 to 1 by female purgers. In addition, compared to male purgers, female purgers reported significantly higher rates of diet pill use, diuretics use, and self-induced vomiting. Specifically, 10.6% of the tenth-grade girls reported vomiting (8.6% ever forced vomiting and 2% vomited at least weekly), 6.8% reported laxative use (6.1% ever used laxatives and 0.7% used them at least weekly), and 3.6% reported using diuretics (3.1% ever used diuretics and 0.5% used them at least weekly).

#### Summary of prevalence data

In summary, prevalence studies of bulimia and bulimic behaviors in college- and high school-age females have produced a broad range of

results. These results are summarized in Table 3 on pages 22-23 for college females and in Table 4 on pages 25-27 for high school females. The prevalence rates reported for bulimia in college females range from 3.9% to 25%. When criteria for bulimia are aligned with the DSM-III definition of bulimia, prevalence rates in this population range from 4% to 19%. The range of prevalence rates reported in high school females is from 2% to 20.1% and drops to a range of 6.5% to 12.9% when criteria for bulimia classification correspond directly to the DSM-III criteria. Differences in sampling methods, data collection procedures, instruments used, and interpretation of the DSM-III bulimia criteria all probably account for the widely varying prevalence rates in both populations and make direct comparisons across studies difficult.

Prevalence of just binge eating behavior in both populations is high; up to 79% (reported by Hawkins & Clement, 1980) in college females, and up to 46% (reported by Crowther et al., 1985) for high school females. Likewise, prevalence of purging behavior is relatively high; up to 23% for at least weekly use of diuretics, laxatives, and/or self-induced vomiting (reported by Zuckerman et al., 1986) in college females, and up to 28.8% for at least monthly self-induced vomiting (reported by Vincent, 1984/1985) in high school females.

In general, the phenomena of binge eating and purging, even at a rather high frequency, are relatively common among college women. Adolescent females are also engaging in these behaviors at a relatively high frequency. How many of these early bingers and purgers become chronic bulimics is not known.



Table 3

Summary of College Female Prevalence Data for Bulimia (Based on Subject Self-Report)

| Source                           | Population   | N                | Prevalence of<br>binging   | Prevalence of<br>purging  | Prevalence<br>of bulimia |
|----------------------------------|--|------------------|--|---|--------------------------|
| Hawkins &<br>Clement<br>(1980)   | Univ. of Texas<br>undergrads and<br>students in<br>weight control<br>program | 208              | 79% had bingeing<br>occurrences (no<br>frequency data<br>included)                       | 4.3% had ever<br>induced vomiting<br>after a binge  | (N/A)                    |
| Stangler &<br>Printz (1980)      | Univ. of<br>Washington<br>Psychiatric<br>Clinic for<br>Students              | 318              | (N/A)  | (N/A)   | 5.3% <sup>a</sup>        |
| Halmi et al.<br>(1981)           | State Univ. of<br>New York summer<br>session                                 | 215<br>(approx.) | 68.1% had a<br>binge episode;<br>35.0% considered<br>self a 'binge-<br>eater'            | 11.9% used self-<br>induced vomiting<br>(no frequency<br>reported)  | 19% <sup>a</sup>         |
| Thompson &<br>Schwartz<br>(1983) | Private mid-<br>western<br>college (ages<br>18-23)                           | 51               | 37% reported<br>severe or<br>moderate binge<br>eating (no<br>frequency data<br>included) | 27% ever used<br>voluntary vomiting<br>for weight control<br>(18% used same<br>within past year);<br>12% ever used laxa-<br>tives for weight<br>control | (N/A)                    |

<sup>a</sup>Based on DSM-III (American Psychiatric Association, 1930) diagnostic criteria for bulimia.

Table 3 (continued)

| Source                | Population   | N   | Prevalence of<br>binging   | Prevalence of<br>purging   | Prevalence<br>of bulimia  |
|-----------------------|--|---|--|--|---|
| Pyle et al.<br>(1983) | Midwestern<br>college<br>freshmen                                    | 575   | 61% binged at<br>any time; 17%<br>binged at least<br>weekly  | 7% self-induced<br>vomiting at any<br>time, 2% at least<br>weekly; 10% used<br>laxatives at any<br>time, 1% at least<br>weekly; 6% used<br>diuretics at any<br>time, 2% at least<br>weekly | 7.8% <sup>a</sup>   |
| Sinoway<br>(1983)     | Penn. State<br>Univ.<br>freshmen                                     | 1172  | 14% met cri-<br>teria for bing-<br>ing and purging;<br>11% met just<br>binging criteria<br>(no frequency<br>data included) | 14% met criteria<br>for purging, fast-<br>ing, and dieting<br>(no frequency data<br>included)  | 25%   |
| Pope et al.<br>(1984) | Private women's<br>college and co-<br>educational<br>college seniors | 389<br>total<br>college<br>female<br>sample | 10.0% of women's<br>college females<br>and 12.9% of<br>coed. college<br>females binged<br>at least<br>weekly               | 6.4% of college<br>and high school<br>females induced<br>vomiting or abused<br>laxatives on some<br>occasions  | 12.6% <sup>a</sup> of<br>women's<br>college<br>sample;<br>18.6% <sup>a</sup> of<br>females<br>from coed.<br>college<br>sample |

Table 3 (continued)

| Source                        | Population   | N   | Prevalence of<br>binging  | Prevalence of<br>purging   | Prevalence<br>of bulimia |
|-------------------------------|--|-----|---|--|--------------------------|
| Katzman<br>et al.<br>(1984)   | College<br>freshmen                                  | 485 | 56% reported<br>binge eating;<br>3.3% had at<br>least eight<br>binges monthly | (N/A)  | 3.9% <sup>a</sup>        |
| Hart &<br>Ollendick<br>(1985) | Virginia<br>university<br>undergrads<br>(ages 17-25) | 234 | 69% had bingeing<br>occurrences (no<br>frequency data<br>included)            | 5% induced vomiting<br>weekly  | 5% <sup>a</sup>          |
| Zuckerman<br>et al.<br>(1986) | New England<br>college<br>freshmen and<br>seniors    | 631 | 23% averaged at<br>least weekly<br>binges                                     | 23% averaged at<br>least weekly use of<br>fasting, diuretics,<br>laxatives, and/or<br>self-induced<br>vomiting | 8% <sup>a</sup>          |

Table 4

Summary of High School Female Prevalence Data for Bulimia (Based on Subject Self-Report)

| Source                       | Population  | N    | Prevalence of<br>binging  | Prevalence of<br>purging   | Prevalence of<br>bulimia   |
|------------------------------|---|------|---|--|--|
| Johnson<br>et al.<br>(1984)  | Midwestern<br>public high<br>school (grades<br>9-12)            | 1268 | 21% reported<br>binge eating<br>at least<br>weekly  | 4% used self-<br>induced vomiting<br>at least weekly;<br>3% used laxatives<br>at least weekly  | 8.3% <sup>a</sup> ; (4.9%<br>when included<br>at least<br>weekly bing-<br>ing)   |
| Kagan &<br>Squires<br>(1984) | Four metropoli-<br>tan Phoenix<br>high schools<br>(grades 9-12) | 1082 | 18% reported<br>at least weekly<br>"eat so much<br>that your<br>stomach hurts";<br>26.9% reported<br>same once a<br>month | 2.1% reported at<br>least weekly laxa-<br>tive use; 2.9%<br>reported same<br>once a month;<br>3.2% reported at<br>least weekly<br>forced vomiting<br>after eating;<br>3.9% reported<br>same once a month | not estimated<br>(2% met 'dis-<br>ordered eat-<br>ing' criteria<br>which corre-<br>sponded only<br>loosely with<br>DSM-III<br>bulimia<br>criteria) |
| Carter &<br>Duncan<br>(1984) | Louisiana<br>rural high<br>school<br>(grades 9-12)              | 421  | 7.1% reported<br>binging (14% of<br>these binged more<br>than once a day,<br>50% binged only<br>on special<br>occasions)  | 9% used self-<br>induced vomiting<br>(9% of these<br>vomited after<br>ingesting any food<br>and 40% vomited<br>only after binging)   | 7.1% inferred<br>from preva-<br>lence of<br>binge-purge<br>behaviors   |

<sup>a</sup>Based on DSM-III (American Psychiatric Association, 1980) diagnostic criteria for bulimia.

Table 4 (continued)

| Source                           | Population   | N    | Prevalence of<br>binging                                   | Prevalence of<br>purging   | Prevalence of<br>bulimia   |
|----------------------------------|--|------|--|--|--|
| Moss et al.<br>(1984)            | Two Georgia<br>public high<br>school tenth-<br>graders | 151  | 16.6% reported<br>"often" to "al-<br>ways" binge<br>eating | 6.6% reported<br>"often" to "al-<br>ways" vomiting<br>after eating   | estimated 6-<br>7% based on<br>self-induced<br>vomiting;<br>16-17% based<br>on binge<br>eating |
| Pope et al.<br>(1984)            | Eastern sub-<br>urban high<br>school (grades<br>9-12)  | 186  | 5.6% binged at<br>least weekly                             | 6.4% of high<br>school <u>and</u> college<br>females induced<br>vomiting or<br>abused laxatives<br>on some occasions | 6.5% <sup>a</sup>  |
| Maceyko &<br>Nagelberg<br>(1985) | Two Georgia<br>public high<br>schools (grades<br>9-12) | 168  | 38.9% binged<br>at least weekly                            | (N/A)  | 7.1% <sup>a</sup>  |
| Vincent<br>(1984/1985)           | Several<br>Illinois high<br>schools (grades<br>9-12)   | 2210 | 23.1% binged at<br>least weekly                            | 28.8% forced vomit-<br>ing at least month-<br>ly; 7.8% used laxa-<br>tives at least<br>monthly                       | 12.9% <sup>a</sup>   |

Table 4 (continued)

| Source                       | Population   | N                | Prevalence of<br>binging   | Prevalence of<br>purging  | Prevalence of<br>bulimia   |
|------------------------------|--|------------------|--|---|--|
| Crowther<br>et al.<br>(1985) | Four Ohio<br>high schools<br>(grades 9-12)             | 363              | 46% ever binged;<br>19.9% binged at<br>least weekly;<br>4.2% binged<br>daily | 2.7% forced<br>vomiting 1-3 times<br>per month; 2.5%<br>forced vomiting at<br>least weekly; 3.3%<br>used laxatives at<br>least monthly; 0.6%<br>used laxatives at<br>least weekly                                 | 7.7% <sup>a</sup> ; (2.8%<br>when in-<br>cluded at<br>least weekly<br>binging and<br>purging only<br>via vomiting<br>or laxative<br>use) |
| VanThorre &<br>Vogel (1985)  | Midwestern<br>suburban high<br>school (grades<br>9-12) | 1093             | (N/A)  | (N/A)   | 20.1% - 14 yr.<br>olds; 12.5% -<br>15 yr. olds;<br>19.0% - 16 yr.<br>olds; 13.8% -<br>17 yr. olds;<br>16.7% - 18 yr.<br>olds             |
| Killen et<br>al. (1986)      | Four<br>California<br>high school<br>tenth-graders     | 823<br>(approx.) | (N/A)  | 8.6% ever forced<br>vomiting; 2%<br>vomited at least<br>weekly; 6.1% ever<br>used laxatives;<br>0.7% used laxatives<br>at least weekly;<br>3.1% ever used<br>diuretics; 0.5%<br>used diuretics<br>at least weekly | (N/A)  |

### Personality Correlates

The personality characteristics connected with bulimia which have been cited in the literature include the following: lack of assertiveness (Boskind-Lodahl, 1976), lack of sexual identity and/or fear of heterosexual relationships (Norman & Herzog, 1983), dependency (Orbach, 1977), depression (e.g., Orbach, 1977; Pyle et al., 1981), compulsiveness (Dunn & Ondercin, 1981), interpersonal sensitivity and need for approval (Johnson & Larson, 1982), high levels of anxiety (e.g., Dunn & Ondercin, 1981; Pyle et al., 1981), impulsivity as well as some form of psychopathic deviancy (i.e., substance abuse, stealing, etc.) (Casper et al., 1980; Pyle et al., 1981), negative body image (Allerdissen, Florin, & Rost, 1981; Johnson, Stuckey, Lewis, & Schwartz, 1982), fear of fat (e.g., Mitchell et al., 1985; Russell, 1979), and a sense of inadequacy or a lack of self-confidence (e.g., Hart & Ollendick, 1985; Maceyko & Nagelberg, 1985). Because of their prominence in the literature and their special interest to the current investigator and research, four of these personality characteristics associated with bulimia--depression, anxiety, fear of fat, and self-efficacy (or confidence)--are addressed in some detail in the following subsections.

#### Depression and anxiety

The recent frequency of the link of depression and anxiety (and low self-esteem) to bulimic behavior deserves special attention. Herzog (1984) found 23.6% of his bulimic outpatient sample meeting criteria for a major depressive order. In a comparison of bulimic, obese, and normal

subjects, Williamson, Kelley, Davis, Ruggiero, and Blouin (1985) found bulimics to be significantly more depressed, more anxious, and generally more neurotic and impulsive. Carter and Duncan (1984) found in their survey for the prevalence of binge eating and vomiting in high school females that the teenage vomiters, when compared to the nonvomiters, had significantly higher levels of depression and anxiety as measured by subscales of the General Health Questionnaire (Goldberg & Hillier, 1979) as well as higher levels of somatic symptoms, social dysfunction, and abnormal attitudes toward eating. In a comparison of bulimic, repeat diet, and nondiet groups of undergraduate women, Dykens (1983) found the bulimic group to be more depressed, neurotic, and impulsive. Pinney (1985) compared binge-purge bulimics, binge-only bulimics, and nonbinging dieters on personality, cognitive and dietary variables and found both bulimic groups to be more depressed, anxious, and narcissistic as well as endorsing a number of irrational cognitions.

In a study of affective disturbance in eating disorders, Piran, Kennedy, Garfinkel, and Owens (1985) found that their bulimic female group (N=33, aged 16 to 35) fell within the clinical range (mild to moderate level of severity) for depression and anxiety as measured by several instruments including the MMPI (Dahlstrom, Welsh, & Dahlstrom, 1972), the Beck Depression Inventory (Beck, Ward, Mendelson, Mork, & Erbaugh, 1961), and the Hamilton Depression (Hamilton, 1960) and Hamilton Anxiety (Hamilton, 1959) Scales. Lee, Rush, and Mitchell (1985) found that approximately 77% of their sample of 56 adult females with DSM-III bulimia evidenced mild depression while approximately 23% reported



moderate-severe symptoms by the Beck Depression Inventory. Pyle et al. (1981) reported MMPI scores of 34 bulimic patients who enrolled in a treatment program and found that the mean T score for 30 of the patients on the depression scale was markedly elevated at 75.87 (SD = 12.23). Other MMPI studies of bulimic females have also shown significant elevations on the clinical scale Depression (as well as on Psychopathic Deviate, Psychasthenia, and Schizophrenia) (Dyken & Gerrard, 1986; Hatsukami, Owen, Pyle, & Mitchell, 1982; Scott & Baroffio, 1986; Wallach & Lowenkopf, 1984).

In looking at bulimia nervosa as "an ominous variant of anorexia nervosa", Russell (1979) reported that depressive symptoms were often severe and distressing and led to a high risk of suicide in those subjects exhibiting bulimic behaviors. Viesselman and Roig (1985) investigated depression and suicidality in 95 eating disordered patients coming to a clinical inpatient treatment program. Of the 72 bulimic females, approximately 17% had a history of suicide attempt and approximately 47% had suicide thoughts at the time of the study interview. In a more recent study, Mitchell et al. (1986) found that 34% of 275 female patients with bulimia indicated they had engaged in self-abusive behavior such as cutting or hitting themselves with intent to hurt and/or burning themselves with cigarettes while 18.8% indicated they had made at least one suicide attempt. The authors recommended that the high rate of suicidal behavior be considered in the context of a high level of depression and high degree of social disruption seen in association with the illness of bulimia.

Grace, Jacobson, and Fullager (1985) found that purging and non-purging bulimics grouped together showed low self-esteem and high anxiety relative to control subjects, even when effects that being overweight might have on personality characteristics were controlled. Roescheise (1983/1984) explored the relationship between frequency of binge urges and binge-purge episodes and level of anxiety. No correlation between state anxiety and binge-purge behaviors was found, but a significant correlation was found between trait anxiety and binge urges. Keck and Fiebert (1986) compared both anorexic and bulimic inpatients and outpatients and normal dieting females (ages 15 to 35 years) on the Avoidance of Existential Confrontation Scale (Thauberger & Sydiaha, 1977). Both of the eating-disordered groups showed a significantly greater avoidance of anxiety and there was a relationship between the severity of the eating disorder and the amount of avoidance. The authors inferred that eating-disordered individuals experience over-reactions to life stresses, which might be interpreted as heightened trait anxiety, and therefore may use eating-disordered behaviors to escape or avoid anxiety.

A finding of increased general "dysphoria" (which included greater anxiety and lower mood) in bulimic patients relative to controls was found to exist both pre- and post-meal in a quantitative assessment of psychologic state as a response to caloric stimulus (Robinson, Tortosa, Sullivan, Buchanan, Andersen, & Folstein, 1983). In a comparison of personality and behavioral characteristics in bulimic and binge eater college women, Katzman and Wolchik (1984) found bulimics more depressed

with lower self-esteem, poorer body image, higher self-expectations, and higher need for approval than binge eaters and controls. Cullari and Redmon (1984) had 55 self-identified bingers and purgers from the general population complete a questionnaire in response to a booklet about bulimia. Sixty-four percent described themselves as depressed and indicated that their binge-purge behaviors were often associated with stress, anxiety, and depression. Weiss and Ebert (1983) explored psychological and behavioral characteristics of normal weight bulimics and normal weight controls and also found the bulimic group with significantly higher levels of anxiety, depression, and suicide attempts than the controls.

Mitchell et al. (1985) looked at reasons for bingeing in their study of 275 bulimic patients' characteristics. Two of the most common reasons given were feeling tense and anxious (83.3%) and feeling unhappy (67.3%). In addition, worry was indicated by 52.7% of the bulimics as a feeling they usually experienced after binge eating episodes. Hawkins and Clement (1980) found that 29% of females in their sample endorsed being depressed after binge eating and 21% endorsed hating themselves after binge eating. In the study of bulimia and depression by Lee et al. (1985), subjects generally reported that they were most likely to binge eat when experiencing unpleasant emotions or feelings, particularly anxiety and loneliness.

It appears that depressive and anxious symptoms are commonly associated with bulimia. Kelly (1985) suggested that binge eating and vomiting may be linked in a vicious cycle of anxiety created by

overeating and reduced by vomiting. Others see heightened existential or trait-anxiety as a possible precursor to binge-purge behaviors (Keck & Fiebert, 1986). The question of depression in bulimia is more complicated. Herzog (1986) discussed four hypotheses for the link between bulimia and depression: (1) depression leads to the eating-disordered state; (2) depression is a reaction to the bulimic behaviors; (3) bulimia and depression are separate, but often coexisting, conditions; and (4) bulimia and depressive illness reflect similar dispositions--biochemical, genetic, etc.--that increase the likelihood of their occurring together. After reviewing the sources of evidence relating bulimia to affective illness, he concluded that "the available data do not allow for any definitive conclusion on the relationship between bulimia and affective disorders" (p. 433). Although some investigators have posited that symptoms of depression (and anxiety) are likely to be secondary to the eating disorder (bulimia) itself rather than of primary significance (e.g., Bruch, 1973; Cooper & Fairburn, 1986; Crisp, 1982), Andersen (1986) suggested that "the best answer to the question of which comes first, mood disorder or eating disorder, is neither: both play an important role in the genesis and maintenance of these disorders" (p. 552). A multiplicity of forces (biological, psychological, familial, and sociocultural) is proposed in Garfinkel and Garner's (1982) multidimensional model/approach to understanding and researching the relationship between eating disorders and affective disorder. A comprehensive discussion of this model and other literature investigating the eating disorder-affective disorder link goes beyond the

scope of this paper but an excellent review is provided by Swift, Andrews, and Barklage (1986).

### Fear of fat

Another personality correlate--fear of fat--has also been reported as significant in the bulimic population. Russell (1979) suggested that "[T]he feature that held fast for both bulimia nervosa and anorexia nervosa was the characteristic psychopathology whereby the patients were abnormally concerned with their body size, fearing fatness which they described in excessively harsh terms out of keeping with sensible standards" (p. 432). More fear of fat was found in bulimic patients versus either control or anorexic patients by Robinson et al. (1983). When asked to quantify their fears of becoming fat, 62.5% of the 275 bulimic females studied by Mitchell et al. (1985) indicated "extremely", 31.6% indicated "very much", and 5.9% reported "moderately", "a little", or "not at all". In their development of the Goldfarb Fear of Fat Scale, Goldfarb, Dykens, and Gerrard (1985) found that their bulimic group, when compared to the repeat diet and nondiet groups, manifested significantly more fear of fat. In addition, fear of fat, one of several variables including measures of depression, anxiety, family environment, and self-concept used in this study, emerged as the most powerful discriminating variable, separating all three groups; it accounted for 36% of the variance and provided support for the central role of fear of fat in women with bulimia. Others have also reported a marked fear of becoming fat in bulimic women (Casper et al., 1980; Pyle et al. 1981; Rosen &

Leitenberg, 1982). Johnson and Brief (1983) and Russell (1979) have suggested that fear of weight gain and obesity are principal motives behind the bulimic dietary strategy.

### Self-efficacy

Finally, not only do many bulimics exhibit high fear of fat and see themselves as overweight (encompassing a distorted and/or negative body image), but they also frequently rate themselves as ineffectual in following standard diet programs (Gormally, Black, Daston, & Rardin, 1982). These self-perceptions (whether accurate or not) that they have been unsuccessful in their past diet attempts may lead to expectations that they may not be able to diet effectively in the future. This low level of self-efficacy (Bandura, 1977), or expectations of future failure, may become a self-fulfilling prophecy and consequently lead to the persistence of the bulimics' maladaptive weight control techniques (such as the binge-purge cycle with vomiting or laxative abuse). The literature also suggests that bulimics may generally perceive themselves as inadequate and incapable. Hart and Ollendick (1985) reported that their bulimic group of working women and university women indicated a greater sense of ineffectiveness in diverse situations as well as greater concerns related to thinness, body distortion, and maturity. The authors suggested that not only do bulimic women have heightened concerns about their bodies but they also have serious concern about "...their efficacy in interpersonal situations demanding more mature interactions" (p. 853). In Maceyko and Nagelberg's (1985) assessment of bulimia in high school

students, it was revealed that, compared to normal eaters, bulimics and binge eaters were more likely to doubt themselves and their capabilities. Vincent (1984/1985) also found the typical female bulimic high school student to be markedly insecure and self-doubting in addition to self-denying, prone to self-abasement, and having severe difficulty with body and self-image as well as depression, anxiety, family problems, and mood lability. In addition, Boskind-Lodahl (1976) and Hawkins and Clement (1984) have hypothesized that feelings of social incompetence as well as depression and poor self-esteem may play a crucial role in the onset of bulimia.

Self-efficacy expectations have been shown to be an important factor in determining behavior by Bandura and his colleagues (Bandura, 1980; Bandura & Adams, 1977; Bandura, Adams, & Beyer, 1977; Bandura, Adams, Hardy, & Howells, 1980). It may be that bulimics' beliefs about their lack of ability to maintain an acceptable weight contribute to their eating and weight control problems, rather than result from them, making low self-efficacy a critical variable in bulimia. An unpublished study (Phelan, 1984) found bulimics engaging in beliefs, self-efficacy expectations, and weight-related self-schema that mediated their maladaptive behavior, lending initial support to this hypothesis. In addition, Kagan and Squires (1984) reported that the most important inference to emerge in their study of disordered eating among adolescents was that all eating-disordered habits in their subjects were strongly associated with a feeling of inadequacy.

Summary of selected personality correlate data

The literature, as previously mentioned, has outlined several personality characteristics found to be associated with the eating-disordered condition of bulimia. Two of the more striking personality features involved appear to be depression and anxiety, with bulimics manifesting higher levels of both over nonbulimics. The nature of the relationship between depression and bulimia as well as between anxiety and bulimia is not clear. A likely possibility is that both may play a role in the development and maintenance of the disorder; that is, depression and anxiety may be features present at the onset of bulimic behaviors as well as reactions to the behaviors and thereby serve to perpetuate the disorder over time.

More recently, fear of fat has been suggested as a prime motivating factor in bulimia. Bulimics, when compared to various controls, admitted to significantly higher levels of fear of becoming fat. These fears may fuel the bulimics' more frequent dieting/fasting attempts, which often trigger the binge-purge cycles. The fear of fat expressed by bulimics appears out of proportion and probably contributes to their excessive concern with body size and negative body image.

Another correlate of bulimia under discussion in the literature (and under focus in the present study) has been low self-confidence or low self-efficacy expectations. This feature appeared in relationship to diet attempts and seems to lead to the maladaptive weight control techniques evident in bulimia. Low self-efficacy expectations were also found in the broader life context of interpersonal situations. General



feelings of inadequacy and self-doubt permeate and perpetuate the bulimic's lifestyle. Feeling incapable and incompetent probably underlies low self-esteem and assertiveness issues also accompanying bulimia.

In summary, there is evidence for multiple personality forces influencing the onset and/or maintenance of the bulimia syndrome in young women. Understanding the extent and exact nature of the relationship of personality contributions to this eating disorder is not yet complete.

## A RATIONALE FOR THE CURRENT STUDY

It is important to note that the investigation into the disorder of bulimia is a rather recent phenomenon. There remains a wealth of confusion surrounding this eating disorder in that inconsistencies exist, not only in terminology and definition, but also in diagnostic criteria and reporting practices, making comparisons across studies difficult and identification of the disorder less than standardized.

Much of the past research has been focused on clinical populations and/or college populations. It has been shown and discussed earlier that age of onset for the disorder is typically adolescence. The recent trend toward surveying high school populations is warranted. Prevalence data are limited and vary for this group. As discussed earlier, regional biases, sampling biases, response rate differences, and method of questionnaire administration could account for some of these differences.

Reports on personality characteristics or psychological problems associated with bulimia in college female populations were often based on unsystematic observations. Nevertheless, high anxiety, fear of fat, low self-esteem, depression, distorted body image, and high self-expectations with limited beliefs in self-efficacy have been demonstrated in this group. Sound, systematic investigations of personality and behavioral correlates to bulimia and the practice of bulimic behaviors in high school females are limited. Do adolescents with disordered eating habits share any common traits with the older population and/or among themselves as a group? Are the cognitive and affective components

identified in chronic bulimics precursors to the development of the disorder or consequences of the disorder over time?

Early detection and prevention of chronicity appear to be vital since several medical/physical complications are associated with long-term bulimic behaviors. The medical problems are usually consequences of the purging behavior. These include anemia, dental decay, potassium depletion, alkalosis, urinary infections, renal failure, swollen parotid glands, malabsorption, epileptic seizures, gastrointestinal bleeding, edema, and even cardiovascular failure (Lustick, 1985; Mitchell, 1984; Mitchell & Boutacoff, 1986; Mitchell, Pyle, Eckert, Hatsukami, & Lentz, 1983; Weiss & Ebert, 1983). The longer the practice of binge and/or purge behaviors continues and the more frequent the episodes, the more likely the individual will be to require hospitalization at some point.

In addition to potential medical problems, bulimia is associated with disruption of social functioning. Johnson and Larson (1982), in their analysis of moods and behavior in bulimia, found ". . . that normal-weight bulimic women do experience dysphoric and fluctuating moods and that they are deeply involved in food-related behavior apparently to the exclusion of contact with others" (p. 350). The already vulnerable adolescent years could be complicated by disruption in social contact, especially with peers. In their investigation of the characteristics of 275 young female patients with bulimia, Mitchell et al. (1985) reported that the majority of patients (272 out of 275) indicated that bulimia interfered significantly with areas of social functioning. Affected most commonly were intimate or interpersonal relationships (69.5%, N=189). In

addition, other areas of psychosocial impairment were reported by many patients: 60.7% indicated family problems, 53.3% indicated financial problems related to the high cost of food buying, and 49.6% indicated work impairment.

It seems evident that bulimia and bulimic behaviors need early identification since the disorder is known to involve physical, emotional, psychological, and social dysfunction. In many cases, bulimia is a symptom of greater problems, and without help, bulimics may continue to suffer with poor self-image and other problematic characteristics. Because of its disruptive nature, it is conceivable that bulimia (and bulimic behaviors) may reduce academic performance during the educational teen years.

This study attempted to systematically survey for the prevalence of bulimia and bulimic behaviors in a diverse, nonclinical population consisting of high school females. Because bulimia tends to be more prevalent among women (e.g., Halmi et al., 1981; Pyle et al., 1983), only female high school students were surveyed. Equally important was the investigation's attempt to identify potential predictor variables for screening adolescent female students "at risk" through the exploration of the relationship among the personality characteristics of anxiety, depression, self-efficacy, and fear of fat and bulimic symptoms. These four variables were selected because, as previous discussion outlines, anxiety is typically high and associated with binge urges in bulimics; depression is widespread and viewed by some as possibly one of the most important predictor variables (e.g., Herzog, 1982; Post,

1983/1984; Pyle et al., 1981) of bulimia; low self-esteem, high self-expectations, and a low level of belief in self-efficacy are typical of bulimics' cognitions--failure to meet one's own expectations and the expectations of others was found by Kagan and Squires (1984) to be the most important affective variable for identifying adolescents with disordered eating habits; and fear of fat has been suggested as a powerful factor motivating bulimia and bulimic behaviors. The current investigation is seen as establishing a foundation for effectively and efficiently identifying "at risk" females from which the direction for educational, preventive, and intervening strategies could be elucidated and developed.

## RESEARCH QUESTIONS AND HYPOTHESES

In general, this research investigated some of the quantitative and qualitative differences in bulimia and bulimic behaviors that may exist in high school females when compared to previous studies. Since the previous literature addressing bulimia in high school females is limited, this study was of an exploratory nature in addition to testing certain hypotheses.

### Research Questions

1. What is the prevalence of bulimia and bulimic behaviors in midwestern high school females?
2. What are the frequencies of bulimic behaviors in high school females?
3. What are the differences, if any, in prevalence and frequencies of bulimic behaviors among high school grade levels of females?
4. What are the relationships among anxiety, depression, self-efficacy, fear of fat and bulimic symptomatology in high school females?
5. What are some of the potential predictor variables for bulimia? or Who appears to be "at risk" for developing the disorder in high school female populations?

## Research Hypotheses

1. Subjects meeting criteria for bulimia will report a significantly higher level of trait anxiety than subjects not meeting bulimia criteria.
2. Subjects meeting criteria for bulimia will report a significantly higher level of depression than subjects not meeting bulimia criteria.
3. Subjects meeting criteria for bulimia will report a significantly lower level of self-efficacy expectations (both generally and in relation to eating behaviors) than subjects not meeting bulimia criteria.
4. Subjects meeting criteria for bulimia will report a significantly higher level of fear of fat than subjects not meeting bulimia criteria.
5. Subjects meeting some, but not all, of the criteria for bulimia will report significantly higher levels of anxiety, depression, and fear of fat and significantly lower levels of general and eating-related self-efficacy than those subjects clearly not meeting bulimia criteria.

## METHOD

## Subjects

The subjects for this survey study were 2042 female students, grades 9 through 12 from four of the five high schools and grades 9 through 11 from the fifth high school in the Des Moines Public School System in Iowa. All of the subjects completing the survey were between 13 and 19 years of age. Approximately 34% of the sample were freshmen, 30% were sophomores, 23% were juniors, and 14% were seniors. Subjects were informed that a survey about young women's eating habits and related concerns was being carried out and that participation in the survey was strictly voluntary.

An attempt was made to survey all female students in attendance at regular physical education (P.E.) classes in the schools. The total number surveyed represents approximately 51.5% of the total female population (3965) in the five high schools combined. The remainder of the female students were not available for surveying due to their "contract P.E." status which meant that they had been excused from attending regular P.E. classes for a variety of reasons including medical, academic course load, involvement in certain activities (such as orchestra or debate team), student employment, and/or, in the case of one high school, being at a senior class level status since all seniors were automatically exempt from P.E. classes. In addition to usual absenteeism, approximately 124 students totally refused to fill out the survey forms (an average of four students per class/administration period per school). It is also important to note that responses were not available for the total



series of surveyed students on some of the study's variables; the total N available for each variable is always indicated.

Statistics obtained from the Bureau of the Census for the State of Iowa (U.S. Bureau of the Census, 1983) were used in comparing the racial composition of the obtained sample with those of the geographic region from which they were collected. The comparison is depicted in Table 5 on page 46. Even though the sample racial composition has slightly fewer whites and slightly more Blacks, Asians, and Native Americans represented, it appreciably parallels the general racial composition of the school district.

Information on the level of parents' education for the subjects was obtained and is compared to education level of males and females aged 25 or older for the State of Iowa (U.S. Bureau of the Census, 1983) in Table 6 on page 47. It is important to note that 15.9% of this study's subjects responded "don't know" to the question on mother's education and 24.2% responded "don't know" to the question on father's education, making interpretation of the comparison less clear. It is apparent, however, that in both groups, the most frequent highest level of education represented is high school.

Income characteristics for subjects' parents were also sought in the survey. However, over half of the subjects responded "don't know" to the questions on mother's and father's income (55% did not know mother's income; 62% did not know father's income). Percentages of responses in various income levels for those subjects who did report the information are listed in Table 7 on page 48. No comparison to income

Table 5

Comparison of the Sample Racial Composition to that of the Geographic Region

| Race            | Sample          | Des Moines   |
|-----------------|-----------------|--|
|                 | (N = 1879)<br>% | Independent Community<br>School District<br>(N (females) = 106,357)<br>% |
| White           | 81.3            | 91.9   |
| Black           | 9.4             | 6.5  |
| Hispanic        | 1.9             | 1.6  |
| Asian           | 4.4             | 1.3  |
| Native American | 1.1             | 0.3  |
| Other           | 1.8             | (N/A)  |

Table 6

Comparison of Sample Parents' Education to that of Adults from the  
State of Iowa

| Education          | Sample<br>mothers<br>(N = 1871)<br>% | Iowa<br>female<br>adults<br>(N = 899,521)<br>% | Sample<br>fathers<br>(N = 1878)<br>% | Iowa<br>male<br>adults<br>(N = 800,581)<br>% |
|--------------------|--------------------------------------|--|--------------------------------------|--|
| Less than 8 years  | 1.1                                  | 4.1  | 0.5                                  | 5.8  |
| 8 to 11 years      | 2.0                                  | 11.0   | 3.9                                  | 12.7   |
| 12 years           | 54.4                                 | 45.7   | 40.3                                 | 39.7   |
| 13 to 15 years     | 11.7                                 | 15.6   | 9.4                                  | 13.6   |
| 16 years           | 8.7                                  | 7.7  | 11.7                                 | 8.7  |
| More than 16 years | 6.3                                  | 3.7  | 10.1                                 | 8.2  |
| Don't know         | 15.9                                 | (12.2) <sup>a</sup>                            | 24.2                                 | (11.3) <sup>a</sup>                          |

<sup>a</sup> Represents proportion not available to give information at time of census.

Table 7

Income Characteristics for Parents of Subjects Reporting Information

| Annual income            | Mothers<br>(N = 840)<br>% | Fathers<br>(N = 699)<br>% |
|--------------------------|---------------------------|---------------------------|
| Less than \$15,000       | 23.5                      | 8.2                       |
| \$16,000 to \$25,000     | 25.6                      | 18.5                      |
| \$26,000 to \$35,000     | 15.8                      | 24.9                      |
| \$36,000 to \$45,000     | 7.1                       | 20.5                      |
| More than \$45,000       | 3.1                       | 21.8                      |
| Does not work for income | 24.9                      | 6.3                       |

characteristics for the state of Iowa was possible since the Census Bureau information is based on household earnings and/or on family unit rather than on the separate earnings of mother and father. The median annual income per household for Iowa was \$16,799 (mean = \$19,500) with the median for the Des Moines Independent Community School District slightly higher at \$16,986 (no mean available) (U.S. Bureau of the Census, 1983). The most frequently reported annual income level of mothers and of fathers of subjects who did report the information in this study was \$16,000 to \$25,000 and \$26,000 to \$35,000, respectively.

#### Procedure

The study was accomplished through survey format, consisting of administering a questionnaire screening packet containing self-report measures of eating behaviors, fear of fat, trait anxiety, self-efficacy, depression, and social desirability as well as basic demographic information to the subjects (see Appendix A). A pilot survey with 39 college freshmen enrolled in Psychology 101 classes at Iowa State University, Ames was carried out to address mechanics of the survey such as reaction to the length of the questionnaire packet, time necessary for completion, clarity of directions, clarity of individual items, and ordering of the questionnaires within the survey packet. A summary of the evaluation responses to the survey packet given by the pilot subjects is presented in Appendix B. In general, the responses were supportive of the appropriateness of the survey mechanics listed above. It was estimated and planned from the pilot results, however, that high school students might require additional time (approximately twice the amount)

to complete the survey packet.

Approval from the Instructional Division Committee of the Des Moines Public School System as well as from the Human Subjects for Research Review Committee at Iowa State University was sought and granted. Following their approval, appropriate class periods for the administration of the survey were determined to be all regularly scheduled P.E. classes during the week of September 15th, 1987. In order to generally inform parents, the August issue of the parents' school newsletter contained a "Project Announcement" explaining the survey to be done and a rationale for its pursuit (see Appendix C).

Prior to administration time, the investigator met with the school principals and appropriate teachers whose students were involved to explain the survey procedures as well as to provide background information. All surveys were administered by either the investigator or by her trained assistants. Precise instructions on administration were given to the assistants to assure consistency across subjects (see Appendix D).

At the beginning of each administration P.E. class period, the female students were separated as a group to a different room from the male students. Prior to distributing the survey questionnaires, subjects were given an informed consent statement (see Appendix E). In order to assure that all subjects fully attended to its contents, the informed consent statement was read aloud to all subjects by a trained research assistant (in charge of survey administration to a particular group of subjects) who was equipped to answer questions regarding the study. Any student not wishing to complete the survey was asked to turn in her

unsigned consent form and follow the class instructor to another area (completely separate from the survey administration area) for regular P.E.-related activities. Students agreeing to complete the survey were asked to sign and date the informed consent statements and hand them in to the research assistant in charge. This was done in order to separate identification of subjects by their signatures on the informed consent statement from their answers in the actual survey questionnaire packet. It was presumed that, because of the benign nature of this study and its survey format, parental informed consent was not necessary.

Subjects responded anonymously and directly onto the survey questionnaires. Subjects were assured confidentiality and anonymity both orally and in writing (on consent form). They were requested not to put their names on any of the questionnaire sheets in the packet. The anonymous completion of the survey was sought with the hope of eliciting accurate and complete information from the subjects. The literature has shown that there is a "cloak of secrecy" surrounding this disorder with accompanying feelings of guilt and shame (Fairburn & Cooper, 1982; Russell, 1979). Any perception by subjects of the possibility for the identification of their responses could potentially bias their responses. The survey questionnaire packet contained instructions for completion of the survey as well as reminders about the nature of the survey, confidentiality, etc. (see Appendix A, p. 2). Subjects were asked to follow along as the research assistant read these instructions aloud. Opportunity was given for questions to be asked at that time as well as at any time throughout the administration process. "Project Announcement

Summary" information including phone numbers for contacting the research field supervisor and/or coordinator should subsequent questions occur was also provided on a separate sheet of paper handed to each subject to take home with her on completion of the survey (see Appendix F).

Subjects were given the entire P.E. class period to complete the questionnaires. With rare exception, subjects were able to finish the survey in the allotted class time. The survey administration occurred without any major problems. Cooperation and support was consistently received from the P.E. instructors as well as from the administrators. On all occasions, class instructors took the class roll call, were present for the initial introductions, provided basic endorsement of the survey, and then either visibly left the administration area or took an unobtrusive position in the room. For the most part, subjects seemed to take the survey seriously and asked appropriate questions relating to same.

The school system was offered the availability of resource information sheets for all students (male and female, regardless of whether or not the student participated in the survey), identifying self-help and community resources available to them, with distribution of these to follow data analyses and presentation of group results to appropriate parties in the school system. The school system has requested a delay in any resource information dissemination to students since the Instructional Division Committee is systematically planning programatic procedures to address student problems and concerns relative to the survey results presented. These may include dissemination of



student resource information sheets at a later date; the investigator will continue contact with the school system to offer assistance in providing same if appropriate.

### Measures

The survey screening packet contained paper and pencil self-report measures of eating behaviors through the use of The Bulimia Test (BULIT) (Smith & Thelen, 1984), fear of fat through the Goldfarb Fear of Fat Scale (GFFS) (Goldfarb, Dykens, & Gerrard, 1985), trait anxiety through the State-Trait Anxiety Inventory: Trait Anxiety Scale (TAS) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), self-efficacy through the General Self-efficacy subscale (GSES) of the Self-efficacy Scale (Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rogers, 1982) as well as through a specific self-efficacy scale (SSES) relating to eating behaviors developed for the current survey study, depression through the Beck Depression Inventory (BDI) (Beck, Ward, Medelson, Mork, & Erbaugh, 1961), and social desirability through the Marlowe-Crowne Social Desirability Scale 20-item short form (M-C SDS) (Crowne & Marlowe, 1960; Strahan & Gerbasi, 1972). Preceding the above measures in the packet were eight demographic items as well as a page containing general survey instructions (see Appendix A, pp. 2 and 3).

The four non-eating behavior related measures (i.e., TAS, GSES, BDI, and M-C SDS) always appeared first in the survey (following the demographic items) since it was presumed that these items might be less threatening to the subjects than those items concerned with eating habits

and might not sensitize the subjects to a general idea of eating disordered behavior early on in the response procedure. All possible combinations of ordering these instruments (a total of 24) were administered to help control for order effects. The three eating behavior related measures (i.e., BULIT, GFFS, and SSES) always appeared last in the survey packet and also in all combinations of ordering (a total of 6) to control for possible order effects.

#### The Bulimia Test (BULIT)

This 36-item, self-report, multiple choice scale was developed by Smith and Thelen (1984) to assess the symptoms of bulimia (see Appendix A, #103 through #138). The BULIT was constructed by comparing responses of clinically identified female bulimic subjects with normal female college students on 75 preliminary test items, which were based on criteria for bulimia from the DSM-III (American Psychiatric Association, 1980). The BULIT score is the sum of the weighted responses to 32 items. The four additional items (#s 109, 135, 136, and 138) are included to provide information regarding laxative and diuretic use, and menstrual cycles but, following Smith and Thelen (1984), their responses are not added to determine the total score. The range of the BULIT score can be from 32 to 160. A cutoff score on the BULIT of 102 has been shown to best discriminate bulimics from nonbulimics, with subjects meeting this criterion clearly manifesting bulimic symptomatology. The authors further suggest that, by using a more liberal classification strategy with a cutoff score of 88, ". . . the BULIT can be effectively employed

as a screening device to identify actual or incipient cases of bulimia before behavior patterns become chronic" (p. 869).

There is evidence for the reliability and validity of this instrument. Cross-validation was performed on independent samples of bulimic and normal control subjects, revealing that the BULIT was a good predictor of group membership for both initial and replication samples. The scale was then administered to female college students with a retest and interview conducted several weeks later on a stratified sample of these subjects. The BULIT was found to be a reliable and valid predictor of bulimia in this nonclinical population based on the results of retesting and judgments of diagnostic interviews. Specifically, overall test-retest reliability was found to be .87 ( $p < .0001$ ) Pearson correlation, sensitivity was .64, specificity was .89, positive predictive value was .74, and negative predictive value was .84 (Smith & Thelen, 1984). The authors posited, however, that these figures ". . . may represent an underestimation of the scale's true ability because the sampling method used to select subjects for retesting (and diagnostic interview) in the nonclinical population resulted in an overrepresentation of subjects with scores close to the designated cutoff score" and that "[T]hese subjects were presumably more difficult to classify than subjects with extreme scores. . . ." (Smith & Thelen, 1984, p. 867). The BULIT has also demonstrated construct and discriminant validity through its comparison to other eating disorder scales: A Pearson correlation of .93 ( $p < .0001$ ) was obtained between scores on the BULIT and the Binge Scale (a measure of bingeing behavior; Hawkins & Clement, 1980) for bulimic and

normal control subjects, suggesting that the two scales are based on similar underlying constructs; the correlation between the BULIT and the Eating Attitudes Test (EAT, a test for anorexia nervosa; Garner & Garfinkel, 1979) was .68 ( $p < .0001$ ), suggesting that the scales are tapping overlapping, but not identical, constructs.

The BULIT has been used with a clinical population and with a nonclinical population of college females as mentioned above. A validation study with a high school female population has been attempted (Haut, 1986); however, due to methodological problems (specifically, lack of subject anonymity which led to serious attrition and cooperation problems) the validity of the results is questioned. In general, high school female normative data using the BULIT are not yet available.

#### The Goldfarb Fear of Fat Scale (GFFS)

The GFFS (see Appendix A, #93 through #102) is a quick, reliable 10-item scale assessing thoughts and feelings related to the fear of becoming fat intended for use with bulimic clients (Goldfarb, Dykens, & Gerrard, 1985). Ten statements are presented, asking subjects to respond according to a 4-point Likert scale (i.e., 1 = very untrue, 4 = very true), with responses being summed for the GFFS score (10 = no fear of fat, 40 = extreme fear of fat).

Preliminary norms and reliability data for a female college and a female high school sample are available, as well as pilot comparisons between eating disordered and noneating disordered women. The GFFS was found to have high internal consistency (Cronbach Alpha = .85) as well as

high test-retest reliability ( $r = .88$ ). In addition, the GFFS has been shown to significantly differentiate between anorexic and normal women and between bulimics, repeat dieters, and nondieting women, providing evidence for discriminant validity. It is proposed by the authors as an assessment tool in determining the severity of the underlying disorder and in measuring the fear of losing control and becoming fat motivation behind bulimic symptoms. Thus, the GFFS is seen to have implications for the early identification of high risk individuals.

The State-Trait Anxiety Inventory (Form Y):  
Trait Anxiety Scale (TAS)

An individual's propensity to experience anxiety is measured by the TAS (Spielberger et al., 1983). The single-page test form consists of 20 statements that assess a relatively stable personality factor reflecting tendencies to perceive situations as potentially threatening, physically or psychologically (see Appendix A, #9 through #28). Responses are recorded on a 4-point rating scale according to frequencies of feelings (i.e., "almost never", "almost always"). The TAS has a mixture of reversed items and items which are scored directly (reflecting anxiety-absent items and anxiety-present items, respectively). The final trait anxiety score is obtained by adding the weighted scores for the 20 items. The score range is from a minimum of 20 to a maximum of 80, with higher scores reflecting greater trait anxiety.

Norms and reliability data are available on a wide variety of population samples including high school females. Alpha coefficients

intervals for high school females were .75 and .65, respectively. Evidence for the concurrent, convergent, divergent, and construct validity of the TAS is extensive and goes beyond the scope of this paper. The reader is referred to Spielberger et al. (1983, pp. 14-18) for a full report on the validity data. It is interesting to note that high TAS scores in college students were associated with a larger number of self-reported problems in almost every area of adjustment, suggesting that anxiety-prone students may develop problems in many areas. The authors posit that the TAS has potential for effectively identifying students ". . . likely to need and seek assistance in counseling centers and student health services" (Spielberger et al., 1983, p. 17).

#### The General Self-efficacy Subscale GSES)

This 17-item subscale of the Self-efficacy Scale developed by Sherer et al. (1982) assesses generalized expectations of self-efficacy or personal mastery and confidence thought to exert powerful influences on behavior and behavior change (see Appendix A, #29 through #45). Subjects are asked to respond by rating their agreement with each item (some of which are reversed) on a 5-point Likert scale (i.e., 1 = strongly disagree, 5 = strongly agree). Reversed items are converted before summing responses for the GSES score. Score range is from 17 to 85; the higher the score, the higher are self-efficacy expectations.

Internal reliability of the subscale is evident from its Cronbach alpha coefficient of .86. Evidence of the construct and criterion validity was also obtained in study results confirming hypothesized

relationships between scores on the GSES subscale and other personality constructs, as well as criteria of past success in a variety of areas. All results supported the interpretation of the subscale as a valid measure of expectation of personal ability to initiate and persist in behavior with positive self-efficacy expectancies being associated with enhanced personal adjustment. Details of the validity studies can be found in Sherer et al. (1982) and Sherer and Adams (1983).

#### The Specific Self-efficacy Scale (SSES)

The SSES, constructed for use in the current study, consists of 6 items; each item addresses an expectation or confidence specific to eating or eating-related issues (see Appendix A, #87 through #92). The scale was developed in accordance with self-efficacy theory and therefore on the premise that when dealing with specific target behaviors (such as bulimia-related behaviors), more specifically worded questions are likely to provide the most accurate estimates of an individual's self-efficacy expectations (Bandura, 1977).

The subject is asked to indicate her level of agreement with each self-describing statement on a 5-point scale, 1 indicating "strongly disagree" and 5 indicating "strongly agree". Items #87, 88, and 91 are stated positively and items #89, 90, and 92 are stated negatively. Hence, the negatively stated item responses are reversed before summing ratings for the SSES score. The maximum score possible is 30 and the minimum score possible is 6; the higher the score, the higher are

positive self-efficacy expectations in relationship to the eating-related issues. This scale is presumed to have face validity although its formal reliability and validity have not yet been established.

#### The Beck Depression Inventory (BDI)

This 21-item self-report scale (see Appendix A, #46 through #66) was designed to measure the behavioral and affective manifestations of depression (Beck et al., 1961). Subjects are asked to respond to the item statements by indicating the extent to which particular behaviors or feelings are representative of their current life experience. The statements are ranked according to severity, from neutral or minimal to maximum (e.g., from "I do not feel sad" to "I am so sad or unhappy that I can't stand it"). In the current study, only 20 of the 21 BDI items were used. One item, which addressed changes in interest in sex, was eliminated per request of the school system since they thought it was an inappropriate question for the female high school population. In addition, item #65 is not counted in the total score nor is item #64 counted if item #65 is answered affirmatively. Responses are summed directly across all items (with the exception noted above) to yield a depression score, which can range from 0 to 63; higher scores reflect greater depressive symptomatology. Scale norms are as follows: 0 to 9 normal range, 10 to 15 mild depression, 16 to 19 mild-moderate depression, 20 to 29 moderate-severe depression, and 30 to 63 severe depression.

The BDI has been shown to be reliable and valid. A split-half



correlation coefficient of .93 was reported by Beck et al. (1961). Beck and Beaumesderfer (1974) reported a Pearson  $r$  of .86 between odd and even scale items as well as a correlation of .65 between BDI scores and clinicians' ratings of depth of depression. In addition, Coyne and Gotlib (1983) have reported the inventory's high correlation with other commonly used measures of depression (i.e., the Automatic Thoughts Questionnaire and the Depression Scale of the MMPI). The BDI has been used with a wide variety of clinical and nonclinical populations; it has been considered a relatively reliable instrument for the detection of depression among nonclinically identified adolescents (Teri, 1982).

Marlowe-Crowne Social Desirability Scale -  
Short Form (M-C SDS)

A 20-item short-form version of the original 33-item Marlowe-Crowne Social Desirability Scale was developed by Strahan and Gerbasi (1972) (see Appendix A, #67 through #86). The original scale (and short-form version) is designed to assess the impact of social desirability on self-report measures specific to the primary purpose of an investigation. It is important to note that the M-C SDS is not a personality inventory as such. Item endorsement is indicative of need for social approval rather than of possession of any personality trait(s) implied by the literal content of the items. The scale utilizes brief statements with a true-false response format. The 20-item short form has equal numbers of positively- and negatively-keyed items to control for possible acquiescence set. One point is awarded for each response in the keyed direction. The final M-C SDS (20-item version) score can range from 0 to

20, with a higher score indicating a greater social desirability response tendency.

The 20-item short form version has demonstrated psychometric adequacy. Kuder-Richardson formula 20 (K-R 20) reliability coefficients ranging from .73 to .83 were obtained on four differing samples; these values are close to those of the original 33-item scale (a range of .73 to .87 for the same samples). In addition, correlations between the 20-item and 33-item versions were all in the .90s, providing evidence for the validity of the short form version.

#### Data Analyses

The sample of 2042 high school females was analyzed to establish the prevalence of bulimia and bulimic behaviors in this nonclinical population as well as to form a profile of the high school female "at risk" for bulimia. Three groups of subjects were created on the basis of the BULIT score in accordance with the recommended usage of the instrument (see Smith & Thelen, 1984): 0 = the "low symptom" group (those subjects scoring below 88), 1 = the "moderate symptom" group (those subjects scoring between 88 and 101), and 2 = the "high symptom" group (those subjects meeting or exceeding the criterion cutoff score of 102). The prevalence rate for bulimia in the current study was defined on the basis of the high symptom group membership indicating those subjects clearly manifest a high level of bulimic symptomatology. The groups in general were considered on a symptom level basis since it is assumed that a true and accurate prevalence rate for bulimia could only

be established through thorough clinical evaluation and diagnostic interview processes. It is thought, however, that those subjects endorsing multiple bulimic behaviors with a sufficient frequency (and therefore meeting the BULIT criterion score) would probably attain a formal diagnosis of bulimia if clinically assessed.

Because the current study collected both discrete and continuous data, a variety of statistical procedures was employed. For frequency and categorical data, chi-square tests of association were calculated. Due to unequal cell sizes, analysis of variance procedures used a regression model (SAS - General Linear Model) to test for the significance of the bulimia symptom group factor on the dependent variables of trait anxiety (TAS), depression (BDI), general and specific self-efficacy (GSES and SSES), and fear of fat (GFFS). Correlational analyses were employed to examine the relationship of BULIT scores treated as a continuous variable to the scores on the personality measures as well as to reveal relationships among all variables in general. Social desirability of all the measures was evaluated through the measures' correlations with the Marlowe-Crowne Social Desirability - Short Form Scale (M-C SDS) score. Multiple regression was utilized to identify variables predicting the BULIT score as a continuous variable. Finally, an attempt was made to identify variables which predicted classification within the bulimia symptom groups through discriminant function analysis.

The reader is reminded that responses to all of the items on any one variable measure were not necessarily given by the total number of

surveyed subjects. Those subjects who failed to answer more than 10% of the items on any measure were not included in the data analyses and results presented below. Also, as previously mentioned, the N available for each variable is always indicated.

## RESULTS

## Prevalence Data

The overall prevalence rate for bulimia in the high school female sample was determined to be 6.31% on the basis of the total BULIT scores and high symptom group membership previously defined. The prevalence data for the bulimia symptom groups overall as well as by high school grade level are given in Table 8 on page 66. It is important to note that in addition to the 119 subjects, representing 6.31% of the sample, in the high symptom group, another 176 subjects, representing 9.33% of the sample, fell in the moderate symptom category, indicating a total of 15.64% of the total sample expressing moderate to high levels of bulimic behaviors.

The prevalence of individual bulimia-related behaviors was approached through frequency data of responses to individual items on the BULIT. The frequency data and chi-square analyses of eight selected BULIT items focusing on some of the more prominent behaviors associated with bulimia are shown by high school grade level in Table 9 on pages 67-69 and by bulimia symptom group in Table 10 on pages 71-73. Frequency and chi-square statistics for the remaining 28 BULIT items are presented by grade level in Appendix G.

Prevalence rates for the eight selected bulimia-related behaviors (items) across the entire sample (see Table 9) were as follows. Overall prevalence of binge behavior of any appreciable frequency was 42.83% with 17.86% of the subjects reporting binge episodes at least weekly and

Table 8

Bulimia Symptom Group Prevalence Data by High School Grade Levels

| Grade level | Bulimia symptom group |       |          |       |      |       |       |        |
|-------------|-----------------------|-------|----------|-------|------|-------|-------|--------|
|             | Low                   |       | Moderate |       | High |       | Total |        |
|             | N                     | Row % | N        | Row % | N    | Row % | N     | Row %  |
| Freshmen    | 527                   | 85.00 | 50       | 8.06  | 43   | 6.94  | 620   | 32.87  |
| Sophomores  | 461                   | 83.36 | 55       | 9.95  | 37   | 6.69  | 553   | 29.32  |
| Juniors     | 379                   | 85.17 | 42       | 9.44  | 24   | 5.39  | 445   | 23.59  |
| Seniors     | 224                   | 83.58 | 29       | 10.82 | 15   | 5.60  | 268   | 14.21  |
| Total       | 1591                  | 84.36 | 176      | 9.33  | 119  | 6.31  | 1886  | 100.00 |

Table 9

Relationship of Eight Selected Bulimia-related Behaviors to High School Grade Levels

| Behavior (BULIT item)  | High school grade level |          |            |          |         |          |         |          |       |          |
|--|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|  | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| Do you ever eat uncontrollably to the point of stuffing yourself (i.e., going on eating binges)? |                         |          |            |          |         |          |         |          |       |          |
| Once a month or less (or never)  | 377                     | 57.38    | 322        | 55.52    | 266     | 57.83    | 162     | 59.12    | 1127  | 57.17    |
| 2-3 times a month  | 107                     | 16.29    | 112        | 19.31    | 77      | 16.74    | 53      | 19.34    | 349   | 17.71    |
| Once or twice a week   | 82                      | 12.48    | 93         | 16.03    | 64      | 13.91    | 33      | 12.04    | 272   | 13.80    |
| 3-6 times a week   | 27                      | 4.11     | 21         | 3.62     | 20      | 4.35     | 12      | 4.38     | 80    | 4.06     |
| Once a day or more   | 64                      | 9.74     | 32         | 5.52     | 33      | 7.17     | 14      | 5.11     | 143   | 7.26     |
| Overall response pattern: $\chi^2(15, N = 1971) = 18.48, p = .238$                               |                         |          |            |          |         |          |         |          |       |          |
| Which of the following describes your feelings after binge eating?                               |                         |          |            |          |         |          |         |          |       |          |
| I don't binge eat  | 296                     | 46.69    | 257        | 45.49    | 222     | 49.01    | 120     | 43.64    | 895   | 46.45    |
| I feel O.K.  | 141                     | 22.24    | 111        | 19.65    | 85      | 18.76    | 55      | 20.00    | 392   | 20.34    |
| I feel mildly upset with myself  | 72                      | 11.36    | 76         | 13.45    | 56      | 12.36    | 43      | 15.64    | 247   | 12.82    |
| I feel quite upset with myself   | 69                      | 10.88    | 51         | 9.03     | 53      | 11.70    | 33      | 12.00    | 206   | 10.69    |
| I hate myself  | 56                      | 8.83     | 70         | 12.39    | 37      | 8.17     | 24      | 8.73     | 187   | 9.70     |
| Overall response pattern: $\chi^2(12, N = 1927) = 14.49, p = .271$                               |                         |          |            |          |         |          |         |          |       |          |

Table 9 (continued)

| Behavior (BULIT item)   | High school grade level                  |          |            |          |         |          |         |          |       |          |
|---|--|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|   | Freshmen                                 |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|   | N  | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| How often do you vomit<br>after eating in order to<br>lose weight?  |  |          |            |          |         |          |         |          |       |          |
| Less than once a month<br>(or never)                                | 510                                      | 81.08    | 459        | 82.55    | 375     | 85.23    | 227     | 85.02    | 1571  | 83.03    |
| Once a month  | 29                                       | 4.61     | 27         | 4.86     | 11      | 2.50     | 13      | 4.87     | 80    | 4.23     |
| 2-3 times a month   | 28                                       | 4.45     | 21         | 3.78     | 15      | 3.41     | 10      | 3.75     | 74    | 3.91     |
| Once a week   | 31                                       | 4.93     | 16         | 2.88     | 11      | 2.50     | 2       | 0.75     | 60    | 3.17     |
| 2 or more times a week  | 31                                       | 4.93     | 33         | 5.94     | 28      | 6.36     | 15      | 5.62     | 107   | 5.66     |
| Overall response pattern:   | $\chi^2(12, N = 1892) = 18.48, p = .102$ |          |            |          |         |          |         |          |       |          |
| I use laxatives or sup-<br>positories to help control<br>my weight. |  |          |            |          |         |          |         |          |       |          |
| Once a day or more  | 27                                       | 4.21     | 31         | 5.46     | 14      | 3.08     | 5       | 1.83     | 77    | 3.97     |
| 3-6 times a week  | 12                                       | 1.87     | 11         | 1.94     | 11      | 2.42     | 7       | 2.56     | 41    | 2.12     |
| Once or twice a week  | 18                                       | 2.80     | 13         | 2.29     | 11      | 2.42     | 4       | 1.47     | 46    | 2.37     |
| 2-3 times a month   | 10                                       | 1.56     | 9          | 1.58     | 3       | 0.66     | 4       | 1.47     | 26    | 1.34     |
| Once a month or less<br>(or never)                                  | 575                                      | 89.56    | 504        | 88.73    | 416     | 91.43    | 253     | 92.67    | 1748  | 90.20    |
| Overall response pattern:   | $\chi^2(12, N = 1938) = 12.02, p = .444$ |          |            |          |         |          |         |          |       |          |
| I use diuretics (water pills)<br>to help control my weight.         |  |          |            |          |         |          |         |          |       |          |
| Once a day or more  | 20                                       | 3.20     | 20         | 3.59     | 14      | 3.16     | 6       | 2.23     | 60    | 3.17     |
| 3-6 times a week  | 18                                       | 2.88     | 12         | 2.15     | 1       | 0.23     | 2       | 0.74     | 33    | 1.74     |
| Once or twice a week  | 25                                       | 4.00     | 15         | 2.69     | 10      | 2.26     | 3       | 1.12     | 53    | 2.80     |



Table 9 (continued)

| Behavior (BULIT item)  | High school grade level |          |            |          |         |          |         |          |       |          |
|--|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|  | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| 2-3 times a month  | 17                      | 2.72     | 16         | 2.87     | 10      | 2.26     | 10      | 3.72     | 53    | 2.80     |
| Once a month or less<br>(or never)                                   | 545                     | 87.20    | 494        | 88.69    | 408     | 92.10    | 248     | 92.19    | 1695  | 89.49    |
| Overall response pattern: $\chi^2(12, N = 1894) = 22.33^*, p = .034$ |                         |          |            |          |         |          |         |          |       |          |
| I feel that food controls my life.                                   |                         |          |            |          |         |          |         |          |       |          |
| Always   | 32                      | 5.11     | 26         | 4.68     | 13      | 2.90     | 7       | 2.56     | 78    | 4.10     |
| Almost always  | 20                      | 3.19     | 21         | 3.78     | 13      | 2.90     | 9       | 3.30     | 63    | 3.31     |
| Frequently   | 61                      | 9.74     | 38         | 6.83     | 31      | 6.92     | 19      | 6.96     | 149   | 7.83     |
| Sometimes  | 133                     | 21.25    | 123        | 22.12    | 94      | 20.98    | 75      | 27.47    | 425   | 22.33    |
| Seldom or never  | 380                     | 60.70    | 348        | 62.59    | 297     | 66.29    | 163     | 59.71    | 1188  | 62.43    |
| Overall response pattern: $\chi^2(12, N = 1903) = 15.78, p = .202$   |                         |          |            |          |         |          |         |          |       |          |
| Do you feel you have control over the amount of food you consume?    |                         |          |            |          |         |          |         |          |       |          |
| Most or all of the time  | 286                     | 43.73    | 258        | 44.71    | 222     | 48.47    | 123     | 44.73    | 889   | 45.26    |
| A lot of the time  | 170                     | 25.99    | 151        | 26.17    | 109     | 23.80    | 71      | 25.82    | 501   | 25.51    |
| Occasionally   | 114                     | 17.43    | 102        | 17.68    | 85      | 18.56    | 53      | 19.27    | 354   | 18.02    |
| Rarely   | 50                      | 7.65     | 41         | 7.11     | 26      | 5.68     | 13      | 4.73     | 130   | 6.62     |
| Never  | 34                      | 5.20     | 25         | 4.33     | 16      | 3.49     | 15      | 5.45     | 90    | 4.58     |
| Overall response pattern: $\chi^2(12, N = 1964) = 8.22, p = .768$    |                         |          |            |          |         |          |         |          |       |          |

\* $p < .05$ .

Table 9 (continued)

| Behavior (BULIT item)   | High school grade level |          |            |          |         |          |         |          |       |          |
|---|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|   | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|   | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| I have tried to lose weight<br>by fasting or going on<br>"crash" diets. |                         |          |            |          |         |          |         |          |       |          |
| Not in the past year  | 299                     | 47.31    | 259        | 46.25    | 180     | 40.00    | 107     | 39.48    | 845   | 44.17    |
| Once in the past year   | 92                      | 14.56    | 83         | 14.82    | 73      | 16.22    | 43      | 15.87    | 291   | 15.21    |
| 2-3 times in the past year  | 90                      | 14.24    | 70         | 12.50    | 75      | 16.67    | 49      | 18.08    | 284   | 14.85    |
| 4-5 times in the past year  | 37                      | 5.85     | 33         | 5.89     | 28      | 6.22     | 21      | 7.75     | 119   | 6.22     |
| More than 5 times in the<br>past year                                   | 114                     | 18.04    | 115        | 20.54    | 94      | 20.89    | 51      | 18.82    | 374   | 19.55    |
| Overall response pattern: $\chi^2(12, N = 1913) = 13.59, p = .327$      |                         |          |            |          |         |          |         |          |       |          |

Table 10

Relationship of Eight Selected Bulimia-related Behaviors to BulimiaSymptom Groups

|  | Bulimia symptom group                        |          |          |          |      |          |
|--|--|----------|----------|----------|------|----------|
|  | Low  |          | Moderate |          | High |          |
| Behavior (BULIT item)  | N  | Column % | N        | Column % | N    | Column % |
| Do you ever eat uncontrollably to the point of stuffing yourself (i.e., going on eating binges)? |  |          |          |          |      |          |
| Once a month or less (or never)  | 1023   | 64.34    | 43       | 24.29    | 12   | 10.08    |
| 2-3 times a month  | 282  | 17.74    | 41       | 23.16    | 17   | 14.29    |
| Once or twice a week   | 171  | 10.75    | 50       | 28.25    | 38   | 31.93    |
| 3-6 times a week   | 36   | 2.26     | 18       | 10.17    | 24   | 20.17    |
| Once a day or more   | 78   | 4.91     | 25       | 14.12    | 28   | 23.53    |
| Overall response pattern:  | $\chi^2(10, N = 1886) = 336.45***, p = .000$ |          |          |          |      |          |
| Which of the following describes your feelings after binge eating?                               |  |          |          |          |      |          |
| I don't binge eat  | 849  | 53.43    | 16       | 9.14     | 7    | 5.98     |
| I feel O.K.  | 331  | 20.83    | 30       | 17.14    | 19   | 16.24    |
| I feel mildly upset with myself  | 192  | 12.08    | 40       | 22.86    | 13   | 11.11    |
| I feel quite upset with myself   | 131  | 8.24     | 51       | 29.14    | 19   | 16.24    |
| I hate myself  | 86   | 5.41     | 38       | 21.71    | 59   | 50.43    |
| Overall response pattern:  | $\chi^2(8, N = 1881) = 450.50***, p = .000$  |          |          |          |      |          |
| How often do you vomit after eating in order to lose weight?                                     |  |          |          |          |      |          |
| Less than once a month (or never)  | 1394   | 88.23    | 99       | 56.25    | 59   | 50.43    |
| Once a month   | 52   | 3.29     | 16       | 9.09     | 11   | 9.40     |
| 2-3 times a month  | 37   | 2.34     | 27       | 15.34    | 10   | 8.55     |
| Once a week  | 42   | 2.66     | 10       | 5.68     | 9    | 7.69     |
| 2 or more times a week   | 55   | 3.48     | 24       | 13.64    | 28   | 23.93    |
| Overall response pattern:  | $\chi^2(8, N = 1873) = 243.45***, p = .000$  |          |          |          |      |          |

\*\*\* $p < .001$ .

Table 10 (continued)

| Behavior (BULIT item)   | Bulimia symptom group                       |          |          |          |      |          |
|---|---|----------|----------|----------|------|----------|
|   | Low   |          | Moderate |          | High |          |
|   | N   | Column % | N        | Column % | N    | Column % |
| I use laxatives or suppositories to help control my weight.       |   |          |          |          |      |          |
| Once a day or more  | 31  | 1.97     | 23       | 13.22    | 17   | 14.53    |
| 3-6 times a week  | 16  | 1.02     | 12       | 6.90     | 12   | 10.26    |
| Once or twice a week  | 24  | 1.52     | 17       | 9.77     | 3    | 2.56     |
| 2-3 times a month   | 17  | 1.08     | 5        | 2.87     | 4    | 3.42     |
| Once a month or less (or never)                                   | 1488  | 94.42    | 117      | 67.24    | 81   | 69.23    |
| Overall response pattern:   | $\chi^2(8, N = 1867) = 225.09***, p = .000$ |          |          |          |      |          |
| I use diuretics (water pills) to help control my weight.          |   |          |          |          |      |          |
| Once a day or more  | 30  | 1.90     | 15       | 8.47     | 15   | 12.61    |
| 3-6 times a week  | 12  | 0.76     | 11       | 6.21     | 10   | 8.40     |
| Once or twice a week  | 25  | 1.58     | 18       | 10.17    | 9    | 7.56     |
| 2-3 times a month   | 36  | 2.28     | 12       | 6.78     | 6    | 5.04     |
| Once a month or less (or never)                                   | 1478  | 93.49    | 121      | 68.36    | 79   | 66.39    |
| Overall response pattern:   | $\chi^2(8, N = 1877) = 200.55***, p = .000$ |          |          |          |      |          |
| I feel that food controls my life.                                |   |          |          |          |      |          |
| Always  | 23  | 1.45     | 21       | 11.93    | 33   | 27.97    |
| Almost always   | 19  | 1.20     | 22       | 12.50    | 21   | 17.80    |
| Frequently  | 70  | 4.41     | 49       | 27.84    | 30   | 25.42    |
| Sometimes   | 338   | 21.31    | 53       | 30.11    | 28   | 23.73    |
| Seldom or never   | 1136  | 71.63    | 31       | 17.61    | 6    | 5.08     |
| Overall response pattern:   | $\chi^2(8, N = 1880) = 663.58***, p = .000$ |          |          |          |      |          |
| Do you feel you have control over the amount of food you consume? |   |          |          |          |      |          |
| Most or all of the time   | 805   | 50.66    | 29       | 16.38    | 15   | 12.61    |
| A lot of the time   | 435   | 27.38    | 39       | 22.03    | 11   | 9.24     |
| Occasionally  | 246   | 15.48    | 62       | 35.03    | 33   | 27.73    |
| Rarely  | 61  | 3.84     | 31       | 17.51    | 32   | 26.89    |
| Never   | 42  | 2.64     | 16       | 9.04     | 28   | 23.53    |
| Overall response pattern:   | $\chi^2(8, N = 1885) = 365.94***, p = .000$ |          |          |          |      |          |

Table 10 (continued)

| Behavior (BULIT item)   | Bulimia symptom group                          |          |          |          |      |          |
|---|--|----------|----------|----------|------|----------|
|   | Low  |          | Moderate |          | High |          |
|   | N  | Column % | N        | Column % | N    | Column % |
| I have tried to lose weight by fasting or going on "crash" diets. |  |          |          |          |      |          |
| Not in the past year  | 792  | 50.16    | 22       | 12.57    | 12   | 10.08    |
| Once in the past year   | 239  | 15.14    | 33       | 18.86    | 13   | 10.92    |
| 2-3 times in the past year  | 233  | 14.76    | 29       | 16.57    | 18   | 15.13    |
| 4-5 times in the past year  | 85   | 5.38     | 21       | 12.00    | 8    | 6.72     |
| More than 5 times in the past year                                | 230  | 14.57    | 70       | 40.00    | 68   | 57.14    |
| Overall response pattern:   | $\chi^2(8, N = 1873) = 241.35^{***}, p = .000$ |          |          |          |      |          |

7.26% of the subjects reporting binge episodes at least daily. Feelings after binge eating ranged from ". . . mildly upset with myself" to ". . . hate myself" for 33.21% of all subjects with 9.70% falling in the latter category.

Overall prevalence of purgative behavior was as follows: 16.97% reported at least monthly vomiting after eating in order to lose weight with 7.08% reporting vomiting two to four times a month and an additional 5.66% reporting same at least two or more times a week; 9.80% reported using laxatives or suppositories for weight control with 4.49% reporting use one to six times weekly and an additional 3.97% reporting use at least daily. Use of diuretics for weight control was reported by 10.51% of all of the subjects with 4.54% using diuretics one to six times weekly and an additional 3.17% using same at least daily.

Of the overall sample, 37.57% reported feeling ". . . that food controls my life" on a "sometimes" to "always" basis with 7.41% reporting the feeling "almost always" to "always". Furthermore, 11.20% of all of the subjects reported "rarely" or "never" feeling control over the amount of food they consume. Finally, prevalence of fasting or "crash" dieting within the past year to lose weight was reported by 55.83% of the sample with 19.55% of these reporting same more than five times in the past year.

Prevalence of these same behaviors across the low, moderate, and high bulimia symptom groups (see Table 10) was as follows. A total of 75.70% of the moderate symptom level group reported appreciable bingeing behavior with 38.42% bingeing one to six times a week and another 14.12%

binging at least daily. This is compared to a total of 89.92% of the high symptom level group reporting appreciable binging behavior with 52.10% binging one to six times a week and another 23.53% binging at least daily. In contrast to the above, 35.66% of the low symptom group reported any appreciable binging behavior with 13.01% binging one to six times weekly and another 4.91% binging at least daily. Feelings after binge eating ranged from ". . . mildly upset with myself" to ". . . hate myself" for 73.71% of the moderate symptom level group with 21.71% endorsing the latter; 77.78% of the high symptom group reported the same range of feelings following binging but with 50.43% endorsing the latter category of ". . . hate myself". Again, in contrast to the above, only about one-fourth (25.73%) of the low symptom group endorsed the "mildly upset. . ." to "hate myself" feelings following binging with only 5.41% endorsing the most negative of these.

The prevalence rate for at least monthly vomiting after eating in order to lose weight was 11.77% for the low symptom group, 43.75% for the moderate group, and 49.57% for the high symptom group. In the low symptom group, 5.00% reported vomiting two to four times a month while an additional 3.48% reported the two or more times a week frequency. Two to four times a month frequency of vomiting episodes was endorsed by 21.02% of the moderate symptom group with another 13.64% reporting vomiting at least two or more times a week; 16.24% of the high symptom group reported vomiting two to four times a month while another 23.93% of the group reported vomiting at least two or more times a week. Laxative or suppository use for weight control was reported by 5.59% of the low

symptom group, 32.76% of the moderate symptom group, and 30.77% of the high symptom group. While 2.54% of the low symptom group endorsed laxative or suppository use one to six times weekly with another 1.97% endorsing at least daily use, 16.67% and 12.82% of the moderate and high symptom groups, respectively, endorsed the one to six times weekly frequency with another 13.22% of the moderate group and 14.53% of the high group reporting at least daily use. Prevalence of the use of diuretics to help control weight was 6.51%, 31.64%, and 33.61% for the low, moderate, and high symptom groups, respectively. In the low symptom group, 2.34% reported diuretics use one to six times weekly and another 1.90% reported use at least daily; in the moderate symptom group, 16.38% reported one to six times weekly use and another 8.47% reported use at least daily; and in the high symptom group, 15.96% endorsed the one to six times weekly frequency and another 12.61% endorsed at least daily use of diuretics.

Feeling ". . . that food controls my life" on a "sometimes" to "always" basis was reported by 28.37% of the low symptom group, 82.39% of the moderate symptom group, and 94.92% of the high symptom group. In the low symptom group, only 2.65% reported the feeling on an "almost always" to "always" frequency compared to 24.43% in the moderate group and 45.77% in the high symptom group. Furthermore, 6.48% of the low symptom group, 26.55% of the moderate symptom group, and 50.42% of the high symptom group reported "rarely" or "never" feeling control over the amount of food they consume. Finally, fasting or "crash" dieting within the past year to lose weight was reportedly attempted by 49.85%, 87.43%, and



89.92% of the low, moderate, and high symptom groups, respectively. Only 14.57% of the low symptom group reported fasting or "crash" dieting more than five times in the past year compared to 40.00% in the moderate symptom group and 57.14% in the high symptom group.

Chi-square statistics for test of association of the selected bulimia-related behaviors (items) among high school grade levels revealed significant differences for only one item--frequency of use of diuretics for weight control ( $\chi^2(12, N = 1894) = 22.33, p < .05$ ) (see Table 9). In order to facilitate understanding of this finding given the multi-celled condition, a follow-up chi-square analysis was done by creating a dichotomous variable for the use of diuretics. Response levels one through four were collapsed to indicate diuretics use on a twice monthly to daily or more frequency while response level five of once monthly or less (or never) frequency remained as the second level of response. It can be seen in Table 11 on page 78 that greater proportions of the lower grade levels of freshmen and sophomores endorsed higher frequency usage of diuretics than did the upper grade levels of juniors and seniors ( $\chi^2(3, N = 1894) = 9.16, p < .05$ ). There were no significant differences among high school grade levels on all of the other selected behaviors/items. For the bulimia symptom groups, however, chi-square statistics revealed highly significant differences for all eight of the selected bulimia-related behaviors (all  $p < .001$ ) (see Table 10). Inspection of Table 10 suggests that there are generally higher frequency rates of the behaviors as the level of bulimia symptom group increases. These results were not surprising and were expected because responses to the BULIT

Table 11

Relationship of a Dichotomous Variable for the Use of Diuretics to High School Grade Levels

| Grade level  | Diuretics use                |                            |
|--|------------------------------|----------------------------|
|  | 1x/mo. or less<br>(or never) | 2x/mo. to<br>daily or more |
| Freshmen   |                              |                            |
| N  | 545                          | 80                         |
| Row %  | 87.20                        | 12.80                      |
| Sophomores   |                              |                            |
| N  | 494                          | 63                         |
| Row %  | 88.69                        | 11.31                      |
| Juniors  |                              |                            |
| N  | 408                          | 35                         |
| Row %  | 92.10                        | 7.90                       |
| Seniors  |                              |                            |
| N  | 248                          | 21                         |
| Row %  | 92.19                        | 7.81                       |
| Total  |                              |                            |
| N  | 1695                         | 199                        |
| Row %  | 89.49                        | 10.51                      |
| Overall response pattern: $\chi^2(3, N = 1894) = 9.16^*, p = .027$ |                              |                            |

\* $p < .05$ .

items determined the total BULIT score which, in turn, determined bulimia symptom group membership.

#### Relationship of Demographic Variables to Bulimia

Frequency data and overall chi-square analyses of the demographic variables to explore any differences among the three bulimia symptom groups appear in Table 12 on pages 80-83. There were no significant differences among the symptom groups on the age, grade level, school, race, and father's income variables. The chi-square statistics for the groups on parent's education variables were significant (for mother's education,  $\chi^2(10, N = 1574) = 38.97, p < .001$ ; for father's education,  $\chi^2(10, N = 1424) = 29.66, p = .001$ ). There appears to be a trend toward higher bulimic symptomatology in subjects whose mothers have less than eight years or eight to eleven years of education as well as in subjects whose fathers have less than eight years of education. There was also a significant difference among the symptom groups on the mother's income variable ( $\chi^2(10, N = 840) = 19.50, p < .05$ ) with a possible trend toward higher bulimic symptomatology in subjects whose mothers earn more than \$45,000 annually. It is extremely important to note that for the above demographic variables achieving significance, all have a considerable amount of missing data (i.e., 23% and 30% missing data for mother's and father's education variables, respectively; 59% missing data for mother's income variable). In addition, for half of the demographic variables (i.e., age, race, mother's education, father's income), there are substantial percentages of cells having expected counts less than five.

Table 12

Relationship of Demographic Data to Bulimia Symptom Groups

| Demographic variable  | Bulimia symptom group |          |          |          |      |                   |       |          |
|---|-----------------------|----------|----------|----------|------|-------------------|-------|----------|
|   | Low                   |          | Moderate |          | High |                   | Total |          |
|   | N                     | Column % | N        | Column % | N    | Column %          | N     | Column % |
| Age   |                       |          |          |          |      |                   |       |          |
| 13  | 8                     | 0.50     | 0        | 0.00     | 1    | 0.84              | 9     | 0.48     |
| 14  | 427                   | 26.79    | 40       | 22.73    | 30   | 25.21             | 497   | 26.31    |
| 15  | 470                   | 29.49    | 51       | 28.98    | 36   | 30.25             | 557   | 29.49    |
| 16  | 394                   | 24.72    | 45       | 25.57    | 30   | 25.21             | 469   | 24.83    |
| 17  | 254                   | 15.93    | 31       | 17.61    | 16   | 13.45             | 301   | 15.93    |
| 18  | 37                    | 2.32     | 6        | 3.41     | 5    | 4.20              | 48    | 2.54     |
| 19(+)   | 4                     | 0.25     | 3        | 1.70     | 1    | 0.84 <sup>a</sup> | 8     | 0.42     |
| Overall response pattern: $\chi^2(12, N = 1889) = 13.66^a$ , $p = .323$ |                       |          |          |          |      |                   |       |          |
| Grade level   |                       |          |          |          |      |                   |       |          |
| Freshman  | 527                   | 33.12    | 50       | 28.41    | 43   | 36.13             | 620   | 32.87    |
| Sophomore   | 461                   | 28.98    | 55       | 31.25    | 37   | 31.09             | 553   | 29.32    |
| Junior  | 379                   | 23.82    | 42       | 23.86    | 24   | 20.17             | 445   | 23.59    |
| Senior  | 224                   | 14.08    | 29       | 16.48    | 15   | 12.61             | 268   | 14.21    |
| Overall response pattern: $\chi^2(6, N = 1886) = 3.40$ , $p = .757$     |                       |          |          |          |      |                   |       |          |
| School  |                       |          |          |          |      |                   |       |          |
| #1  | 459                   | 28.87    | 64       | 36.16    | 43   | 36.13             | 566   | 30.01    |
| #2  | 224                   | 14.09    | 18       | 10.17    | 12   | 10.08             | 254   | 13.47    |
| #3  | 464                   | 29.18    | 45       | 25.42    | 28   | 23.53             | 537   | 28.47    |
| #4  | 168                   | 10.57    | 20       | 11.30    | 14   | 11.76             | 202   | 10.71    |
| #5  | 275                   | 17.30    | 30       | 16.95    | 22   | 18.49             | 327   | 17.34    |
| Overall response pattern: $\chi^2(8, N = 1886) = 9.50$ , $p = .302$     |                       |          |          |          |      |                   |       |          |
| Race  |                       |          |          |          |      |                   |       |          |
| White   | 1305                  | 82.44    | 138      | 77.97    | 85   | 71.43             | 1528  | 81.32    |
| Black   | 143                   | 9.03     | 18       | 10.17    | 16   | 13.45             | 177   | 9.42     |
| Hispanic  | 28                    | 1.77     | 6        | 3.39     | 3    | 2.52              | 37    | 1.97     |
| Asian   | 64                    | 4.04     | 10       | 5.65     | 9    | 7.56              | 83    | 4.42     |

<sup>a</sup> Twenty-eight percent of the cells have expected counts less than 5; chi-square may not be a valid test.

Table 12 (continued)

| Demographic variable   | Bulimia symptom group |          |          |          |      |          |       |          |
|--|-----------------------|----------|----------|----------|------|----------|-------|----------|
|  | Low                   |          | Moderate |          | High |          | Total |          |
|  | N                     | Column % | N        | Column % | N    | Column % | N     | Column % |
| Native   |                       |          |          |          |      |          |       |          |
| American   | 14                    | 0.88     | 3        | 1.69     | 4    | 3.36     | 21    | 1.12     |
| Other  | 29                    | 1.83     | 2        | 1.13     | 2    | 1.68     | 33    | 1.76     |
| Overall response pattern: $\chi^2(10, N = 1879) = 17.53^b$ , $p = .063$      |                       |          |          |          |      |          |       |          |
| Mother's education   |                       |          |          |          |      |          |       |          |
| Less than  |                       |          |          |          |      |          |       |          |
| 8 years  | 13                    | 0.97     | 1        | 0.69     | 7    | 7.45     | 21    | 1.33     |
| 8 to 11  |                       |          |          |          |      |          |       |          |
| years  | 29                    | 2.17     | 2        | 1.38     | 6    | 6.38     | 37    | 2.35     |
| 12 years   | 865                   | 64.79    | 101      | 69.66    | 51   | 54.26    | 1017  | 64.61    |
| 13 to 15   |                       |          |          |          |      |          |       |          |
| years  | 188                   | 14.08    | 16       | 11.03    | 14   | 14.89    | 218   | 13.85    |
| 16 years   | 140                   | 10.49    | 15       | 10.34    | 8    | 8.51     | 163   | 10.36    |
| More than  |                       |          |          |          |      |          |       |          |
| 16 years   | 100                   | 7.49     | 10       | 6.90     | 8    | 8.51     | 118   | 7.50     |
| Overall response pattern: $\chi^2(10, N = 1574) = 38.97^{***c}$ , $p = .000$ |                       |          |          |          |      |          |       |          |
| Father's education   |                       |          |          |          |      |          |       |          |
| Less than  |                       |          |          |          |      |          |       |          |
| 8 years  | 5                     | 0.41     | 1        | 0.77     | 4    | 4.88     | 10    | 0.70     |
| 8 to 11  |                       |          |          |          |      |          |       |          |
| years  | 59                    | 4.87     | 7        | 5.38     | 7    | 8.54     | 73    | 5.13     |
| 12 years   | 645                   | 53.22    | 74       | 56.92    | 37   | 45.12    | 756   | 53.09    |
| 13 to 15   |                       |          |          |          |      |          |       |          |
| years  | 148                   | 12.21    | 20       | 15.38    | 8    | 9.76     | 176   | 12.36    |
| 16 years   | 190                   | 15.68    | 14       | 10.77    | 15   | 18.29    | 219   | 15.38    |

<sup>b</sup>Thirty-three percent of the cells have expected counts less than 5; chi-square may not be a valid test.

<sup>c</sup>Twenty-three percent of the data are missing. Twenty-two percent of the cells have expected counts less than 5; chi-square may not be a valid test.

\*\*\* $p < .001$ .

Table 12 (continued)

| Demographic variable  | Bulimia symptom group |          |          |          |      |                    |       |          |
|---|-----------------------|----------|----------|----------|------|--------------------|-------|----------|
|   | Low                   |          | Moderate |          | High |                    | Total |          |
|   | N                     | Column % | N        | Column % | N    | Column %           | N     | Column % |
| More than 16 years  | 165                   | 13.61    | 14       | 10.77    | 11   | 13.41 <sup>d</sup> | 190   | 13.34    |
| Overall response pattern: $\chi^2(10, N = 1424) = 29.66^{**d}$ , $p = .001$ |                       |          |          |          |      |                    |       |          |
| Mother's income   |                       |          |          |          |      |                    |       |          |
| Less than \$15,000  | 172                   | 24.29    | 11       | 13.92    | 14   | 26.42              | 197   | 23.45    |
| \$16,000 to \$25,000  | 178                   | 25.14    | 23       | 29.11    | 14   | 26.42              | 215   | 25.60    |
| \$26,000 to \$35,000  | 114                   | 16.10    | 12       | 15.19    | 7    | 13.21              | 133   | 15.83    |
| \$36,000 to \$45,000  | 53                    | 7.49     | 5        | 6.33     | 2    | 3.77               | 60    | 7.14     |
| More than \$45,000  | 15                    | 2.12     | 7        | 8.86     | 4    | 7.55               | 26    | 3.10     |
| Does not work for income  | 176                   | 24.86    | 21       | 26.58    | 12   | 22.64 <sup>e</sup> | 209   | 24.88    |
| Overall response pattern: $\chi^2(10, N = 840) = 19.50^{*e}$ , $p = .034$   |                       |          |          |          |      |                    |       |          |
| Father's income   |                       |          |          |          |      |                    |       |          |
| Less than \$15,000  | 48                    | 8.03     | 4        | 7.27     | 5    | 10.87              | 57    | 8.15     |
| \$16,000 to \$25,000  | 106                   | 17.73    | 17       | 30.91    | 6    | 13.04              | 129   | 18.45    |
| \$26,000 to \$35,000  | 157                   | 26.25    | 7        | 12.73    | 10   | 21.74              | 174   | 24.89    |
| \$36,000 to \$45,000  | 124                   | 20.74    | 11       | 20.00    | 8    | 17.39              | 143   | 20.46    |

<sup>d</sup>Thirty percent of the data are missing.

<sup>e</sup>Fifty-nine percent of the data are missing.

\* $p < .05$ .

\*\* $p < .01$ .

Table 12 (continued)

| Demographic<br>variable   | Bulimia symptom group |          |          |          |      |                   |       |          |
|---|-----------------------|----------|----------|----------|------|-------------------|-------|----------|
|   | Low                   |          | Moderate |          | High |                   | Total |          |
|   | N                     | Column % | N        | Column % | N    | Column %          | N     | Column % |
| More than<br>\$45,000   | 122                   | 20.40    | 14       | 25.45    | 16   | 34.78             | 152   | 21.75    |
| Does not<br>work for<br>income                                      | 41                    | 6.86     | 2        | 3.64     | 1    | 2.17 <sup>f</sup> | 44    | 6.29     |
| Overall response pattern: $\chi^2(10, N = 699) = 16.74^f, p = .080$ |                       |          |          |          |      |                   |       |          |

<sup>f</sup> Sixty-six percent of the data are missing. Twenty-two percent of the cells have expected counts less than 5; chi-square may not be a valid test.

Both missing data and cells with expected low counts make these results highly suspect.

Analysis of variance procedures to test for the significance of the demographic variables on the dependent measure of the total BULIT score (used for the detection of bulimic symptoms) treated as a continuous variable were conducted. Cell sizes, means, and standard deviations for the demographic variables on the total BULIT score are presented in Table 13 on pages 85-86. Table 14 on page 87 shows F statistics and associated p values for type III sums of squares (type III for SAS is partial sums of squares analysis) for all F tests performed. Level of significance was reached on both mother's and father's education variables ( $p < .01$ ). Post-hoc Tukey's Studentized Range (HSD) Test to detect any significant differences in pairwise comparisons of the means at the .05 level revealed that: Subjects whose mothers have less than eight years of education obtained a significantly higher mean total BULIT score (indicating higher levels of bulimic symptomatology) than did subjects whose mothers have twelve or more years of education; and subjects whose fathers have less than eight years of education obtained a significantly higher mean BULIT score than did subjects whose fathers have eight or more years of education. In order to assess the strength of the relationships found between the parents' education levels and the total BULIT score, the eta squared (a measure of nonlinear covariation) calculations (see Table 14) need consideration. The proportion of variance in the BULIT score explained by either the mother's or the father's education variable is minimal; only 1.1% by mother's education



Table 13

Cell Sizes, Means, and Standard Deviations for Demographic Variables  
on the Total BULIT Score

| Demographic variable | Total BULIT score (dependent variable) |       |                    |
|----------------------|--|-------|--------------------|
|                      | N                                      | Mean  | Standard deviation |
| Age                  |  |       |                    |
| 13                   | 9                                      | 63.89 | 19.67              |
| 14                   | 497                                    | 64.64 | 20.10              |
| 15                   | 557                                    | 65.41 | 20.58              |
| 16                   | 469                                    | 66.55 | 20.68              |
| 17                   | 301                                    | 65.72 | 20.41              |
| 18                   | 48                                     | 69.64 | 20.50              |
| 19(+)                | 8                                      | 85.57 | 22.13              |
| Grade level          |  |       |                    |
| Freshman             | 620                                    | 65.63 | 20.46              |
| Sophomore            | 553                                    | 66.53 | 20.78              |
| Junior               | 445                                    | 64.86 | 20.29              |
| Senior               | 268                                    | 65.72 | 20.39              |
| School               |  |       |                    |
| #1                   | 566                                    | 66.44 | 21.69              |
| #2                   | 254                                    | 63.42 | 19.78              |
| #3                   | 537                                    | 66.24 | 19.54              |
| #4                   | 202                                    | 66.09 | 21.31              |
| #5                   | 327                                    | 65.50 | 19.92              |
| Race                 |  |       |                    |
| White                | 1528                                   | 65.32 | 20.05              |
| Black                | 177                                    | 66.59 | 22.43              |
| Hispanic             | 37                                     | 73.38 | 18.20              |
| Asian                | 83                                     | 69.48 | 22.97              |
| Native American      | 21                                     | 67.46 | 28.23              |
| Other                | 33                                     | 65.62 | 19.92              |
| Mother's education   |  |       |                    |
| Less than 8 years    | 21                                     | 80.27 | 31.84              |
| 8 to 11 years        | 37                                     | 72.87 | 25.22              |
| 12 years             | 1017                                   | 65.29 | 19.92              |
| 13 to 15 years       | 218                                    | 64.41 | 19.66              |
| 16 years             | 163                                    | 64.22 | 20.20              |
| More than 16 years   | 118                                    | 65.39 | 20.94              |

Table 13 (continued)

| Demographic variable     | Total BULIT score (dependent variable) |       |                    |
|--------------------------|--|-------|--------------------|
|                          | N                                      | Mean  | Standard deviation |
| Father's education       |  |       |                    |
| Less than 8 years        | 10                                     | 91.36 | 33.65              |
| 8 to 11 years            | 73                                     | 68.04 | 22.98              |
| 12 years                 | 756                                    | 65.59 | 19.69              |
| 13 to 15 years           | 176                                    | 65.37 | 19.96              |
| 16 years                 | 219                                    | 65.44 | 20.19              |
| More than 16 years       | 190                                    | 63.72 | 19.92              |
| Mother's income          |  |       |                    |
| Less than \$15,000       | 197                                    | 65.80 | 19.93              |
| \$16,000 to \$25,000     | 215                                    | 65.23 | 20.95              |
| \$26,000 to \$35,000     | 133                                    | 64.82 | 20.69              |
| \$36,000 to \$45,000     | 60                                     | 64.11 | 19.62              |
| More than \$45,000       | 26                                     | 75.44 | 26.33              |
| Does not work for income | 209                                    | 69.90 | 21.02              |
| Father's income          |  |       |                    |
| Less than \$15,000       | 57                                     | 68.92 | 22.10              |
| \$16,000 to \$25,000     | 129                                    | 66.83 | 20.66              |
| \$26,000 to \$35,000     | 174                                    | 62.65 | 18.91              |
| \$36,000 to \$45,000     | 143                                    | 65.13 | 20.01              |
| More than \$45,000       | 152                                    | 66.94 | 23.89              |
| Does not work for income | 44                                     | 63.41 | 16.89              |

Table 14

Relationship of Demographic Variables to the Total BULIT Score: ANOVA  
F Statistics and Associated p Values for Type III Sums of Squares

| Demographic variable | DF <sup>a</sup> |        | F      | p    | Eta  | Eta <sup>2</sup> |
|----------------------|-----------------|--------|--------|------|------|------------------|
|                      | Between         | Within |        |      |      |                  |
| Age                  | 6               | 1882   | 1.94   | .071 | .079 | .006             |
| Grade level          | 3               | 1882   | .56    | .644 | .030 | .001             |
| School               | 4               | 1881   | 1.08   | .364 | .048 | .002             |
| Race                 | 5               | 1873   | 1.80   | .110 | .069 | .005             |
| Mother's education   | 5               | 1568   | 3.47** | .004 | .105 | .011             |
| Father's education   | 5               | 1418   | 3.83** | .002 | .116 | .013             |
| Mother's income      | 5               | 834    | 1.29   | .268 | .087 | .008             |
| Father's income      | 5               | 693    | 1.31   | .257 | .097 | .009             |

<sup>a</sup>DF = Degrees of freedom, both for between groups and within groups.

\*\*p<.01.

level and 1.3% by father's education level. The proportion of variance in the BULIT score explained by each of the other demographic variables is less than 1% in all cases (range is from 0.1% to 0.9%).

#### Relationship of Personality Variables to Bulimia

Before addressing the analysis of variance and related data on the relationship of the personality variables to bulimia, internal consistency results for the dependent variables as well as correlations between the dependent variables are presented. The overall internal consistency of each of the dependent variables (the five personality-related measures as well as the BULIT) was computed using Cronbach's alpha. The resulting alpha coefficients are shown in Table 15 on page 89. All of the alpha coefficients ranged from .84 to .92 with the exception of the specific self-efficacy measure which was .54; a relatively high level of internal consistency is seen in most of the measures.

Correlations between the dependent variables (the personality measures as well as the BULIT measure) were calculated using Pearson's Product-Moment Correlation. The correlation coefficients are presented in Table 16 on page 90. All of the variables showed moderate to high intercorrelations (range of absolute values is from .26 to .69). The BULIT, GFFS, TAS, and BDI were all positively intercorrelated, indicating that higher levels of bulimic symptomatology, fear of fat, trait anxiety, and depression were reported concomitantly. These same variables were all negatively correlated with the GSES and SSES variables, indicating

Table 15

Cronbach's Alpha Internal Consistency Coefficients for the Dependent Variables

| Dependent variable            | N    | Cronbach's alpha |
|-------------------------------|------|------------------|
| Bulimia test (BULIT)          | 1702 | .92              |
| Fear of fat (GFFS)            | 1856 | .87              |
| Trait anxiety (TAS)           | 1745 | .90              |
| General self-efficacy (GSES)  | 1892 | .84              |
| Specific self-efficacy (SSES) | 1916 | .54              |
| Depression (BDI)              | 1925 | .88              |

Table 16

Correlations Between the Dependent Variables

| Dependent variable            | Dependent variables |                     |                     |                      |                      |                      |
|-------------------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|
|                               | BULIT               | GFFS                | TAS                 | GSES                 | SSES                 | BDI                  |
| Bulimia test (BULIT)          | 1.00<br>(N=1890)    | 0.60***<br>(N=1843) | 0.43***<br>(N=1880) | -0.34***<br>(N=1886) | -0.63***<br>(N=1863) | 0.43***<br>(N=1880)  |
| Fear of fat (GFFS)            |                     | 1.00<br>(N=1926)    | 0.35***<br>(N=1915) | -0.26***<br>(N=1919) | -0.57***<br>(N=1888) | 0.31***<br>(N=1912)  |
| Trait anxiety (TAS)           |                     |                     | 1.00<br>(N=2010)    | -0.60***<br>(N=1999) | -0.36***<br>(N=1927) | 0.69***<br>(N=1990)  |
| General self-efficacy (GSES)  |                     |                     |                     | 1.00<br>(N=2016)     | 0.31***<br>(N=1934)  | -0.47***<br>(N=2000) |
| Specific self-efficacy (SSES) |                     |                     |                     |                      | 1.00<br>(N=1940)     | -0.34***<br>(N=1927) |
| Depression (BDI)              |                     |                     |                     |                      |                      | 1.00<br>(N=2008)     |

\*\*\* $p < .001$ .

that as higher levels of bulimic symptomatology, fear of fat, trait anxiety, and/or depression were reported, self-efficacy ratings (both general and specific to eating issues) decreased. As may be expected, the GSES and SSES variables were positively correlated, indicating that as general self-efficacy ratings increased, so too did ratings of self-efficacy specific to eating issues. All of the intercorrelations (both positive and negative) between the dependent variables were highly significant (all  $p < .001$ ). The highest correlations with the BULIT (measure of bulimia) were achieved by the specific self-efficacy ( $-.63$ ) and the fear of fat ( $.60$ ) variables, followed by trait anxiety and depression (both correlated at  $.43$ ) and lastly, by general self-efficacy ( $-.34$ ).

#### Univariate analyses

Cell sizes, means, and standard deviations for the overall sample as well as for each bulimia symptom group on all of the dependent variable are given in Table 17 on page 92 and in Table 18 on page 93, respectively. Separate univariate analyses of variance (ANOVAs) were conducted to evaluate the relationship of the five personality measures (fear of fat, trait anxiety, general self-efficacy, self-efficacy specific to eating issues, and depression) to the bulimia symptom groups. Table 19 on page 94 presents F statistics and associated p values for type III sums of squares for all F tests performed. All of the dependent personality variables were highly significantly related to the bulimia symptom groups; all Fs were significant at the  $.0001$  level. The strength of the relationships were assessed through eta squared computations (see

Table 17

Cell Sizes, Means, and Standard Deviations (S.D.) for the Overall  
Sample on the Dependent Variables

| Dependent variable            | N    | Mean  | S.D.  |
|-------------------------------|------|-------|-------|
| Bulimia test (BULIT)          | 1890 | 65.74 | 20.49 |
| Fear of fat (GFFS)            | 1926 | 24.48 | 7.46  |
| Trait anxiety (TAS)           | 2010 | 44.03 | 10.19 |
| General self-efficacy (GSES)  | 2016 | 59.83 | 10.50 |
| Specific self-efficacy (SSES) | 1940 | 21.40 | 4.64  |
| Depression (BDI)              | 2008 | 11.27 | 9.23  |



Table 18

Cell Sizes, Means, and Standard Deviations (S.D.) for the Bulimia  
Symptom Groups on the Dependent Variables

| Dependent variable                   | Bulimia symptom group |          |        |
|--------------------------------------|-----------------------|----------|--------|
|                                      | Low                   | Moderate | High   |
| <b>Bulimia test (BULIT)</b>          |                       |          |        |
| N                                    | 1594                  | 177      | 119    |
| Mean                                 | 59.11                 | 94.13    | 112.41 |
| S.D.                                 | 13.90                 | 3.75     | 9.48   |
| <b>Fear of fat (GFFS)</b>            |                       |          |        |
| N                                    | 1554                  | 174      | 115    |
| Mean                                 | 23.24                 | 30.20    | 32.91  |
| S.D.                                 | 6.92                  | 6.62     | 5.98   |
| <b>Trait anxiety (TAS)</b>           |                       |          |        |
| N                                    | 1587                  | 175      | 118    |
| Mean                                 | 42.75                 | 48.86    | 53.83  |
| S.D.                                 | 9.79                  | 9.54     | 10.02  |
| <b>General self-efficacy (GSES)</b>  |                       |          |        |
| N                                    | 1590                  | 177      | 119    |
| Mean                                 | 60.94                 | 55.26    | 52.58  |
| S.D.                                 | 10.13                 | 10.00    | 11.62  |
| <b>Specific self-efficacy (SSES)</b> |                       |          |        |
| N                                    | 1572                  | 174      | 117    |
| Mean                                 | 22.23                 | 17.61    | 16.04  |
| S.D.                                 | 4.35                  | 3.29     | 4.01   |
| <b>Depression (BDI)</b>              |                       |          |        |
| N                                    | 1585                  | 174      | 119    |
| Mean                                 | 9.46                  | 15.35    | 20.18  |
| S.D.                                 | 7.76                  | 10.52    | 10.76  |

Table 19

Relationship of Bulimia Symptom Groups to the Dependent Variables: ANOVA  
F Statistics and Associated p Values for Type III Sums of Squares

| Demographic<br>variable           | DF <sup>a</sup> |        | F          | p     | Eta  | Eta <sup>2</sup> |
|-----------------------------------|-----------------|--------|------------|-------|------|------------------|
|                                   | Between         | Within |            |       |      |                  |
| Fear of fat<br>(GFFS)             | 2               | 1840   | 173.51**** | .0000 | .398 | .159             |
| Trait anxiety<br>(TAS)            | 2               | 1877   | 94.28****  | .0000 | .302 | .091             |
| General self-<br>efficacy (GSES)  | 2               | 1883   | 57.14****  | .0000 | .239 | .057             |
| Specific self-<br>efficacy (SSES) | 2               | 1860   | 192.77**** | .0000 | .414 | .172             |
| Depression (BDI)                  | 2               | 1875   | 123.71**** | .0000 | .341 | .117             |

<sup>a</sup>DF = Degrees of freedom, both for between groups and within groups.

\*\*\*\*p<.0001.

Table 19). The percentage of variance in the dependent variables accounted for by the bulimia symptom groups factor ranged from 5.7% to 17.2%. The greatest contributions in terms of effect size were made by the specific self-efficacy (17.2%) and the fear of fat (15.9%) variables; these were followed by the depression (11.7%), trait anxiety (9.1%), and general self-efficacy (5.7%) variables.

All of the above significant ANOVAs were tested post-hoc by Tukey's Studentized Range (HSD) Test and all groups were significantly different ( $p < .05$ ) from each other on all of the variables. Inspection of the means for the three bulimia symptom groups on all of the personality variables (see Table 18) show higher group means for fear of fat, trait anxiety, and depression when moving from the low bulimia symptom group to the moderate and to the high symptom group. In contrast, lower group means for general and specific self-efficacy are seen when moving from the low to moderate to high bulimia symptom groups. To help visualize the univariate differences between the bulimia symptom groups, means on the dependent variables for each group (see Table 18) were transformed to z-scores and profiled in graph form (see Figure 1 on page 96). In general, the moderate and high symptom groups were closer to each other on the dependent variables than were the low and moderate groups.

#### Multivariate analyses

In addition to the univariate analyses described above, two multivariate procedures were conducted--multiple regression and discriminant function analysis. These procedures are obviously similar

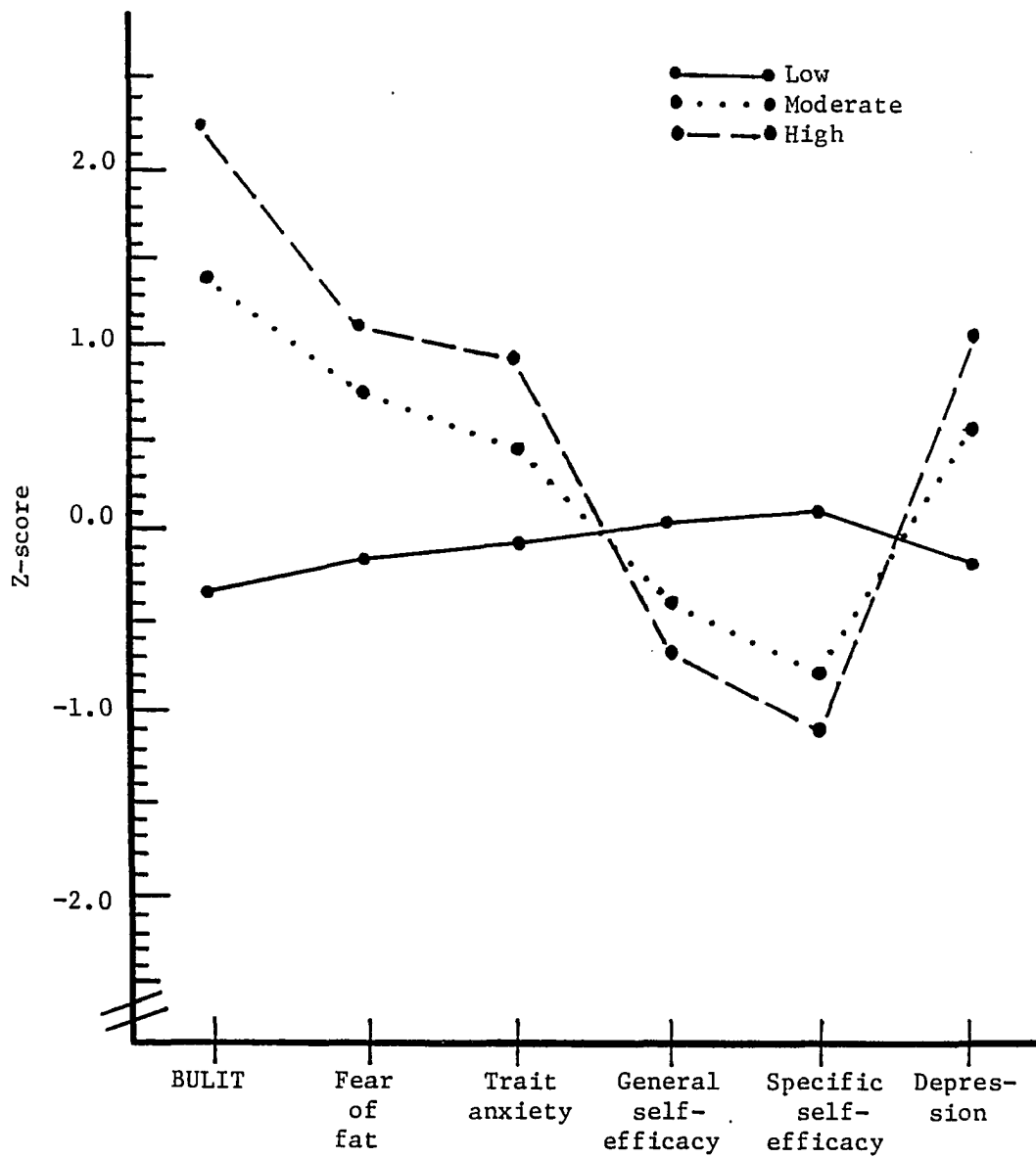


Figure 1. Profile of dependent variables for three bulimia symptom groups (based on z-score transformations for Table 18)

in their goal of establishing predictor variables. Both were employed in the present study since, in the case of the multiple regression, focus was on identifying variables predicting the BULIT score as a continuous variable, and in the case of the discriminant function analysis, focus was on identifying variables predicting classification within the bulimia symptom groups. As may be expected, given that the BULIT score was used to determine bulimia symptom group classification, results of both procedures that are presented in the following paragraphs were similar.

A multiple regression analysis was performed with the five personality variables as predictors of the BULIT score. The BULIT score was used as a continuous variable indicating the level of bulimic symptomatology. The overall F test was highly significant:  $F(5, 1802) = 384.98$ ,  $p = .0001$ . The coefficient of determination ( $R^2$ ) was .517, indicating that 51.7% of the variation in the BULIT score (bulimic symptomatology) can be explained by all five personality variables together. Table 20 on page 98 presents a summary of the multiple regression results. Using the standardized beta weights from the regression equation, it is evident that, for this set of variables, the two most potent predictors for the BULIT score or bulimic symptomatology were the specific self-efficacy and fear of fat variables. The depression variable provided the third best contribution to the prediction of the BULIT variance. The t-tests for the beta weights on all of these three variables were highly significant ( $ps = .0001$ ). Although the t-test for the beta weight for trait anxiety was significant at the .02 level, its relative contribution to prediction (standardized

Table 20

Bulimic Symptomatology as a Function of Five Personality Variables:Multiple Regression Analysis


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| Variable | Zero-order<br>correlation with<br>BULIT score |                | Unstan-<br>dardized<br>beta<br>weight | Stan-<br>dardized<br>beta<br>weight | t-test<br>for<br>beta<br>weight | p<br>value |
|----------|---|----------------|---------------------------------------|-------------------------------------|---------------------------------|------------|
|          | r   | r <sup>2</sup> |                                       |                                     |                                 |            |

---

(Intercept=74.64)

|                                   |      |     |       |       |        |       |
|-----------------------------------|------|-----|-------|-------|--------|-------|
| Fear of fat<br>(GFFS)             | .60  | .36 | 0.85  | 0.31  | 15.08  | .0001 |
| Trait anxiety<br>(TAS)            | .43  | .18 | 0.19  | 0.06  | 2.34   | .0200 |
| General self-<br>efficacy (GSES)  | -.34 | .12 | -0.06 | -0.03 | -1.50  | .1350 |
| Specific self-<br>efficacy (SSES) | -.63 | .40 | -1.63 | -0.37 | -18.00 | .0001 |
| Depression<br>(BDI)               | .43  | .18 | 0.35  | 0.15  | 6.53   | .0001 |

Overall  $F(5, 1802) = 384.98, p = .0001$   
 $R^2 = .517$

---

beta weight) was small. Finally, general self-efficacy made no significant contribution to the regression equation.

The relative contributions of the personality variables to the prediction of the BULIT score can be examined in terms of the predictor intercorrelations (see Table 16) and their zero-order correlations with the BULIT score. Although general and specific self-efficacy were positively intercorrelated (.31), the correlation of specific self-efficacy with the BULIT score (-.63) was much higher than that for general self-efficacy (-.34), and therefore it appears that nearly all of the predictive weight was given to specific self-efficacy. The specific self-efficacy and fear of fat variables ranked first and second, respectively, in their correlations with the BULIT score and also maintained that ranking in their contributions to the regression equation. Although the trait anxiety and depression simple correlations with the BULIT score were equivalent (.43), depression received the greater weighting in the regression equation. This may, in part, be due to the fact that trait anxiety and depression were the two most highly intercorrelated predictors (.69).

The multivariate contribution of the five personality variables to bulimia symptom group classification (low, moderate, and high) was explored through a discriminant function analysis. The analysis yielded one significant function separating the three groups in the multivariate space defined by the five personality predictor variables (canonical correlation = .49; Wilks' lambda = .75; eigenvalue = .32). This function accounted for approximately 32% of the variance (based on the eigenvalue)

and correctly classified 69.34% of the cases. Table 21 on page 101 summarizes the hit-miss data for the discriminant analysis. Because the purpose of this analysis was understanding the contribution of the personality variables to the bulimia symptom groups, rather than to maximize prediction, the prior probabilities for group membership were set at .33. Therefore, the overall hit rate of 69.34% can be contrasted with this 33% prior rate.

Two alternative indicators of the relative contributions of discriminant predictors are standardized discriminant weights and correlations of the predictors with the discriminant variate, as shown in Table 22 on page 102. Based on the standardized discriminant function coefficients, the most discriminating variables were specific self-efficacy (-.50), depression (.43), and fear of fat (.42) with near zero contributions by general self-efficacy (-.05) and trait anxiety (-.02). The discriminant variate was most highly correlated (see Table 22) with specific self-efficacy (-.809) and fear of fat (.754), followed by depression (.637), trait anxiety (.541), and general self-efficacy (-.423).

Evaluation of the discriminant function at the group means (group centroids) level revealed nearly a two standard deviation separation between the low symptom and high symptom groups (from -0.238 to 1.658) (see Figure 2 on page 103). Separation was greater between the low and moderate symptom groups than between the moderate and high symptom groups (from -0.238 to 1.057 vs. from 1.057 to 1.658). These findings parallel the hit-miss results in Table 21 where misses occurred more often between



Table 21

Hit-Miss Summary Data for Discriminant Analysis

| Actual<br>symptom<br>group | <u>Predicted symptom group</u> |          |      | Total |
|----------------------------|--------------------------------|----------|------|-------|
|                            | Low                            | Moderate | High |       |
| Low                        |                                |          |      |       |
| N                          | 1106                           | 286      | 138  | 1530  |
| Row %                      | 72.3                           | 18.7     | 9.0  | 100.0 |
| Moderate                   |                                |          |      |       |
| N                          | 28                             | 80       | 59   | 167   |
| Row %                      | 16.8                           | 47.9     | 35.3 | 100.0 |
| High                       |                                |          |      |       |
| N                          | 8                              | 36       | 69   | 113   |
| Row %                      | 7.1                            | 31.9     | 61.1 | 100.0 |
| Total                      |                                |          |      |       |
| N                          | 1142                           | 402      | 266  | 1810  |
| Row %                      | 63.1                           | 22.2     | 14.7 | 100.0 |

Note. Overall hit rate = 69.34%.

Table 22

Standardized Discriminant Function Coefficients and Pooled Within-Groups  
Correlations Between Predictive Variables and the Discriminant Function

| Predictive<br>variable        | Standardized<br>discriminant<br>function<br>coefficient | Correlation<br>with<br>discriminant<br>function |
|-------------------------------|---|---|
| Fear of fat (GFFS)            | .42   | .754  |
| Trait anxiety (TAS)           | -.02  | .541  |
| General self-efficacy (GSES)  | -.05  | -.423   |
| Specific self-efficacy (SSES) | -.50  | -.809   |
| Depression (BDI)              | .43   | .637  |

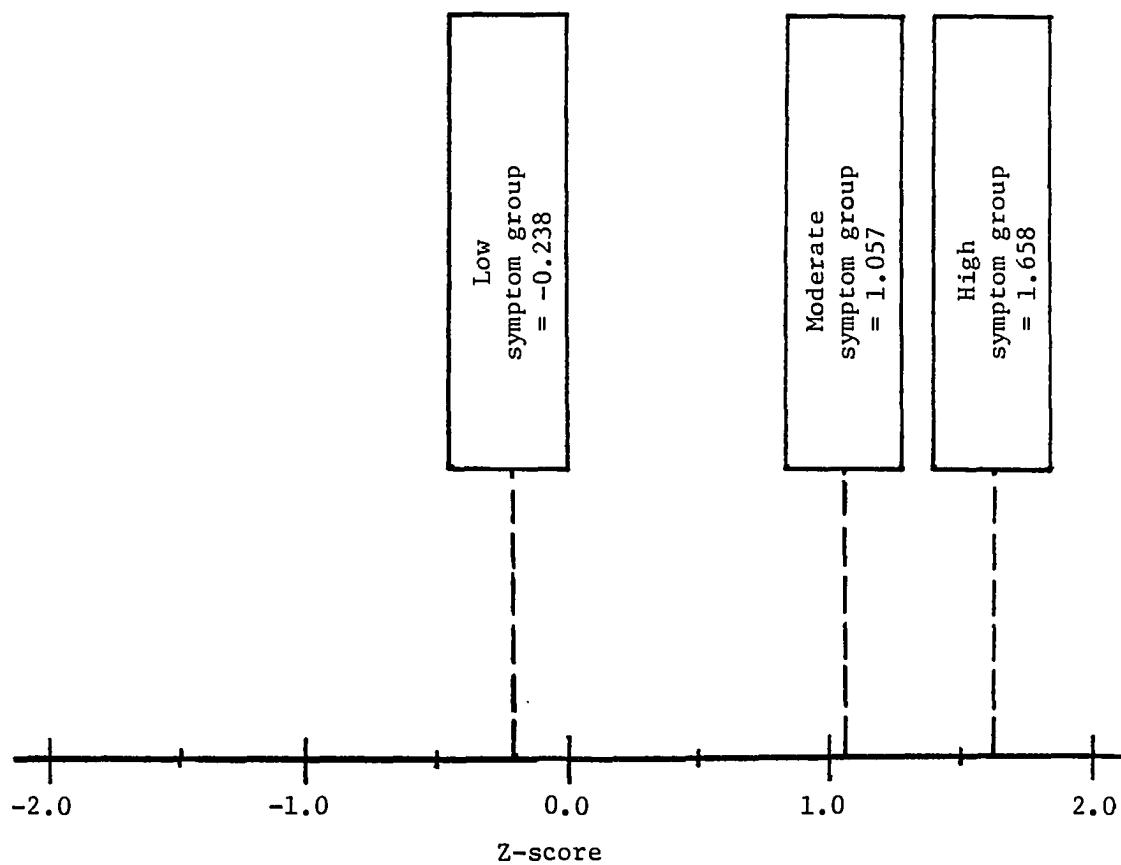


Figure 2. Group centroids of three bulimia symptom groups in multi-variate space defined by five personality variables

the moderate and high symptom groups; that is, these were relatively similar groups and thus more difficult to distinguish with the discriminant function. The multivariate differences between the bulimia symptom groups appearing in Figure 2 are also similar to the univariate differences between the symptom groups appearing in Figure 1, where the moderate and high groups were closer to each other on the dependent variables than were the low and moderate groups.

#### Additional Analyses

Correlations between the Marlowe-Crowne Social Desirability - Short Form Scale (M-C SDS) and each of the dependent variables were calculated to evaluate social desirability as a response tendency with the self-report measures. These correlations are presented in Table 23 on page 105. It appears that the impact of social desirability was significant on the fear of fat ( $p < .05$ ), trait anxiety ( $p < .05$ ), general self-efficacy ( $p < .001$ ), and depression ( $p < .01$ ) variables, raising the question of a response bias on these measures. However, it is important to note that all of the correlations reaching significance were extremely small, ranging from only .05 to .08, and that they attained significance because of the large Ns involved (Ns ranged from 1883 to 2002). It is doubtful, given the almost negligible correlations, that social desirability impinged upon responses to the self-report measures to any appreciable degree.

Univariate analyses of variance (ANOVAs) were conducted to determine any effect a variable labeled "Form", representing the 24 orderings of

Table 23

Correlations Between Social Desirability (M-C SDS) and the Dependent Variables

| Dependent variable            | N    | Correlation<br>with M-C SDS |
|-------------------------------|------|-----------------------------|
| Bulimia test (BULIT)          | 1883 | 0.01                        |
| Fear of fat (GFFS)            | 1920 | 0.05*                       |
| Trait anxiety (TAS)           | 1999 | -0.05*                      |
| General self-efficacy (GSES)  | 2002 | 0.08***                     |
| Specific self-efficacy (SSES) | 1931 | 0.02                        |
| Depression (BDI)              | 1993 | -0.07**                     |

\* $p < .05$ .

\*\* $p < .01$ .

\*\*\* $p < .001$ .

the instruments in the survey packets, may have had on the dependent measures. Two of the dependent variables, depression and specific self-efficacy, were significantly related to the Form variable ( $F(23, 1984) = 1.55, p < .05$ ; and  $F(23, 1916) = 2.88, p < .001$ , respectively). These results offered support for the presumption made in establishing the research design that the ordering of the measures in the survey packet would have an effect. Thus, the random distribution of all possible combinations of instrument ordering within the packets was methodologically prudent.

## DISCUSSION

The present study investigated the prevalence of bulimia and bulimic behaviors in a nonclinical population of high school females as well as explored the relationship between certain personality characteristics and bulimia in this group. Results of the prevalence data and data on the relationship of the demographic and personality variables to bulimia are reviewed and discussed in the following sections. In addition, limitations of the current study and implications of the findings are addressed.

## Prevalence Data

Results from the current study indicate a relatively high prevalence rate (6.31%) for bulimia in high school females. This figure is higher than the DSM-III based prevalence rates found by Hart and Ollendick (1985), Katzman et al. (1984), and Stangler and Printz (1980) in their studies of college females. However, it is lower than other college female prevalence rates, also based on DSM-III criteria (or modified versions of same), found by Halmi et al. (1981), Pope et al. (1984), Pyle et al. (1983), and Zuckerman et al. (1986). In general, the 6.31% bulimia prevalence rate found in the current study falls at the lower end of the range for DSM-III based bulimia prevalence (4% to 19%) reported in the college female samples. When comparisons are made to the published reports of prevalence rates for bulimia in high school females, the results from the current sample are most similar to the Pope et al. (1984) high school female rate of 6.5%. However, in comparing the

current sample rate of 6.31% to all of the high school female reports of bulimia prevalence, it is seen that the figure is actually below the range of 6.5% to 12.9% for DSM-III based studies. It is unclear what factors account for the discrepancies in the prevalence rates for bulimia across samples. As previously mentioned, differences in sampling methods, questionnaire administration, instruments used, and interpretation of the DSM-III bulimia criteria as well as regional biases could account for the inconsistencies.

It is of interest to note that, in validation studies of the BULIT measure, the prevalence rate for bulimia was 4% in a college female sample (Smith & Thelen, 1984) and 3.1% in a high school female sample (Haut, 1986). The prevalence rate in the present study is substantially higher than the rates found in the validation studies, even though the same measure (BULIT) was used in all three cases. The discrepancy may easily be accounted for by the lack of subject anonymity in the validation studies which may have led some subjects to deny or simply not report bulimic behaviors, resulting in the lower prevalence rates. This especially applies to the prevalence rate found in the high school female validation attempt where the lack of subject anonymity led to serious attrition and cooperation problems (Haut, 1986). It appears that the results of the current study may more accurately reflect the prevalence rate for bulimia (based on the BULIT) in high school females since the subjects reported completely anonymously and were insured anonymity throughout their participation. It may also be that the 6.31% figure in the current study is conservative since the author received anecdotal



reports that some students who had symptoms of bulimia did not report them on the BULIT for fear that other students might see them endorse the items.

Results from the current study also indicate that the phenomenon of binge eating is a fairly prevalent behavior among female adolescents, with approximately 43% of the total sample reporting twice monthly or greater episodes of binge eating. Approximately one-fourth (25.12%) of all of the subjects reported binge episodes at least weekly and approximately 7% reported binge episodes at least daily. This study's at least weekly frequency rate for bingeing episodes is, in most cases, considerably higher than the same level of frequency rates available in the college female data (10-13% reported by Pope et al., 1984; 17% reported by Pyle et al., 1983; and 23% reported by Zuckerman et al., 1986). Comparisons of daily rates of binge episodes between the present sample and the college samples are not possible since daily frequency rates were not reported in the college samples' data. The prevalence rate for binge eating at least weekly in the current investigation falls within the range reported in previous high school female studies (approximately 6% reported by Pope et al., 1984, to approximately 39% reported by Maceyko & Nagelberg, 1985); the rate most closely parallels those reported by Crowther et al. (1985) (20%), Johnson et al. (1984) (21%), and Vincent (1984/1985) (23%), perhaps because these samples were all drawn from the Midwest. The midwestern rates for weekly bingeing by high school females are considerably higher than the rate obtained in the one eastern sample (approximately 6%) reported by Pope et al. (1984);

they are, however, considerably lower than the rate from the southeastern sample (approximately 39%) reported by Maceyko and Nagelberg (1985). Specific binge frequency data are not available for all areas of the United States, making it difficult to draw any conclusions about regional differences. Only two previous high school studies reported at least daily binge frequency rates--approximately 1% and 4% reported by Carter and Duncan (1984) and Crowther et al. (1985), respectively; these were considerably lower than the 7% rate found in the present study.

The prevalence of purgative behavior to control weight also appears relatively high in midwestern adolescent females: approximately 17% of the total sample reported using self-induced vomiting, with about 9% reporting same on a weekly or greater basis; almost 10% reported using laxatives or suppositories, with about 8.5% using these at least weekly; and approximately 10.5% reported using diuretics, with about 7.7% reporting weekly or greater use. Here, the percentages of female adolescents acknowledging these methods of weight control are, in many cases, higher than those reported in female college populations (Halmi et al., 1981; Hart & Ollendick, 1985; Hawkins & Clement, 1980; Pope et al., 1984; Pyle et al., 1983). In general, a higher percentage of female adolescents report self-induced vomiting, laxative, and diuretic use at least weekly as methods of weight control. Only the New England college females sampled by Zuckerman et al. (1986) reported higher rates of frequency for these purgative behaviors. The use of evacuation techniques for weight control in the present study is also somewhat higher than the use reported in previous female high school populations

(Carter & Duncan, 1984; Crowther et al., 1985; Johnson et al., 1984; Kagan & Squires, 1984; Killen et al., 1986; Pope et al., 1984), where the percentages of at least weekly use for self-induced vomiting, laxatives, and/or diuretics ranged from 0.5% to 7.8%.

It is difficult to directly compare the prevalence of fasting or "crash" dieting in the current study to previous college and high school investigations since method of inquiry differed greatly or was simply not included. Over half (approximately 56%) of the current total sample reported fasting or "crash" dieting within the past year to lose weight with nearly 20% reporting same more than five times in the past year. The prevalence, however, does appear slightly higher than that reported by Crowther et al. (1985), where approximately 36% of the Ohio female high school sample reported that they "fasted"; i.e., they went without food for a day or more to control their weight (no frequency variable included).

Although there is little basis for comparison to other studies, it is important to reemphasize that 9.7% of the total current sample reported ". . . hate myself" after binge eating, supporting the notion that bingeing behavior can contribute to subjective distress. In addition, 7.41% of the total sample reported feeling ". . . that food controls my life" on an "almost always" to "always" basis, while 11.2% of all subjects reported "rarely" or "never" feeling control over the amount of food they consume. This element of control (or lack of) probably interplays with other factors involved in bulimic behavior.

The reader is reminded that, out of all of the eight selected

bulimia-related behaviors (items) discussed above (binging, self-induced vomiting, laxative or suppository use, diuretic use, fasting or "crash" dieting, feelings after binge eating, feelings that life is controlled by food, and feelings about control over amount of food consumed), significant differences among high school grade levels appeared for only diuretic use, with freshmen and sophomores endorsing higher frequency usage than juniors and seniors. The reason for this is unclear. One explanation might be that, for some reason, the younger group is more vulnerable to media forces advertising use of diuretics. Another, perhaps more plausible explanation, is that this finding of minimal significance ( $p < .05$ ) occurred by chance.

The prevalence results of the current study support the notion that high school females engage in the bulimic behaviors of bingeing and purging at a rate at least comparable to or higher than college females. The high prevalence of bulimic behaviors among these young women needs to be understood and addressed within a biological and psychosocial context. Certainly the developmental adolescent years are vulnerable ones, when physiological, psychological, emotional, and social forces carry a heightened impact. As previously discussed, cultural emphasis on thinness for women has increased over the last two decades (Garner et al., 1980; Schwartz et al., 1982). This increased "thin is in" or "thin is beautiful" emphasis appears to have created an unrealistic standard for body size among women that has led to increased dieting and even more drastic weight control measures such as self-induced vomiting and laxative abuse in the teen years. There is also evidence that binge

eating is a counter-regulatory behavior provoked by psychological and biological symptoms resulting from chronic or repeated food restriction (Polivy, Herman, Jazwenski, & Olmsted, 1984). The existence of peer pressure, to which teens seem especially sensitive, may also play a part in the widespread participation by this group in bulimic behaviors that are evident in their social circles.

The generally higher prevalence rates for binge eating and purgative behaviors for weight control found in the present study compared to those reported in previous high school female studies is not clearly interpretable. One explanation is that, for this particular sample, actual prevalence of these behaviors is higher than for other samples, suggesting a possible regional difference. A more likely explanation may be that the data for this study were collected within the first month of a new academic year when students were probably experiencing multiple pressures in their adjustment to returning to school; these pressures may have exacerbated bulimic symptomatology at the time of data collection.

The prevalence rates for bulimic behaviors across the bulimia symptom groups created in this study warrant minimal discussion since, as previously described, it was on the basis of bulimic behavior endorsement that subjects were assigned to the symptom groups. Thus, levels of bulimic symptomatology increase from the low to moderate to high symptom groups. What is noteworthy, however, is that there is a rather large proportion of low symptom group subjects (considered noneating-disordered) who reported binge eating episodes as well as purgative

behaviors for weight control on an at least weekly basis (approximately 18% endorsed eating binges, 6.1% endorsed self-induced vomiting, 2.6% endorsed laxative or suppository use, and 3.9% endorsed diuretic use). This, in addition to the fact that 9.33% of the total sample fell in the moderate symptom group, provides further support that bulimic behaviors are relatively common phenomena in female adolescents. It is important to remember, however, that the presence of episodic bingeing and purging behaviors is not sufficient for a diagnosis of the syndrome of bulimia. As previously discussed, the overall prevalence rate of 6.31% for bulimia found in this study was at the low end of the range found in college females and slightly below the range found in other high school female samples. But in light of the medical (and social) complications associated with frequent and prolonged bingeing and purging behaviors, the percentages of female adolescents acknowledging these behaviors is of major concern.

#### Relationship of Demographic Variables to Bulimia

Analyses exploring differences among the three bulimic symptom groups in relationship to the demographic variables yielded results that are, in part, difficult to interpret. There were no significant differences found for the age, grade level, school, race, and father's income variables. There were significant differences, however, found on both parent's education variables and for the mother's income variable. The appearance of a trend toward reports of higher bulimic symptomatology in subjects whose mothers have less than eight years or eight to eleven

years of education as well as in subjects whose fathers have less than eight years of education is interesting. If lack of education is considered an indication of socioeconomic status (SES), it appears that bulimia may be penetrating the lower SES levels thought previously less vulnerable to the disorder. On the other hand, the appearance of a trend toward higher bulimic symptomatology in subjects whose mothers earn more than \$45,000 annually supports previous evidence that bulimia is more prominent in the higher SES groups (Andersen & Hay, 1985). The above findings are not to be taken too seriously since, as discussed in the previous chapter, both high levels of missing data and cells with expected low counts make these findings highly suspect.

What may clarify the understanding of the relationship of the demographic variables to bulimia is to consider the results obtained by using the total BULIT score as a continuous variable for the dependent measure. Here, only the parents' education variables achieved significance and were essentially identical to the findings discussed above. However, further clarification is gained by examining the proportion of variance in the BULIT score explained by either parent's education variable--only 1.1% and 1.3% explained by mother's and father's education levels, respectively. For all practical purposes, these proportions are negligible and offer little meaningful information about any influence of parents' education levels on subjects' reports of bulimic symptomatology.

Perhaps the most informative conclusion that can be drawn from the demographic data in the current study is that bulimia and/or bulimic

symptomatology appear to transcend any racial boundaries. This finding is contrary to results reported in a recent study of the prevalence of bulimic symptoms among college women where Asian-American and Black women were less often bulimic than White women (Nevo, 1985). In addition, in this study, there were no differences in bulimia prevalence across the age and grade level variables, suggesting equal concern be given to the problem throughout the high school years.

The reader is reminded that it was not the intention of the current investigation to focus on demographic variables influencing bulimia, but rather the focus was on establishing the prevalence and personality correlates of bulimia. Thus, demographic inquiry was minimal and the results are reported and discussed as a matter of convenience and simple curiosity. The most surprising information gained from the inquiry was that nearly one-fifth to one-fourth of the subjects reported not knowing their parents' level of education and over half of the subjects reported not knowing their parents' level of income. This suggests that future research exploring any demographic correlates of bulimia consider alternative methods of inquiry for socioeconomic status.

#### Relationship of Personality Variables to Bulimia

Results of the univariate analyses evaluating the relationship of the five personality variables to the bulimia symptom groups confirmed all of the research hypotheses. That is, subjects meeting criteria for bulimia (members of the high symptom group) reported significantly higher levels of trait anxiety, depression, and fear of fat than subjects not



meeting bulimia criteria (members of the low and moderate symptom groups) (hypotheses #1, #2, and #4); subjects meeting criteria for bulimia reported significantly lower levels of both general self-efficacy and self-efficacy specific to eating-related behaviors than subjects not meeting bulimia criteria (hypothesis #3); and subjects meeting some, but not all, of the criteria for bulimia (members of the moderate symptom group) reported significantly higher levels of trait anxiety, depression, and fear of fat and significantly lower levels of both general and eating-related self-efficacy than subjects clearly not meeting bulimia criteria (members of the low symptom group) (hypothesis #5).

The finding of greater depression and anxiety in the high symptom (bulimic) group aligns with the previous literature where bulimics (both in clinical and nonclinical samples) reported more depressive and anxious symptoms (e.g., Katzman & Wolchik, 1984; Piran et al., 1985; Pyle et al., 1981; Weiss & Ebert, 1983; Williamson et al., 1985). Since most of the previous studies focused on clinical samples or college and young adult women, the findings in this study support the notion that depression and anxiety are also concomitants of bulimia in the earlier stages of development as is seen in high school females. The exact nature of the relationship between depression or anxiety and bulimia, as previously discussed in the introductory chapter, remains unclear.

Higher levels of fear of fat in the high symptom group versus the low and moderate symptom groups are also similar to the previous literature findings for this variable (e.g., Casper et al., 1980; Goldfarb et al. 1985; Robinson et al., 1983). Even though body size and

shape are expected concerns of most developing young women, the excessive fear of fat reported by the high symptom group members provides support for this variable's strong relationship to bulimia in adolescent females as well.

The adolescent bulimic group in the current study also matches other bulimic groups reported in the literature on their lower levels of general self-efficacy (self-confidence or effectiveness) expectations when compared to nonbulimic groups (e.g., Hart & Ollendick, 1985; Kagan & Squires, 1984; Phelan, 1984). In addition, the bulimic group in the current study reported less confidence or effectiveness when dealing with eating-related issues, a result somewhat similar to Gormally et al.'s (1982) bulimic group who rated themselves as ineffectual in following standard diet programs. It may be that low self-efficacy expectations or feelings of ineffectiveness overlap or interplay with low self-esteem and feelings of being out of control also associated with bulimia. Perhaps, as Johnson, Connors, and Tobin (1987) suggest, bulimics attempt to solve self-control/self-esteem problems or feelings of ineffectiveness by accomplishing thinness (that is culturally reinforced) through bulimic strategies. However, the solution to the problems eventually and inevitably contributes to the problems; that is, the binge-purge behaviors increase to the extent that feelings of loss of control with side effects of lowered self-esteem and a sense of ineffectiveness result. The relationship of self-efficacy to bulimia, thus, appears somewhat circular. It also can be postulated that low self-efficacy makes contributions to feelings of depression and anxiety.

It is of interest to note that, out of all the personality variables employed in the current study, self-efficacy specific to eating-related issues and fear of fat made the greatest contributions to the effect size found among the bulimic symptom groups (17.2% and 15.9%, respectively). These results parallel the correlational data where the specific self-efficacy and fear of fat variables had the highest correlations with the BULIT score. In both cases, the general self-efficacy variable showed the least association with bulimic symptomatology. This suggests that these two variables (specific self-efficacy and fear of fat) play particularly crucial roles in bulimia and assessment of these may be useful in screening for or monitoring the disorder.

The fact that subjects in the moderate symptom group appeared significantly different (higher levels of depression, anxiety, and fear of fat; lower levels of general and specific self-efficacy) from subjects in the low symptom group on all five of the personality variables deserves comment. It appears that the moderate and high symptom groups were closer to each other on the personality variables than were the low and moderate groups, suggesting that the subjects in the moderate group may be considered "pre-bulimic" or perhaps, incipient cases of bulimia. In any case, it is clear that subjects expressing moderate levels of bulimic symptomatology are also expressing heightened levels of depression, anxiety, and fear of fat as well as lowered levels of general and specific self-efficacy expectations.

Results of the multivariate analyses (multiple regression and discriminant function analysis) suggested once again that self-efficacy

specific to eating-related issues and fear of fat are both potentially intertwined with the syndrome of bulimia. Depression also contributes significantly to the understanding of personality correlates of bulimia. The relative similarity between the moderate and high symptom groups on the personality variables reappeared, supporting the notion previously discussed that subjects in the moderate group may be at risk for increasing problems associated with bulimia.

#### Limitations of the Study

There are several factors in this study that may weaken the generalizability of the results. Of primary concern are the inherent limitations of questionnaire studies that rely on subjective report. All self-report data are susceptible to certain sources of error such as forgetting, incompetent reporting, and/or distortion and biases. There is the possibility that incompetent reporting may have occurred, especially if some students did not fully understand instructions or were not clear on the meanings of words in the items. The subjects were, however, encouraged to ask the research administrators to clarify instructions and/or word meanings if not fully understood. (There were a few subjects in most administration sessions that did inquire about the meanings of various words.) The possibility of response distortions (such as the tendency to give a socially desirable response or an automatic response as in word association or a response seen as not damaging to the self) also exists. The fact that subjects responded anonymously to the questionnaires and the fact that correlations between

a measure of social desirability and each of the other measures were negligible suggest minimal impact of response distortions in this study.

Other limitations for consideration include the following: (1) Although the survey was designed to encourage open disclosure, there is no way of knowing precisely to what degree this occurred; (2) The reliability and validity of the specific self-efficacy instrument had not been previously established; (3) Results may have been affected by the particular time in the school semester that the data were collected; (4) Even though all of the high schools in the community participated in the study, the sample of subjects acquired cannot be considered to have been obtained by random procedures; (5) Although the sample was large, it did not include students who were exempted from P.E. classes; (6) It is difficult to assign a diagnosis of bulimia on the basis of questionnaire alone; and (7) This survey, because of time constraints and research scope, does not represent an exhaustive sampling of personality characteristics associated with bulimia.

#### Implications

Even with limitations, the present findings are of considerable interest as the development and prevalence of the symptoms and syndrome of bulimia in women continues to be explored. It is important to remember that these data do not reveal the causes of any of the problems suggested; they will function best if they sensitize the reader to the prevalence of health problems found in high school females.

From a theoretical perspective, this study provides information

relative to the age of onset of bulimia in an adolescent female population. Researchers such as Halmi (1981) and Mitchell and Pyle (1982) have stated that the typical age of onset is 18 years of age, and that many bulimics continue with increasingly frequent episodes for as many as 20 years and associated physical, emotional (e.g., depression), and social functioning problems. However, the results of this study seem to indicate that the onset of bulimia may be well before age 18 in many cases, suggesting that understanding of the etiology and treatment of this disorder as well as preventive measures would best be approached or directed at the initial pubertal years.

Implications of the current data for practice are multiple. Given the high rates of bulimia-related behaviors and associated problems (e.g., depression, anxiety) in this nonclinical sample of adolescent females, it is recommended that adolescents be given information on such topics as nutritional requirements for healthy development, more appropriate and less harmful methods of weight control, and the risks and complications (especially medical) of repeated bingeing and use of drastic evacuation techniques. It may be that adolescent females are particularly prone or vulnerable to emotional lability (especially when in the context of the multiple stressors appearing during puberty years) and, because of a minimally developed coping repertoire, choose bulimic behaviors to assuage their discomforting feelings, especially those of depression, ineffectiveness, low self-esteem, etc. A focus on developing healthful coping habits, strategies for enhancing feelings of personal efficacy, improving problem-solving skills, relaxation training, or

assertiveness skill building may prove helpful in preventing a full blown syndrome of bulimia in some adolescent females. In other words, primary prevention, aimed at reducing the incidence of bulimia, is warranted. At present, however, little, if any, research has focused on education for primary prevention of eating disorders. Instructional programs in the schools aimed at preventing bulimia need to be developed. A full discussion delineating the characteristics and elements of such a prevention program is beyond the scope of this paper but should incorporate the aforementioned components as well as include a focus on improving body image/acceptance and understanding the sociocultural influences on eating disorders. The reader is referred to a recent report by Shisslak, Crago, Neal, and Swain (1987) offering some excellent suggestions for the primary prevention of eating disorders at the individual, family, and community levels. Given that societal/cultural influences appear to play a crucial role in the increased prevalence of bulimia over recent decades, the idea of prevention becomes particularly complex and challenging. It is this author's opinion, however, that targeting the schools for preventive efforts may be the most effective and efficient method for modifying sociocultural influences since this environment most intensely encompasses those at particular risk for the disorder and, therefore, may prove to exert the greatest influence for behavior change.

These findings provide information useful to school personnel who work with the behavioral, social, and academic problems of adolescents. School counselors and staff should be alerted to the widespread nature of

bulimia-related behavior in the adolescent female population. Being aware of and looking for the presence of the attitudes and behaviors that characterize (and may be precursors to) bulimia may enhance the likelihood of detection of the disorder and ultimately the prevention of its complications. In addition, school counselors can help educate parents about bulimia through special programs and presentations as well as be aware of community resources and professional help if referral is necessary.

It is clear from this and previous studies that bulimia and bulimic behaviors are occurring at an alarming rate in young, adolescent females. It is recommended that future research broaden its base of systematic investigations into the etiology, treatment, and prevention of bulimia with the high school (and possible junior high) female population. Exploring a confluence of factors, including biological variables, personality traits, and cultural attitudes associated with bulimia seems necessary. In addition, using the revised DSM-III-R criteria for bulimia nervosa (that include a specific bingeing behavior frequency and duration rule) in future prevalence research may allow for more meaningful comparisons across studies as well as contribute to the continual efforts to clarify an even more sensible and practical classification of eating disorders. A cooperative effort in the research community is warranted to sort out the complex interplay of influences associated with bulimia and to elucidate additional factors that may place individuals at risk of developing this debilitating disorder.



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Finally, special thanks go to my husband, Adrian Bennett, for his unfailing acceptance, support, and encouragement.

APPENDIX A. SURVEY OF EATING HABITS  
AND RELATED CONCERNS

**Survey  
of  
Eating Habits  
and  
Related Concerns**

## SURVEY INSTRUCTIONS

1. The following pages contain questions about the way you may think, feel, and/or act. Try to be as honest and serious as you can in marking your answers.
2. Do not be concerned that some of the questions may seem odd or unusual to you; they are put in the survey to cover many types of thoughts, feelings, and behaviors that can occur, whether rarely or often.
3. Work quickly, and don't spend too much time on any one question. Answer as best you can. Be sure not to skip any questions or pages.
4. There are no right or wrong answers and this is not a test of personality, intelligence, or ability. Your answers and the results of the survey are confidential and will only be used for scientific purposes. School staff or parents will not score or even look over completed survey question sheets.
5. You may mark your answers with a pen or pencil; just make sure your answers are marked clearly.
6. REMEMBER--DO NOT PUT YOUR NAME ON ANY OF THE SURVEY QUESTION SHEETS.
7. Now go ahead and begin.

Directions: Please fill in each statement below by putting a circle around the appropriate number in parentheses.

1. My current age is:
 

|        |        |                  |
|--------|--------|------------------|
| (1) 13 | (3) 15 | (5) 17           |
| (2) 14 | (4) 16 | (6) 18           |
|        |        | (7) 19 (or more) |
  
2. My current grade level in school is:
 

|                      |                   |
|----------------------|-------------------|
| (1) 9th (freshman)   | (3) 11th (junior) |
| (2) 10th (sophomore) | (4) 12th (senior) |
  
3. I am currently a student at:
 

|                         |                           |
|-------------------------|---------------------------|
| (1) East High School    | (4) North High School     |
| (2) Hoover High School  | (5) Roosevelt High School |
| (3) Lincoln High School |                           |
  
4. My racial background is: (optional)
 

|           |              |                                  |
|-----------|--------------|----------------------------------|
| (1) White | (3) Hispanic | (5) Native American              |
| (2) Black | (4) Asian    | (6) Other (please specify _____) |
  
5. The highest level of education reached by my mother was:
 

|                                     |                                     |
|-------------------------------------|-------------------------------------|
| (1) Less than 8th grade             | (5) 4 year college degree           |
| (2) 8th grade or junior high school | (6) more than 4 year college degree |
| (3) High school                     | (7) don't know                      |
| (4) 2 year college degree           |                                     |
  
6. The highest level of education reached by my father was:
 

|                                     |                                     |
|-------------------------------------|-------------------------------------|
| (1) Less than 8th grade             | (5) 4 year college degree           |
| (2) 8th grade or junior high school | (6) more than 4 year college degree |
| (3) High school                     | (7) don't know                      |
| (4) 2 year college degree           |                                     |
  
7. My mother's income per year is:
 

|                          |                                     |
|--------------------------|-------------------------------------|
| (1) less than \$15,000   | (4) \$36,000 to \$45,000            |
| (2) \$16,000 to \$25,000 | (5) more than \$45,000              |
| (3) \$26,000 to \$35,000 | (6) does <u>not</u> work for income |
|                          | (7) don't know                      |
  
8. My father's income per year is:
 

|                          |                                     |
|--------------------------|-------------------------------------|
| (1) less than \$15,000   | (4) \$36,000 to \$45,000            |
| (2) \$16,000 to \$25,000 | (5) more than \$45,000              |
| (3) \$26,000 to \$35,000 | (6) does <u>not</u> work for income |
|                          | (7) don't know                      |



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APPENDIX B. SUMMARY OF PILOT  
EVALUATION RESPONSES



## APPENDIX C. PROJECT ANNOUNCEMENT

A prevention project developed through the Behavioral Health Resource Service in the Family Environment Department at Iowa State University is being offered to the students in the Des Moines Public School System. It targets increasingly prevalent health problems among high school students--poor eating habits and body images, accompanied by stress or depression.

Surveys in other school systems have revealed significant percentages of female high school students who have eating habits or body images which can place them at risk for bulimia (binge-purge syndrome). In addition to potential medical problems, this syndrome is associated with high scores on depression and anxiety scales. This can not only worsen typical adolescent life stress but also interfere with other healthy functioning, including expected academic performance. In most cases, it is a hidden problem. Adolescents suffering from the difficulty are typically secretive, don't show drastic weight change and aren't aware of help available to them.

The purpose of the project will be to help prevent these potential problems by: (1) surveying female senior high students concerning eating habits and related concerns; and (2) providing all students with a "community resource" sheet, identifying sources of information and help available. Results of the survey will be made available through the school system. A program of educational seminars for parents and students alike can be developed upon request.

The project is being supervised by Richard Spoth, Ph.D., Director of the Family Environment Behavioral Health Resource Service. Also collaborating with Dr. Spoth on the project is Nancy Bennett, M.S., a doctoral student in the Psychology Department of the University.

## APPENDIX D. INSTRUCTIONS FOR SURVEY ADMINISTRATION

1. "Good morning (afternoon). My name is \_\_\_\_\_ and I'm here today to ask you to fill out a survey in order to gather information about young women's eating habits and related concerns."
2. "I am going to pass out a sheet of paper to each of you now; it's titled 'Informed Consent Statement'." **Hand out "Informed Consent Statements."** While doing so, add "You do have a choice about whether or not you want to fill out the survey. This statement will give you information to help you decide. Of course, I am hoping that you will all choose to fill out the survey since the general information we will gain from all of your responses put together will be of enormous help in understanding and planning programs for several concerns of young women today."
3. "I want you to follow along as I read aloud this statement." **Read "Informed Consent Statement" aloud.** When finished, ask "Are there any questions about this statement or anything else so far?" **Respond to questions by providing sufficient information to satisfy the inquiry. If you do not have the information, inform the student that you will check on it and supply her an answer as soon as possible.**
4. "If there are no (more) questions and if you agree to fill out the survey, please sign AND print your name in ink along with today's date (Sept. \_\_) on the bottom line as indicated on the statement form. When you finish, pass them forward to turn in to me now. This is another way to make sure that your name can never be connected to your answers on the survey; that is, by keeping this statement separate from your survey, there will be no way to know who answered which survey questions."
5. "I will now hand out the survey packets." **Hand out survey packets.** "You will notice a single letter in the bottom corner of the cover page. This letter simply tells us in which order the pages and questions appear in your particular survey. It is important for you to know that the questions may not appear in order from page to page. For example, everyone turn to the third page of the survey. You will notice that the number of the last question on this page is #8. Now everyone turn to the very next page. Some of you will have question #9 as the first question on this page, but many of you may not; it may be question #29, or #46, or #67. Please don't pay any attention to the numbering of questions from page to page. Just make sure to answer each and every question as it comes in your survey. Do not skip around and check to make sure that you have completed every page in the survey. Are there any questions about this?" **(Answer questions, repeat, and clarify as needed.)**

6. "Now everyone please turn back to the second page of your survey packet and follow along as I read aloud the instructions printed there." Read "Survey Instructions" sheet aloud up through #6--STOP AFTER #6. Ask "Are there any questions before you go ahead and begin?" (Answer questions, repeat, and/or clarify as needed.) Add, "You may interrupt me at any time if you have a question; just raise your hand, and I'll come to you."
7. "When you have finished, please go back and double check to see that every question on every page has been answered. Then turn in your completed survey packet to me."
8. "Now go ahead and begin."

## APPENDIX E. INFORMED CONSENT STATEMENT

The purpose of this statement is to give you information to help you decide whether you wish to answer questions in a survey about young women's eating habits and related concerns. The survey is being sponsored by your school, by Iowa State University, and by the Mid-Iowa Health Foundation. You should know that even after you start filling out the survey form, you are free to stop at any time.

If you decide to fill out the survey form, here's what will happen:

1. You will be asked to answer questions about your eating patterns and related concerns. It should take about 20-30 minutes of your time.

There are no known risks to you and all of your answers will be treated with strict regard for confidentiality. That is, your name will not be put on any of the forms and will not be used or connected with any part of the information coming out of the survey.

2. After the survey is finished, students will be given a resource information sheet on eating concerns and problems, telling about how and where to get help.

All students will get the same information so that no one person, whether she filled out the survey form or not, will be seen as necessarily having an eating problem. Thus, your being given this information does not necessarily mean that you have a problem; it is simply a way for any student to get help if she wants it.

We ask your help by answering these questions, but your doing so is completely up to you. If you do so, you will help an effort to set up a program for whichever students have concerns about their eating habits. In addition, if you want information about this area and don't know how to get it, this can help.

If you have any questions about the survey, please ask the person who is handing out the forms now or get in touch with either of the persons listed below by leaving a message with your school office.

We thank you and appreciate your help and cooperation!

Richard Spoth, Ph.D.  
Project Supervisor  
(1) 294-6316

Nancy Bennett, M.S.  
Project Coordinator  
(1) 294-1742

I HAVE READ AND UNDERSTAND THE ABOVE INFORMATION AND AGREE TO FILL OUT THE SURVEY FORM.

\_\_\_\_\_  
(Write your name)

\_\_\_\_\_  
(Print your name)

\_\_\_\_\_  
(Date)

## APPENDIX F. PROJECT ANNOUNCEMENT SUMMARY

A prevention project developed through the Behavioral Health Resource Service in the Family Environment Department at Iowa State University is being offered to the students in the Des Moines Public School System. The purpose of the project is to: (1) survey female senior high students (during their physical education classes) concerning eating habits and related concerns; and (2) provide students with a "community resource" sheet, identifying sources of information and help available. Results of the survey will be made available through the school system. A program of educational seminars for parents and students alike can be developed upon request.

The project is being supervised by Richard Spoth, Ph.D., Director of the Family Environment Behavioral Health Resource Service. Also collaborating with Dr. Spoth on the project is Nancy Bennett, M.S., a doctoral student in the Psychology Department of the University. If you have any questions about the project, please call:

Richard Spoth, Ph.D.  
Project Supervisor  
(1) 294-6316

Nancy Bennett, M.S.  
Project Coordinator  
(1) 294-1742

This summarizes information in the project announcement that went out or will go out in parent news releases and newsletters.



APPENDIX G. RELATIONSHIP OF REMAINING BULIMIA-RELATED  
BEHAVIORS TO HIGH SCHOOL GRADE LEVELS

Table G-1

Relationship of Remaining Bulimia-related Behaviors to High School Grade Levels

|  | High school grade level                    |          |            |          |         |          |         |          |       |          |
|--|--|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                                   |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
| Behavior (BULIT item)                                      | N  | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| <hr/>  |  |          |            |          |         |          |         |          |       |          |
| I am satisfied with my eating patterns.                    |  |          |            |          |         |          |         |          |       |          |
| Agree  | 222  | 33.79    | 161        | 27.71    | 124     | 26.90    | 64      | 23.19    | 571   | 28.91    |
| Neutral  | 133  | 20.24    | 117        | 20.14    | 98      | 21.26    | 57      | 20.65    | 405   | 20.51    |
| Disagree a little  | 163  | 24.81    | 161        | 27.71    | 118     | 25.60    | 80      | 28.99    | 522   | 26.43    |
| Disagree   | 83   | 12.63    | 73         | 12.56    | 70      | 15.18    | 53      | 19.20    | 279   | 14.13    |
| Disagree strongly  | 56   | 8.52     | 69         | 11.88    | 51      | 11.06    | 22      | 7.97     | 198   | 10.03    |
| Overall response pattern:                                  | $\chi^2(12, N = 1975) = 24.04^*, p = .020$ |          |            |          |         |          |         |          |       |          |
| <hr/>  |  |          |            |          |         |          |         |          |       |          |
| Have you ever kept eating until you thought you'd explode? |  |          |            |          |         |          |         |          |       |          |
| Practically every time                                     |  |          |            |          |         |          |         |          |       |          |
| I eat  | 31   | 4.71     | 18         | 3.10     | 13      | 2.82     | 8       | 2.90     | 70    | 3.54     |
| Very frequently  | 51   | 7.75     | 30         | 5.16     | 24      | 5.21     | 11      | 3.99     | 116   | 5.87     |
| Often  | 60   | 9.12     | 63         | 10.84    | 45      | 9.76     | 24      | 8.70     | 192   | 9.72     |
| Sometimes  | 195  | 29.64    | 185        | 31.84    | 146     | 31.67    | 105     | 38.04    | 631   | 31.93    |
| Seldom or never  | 321  | 48.78    | 285        | 49.05    | 233     | 50.54    | 128     | 46.38    | 967   | 48.94    |
| Overall response pattern:                                  | $\chi^2(12, N = 1976) = 16.58, p = .166$   |          |            |          |         |          |         |          |       |          |
| <hr/>  |  |          |            |          |         |          |         |          |       |          |
| Would you presently call yourself a "binge eater"?         |  |          |            |          |         |          |         |          |       |          |
| Yes, absolutely  | 32   | 4.97     | 22         | 3.80     | 23      | 5.01     | 9       | 3.28     | 86    | 4.40     |
| Yes  | 47   | 7.30     | 50         | 8.64     | 23      | 5.01     | 19      | 6.93     | 139   | 7.11     |

\* $p < .05$ .

Table G-1 (continued)

| Behavior (BULIT item)  | High school grade level |          |            |          |         |          |         |          |       |          |
|--|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|  | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| Yes, probably  | 55                      | 8.54     | 58         | 10.02    | 34      | 7.41     | 23      | 8.39     | 170   | 8.69     |
| Yes, possibly  | 123                     | 19.10    | 95         | 16.41    | 99      | 21.57    | 53      | 19.34    | 370   | 18.92    |
| No, probably not   | 387                     | 60.09    | 354        | 61.14    | 280     | 61.00    | 170     | 62.04    | 1191  | 60.89    |
| Overall response pattern: $\chi^2(12, N = 1956) = 12.79, p = .384$                 |                         |          |            |          |         |          |         |          |       |          |
| I prefer to eat:   |                         |          |            |          |         |          |         |          |       |          |
| At home alone  | 94                      | 14.44    | 75         | 12.95    | 64      | 13.91    | 30      | 10.95    | 263   | 13.39    |
| At home with others  | 75                      | 11.52    | 67         | 11.57    | 50      | 10.87    | 36      | 13.14    | 228   | 11.61    |
| In a public restaurant   | 45                      | 6.91     | 39         | 6.74     | 52      | 11.30    | 24      | 8.76     | 160   | 8.15     |
| At a friend's house  | 21                      | 3.23     | 13         | 2.25     | 7       | 1.52     | 4       | 1.46     | 45    | 2.29     |
| Doesn't matter   | 416                     | 63.90    | 385        | 66.49    | 287     | 62.39    | 180     | 65.69    | 1268  | 64.56    |
| Overall response pattern: $\chi^2(12, N = 1964) = 16.36, p = .175$                 |                         |          |            |          |         |          |         |          |       |          |
| I eat until I feel too tired to continue.  |                         |          |            |          |         |          |         |          |       |          |
| At least once a day  | 38                      | 5.86     | 34         | 5.90     | 17      | 3.72     | 10      | 3.65     | 99    | 5.06     |
| 3-6 times a week   | 17                      | 2.62     | 13         | 2.26     | 11      | 2.41     | 5       | 1.82     | 46    | 2.35     |
| Once or twice a week   | 40                      | 6.16     | 40         | 6.94     | 15      | 3.28     | 10      | 3.65     | 105   | 5.37     |
| 2-3 times a month  | 38                      | 5.86     | 34         | 5.90     | 28      | 6.13     | 24      | 8.76     | 124   | 6.34     |
| Once a month or less (or never)  | 516                     | 79.51    | 455        | 78.99    | 386     | 84.46    | 225     | 82.12    | 1582  | 80.88    |
| Overall response pattern: $\chi^2(12, N = 1956) = 17.67, p = .126$                 |                         |          |            |          |         |          |         |          |       |          |
| How often do you prefer eating ice cream, milk shakes, or puddings during a binge? |                         |          |            |          |         |          |         |          |       |          |
| Always   | 85                      | 13.04    | 80         | 13.89    | 63      | 13.73    | 21      | 7.66     | 249   | 12.70    |

Table G-1 (continued)

| Behavior (BULIT item)   | High school grade level |          |            |          |         |          |         |          |       |          |
|---|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|   | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|   | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| Frequently  | 115                     | 17.64    | 100        | 17.36    | 61      | 13.29    | 33      | 12.04    | 309   | 15.76    |
| Sometimes   | 198                     | 30.37    | 175        | 30.38    | 117     | 25.49    | 91      | 33.21    | 581   | 29.63    |
| Seldom or never   | 94                      | 14.42    | 83         | 14.41    | 97      | 21.13    | 50      | 18.25    | 324   | 16.52    |
| I don't binge   | 160                     | 24.54    | 138        | 23.96    | 121     | 26.36    | 79      | 28.83    | 498   | 25.40    |
| Overall response pattern: $\chi^2(12, N = 1961) = 29.00^{**}, p = .004$                     |                         |          |            |          |         |          |         |          |       |          |
| How much are you concerned about your eating binges?  |                         |          |            |          |         |          |         |          |       |          |
| I don't binge   | 294                     | 45.51    | 262        | 45.88    | 201     | 43.98    | 118     | 43.22    | 875   | 44.94    |
| Bothers me a little   | 166                     | 25.70    | 125        | 21.89    | 122     | 26.70    | 64      | 23.44    | 477   | 24.50    |
| Moderate concern  | 83                      | 12.85    | 89         | 15.59    | 61      | 13.35    | 54      | 19.78    | 287   | 14.74    |
| Major concern   | 75                      | 11.61    | 69         | 12.08    | 47      | 10.28    | 24      | 8.79     | 215   | 11.04    |
| Probably the biggest concern in my life   | 28                      | 4.33     | 26         | 4.55     | 26      | 5.69     | 13      | 4.76     | 93    | 4.78     |
| Overall response pattern: $\chi^2(12, N = 1947) = 13.93, p = .305$                          |                         |          |            |          |         |          |         |          |       |          |
| Most people I know would be amazed if they knew how much food I can consume at one sitting. |                         |          |            |          |         |          |         |          |       |          |
| Without a doubt   | 73                      | 11.35    | 66         | 11.58    | 54      | 11.84    | 22      | 8.09     | 215   | 11.08    |
| Very probably   | 63                      | 9.80     | 40         | 7.02     | 29      | 6.36     | 20      | 7.35     | 152   | 7.83     |
| Probably  | 88                      | 13.69    | 100        | 17.54    | 76      | 16.67    | 48      | 17.65    | 312   | 16.07    |
| Possibly  | 147                     | 22.86    | 135        | 23.68    | 106     | 23.25    | 79      | 29.04    | 467   | 24.06    |
| No  | 272                     | 42.30    | 229        | 40.18    | 191     | 41.89    | 103     | 37.87    | 795   | 40.96    |
| Overall response pattern: $\chi^2(12, N = 1941) = 15.62, p = .209$                          |                         |          |            |          |         |          |         |          |       |          |

\*\*p&lt;.01.

Table G-1 (continued)

| Behavior (BULIT item)  | High school grade level |          |            |          |         |          |         |          |       |          |
|--|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|  | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| Do you ever eat to the point of feeling sick?                      |                         |          |            |          |         |          |         |          |       |          |
| Very frequently  | 31                      | 4.78     | 29         | 5.04     | 22      | 4.80     | 9       | 3.27     | 91    | 4.65     |
| Frequently   | 37                      | 5.71     | 31         | 5.39     | 20      | 4.37     | 11      | 4.00     | 99    | 5.06     |
| Fairly often   | 44                      | 6.79     | 43         | 7.48     | 34      | 7.42     | 19      | 6.91     | 140   | 7.16     |
| Occasionally   | 138                     | 21.30    | 118        | 20.52    | 99      | 21.62    | 68      | 24.73    | 423   | 21.63    |
| Rarely or never  | 398                     | 61.42    | 354        | 61.57    | 283     | 61.79    | 168     | 61.09    | 1203  | 61.50    |
| Overall response pattern: $\chi^2(12, N = 1956) = 4.94, p = .960$  |                         |          |            |          |         |          |         |          |       |          |
| I am afraid to eat anything for fear that I won't be able to stop. |                         |          |            |          |         |          |         |          |       |          |
| Always   | 23                      | 3.55     | 21         | 3.66     | 13      | 2.84     | 9       | 3.30     | 66    | 3.38     |
| Almost always  | 28                      | 4.33     | 19         | 3.31     | 14      | 3.06     | 8       | 2.93     | 69    | 3.53     |
| Frequently   | 35                      | 5.41     | 35         | 6.10     | 20      | 4.37     | 13      | 4.76     | 103   | 5.28     |
| Sometimes  | 113                     | 17.47    | 99         | 17.25    | 77      | 16.81    | 44      | 16.12    | 333   | 17.06    |
| Seldom or never  | 448                     | 69.24    | 400        | 69.69    | 334     | 72.93    | 199     | 72.89    | 1381  | 70.75    |
| Overall response pattern: $\chi^2(12, N = 1952) = 5.03, p = .957$  |                         |          |            |          |         |          |         |          |       |          |
| I don't like myself after I eat too much.                          |                         |          |            |          |         |          |         |          |       |          |
| Always   | 113                     | 17.49    | 128        | 22.30    | 85      | 18.56    | 57      | 20.88    | 383   | 19.63    |
| Frequently   | 49                      | 7.59     | 57         | 9.93     | 46      | 10.04    | 28      | 10.26    | 180   | 9.23     |
| Sometimes  | 115                     | 17.80    | 94         | 16.38    | 81      | 17.69    | 56      | 20.51    | 346   | 17.73    |
| Seldom or never  | 155                     | 23.99    | 105        | 18.29    | 99      | 21.62    | 52      | 19.05    | 411   | 21.07    |
| I don't eat too much   | 214                     | 33.13    | 190        | 33.10    | 147     | 32.10    | 80      | 29.30    | 631   | 32.34    |
| Overall response pattern: $\chi^2(12, N = 1951) = 15.03, p = .240$ |                         |          |            |          |         |          |         |          |       |          |

Table G-1 (continued)

| Behavior (BULIT item)   | High school grade level |          |            |          |         |          |         |          |       |          |
|---|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|   | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|   | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| How often do you intentional-ly vomit after eating?                   |                         |          |            |          |         |          |         |          |       |          |
| 2 or more times a week  | 27                      | 4.22     | 20         | 3.53     | 13      | 2.86     | 11      | 4.01     | 71    | 3.67     |
| Once a week   | 20                      | 3.13     | 15         | 2.65     | 8       | 1.76     | 4       | 1.46     | 47    | 2.43     |
| 2-3 times a month   | 32                      | 5.00     | 24         | 4.23     | 16      | 3.52     | 11      | 4.01     | 83    | 4.29     |
| Once a month  | 26                      | 4.06     | 20         | 3.53     | 26      | 5.73     | 16      | 5.84     | 88    | 4.55     |
| Less than once a month (or never)                                     | 535                     | 83.59    | 488        | 86.07    | 391     | 86.12    | 232     | 84.67    | 1646  | 85.06    |
| Overall response pattern: $\chi^2(12, N = 1935) = 10.47, p = .575$    |                         |          |            |          |         |          |         |          |       |          |
| I eat a lot of food when I'm not even hungry.                         |                         |          |            |          |         |          |         |          |       |          |
| Very frequently   | 50                      | 7.82     | 42         | 7.39     | 26      | 5.73     | 18      | 6.55     | 136   | 7.02     |
| Frequently  | 57                      | 8.92     | 63         | 11.09    | 38      | 8.37     | 26      | 9.45     | 184   | 9.50     |
| Occasionally  | 95                      | 14.87    | 79         | 13.91    | 67      | 14.76    | 36      | 13.09    | 277   | 14.31    |
| Sometimes   | 173                     | 27.07    | 169        | 29.75    | 150     | 33.04    | 105     | 38.18    | 597   | 30.84    |
| Seldom or never   | 264                     | 41.31    | 215        | 37.85    | 173     | 38.11    | 90      | 32.73    | 742   | 38.33    |
| Overall response pattern: $\chi^2(12, N = 1936) = 17.23, p = .141$    |                         |          |            |          |         |          |         |          |       |          |
| My eating patterns are different from eating patterns of most people. |                         |          |            |          |         |          |         |          |       |          |
| Always  | 51                      | 8.02     | 54         | 9.54     | 41      | 9.05     | 24      | 8.76     | 170   | 8.81     |
| Almost always   | 61                      | 9.59     | 53         | 9.36     | 47      | 10.38    | 22      | 8.03     | 183   | 9.49     |
| Frequently  | 79                      | 12.42    | 78         | 13.78    | 51      | 11.26    | 47      | 17.15    | 255   | 13.22    |
| Sometimes   | 243                     | 38.21    | 212        | 37.46    | 166     | 36.64    | 108     | 39.42    | 729   | 37.79    |
| Seldom or never   | 202                     | 31.76    | 169        | 29.86    | 148     | 32.67    | 73      | 26.64    | 592   | 30.69    |
| Overall response pattern: $\chi^2(12, N = 1929) = 9.60, p = .651$     |                         |          |            |          |         |          |         |          |       |          |

Table G-1 (continued)

| Behavior (BULIT item)  | High school grade level |          |            |          |         |          |         |          |       |          |
|--|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|  | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| I feel sad or blue after eating more than I'd planned to eat.  |                         |          |            |          |         |          |         |          |       |          |
| Always   | 72                      | 11.29    | 87         | 15.34    | 64      | 14.16    | 28      | 10.22    | 251   | 13.00    |
| Almost always  | 49                      | 7.68     | 48         | 8.47     | 27      | 5.97     | 25      | 9.12     | 149   | 7.72     |
| Frequently   | 72                      | 11.29    | 57         | 10.05    | 49      | 10.84    | 33      | 12.04    | 211   | 10.93    |
| Sometimes  | 134                     | 21.00    | 116        | 20.46    | 99      | 21.90    | 66      | 24.09    | 415   | 21.49    |
| Seldom, never, or not applicable   | 311                     | 48.75    | 259        | 45.68    | 213     | 47.12    | 122     | 44.53    | 905   | 46.87    |
| Overall response pattern: $\chi^2(12, N = 1931) = 11.85, p = .458$   |                         |          |            |          |         |          |         |          |       |          |
| When engaged in an eating binge, I tend to eat foods that are high in carbohydrates (sweets and starches). |                         |          |            |          |         |          |         |          |       |          |
| Always   | 59                      | 9.34     | 53         | 9.41     | 60      | 13.33    | 24      | 8.79     | 196   | 10.22    |
| Almost always  | 48                      | 7.59     | 65         | 11.55    | 26      | 5.78     | 30      | 10.99    | 169   | 8.81     |
| Frequently   | 110                     | 17.41    | 74         | 13.14    | 73      | 16.22    | 44      | 16.12    | 301   | 15.69    |
| Sometimes  | 148                     | 23.42    | 147        | 26.11    | 84      | 18.67    | 68      | 24.91    | 447   | 23.31    |
| Seldom, or I don't binge   | 267                     | 42.25    | 224        | 39.79    | 207     | 46.00    | 107     | 39.19    | 805   | 41.97    |
| Overall response pattern: $\chi^2(12, N = 1918) = 30.54^{**}, p = .002$                                    |                         |          |            |          |         |          |         |          |       |          |
| Compared to most people, my ability to control my eating behavior seems to be:                             |                         |          |            |          |         |          |         |          |       |          |
| Greater than others' ability   | 150                     | 23.70    | 139        | 24.82    | 106     | 23.45    | 65      | 23.90    | 460   | 24.00    |

Table G-1 (continued)

| Behavior (BULIT item)        | High school grade level |          |            |          |         |          |         |          | Total |          |
|------------------------------|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|                              | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          |       |          |
|                              | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| About the same               | 288                     | 45.50    | 270        | 48.21    | 221     | 48.89    | 118     | 43.38    | 897   | 46.79    |
| Less                         | 105                     | 16.59    | 92         | 16.43    | 71      | 15.71    | 59      | 21.69    | 327   | 17.06    |
| Much less                    | 56                      | 8.85     | 40         | 7.14     | 33      | 7.30     | 17      | 6.25     | 146   | 7.62     |
| I have absolutely no control | 34                      | 5.37     | 19         | 3.39     | 21      | 4.65     | 13      | 4.78     | 87    | 4.54     |

Overall response pattern:  $\chi^2(12, N = 1917) = 10.71, p = .554$

One of your best friends suddenly suggests that you both eat at a new restaurant buffet that night. Although you'd planned on eating something light at home, you go ahead and eat out, eating quite a lot and feeling uncomfortably full. How would you feel about yourself on the ride home?

|   |     |       |     |       |     |       |     |       |     |       |
|---|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| Fine, glad I'd tried that new restaurant  | 151 | 24.01 | 144 | 25.67 | 106 | 23.71 | 55  | 20.30 | 456 | 23.90 |
| A little regretful that I'd eaten so much | 211 | 33.55 | 158 | 28.16 | 152 | 34.00 | 101 | 37.27 | 622 | 32.60 |
| Somewhat disappointed in myself           | 109 | 17.33 | 111 | 19.79 | 89  | 19.91 | 57  | 21.03 | 366 | 19.18 |
| Upset with myself                         | 74  | 11.76 | 79  | 14.08 | 53  | 11.86 | 33  | 12.18 | 239 | 12.53 |
| Totally disgusted with myself             | 84  | 13.35 | 69  | 12.30 | 47  | 10.51 | 25  | 9.23  | 225 | 11.79 |

Overall response pattern:  $\chi^2(12, N = 1908) = 14.82, p = .252$



Table G-1 (continued)

| Behavior (BULIT item)   | High school grade level |          |            |          |         |          |         |          |       |          |
|---|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|   | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|   | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| I would presently label myself a "compulsive eater" (one who engages in episodes of uncontrolled eating). |                         |          |            |          |         |          |         |          |       |          |
| Absolutely  | 26                      | 4.14     | 26         | 4.66     | 14      | 3.13     | 10      | 3.68     | 76    | 3.99     |
| Yes   | 52                      | 8.28     | 38         | 6.81     | 22      | 4.92     | 18      | 6.62     | 130   | 6.82     |
| Yes, probably   | 45                      | 7.17     | 51         | 9.14     | 26      | 5.82     | 21      | 7.72     | 143   | 7.51     |
| Yes, possibly   | 92                      | 14.65    | 82         | 14.70    | 74      | 16.55    | 45      | 16.54    | 293   | 15.38    |
| No, probably not  | 413                     | 65.76    | 361        | 64.70    | 311     | 69.57    | 178     | 65.44    | 1263  | 66.30    |
| Overall response pattern: $\chi^2(12, N = 1905) = 11.72, p = .469$  |                         |          |            |          |         |          |         |          |       |          |
| What is the most weight you've ever lost in 1 month?  |                         |          |            |          |         |          |         |          |       |          |
| Over 20 pounds  | 40                      | 6.40     | 40         | 7.14     | 24      | 5.37     | 17      | 6.32     | 121   | 6.37     |
| 12-20 pounds  | 89                      | 14.24    | 83         | 14.82    | 64      | 14.32    | 47      | 17.47    | 283   | 14.89    |
| 8-11 pounds   | 122                     | 19.52    | 120        | 21.43    | 119     | 26.62    | 69      | 25.65    | 430   | 22.62    |
| 4-7 pounds  | 172                     | 27.52    | 154        | 27.50    | 123     | 27.52    | 68      | 25.28    | 517   | 27.20    |
| Less than 4 pounds  | 202                     | 32.32    | 163        | 29.11    | 117     | 26.17    | 68      | 25.28    | 550   | 28.93    |
| Overall response pattern: $\chi^2(12, N = 1901) = 15.30, p = .225$  |                         |          |            |          |         |          |         |          |       |          |
| If I eat too much at night, I feel depressed the next morning.  |                         |          |            |          |         |          |         |          |       |          |
| Always  | 35                      | 5.57     | 36         | 6.42     | 23      | 5.15     | 15      | 5.51     | 109   | 5.71     |
| Frequently  | 53                      | 8.44     | 40         | 7.13     | 25      | 5.59     | 20      | 7.35     | 138   | 7.23     |
| Sometimes   | 109                     | 17.36    | 89         | 15.86    | 73      | 16.33    | 52      | 19.12    | 323   | 16.93    |
| Seldom or never   | 205                     | 32.64    | 202        | 36.01    | 152     | 34.00    | 95      | 34.93    | 654   | 34.28    |

Table G-1 (continued)

| Behavior (BULIT item)   | High school grade level |          |            |          |         |          |         |          |       |          |
|---|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|   | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|   | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| I don't eat too much at night   | 226                     | 35.99    | 194        | 34.58    | 174     | 38.93    | 90      | 33.09    | 684   | 35.85    |
| Overall response pattern: $\chi^2(12, N = 1908) = 8.06, p = .780$             |                         |          |            |          |         |          |         |          |       |          |
| Do you believe that it is easier for you to vomit than it is for most people? |                         |          |            |          |         |          |         |          |       |          |
| Yes, it's no problem at all for me  | 35                      | 5.68     | 30         | 5.38     | 19      | 4.31     | 14      | 5.28     | 98    | 5.21     |
| Yes, it's easier  | 37                      | 6.01     | 32         | 5.73     | 12      | 2.72     | 11      | 4.15     | 92    | 4.89     |
| Yes, it's a little easier   | 36                      | 5.84     | 33         | 5.91     | 31      | 7.03     | 15      | 5.66     | 115   | 6.12     |
| About the same  | 140                     | 22.73    | 122        | 21.86    | 113     | 25.62    | 54      | 20.38    | 429   | 22.82    |
| No, it's less easy  | 368                     | 59.74    | 341        | 61.11    | 266     | 60.32    | 171     | 64.53    | 1146  | 60.96    |
| Overall response pattern: $\chi^2(12, N = 1880) = 11.88, p = .456$            |                         |          |            |          |         |          |         |          |       |          |
| I feel depressed immediately after I eat too much.                            |                         |          |            |          |         |          |         |          |       |          |
| Always  | 57                      | 9.06     | 68         | 12.12    | 58      | 12.95    | 27      | 9.85     | 210   | 10.98    |
| Frequently  | 53                      | 8.43     | 43         | 7.66     | 23      | 5.13     | 19      | 6.93     | 138   | 7.22     |
| Sometimes   | 106                     | 16.85    | 117        | 20.86    | 85      | 18.97    | 66      | 24.09    | 374   | 19.56    |
| Seldom or never   | 194                     | 30.84    | 153        | 27.27    | 125     | 27.90    | 83      | 30.29    | 555   | 29.03    |
| I don't eat too much  | 219                     | 34.82    | 180        | 32.09    | 157     | 35.04    | 79      | 28.83    | 635   | 33.21    |
| Overall response pattern: $\chi^2(12, N = 1912) = 19.00, p = .088$            |                         |          |            |          |         |          |         |          |       |          |

Table G-1 (continued)

| Behavior (BULIT item)  | High school grade level |          |            |          |         |          |         |          |       |          |
|--|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|  | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| When consuming a large quantity of food, at what rate of speed do you usually eat? |                         |          |            |          |         |          |         |          |       |          |
| More rapidly than most people have ever eaten in their lives                       | 31                      | 4.94     | 21         | 3.80     | 18      | 4.06     | 10      | 3.72     | 80    | 4.23     |
| A lot more rapidly than most people  | 56                      | 8.93     | 61         | 11.03    | 33      | 7.45     | 20      | 7.43     | 170   | 8.99     |
| A little more rapidly than most people   | 117                     | 18.66    | 100        | 18.08    | 81      | 18.28    | 64      | 23.79    | 362   | 19.13    |
| About the same rate as most people   | 274                     | 43.70    | 242        | 43.76    | 194     | 43.79    | 108     | 40.15    | 818   | 43.23    |
| More slowly than most people (or not applicable)                                   | 149                     | 23.76    | 129        | 23.33    | 117     | 26.41    | 67      | 24.91    | 462   | 24.42    |
| Overall response pattern: $\chi^2(12, N = 1892) = 11.09, p = .522$                 |                         |          |            |          |         |          |         |          |       |          |
| What is the most weight you've ever gained in 1 month?                             |                         |          |            |          |         |          |         |          |       |          |
| Over 20 pounds   | 29                      | 4.60     | 19         | 3.42     | 16      | 3.61     | 6       | 2.25     | 70    | 3.69     |
| 12-20 pounds   | 27                      | 4.28     | 39         | 7.03     | 24      | 5.42     | 12      | 4.49     | 102   | 5.38     |
| 8-11 pounds  | 83                      | 13.15    | 71         | 12.79    | 55      | 12.42    | 49      | 18.35    | 258   | 13.61    |
| 4-7 pounds   | 188                     | 29.79    | 187        | 33.69    | 160     | 36.12    | 103     | 38.58    | 638   | 33.65    |
| Less than 4 pounds   | 304                     | 48.18    | 239        | 43.06    | 188     | 42.44    | 97      | 36.33    | 828   | 43.67    |
| Overall response pattern: $\chi^2(12, N = 1896) = 24.83^*, p = .016$               |                         |          |            |          |         |          |         |          |       |          |

Table G-1 (continued)

| Behavior (BULIT item)  | High school grade level |          |            |          |         |          |         |          |       |          |
|--|-------------------------|----------|------------|----------|---------|----------|---------|----------|-------|----------|
|  | Freshmen                |          | Sophomores |          | Juniors |          | Seniors |          | Total |          |
|  | N                       | Column % | N          | Column % | N       | Column % | N       | Column % | N     | Column % |
| My last menstrual period was   |                         |          |            |          |         |          |         |          |       |          |
| Within the past month  | 497                     | 80.29    | 460        | 83.94    | 378     | 85.33    | 214     | 80.45    | 1549  | 82.57    |
| Within the past 2 months   | 60                      | 9.69     | 41         | 7.48     | 34      | 7.67     | 31      | 11.65    | 166   | 8.85     |
| Within the past 4 months   | 19                      | 3.07     | 15         | 2.74     | 14      | 3.16     | 8       | 3.01     | 56    | 2.99     |
| Within the past 6 months   | 9                       | 1.45     | 10         | 1.82     | 2       | 0.45     | 4       | 1.50     | 25    | 1.33     |
| Not within the past 6 months   | 34                      | 5.49     | 22         | 4.01     | 15      | 3.39     | 9       | 3.38     | 80    | 4.26     |
| Overall response pattern: $\chi^2(12, N = 1876) = 13.21, p = .354$         |                         |          |            |          |         |          |         |          |       |          |
| How do you think your appetite compares with that of most people you know? |                         |          |            |          |         |          |         |          |       |          |
| Many times larger than most  | 27                      | 4.35     | 22         | 3.98     | 14      | 3.18     | 9       | 3.35     | 72    | 3.82     |
| Much larger  | 53                      | 8.53     | 36         | 6.51     | 23      | 5.23     | 20      | 7.43     | 132   | 7.01     |
| A little larger  | 108                     | 17.39    | 127        | 22.97    | 95      | 21.59    | 61      | 22.68    | 391   | 20.76    |
| About the same   | 280                     | 45.09    | 280        | 50.63    | 226     | 51.36    | 124     | 46.10    | 910   | 48.33    |
| Smaller than most  | 153                     | 24.64    | 88         | 15.91    | 82      | 18.64    | 55      | 20.45    | 378   | 20.07    |
| Overall response pattern: $\chi^2(12, N = 1883) = 25.50^*, p = .013$       |                         |          |            |          |         |          |         |          |       |          |
| My menstrual cycles occur once a month:                                    |                         |          |            |          |         |          |         |          |       |          |
| Always   | 291                     | 46.94    | 304        | 54.87    | 273     | 61.49    | 173     | 64.79    | 1041  | 55.23    |
| Usually  | 186                     | 30.00    | 157        | 28.34    | 99      | 22.30    | 51      | 19.10    | 493   | 26.15    |
| Sometimes  | 72                      | 11.61    | 45         | 8.12     | 50      | 11.26    | 19      | 7.12     | 186   | 9.87     |
| Seldom   | 30                      | 4.84     | 20         | 3.61     | 12      | 2.70     | 11      | 4.12     | 73    | 3.87     |
| Never  | 41                      | 6.61     | 28         | 5.05     | 10      | 2.25     | 13      | 4.87     | 92    | 4.88     |
| Overall response pattern: $\chi^2(12, N = 1885) = 47.31^{***}, p = .000$   |                         |          |            |          |         |          |         |          |       |          |

\*\*\* $p < .001$ .