Risk Factors and Bulimia outcomes in Adolescent Women: A Longitudinal and Retrospective Analysis

Therese Elizabeth Barnett
Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/etd
Part of the Psychology Commons

Recommended Citation
https://digitalcommons.usu.edu/etd/6360

This Dissertation is brought to you for free and open access by the Graduate Studies at DigitalCommons@USU. It has been accepted for inclusion in All Graduate Theses and Dissertations by an authorized administrator of DigitalCommons@USU. For more information, please contact dylan.burns@usu.edu.
INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.
RISK FACTORS AND BULIMIA OUTCOMES IN ADOLESCENT WOMEN:
A LONGITUDINAL AND RETROSPECTIVE ANALYSIS

by

Therese Elizabeth Barnett

A dissertation submitted in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Psychology

Approved:

UTAH STATE UNIVERSITY
Logan, Utah

1996
The goal of the present study was to verify whether four purported risk factors predate the development of eating disorder symptoms, particularly bulimia nervosa. The four major purported risk factors for developing bulimia nervosa (and eating disorders in general) among female adolescents include: (a) overinternalization of culture’s value of thinness in women, (b) inordinate dissatisfaction with body form, (c) depression, and (d) irrational beliefs and cognitions about thinness and the benefits of dieting. The present study involved a 5-year follow-up of adolescent girls initially identified as being either at high or low risk for developing an eating disorder, particularly bulimia nervosa. Subjects completed the risk factor inventories, and eating disorder diagnoses were based upon a structured Diagnostic and Statistical Manual of Mental Disorders clinical interview.

Results indicated that: (a) two bulimic cases were found in the high-risk group, with an overall prevalence rate of 3.5% (2/57); (b) the total 6-month incidence rate (for any eating disorder) was 6.5% in the high-risk group, and 0.0% in the low-risk
group; (c) younger at-risk girls tended to generally acknowledge more eating disorder symptoms; (d) z-score means of the low and high risk group are dramatically different at both Time #1 and 5 years later at Time #2, with the high-risk group exhibiting more severe and quite stable symptomatology relative to the low-risk group; and (e) change in scores over time, in all four risk factor measures, was related to bulimia, binge-related symptoms, and overall (total) symptoms. The study confirmed the importance of these risk factors in the etiology of eating disorder symptoms, as well as the significance of tracking girls in early adolescence in longitudinal studies.
ACKNOWLEDGMENTS

First and foremost, I would like to thank David M. Stein, Ph.D., for making his initial data set available to me, and for all his help, encouragement, and support. He has been a great mentor over the years, in both research and clinical skills. I would like to thank my other committee members, Mary Doty, Ph.D.; Georgia Lauritzen, Ph.D.; Ken Merrell, Ph.D.; and Lani Van Dusen, Ph.D., for their patience, suggestions, and support through this process. I would like to thank Karen Ranson for making sure that this document met APA and graduate school style requirements.

I would also like to acknowledge the grant I received from the Women and Gender Research Institute, which helped me pay for some of the expenses of this project.

I give special thanks to my parents, Don and Darlene Barnett, along with my siblings, Ellen, Patrick, David, and Margaret, for all their love and encouragement. I would like to express my deepest gratitude to my grandparents, Mammy and Papa (otherwise known as John and Amanda Barnett), for teaching me what is really important in life. My immediate and extended family have been wonderful seeing me through this entire process. I love you all. I would also like to extend thanks to all my great friends, especially Jim and Donna Sharpnack, Frances Tous-Machado, Kent Nabers, and Paul Caldarella, who were supportive, helpful, and encouraging, and even dragged me away from this to have a little fun. I would like to thank Lyle Wagner, Brit Creelman, and Jill Miller for helping me keep my sanity the last couple months. Finally, I would like to thank Kismet, Fluff, and Siska (in heaven) for their love through this process.

Therese Elizabeth Barnett
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>ix</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II. REVIEW OF THE LITERATURE</td>
<td>3</td>
</tr>
<tr>
<td>III. METHODS</td>
<td>19</td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>34</td>
</tr>
<tr>
<td>V. DISCUSSION</td>
<td>58</td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Prevalence Estimates</td>
<td>3</td>
</tr>
<tr>
<td>Medical Complications</td>
<td>5</td>
</tr>
<tr>
<td>Risk Factors</td>
<td>6</td>
</tr>
<tr>
<td>Longitudinal Studies to Date</td>
<td>13</td>
</tr>
<tr>
<td>Research Questions</td>
<td>18</td>
</tr>
<tr>
<td>Research Design</td>
<td>19</td>
</tr>
<tr>
<td>Selection of Risk Factor Measures</td>
<td>20</td>
</tr>
<tr>
<td>Psychometric Properties of Instruments: Risk Factors, Inventories, and Clinical Interview</td>
<td>24</td>
</tr>
<tr>
<td>Subjects</td>
<td>29</td>
</tr>
<tr>
<td>Demographic Characteristics of High- and Low-Risk Groups</td>
<td>35</td>
</tr>
<tr>
<td>Prevalence and Incidence Estimates</td>
<td>36</td>
</tr>
<tr>
<td>Means, Standard Deviations, and Effect Sizes for Risk Factors: Time #1 and Time #2</td>
<td>45</td>
</tr>
<tr>
<td>Early (Time #1) Risk Factor Predictors</td>
<td>51</td>
</tr>
<tr>
<td>Time #1 Versus Time #2 Risk Factor Scores for High- and Low-Risk Groups</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Research Questions</td>
<td>58</td>
</tr>
<tr>
<td>Present Study Relative to Other Studies</td>
<td>61</td>
</tr>
<tr>
<td>Limitations</td>
<td>62</td>
</tr>
<tr>
<td>Implications and Future Directions</td>
<td>63</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>65</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>75</td>
</tr>
<tr>
<td>Appendix A: Lifetime Prevalence Rate of Depression in Bulimics</td>
<td>76</td>
</tr>
<tr>
<td>Appendix B: Occurrence of Eating Disorder and Depression</td>
<td>77</td>
</tr>
<tr>
<td>Appendix C: Means and Standard Deviations for Bulimics Versus Controls and Adolescent Samples on Indices of Risk Factors</td>
<td>78</td>
</tr>
<tr>
<td>Appendix D: Time #1 Risk Factors and Measurements</td>
<td>81</td>
</tr>
<tr>
<td>Appendix E: DSM Interview Global Severity Rating Form</td>
<td>82</td>
</tr>
<tr>
<td>Appendix F: Height and Weight Chart</td>
<td>83</td>
</tr>
<tr>
<td>Appendix G: Consent Form for Subjects Age 17</td>
<td>84</td>
</tr>
<tr>
<td>Appendix H: Consent Form for Subjects Age 18 and Older</td>
<td>85</td>
</tr>
<tr>
<td>Appendix I: Instructions for Answering Inventories</td>
<td>86</td>
</tr>
<tr>
<td>VITA</td>
<td>87</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Onset of Eating Disorders—Time #2 Diagnosis</td>
<td>37</td>
</tr>
<tr>
<td>2  Individual Eating Disorder Cases Identified by DSM Interview:</td>
<td></td>
</tr>
<tr>
<td>Movement Across Categories</td>
<td>37</td>
</tr>
<tr>
<td>3  Time #2 Prevalence Rates</td>
<td>39</td>
</tr>
<tr>
<td>4  Time #2—6 Month Incidence Rates</td>
<td>40</td>
</tr>
<tr>
<td>5  Time #2—2 Year Incidence Rates</td>
<td>40</td>
</tr>
<tr>
<td>6  Time #1: Means (Standard Deviations) and Effect Sizes of High-,</td>
<td>46</td>
</tr>
<tr>
<td>Low-Risk Groups and Clinical Group</td>
<td></td>
</tr>
<tr>
<td>7  Time #2: Means (Standard Deviations) and Effect Sizes of High-,</td>
<td>49</td>
</tr>
<tr>
<td>Low-Risk Groups and Clinical Group</td>
<td></td>
</tr>
<tr>
<td>8  Correlations Between DSM Interview and Time #1 Risk Factor</td>
<td>52</td>
</tr>
<tr>
<td>Measures Including Age ($n = 57$)</td>
<td></td>
</tr>
<tr>
<td>9  Proportion of Variance Accounted for in DSM Interview Cluster</td>
<td>57</td>
</tr>
<tr>
<td>Scores by Individual, Time #2 Risk Factors</td>
<td></td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Research design</td>
<td>20</td>
</tr>
<tr>
<td>2 Mean group risk factor z-scores over 5 years: High- versus low-risk groups</td>
<td>55</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Eating disorders, and particularly bulimia nervosa, are prevalent in female adolescents. Based on strict Diagnostic and Statistical Manual of Mental Disorders (3rd Ed., Revised) (APA, 1987) criteria for bulimia nervosa, between 1.7-2.5% of junior high and high school females can be diagnosed with bulimia, while at least 8% may experience bulimia-related behaviors (e.g., self-induced vomiting) (Connors & Johnson, 1987; Stein & Brinza, 1989). Among females in late adolescence and early adulthood, prevalence rates for anorexia nervosa range between 0.5-1.0% (APA, 1994).

Eating disorders are associated with serious health complications (e.g., electrolyte imbalance, cardiac arrhythmia) (APA, 1994; Hall et al., 1989; Mitchell, 1984) and pose a major health problem to female adolescents (Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). Because bulimia nervosa is much more prevalent in adolescents than anorexia nervosa, and given its substantial health threat, research is needed to investigate possible risk factors for developing bulimia in order to reach at-risk females before they have a chance to adopt eating disorder behaviors. This is essential because once the eating disorder cycle is begun, it is much more easily treated.

Some of the major purported risk factors for developing eating disorders (particularly bulimia nervosa) among female adolescents include: (a) overinternalization of culture’s value of thinness in women, (b) inordinate dissatisfaction with body form, (c) depression, and (d) irrational beliefs and cognitions about thinness and the benefits of dieting (Stein, 1993).

Most studies focusing on risk factors have relied upon retrospective inquires of current or recovered clients. Such an approach poses a problem, because clients' or their
families’ recall of behavior and situations prior to the onset of the disorder are of questionable validity (Pyle & Mitchell, 1988). Given the high prevalence and severity of health problems associated with eating disorders, a more objective approach is needed to study the validity of purported risk factors. Indeed, several researchers have stated that hypotheses about etiology and risk factors may be best addressed by longitudinal studies (Attie & Brooks-Gunn, 1989; Hsu, 1990).

The present study involved a 5-year follow-up of adolescent girls initially identified as being either at high or low risk for developing an eating disorder, particularly bulimia nervosa (Stein, 1990). The goal of the study was to verify whether purported risk factors predated the development of eating disorder symptoms, particularly bulimia nervosa. Because this study was longitudinal in its design, problems associated with the reliance on subjective, retrospective recall of symptoms and developmental issues (such as dieting) were largely avoided.
CHAPTER II
REVIEW OF THE LITERATURE

Introduction

The literature review that follows will summarize recent published estimates of the prevalence of eating disorders and their common medical complications. Such a review will serve to illustrate how widespread eating disorder problems are in adolescents, and the need for scientists and clinicians to develop better models of risk and etiology. Also, to justify the selection of the risk factors used in the present dissertation research, results from published research studies that sought to document four commonly reported risk factors for bulimia nervosa will also be reviewed. Finally, published longitudinal or prospective studies investigating eating disorder risk factors will be summarized. The current knowledge about risk predictors will be summarized, and questions about risk that the present longitudinal study will address are outlined.

Prevalence Estimates

Stein (1991a) reviewed 39 published studies dealing with the prevalence of bulimia. He concluded that use of structured clinical interviews in diagnosis (versus questionnaires) was a methodology that decreased the high rates of false-positive "cases" typically encountered in estimates of bulimia. Specifically, Stein (1991a) also stated that using interviews to screen samples (using DSM-III-R criteria) resulted in a minimum prevalence estimate for bulimia nervosa of 1-3% among older adolescents and college women, and 0.8-1.4% among junior high and young high school females. When using a
questionnaire-based diagnosis alone, the prevalence of bulimia is 2% for female junior high school students and 4% for female high school students (Stein & Brinza, 1989). Further, between 7-13% of college women may be considered "bulimic," if the syndrome is diagnosed solely on the basis of self-report inventories, and/or using less stringent diagnostic criteria (e.g., DSM-III); historically, some criteria require no minimum frequency of binging. Rand and Kulda (1992) used a structured interview, and found a prevalence of 4.1% for bulimia nervosa among women age 18-30 years. It should be noted that generally, the prevalence of anorexia nervosa is thought to be much lower, between 0.5%-1.0% for females in late adolescence and early adulthood (APA, 1994). Although using a structured interview to diagnosis eating disorders may decrease false-positive cases, there may be some individuals who do not disclose symptoms during an interview due to the secrecy that is commonly found in bulimic clients. Thus, while clinical interviews are generally regarded as the most valued method for determining a diagnosis, the approach suffers from a likely (unknown) degree of false-negative case designation. It is clear that paper-and-pencil approaches to diagnosis are probably more problematic because they overinclude noncases, and that clinical interviews will yield more conservative, minimal estimates of incidence and prevalence.

In summary, the aforementioned studies on prevalence illustrate that researchers have obtained diverse estimates, depending on the research methods used (e.g., structured interviews versus questionnaire-based diagnoses). Even when using strict criteria and methods that should minimize inclusion of false-positive cases, it is clear that eating disorders, especially bulimia nervosa, are common enough among adolescents to warrant serious attention by health practitioners and researchers.
Medical Complications

Eating disorders are often associated with serious health complications and are a substantial health threat to individuals diagnosed with eating disorders. Some of the common medical complications will be highlighted below.

In a review of the literature, Mitchell (1984) found several medical complications and endocrine abnormalities associated with bulimia nervosa and anorexia nervosa. These included: acute gastric dilation (which can result in gastric rupture and death), salivary gland enlargement, rapidly developing dental caries, perimyolysis (a dental condition which develops after chronic regurgitation), electrolyte abnormalities, dehydration, and an irregular menstrual cycle or amenorrhea. Bulimic patients often exhibit a significant decrease in most routine clinical indices related to red blood cells (Marcos, Varela, Santacruz, & Munoz, 1993). Hall and colleagues (1989) found that 70% of bulimic patients admitted to a hospital required some medical treatment; 5% were considered severely medically ill, and 34% suffered from a significant medical disorder. Hall and associates (1989) found that the most common medical disorders accompanying bulimia and anorexia included: serious reduction of granulocytes in the blood, iron deficiency anemia, abnormal decrease of white blood corpuscles, decreased magnesium, decreased protein, cardiac rhythm disturbance, clinical malnutrition, nutritional hepatitis, irritable bowel syndrome, and peptic ulcers. Severe life-threatening illnesses occur most frequently in individuals displaying a mixed history of severe anorexia nervosa alternating with periods of bulimia (Hall et al., 1989). Individuals who regularly used ipecac syrup to induce vomiting often exhibit serious cardiac and skeletal myopathies (APA, 1994).

Thus, available studies of health complications among females with eating
disorders suggest that the potential health complications are not uncommon. They appear to be related to the severity of starvation, frequency of binging and purging, and general chronicity of symptoms. The prevalence and severity of such health complications justify research efforts aimed at better understanding risk factors associated with eating disorders.

Risk Factors

Women who have been diagnosed with either bulimia nervosa or anorexia nervosa are thought to evidence similar risk factors. In fact, the nature of any differences (if any) in risk factors for the two disorders is not currently known. This review will focus on four purported risk factors of bulimia nervosa commonly described in the literature, because bulimia is more prevalent than anorexia nervosa. However, it is commonly believed that risk factors may apply to anorexia nervosa and other eating disorders as well.

Overinternalization of Culture’s Value of Thinness in Women

The overinternalization of thinness as a cultural ideal by women has been posited as a major risk factor for bulimia nervosa (Striegel-Moore, Silberstein, & Rodin, 1986; Garner, Olmsted, & Garfinkel, 1985; Mintz & Betz, 1988). Indirect evidence supporting such a view has been presented by several researchers. For example, Garner, Garfinkel, Schwartz, and Thompson (1980) examined the body proportions of Playboy centerfolds and found that this presumed standard for the “ideal” body form for women has become increasingly slim over just the last few decades. In addition, they noted that
physiologically, less than 5% of women could ever attain the ideal, as portrayed in advertising and other cultural media.

After reviewing several articles on risk factors, Striegel-Moore and associates (1986) concluded that: (a) in children, the thinner the girl, the more likely she was to report feeling attractive, popular, and successful academically; (b) after puberty, adolescent girls want to be thinner, reporting that weight is one of their leading concerns; (c) adolescent girls seem to worry more than boys about what other people think about them, care more about being liked, and try to avoid negative reactions from others; and (d) early-developing girls seem to be particularly unhappy about their weight.

These themes in the literature suggest that young women who gradually overinternalize the value of extreme female thinness may be at higher risk for developing bulimia. Likewise, in reviewing the literature, Feldman, Feldman, and Goodman (1988) assert that in most studies, children appear to acquire the prevailing cultural values of beauty before adolescence, by about age 7. Presence or absence of value acquisition was assessed by asking children and adults to rate the attractiveness of people in photographs. On the other hand, Klingenspor (1994) found that bulimic females did not overidentify with feminine attributes; rather, they were found to underidentify with masculine attributes (compared to nonbulimic controls).

Stice (1994) reviewed the literature on the sociocultural model of bulimia nervosa and found strong support for the following conclusions: (a) that images of women in the media have become thinner over the last several decades; (b) that there has been a general increase in the number of diet articles and advertisements in women’s magazines since the late 1950s; (c) that bulimics seem to evidence hyperinternalization of society’s thin-ideal;
(d) that appearance is commonly promoted as being a central component to the female
gender role; and (e) that attractiveness is promoted as being of great importance for
women’s societal success. Additionally, Stice (1994) elaborated on how these cultural
messages may be influenced by family, peers, and the media. Stice also suggested how
internalization of these pressures, body dissatisfaction, restrained eating, and negative
affect may serve as potential mediators.

Inordinate Dissatisfaction with Body Form

Generally, most women in our society are at least somewhat dissatisfied with their
body proportions. However, individuals with bulimia or other eating disorders have more
extreme, negative attitudes about body image, shape, and weight (Ben-Tovim & Walker,
1991; Hadigan & Walsh, 1991; Johnson & Connors, 1987; Killen et al., 1994; Manley,
Tonkin, & Hammond, 1988; van der Ham, van Strien, & van Engeland, 1994).
Dissatisfaction may most rapidly develop after the menstrual cycle begins (Fabian &
Thompson, 1989). Similarly, college females scoring high on bulimic symptoms are
more likely to report a general unhappiness with their physical appearance (Geissler,
Kelly, and Saklofske, 1994).

Both self and ideal body size measures are presently considered to be significant
components of body size dissatisfaction in anorexia nervosa and bulimia nervosa
(Williamson, Gleaves, & Watkins, 1993). Stein and Brinza (1989) found that junior high
and high school girls who evidenced a greater number of bulimic symptoms reported an
exaggerated discrepancy between their current body weight and what they would like to
weigh. Girls’ extreme body weight goals were also reported to be irrational, in that they
exceeded the likely physiological limitations of most subjects (Stein & Brinza, 1989).
Similarly, Williamson, Davis, Goreczny, and Blouin (1989) found that current/ideal body form discrepancy (based on the difference score between sequentially numbered silhouettes) suggested that regardless of current weight, bulimics view themselves as abnormally large, and desire to be abnormally thin. In a recent review of 19 body image studies, it was concluded that, in general, eating-disordered clients overestimate their body width more often than do normal controls, and are more disparaging toward their body (Hsu & Sobkiewicz, 1991).

In a longitudinal study, Attie and Brooks-Gunn (1989) found that female adolescents who felt most negatively about their bodies were the most likely to develop eating problems 2 years later. They also found that high body fat explained a significant proportion of variance in problem eating initially, but was irrelevant 2 years later, when body image played the biggest factor. This finding suggests that early eating problems may emerge in reaction to the physical changes that accompany puberty, and that, subsequently, body image becomes an increasingly important factor with age (Attie & Brooks-Gunn, 1989).

Stice and Shaw (1994) found that viewing ideal body images portrayed in popular women's magazines increased negative affective states and body satisfaction of the female readers. Killen and associates (1994) found that weight concern was the variable most predictive in identifying adolescents who would display eating disorder symptomatology 3 years later.

**Depression**

There is extensive literature showing that depressive symptomatology is common in adolescent and adult bulimics (Braun, Sunday, & Halmi, 1994; Herzog, Keller, Sacks,
Yeh, & Lavori, 1992; Killen et al., 1987; Lee, Rush, & Mitchell, 1985; Leung & Steiger, 1991; Saunders & Saunders, 1989; Schumaker, Warren, Carr, Schreiber, & Jackson, 1995; Viesselman & Roig, 1985), and affective lability or instability may represent a risk for bulimia (Greenberg & Harvey, 1987; Johnson & Larson, 1982). The studies that comprise this literature are nearly all retrospective in nature.

Some researchers believe that bulimia is merely symptomatic of patients' underlying affective disorder (i.e., major depression; Hudson, Pope, Jonas, & Yurgelun-Todd, 1983). After reviewing family and twin studies, Hsu (1990) concluded that the higher concordance rates reported for monozygotic versus dizygotic twins may either suggest a genetic risk factor or a family culture mode of transmission of a primary depressive syndrome; however, he suggested that such speculation could not be confirmed without further longitudinal analysis.

Subjects diagnosed with bulimia often have an additional lifetime diagnosis of a mood disorder (see Appendix A). The studies in Appendix A indicate that a person diagnosed with bulimia is twice as likely (mean = 56.4%) to have a lifetime diagnosis of a major mood disorder than a lifetime diagnosis of a milder mood disorder. Most recently, Kennedy et al. (1994) found that 40% of a clinical sample of female bulimics (diagnosed using the Structured Clinical Interview for DSM-III-R [APA, 1987]) met criteria for major depression. Likewise, Bushnell et al. (1994) found that 84% of their clinical sample of bulimic women had a lifetime affective disorder.

There has been considerable controversy about whether depression predates, emerges with, or postdates the onset of bulimia. Inspection of studies in Appendix B suggests that in approximately one third of the cases, depression appears to predate the
eating disorder by at least 1 year; in one third of the cases, depression and the eating disorder occur within the same year; and one third of the time, the depression postdates the onset of the eating disorder by at least 1 year. Nonetheless, a number of lines of investigation have implicated affective disturbance as a risk factor in bulimia. In a 6-month follow-up study, Leung and Steiger (1991) found a moderate, but stable correlation between depressed mood and eating problems (to be elaborated upon in the longitudinal studies section). Mitchell, Hatsukami, Pyle, and Eckert (1986) noted that an atypical proportion of bulimic patients reported being treated for depression prior to seeking treatment for an eating disorder.

Also, individuals with higher self-rated depression may show less improvement in bulimic behavior after treatment (Bossert-Zaudig, Zaudig, Junker, Wiegand, & Krieg, 1993). At a 3-year follow-up, Herpertz, Beate, and Remschmidt (1993) found a statistically significant association between the severity of eating disorder symptoms and the degree of depression in discharged adolescent anorexia nervosa clients.

Irrational Beliefs/Cognitive Distortions

Phelan (1987) theorized that given the theoretical links between cognitive theories of depression and the relation between affective disorders and eating disorders, it is logical to expect certain cognitive/ideational problems to be present in bulimia nervosa. Phelan (1987) presented data on the Bulimic Thoughts Questionnaire (BTQ), which encompasses these cognitive/ideational constructs. A similar approach to emphasizing cognitive distortions associated with dieting, body image, and weight loss has been taken by Schulman, Kinder, Powers, Prange, and Gleichorn (1986), who developed the Bulimia Cognitive Distortions Scale. Both Phelan (1987) and Schulman and associates (1986)
found highly significant differences between bulimic and nonbulimic women. Ruderman (1986) has also found that a global system of irrational beliefs/cognitions (e.g., irrational perfectionism, tendency to blame self, or use others' frames of reference for judging one's behavior) was related to the severity of bulimic symptoms. Ruderman (1986) speculated that these beliefs may predate the onset of bulimia nervosa.

Mizes and Christiano (1995) conducted a review of the literature on the assessment of cognitive variables relevant to anorexia and bulimia. To date, there are nine self-report questionnaires assessing cognitive distortions (including those mentioned above) (Mizes & Christiano, 1995). Generally, these questionnaires measure cognitive distortions particular to eating disorders, and can differentiate subjects who report bulimic episodes from those who do not.

Many researchers have found that bulimics display significantly more cognitive distortions about food, weight, and body image than do nonbulimics (Cooper & Fairburn, 1992a; Schlesier-Carter, Hamilton, O'Neil, Lydiard, & Malcolm, 1989; Schulman et al., 1986). Also, bulimics who completed a modified version of the Stroop Color and Word Test showed selective processing of information related to eating, weight, and shape (Cooper & Fairburn, 1992b). Clark, Feldman, and Channon (1989) found that both anorexics' and bulimics' degree of food preoccupation was specifically associated with degree of eating disturbance.

Poulakis and Wertheim (1993) found that both bulimia symptoms and depression scores were significantly correlated with cognitive distortions. When depression was entered first into a regression equation, significant variance in bulimia scores was still accounted for by the cognitive measures (Poulakis & Wertheim, 1993). Poulakis and
Wertheim suggested that cognitive distortions have a relationship with bulimic symptomatology, which may be partially independent of depression.

In summary, there is an abundance of published literature that finds a correlation between bulimia nervosa and the four aforementioned risk factors. However, much of this literature is retrospective in nature, and subjects' recall of their behaviors or situations occurring before their eating disorder may be questionable. Longitudinal studies will help clarify to what extent the severity or chronicity of these risk factors, help predict future development of eating disorder symptomatology.

Longitudinal Studies to Date

Each longitudinal or partially longitudinal study published to date has limitations. One longitudinal study examined predictors of eating problems over time in young adolescent females (Attie & Brooks-Gunn, 1989). Bulimia nervosa per se was not a focus of study. Results showed that girls, who early in adolescence felt most negatively about their bodies (body image), were more likely to have developed eating problems 2 years later. Likewise, Killen and colleagues (1994) found that a weight concern measure was the most predictive variable for onset of symptoms in adolescent girls during a 3-year prospective study. Similarly, this study had the weakness of focusing on eating problems, and relying on questionnaires alone (rather than interviews) to make diagnoses.

Another longitudinal study (Marchi & Cohen, 1990) was narrowly focused on maternal reports of specific eating behavior during ages 1-10 (e.g., problem meals, pickiness, and pica-type behavior). These problems were most predictive of eating disorder symptoms 3 years later, but were also still predictive of symptoms reported by
mothers 8-10 years later. Bulimia or specific eating disorders were not the focus of this study.

Patton, Johnson-Sabine, Wood, Mann, and Wakeling (1990) examined predictors of diagnosis of combined group of initially diagnosed bulimics (by interview), plus new cases of the disorder (1 year later). Patton and associates (1990) concluded that while dieting is common and does not apparently result in negative health outcomes for most adolescent females, a substantial minority (21%) appear to develop broadly defined subclinical eating disorder problems 12 months later. Patton and colleagues (1990) found that attempts to control weight were common and often transient; however, the relative risk of dieters becoming eating disorder cases was eight times that of nondieters. This study’s strength was its use of an interview for diagnosis; however, the follow-up period was relatively short.

Garner, Garfinkel, Rockert, and Olmsted (1987) assessed a group of young adolescent ballet dancers for eating disorders, and then retested this group 2-4 years later. Of the ballet dancers interviewed at follow-up, 25.7% were diagnosed with anorexia nervosa, and 14.2% were diagnosed with bulimia nervosa or a partial syndrome. However, half of these subjects who were diagnosed with an eating disorder at follow-up had significant eating problems that may have resulted in an eating disorder diagnosis at initial testing. Subscales on the EDI that were predictive in developing eating disorders at follow-up were Drive for Thinness and Body Dissatisfaction.

Rosen, Tacy, and Howell (1990) used questionnaires to investigate whether weight reduction could be a cause or consequence of stress and overall psychological distress in a 4-month prospective study. These authors found that among adolescents, dieting behavior
predicted an increase in stress (but not an increase in overall psychological distress) over a period of 4 months. However, stress and negative psychological functioning did not predict dieting in the short-term future. Similarly, Rosen et al. (1993) conducted a 4-month prospective study in adolescent girls, investigating the relationships among stress, psychological symptoms, and eating disorder symptoms. They again found that stress and psychological symptoms do not contribute uniquely to the prediction of future levels of eating disorder symptoms. However, eating disorder symptoms contributed uniquely to the prediction of future levels of stress, but not psychological symptoms. Thus, it does not appear that increases in psychological maladjustment will subsequently lead to more symptoms of eating disorders or vice versa (Rosen et al., 1993). It may be that the psychological distress (e.g., depression) and eating disorder symptomatology may be more autonomous than is generally believed, and that a third factor might be responsible for the relationship rather than either type of symptoms contributing directly to the other (Rosen et al., 1993). The main weakness of these studies was the reliance on questionnaires, and also the short time period between initial assessment and follow-up.

A 6-month follow-up study was conducted by Leung and Steiger (1991) investigating the relationship between depressive symptoms and eating abnormalities. Weakness of this study included a short period of time for follow-up, high school girls were administered only questionnaires (rather than being interviewed for diagnoses), and the response rate at Time #1 was only 43%. Although there was a moderate but stable association between depressed mood and eating disturbance, there was no predominant causal sequence between these two variables. The authors concluded that one or more unspecified "third variable(s)" (either genetic and/or psychosocial factors) may have led to
increased vulnerability to both eating disorders and affective disturbance, thereby producing an association between eating pathology and depression (Leung & Steiger, 1991). Other explanations of the results (Leung & Steiger, 1991) may include: (a) depressive symptoms and eating problems may each cause the other, equally and in a cyclical nature, and (b) the relationship between depressed mood and eating disorder symptoms varies across different subgroups (i.e., in some cases, a depression could predispose or contribute to the emergence of an eating disorder; and in other cases, depression may only arise during the course of an already established eating disorder). Thus, mixing these two subgroups together in the same analysis might also cancel out causal effects.

In an 8-year longitudinal study with adolescent girls, both girls who chronically displayed eating disorder symptoms initially and 2 years later, and girls who only temporarily exhibited symptoms initially were more likely to have poorer family relations and body image, more depressive affect, and higher percentage of body fat (early pubertal maturation) than adolescents who never endorsed eating disorder symptoms (Graber, Brooks-Gunn, Paikoff, & Warren, 1994). Although this is the longest longitudinal study to date, it investigates eating problems based upon questionnaires, and the author did not make eating disorder diagnoses.

Finally, Leon, Fulkerson, Perry, and Early-Zald (1995) conducted a prospective investigation of the precursors to the later development of an eating disorder in adolescents. These researchers gave questionnaires to junior and senior high school students for three consecutive years. For both genders, the strongest predictors of Year 3 risk status were Years 1 and 2 risk scores (Leon et al., 1995). When the effects of Year
1 and Year risk were controlled, race (Caucasian) and poor interoceptive awareness at Year 2 were significant predictors of disordered eating at Year 3 for girls (the EDI Ineffectiveness Subscale was statistically significant, but only improved the predictive value of the equation slightly) (Leon et al., 1995). Depression was not predictive of later risk status, suggesting that depression may be secondary to disordered eating (Leon et al., 1995). Similarly, the weakness in this study is the use of questionnaires for diagnosis of eating disorders.

In summary, research studies have identified several variables that may increase the risk for bulimia in the preadolescent or adolescent. Although a few longitudinal or prospective studies have become more prevalent in recent years, much additional verification of purported risk factors is needed. Longitudinal studies can help researchers develop better prediction models, thereby allowing the most appropriate prevention and early intervention programs (Omizo & Omizo, 1992; Grodner, 1991; Moriarty, Shore, & Maxim, 1990) to be developed and administered. Also, knowledge of the most likely risk factors can help counselors focus on possible underlying problems of the eating disorder (e.g., depression), which is likely to be helpful in treatment and recovery of the individual.

The longitudinal studies just reviewed have at least one of the following weaknesses: diagnosis of eating disorders based on questionnaires (rather than interviews), and/or short-time period between Time #1 and Time #2. On the other hand, the present study diagnosed eating disorders through DSM interviews, and involved a 5-year period between initial screening (Time #1) and follow-up (Time #2).

Of particular interest in the present investigation was whether a composite of four
commonly cited risk factors (overinternalization of society's values about thinness in women, depressive symptomatology, maladaptive cognitions about weight loss, dieting and appearance, and poor body image) related to future development of eating disorder symptomatology in a group of adolescent girls.

Research Questions

1. What is the estimated incidence (recent emergent cases) and prevalence of bulimia and other DSM eating disorder symptoms in females between the ages of 17-20?

2. Do adolescent females denoted as being at high risk for an eating disorder display a significantly higher incidence or prevalence of bulimia or other eating disorder symptoms 5 years later (relative to a low-risk group)??

3. What risk factors best differentiate clinical (i.e., bulimia nervosa, anorexia nervosa, eating disorder not otherwise specified [NOS]) and nonclinical samples?

4. What linear combination of early risk predictors (identified 5 years ago) optimally predict current, overall severity of eating disorder symptomatology?

5. What changes in risk factors (pre- to post-) predict global severity of eating disorder symptoms?
CHAPTER III

METHOD

Research Design

Figure 1 presents a brief overview of the present research design, in which high and low risk adolescent girls were followed over a 5-year period (Time #1 to Time #2) and evaluated for eating disorder symptomatology, and incidence and prevalence at the end of that period. It should be noted that eating disorder incidence is defined two ways: (a) the percentage of new cases that appeared within the last 6 months, and (b) the percentage of new cases that appeared within the past 2 years. Prevalence was defined as the overall percentage of cases currently or sometime in the past. Further, some paper-and-pencil measures mentioned in the present study were administered (e.g., SCL-90-R), but will be summarized in another report, as they pertained to accessory research questions.

In the section that follows, an explanation and rationale for selecting specific risk factor measures is outlined. This rationale was principally based on evidence in the literature of being large, standardized mean differences between known bulimic and nonbulimic women. Next, the psychometric properties of risk measures administered to all subjects at Time #1 and Time #2 are outlined and details about the follow-up structured clinical interview (Time #2 only) are outlined. Finally, subject selection and assessment procedures are presented.
Figure 1. Research design.

Selection of Four Risk Factor Measures

Subgroups of individuals identified at-risk for particular disorders should eventually evidence much higher incidence and prevalence rates of a disorder.
compared to low-risk subjects. Disorders with low to moderately low base rates are extremely difficult to predict because the odds are strongly in favor of any given person not developing a disorder. Still, to be meaningful, models of risk should be supported by empirical evidence showing much higher rates of the disorder than would be expected by chance. While no firm guidelines are available, a risk subgroup should evidence more than two to three times the base rate prevalence/incidence rates, and should contain a substantial number of cases that would appear in the larger sample from which it was drawn. For example, if a sample of 500 subjects is expected to have a base rate of 5%, then 25 subjects should meet criteria for caseness. An at-risk group of 100 subjects selected from this sample should include many or most of the 25 eventual cases (e.g., 15+) and its prevalence rate should be 200-300% higher (i.e., 10-15%).

When the present study was initiated 5 years ago, no published data existed on measures that differentiate supposed at-risk women from those who are not-at-risk. However, a large body of literature existed that contrasted known bulimic patients with nonbulimic controls on purported risk measures. This literature provided guidance in selecting at-risk measures; also, the adoption of several assumptions about measures that differentiate at-risk persons, known bulimics, and persons who are presumed to be not-at-risk was necessary to help identify appropriate risk measures. The first assumption was that persons who are at-risk for developing an eating disorder certainly evidence a given risk factor at a moderately abnormal level prior to becoming symptomatic, but show increasing frequency and/or severity of the factor as an eating disorder develops. (An
example might be clinical depression or difficulties modulating or controlling negative affect.) Thus, the risk factor seems to predate the eating disorder, persists with the development of an eating disorder, and may exacerbate over time. In fact, there are no empirical data or theoretical evidence to suggest that major risk factors (discussed in the previous section) decrease in severity or degree as bulimia emerges. Therefore, at-risk subjects are likely to score as somewhat less severe or extreme than active bulimics; however, at the same time, they would certainly score higher than peers who are not-at-risk.

Given this assumption about persistence and exacerbation of risk factors with the development of an eating disorder, it is intuitively reasonable to expect that at-risk persons will score somewhere between the group means of normal women and bulimics on each risk measure. Thus, it would be necessary to select measures that show maximal differences in sample distributions of scores of bulimic, at-risk, and not-at-risk groups. Large differences between these three groups (e.g., standardized mean differences > .8; Stein, 1990) are useful in this regard because the distribution of scores for at-risk persons must overlap very little with that of not-at-risk peers. Also, large standardized mean differences help ensure that at-risk persons' measures will not suffer from ceiling effects (i.e., that they can show meaningful increases), if subjects later become bulimic. Appendix C (Stein, 1990) presents an abbreviated summary of published studies that contrast nonbulimic women with bulimic peers on several reputed measures of risk factors.
Three of the four risk factor measures used in the present study were chosen because they showed large standardized mean differences (bulimics relative to controls), adequate reliability and validity, and/or widespread use. The Self-Image Questionnaire for Young Adolescents (SIQYA) was chosen as a risk factor measure (body dissatisfaction) based on the fact that Attie and Brooks-Gunn (1989) (in their longitudinal study) found that the Emotional Feeling Tone and Body Image Subscales of the SIQYA best correlated with later development of eating problems.

When investigating the scores of the adolescent subjects used in the present study, Stein (1990) found that 10-11% of the subjects scored at or above the 60th percentile on all four of the following measures: (a) the Eating Disorder Inventory Ineffectiveness Subscale, (b) the physical/social Appearance Subscale of the Bulimic Cognitive Distortions Scale, (c) the (negative) Body Image Subscale of the SIQYA, and (d) the Beck Depression Inventory. Also, no statistically significant differences were found between group means of the various ages included in the sample. Thus, Stein (1990) defined subjects as being at-risk if they scored at or above the median on these four indices, and not-at-risk if they scored below the median.

While somewhat arbitrary, these criteria for at-risk status are conceptually reasonable. To suggest that, in general, any larger proportion of adolescents (say, 30% or more) is truly at-risk for bulimia weakens the meaningfulness of discussing at-risk status altogether. More importantly, subjects who meet these cut-off criteria tend to score at or above the median on other similar risk factor measures. For instance, 87% of adolescent women who met these four criteria also scored at or
above the median on the EDI Drive for Thinness Subscale, and 100% did so on the SCL-90-R Global Symptoms Index.

It cannot be expected that all at-risk subjects in any given sample will be validly identified by use of these criteria. It can only be expected that a substantially higher proportion of bulimics and persons with subclinical symptoms (eating disorder NOS) will subsequently be found to be members of this group (relative to a group considered initially to be not-at-risk). As 141 subjects were selected as a representative sample of adolescents, somewhere around 3-4% \((n = 4-6)\) should evidence bulimia nervosa (past prevalence), and the incidence rate may be as high as 2-3% \((n = 2-3)\). Total eating disorder (anorexia, bulimia, subclinical/NOS) rates may be expected to be around 6-10% or more in this sample \((n = 8-14)\). The at-risk group should encompass many of the emergent cases. As the high-risk group contains 34 subjects, then 8/34 to 14/34 (23.5%-41%) of them should evidence the spectrum of eating disorders.

Psychometric Properties of Instruments: Risk Factors, Inventories, and Clinical Interview

Internalization of Cultural Value of Thinness

The Eating Disorder Inventory (EDI; Garner & Olmsted, 1983) is a self-report assessment. The 64-response options to the questions of the inventory are based on a 6-point Likert-type scale that ranges from "always" to "never." Together, the Drive for Thinness Subscale and the Ineffectiveness Subscale both appear to relate to strong
internalization of the social value of thinness, or maladaptive beliefs about one's self-efficacy (Johnson & Connors, 1987). Appendix C presents bulimic and control group data for three EDI subscales: Drive for Thinness (DT), Body Dissatisfaction (BD), and Ineffectiveness (IE). As previously noted, Stein (1990) found statistically significant and clinically dramatic differences between bulimic and control groups in several articles he reviewed. The IE Subscale, however, shows the largest standardized mean differences, and therefore was selected for use as a risk factor measure.

Test-retest reliability for a 3-week interval was high with a group of undergraduates (Wear & Pratz, 1987), and it appears to be internally consistent with a relatively stable factor structure (Raciti & Norcross, 1987).

**Body Image**

The Self-Image Questionnaire for Young Adolescents (Petersen, Schullenbert, Abramowitz, Offer, & Jarcho, 1984) is a 98-item instrument with nine subscales. It uses a 6-point Likert-type scale. In a 3-year longitudinal study by Attie and Brooks-Gunn (1988), the SIQYA predicted eating problems in 13-year-olds. The Body Image and the Emotional Feeling Tone Subscales of the SIQYA are considered to be facets of the overall self-image construct. These may be a useful predictor of eating disorder development. However, there are no data on bulimic versus control samples.

The interitem consistency on the SIQYA for 6th grade girls was .85 for the Emotional Tone Subscale, and .77 for the Body Image Subscale (Petersen et al.,
1984). Construct validity was obtained by correlating the SIQYA with the Rosenberg Self-Esteem Inventory (SEI; Rosenberg, 1965) and authors reported a median correlation of $r = .48$ for a sample of 7th grade girls (Petersen et al., 1984). Also, adolescents with four kinds of mental health problems reported poorer self-image overall and poorer self-image on appropriate scales compared to "normal" adolescents (Petersen et al., 1984).

**Depression/Mood**

The Beck Depression Inventory (BDI; Beck & Steer, 1987) is a self-report assessment of the severity of depression. It has 21 items, and each item is rated on a 4-point scale ranging from 0 to 3. Scores range from 0 to 63. The BDI is one of the most widely used instruments for assessing current symptoms of depression. Appendix C summarizes studies that have contrasted bulimics with control subjects on depression, using the BDI.

Internal consistency estimates for different psychiatric populations vary from .79-.90 (Beck & Steer, 1987). Test-retest stability for nonpsychiatric patients ranges from .60 to .90 (Beck & Steer, 1987). With regard to content validity, the BDI reflects six of the nine DSM-III criteria for Affective Disorder well (Beck & Steer, 1987). Beck and Steer (1987) mentioned several studies that have indicated that the BDI can differentiate psychiatric patients from normals. Meta-analyses revealed a mean correlation of .72 between clinical ratings of depression and the BDI for psychiatric patients, and a mean correlation of .60 between clinical ratings of depression and BDI scores for nonpsychiatric subjects (Beck & Steer, 1987).
Irrational Beliefs. Cognitions

The Bulimia Cognitive Distortions Scale (BCDS; Schulman et al., 1986) assesses irrational beliefs and cognitions related to appearance, body-image, and diet. It has shown the largest standardized mean differences (bulimic versus controls) of any measure published to date (see Appendix C; Stein, 1990). When administered to bulimic and nonbulimic females, discriminant analysis revealed the BCDS to be a significant variable in predicted group membership, correctly classifying 93.6% of all subjects (Schulman et al., 1986) and also predicting the severity of bulimia measured by the frequency of binge eating episodes.

Clinical Interview

A modified version of the Structured Clinical Interview for DSM-III-R (Spitzer, Williams, Gibbon, & First, 1990) was conducted with all subjects to establish the degree to which they met DSM criteria for bulimia nervosa, anorexia nervosa, or eating disorder NOS at Time #2. In a test-retest reliability study of the SCID, across six patient sites, the agreement between interviewers was between .82-.92 when making either current or lifetime diagnoses of bulimia nervosa (Williams, Gibbon, First, & Spitzer, 1992).

A Global Severity Index for weighted DSM criteria has been developed by Stein (1991b). This index involves the sum of all weighed DSM criteria scores derived from the structured interview. The diagnostic criteria scoring was originally based on a point assignment system developed by a group of 16 national experts highly familiar with diagnosing and treating individuals with eating disorders. These
experts differentially weighted the general health threat of each of the eating disorder
symptoms reported in DSM-III-R (Stein, 1991b).

The DSM Interview Global Severity rating form (Stein, 1991b) was used to
code the DSM clinical interview data (see Appendix E). The scores for individual
entries can range from 1 to 5, depending on the severity of the eating disorder
symptom, or frequency designated by each response option. To obtain scores on the
first two diagnostic criteria, "(A) intense fear of becoming obese, even when
underweight," and "(B) disturbance in the way in which one’s body weight, size or
shape is experienced)," the subject also had to obtain at least a rating of "3" on the
third criterion ("refusal to maintain body weight over a minimal normal weight for
age and height"). Thus, only underweight individuals received coding scores for both
DSM Criteria A and B. Also, subjects who received a rating of "3" or above on
Criterion C were automatically given a rating of "3" on Criterion B. Appendix F
presents a weight and height chart, which was adopted for scoring Criterion C. This
chart is based on the 1983 Metropolitan Life Insurance Weight and Height table for
women.

Decision rules for DSM weight loss criteria for anorexia nervosa were based
on: (a) computation of the mean, recommended weight for small-boned and medium-
boned females (Metropolitan Life Insurance Weight and Height table for women); and
(b) developing appropriate intervals for low weights for ranges of women’s weights
across the coding system (i.e., possible ratings of "1" through "5") (e.g., a weight of
15% below the mean was rated a "3"). Likewise, subjects could not receive a score
on Criterion F (i.e., lack of control over binge eating) unless the subject reported consuming at least 1200 calories during a binge. This strict requirement eliminated many individuals who evidenced subclinical symptoms (e.g., someone with normal weight, but a strong fear of getting fat, plus evidence of a low calorie diet despite food consumption throughout the day).

For a diagnosis of anorexia nervosa, the subject had to have a rating of at least "3" on the first four criteria (A,B,C,D). For a diagnosis of bulimia nervosa, subjects needed a rating of "4" on Criterion E (i.e., 9-12 binge eating episodes per month), plus at least a rating of "3" on Criteria F, and a rating of at least "3" on any of the purging methods described in Criterion G. For a diagnosis of eating disorder NOS, the subject had to meet at least three of the criteria mentioned above for anorexia nervosa or bulimia nervosa (in any combination).

Subjects' scores on DSM interview criteria were differentially weighted based on a study by Stein (1991b), which showed that 16 national experts who treat eating disorders can reliably rate and rank the general health risk of each of the DSM-III-R (APA, 1987) "criteria for eating disorders." Subjects scores were weighted and then summed across criteria to produce a global (total) DSM severity rating.

Subjects

In the discussion that follows, how subjects were initially selected (Time #1) will be described, followed by an outline of follow-up procedures 5 years later (Time #2).
Time #1: Subjects and Inventories

At Time #1, subjects were attending either middle school or high school in Logan, Utah, and were identified by published school telephone book listings. Subjects were mailed a consent form and a packet containing risk factor measures, which included the Eating Disorder Inventory, Self-Image Questionnaire for Young Adolescents (subscales: Body Image and Emotional Tone), Beck Depression Inventory, Symptom Checklist-90-Revised, Family Environment Scale (subscales: Cohesion, Expressiveness), and the Bulimia Cognitive Distortions Scale (see Appendix D). Overall, 141 (62%) subjects returned the packets. This study was a pilot investigation that was conducted to provide data for a National Institute of Health grant proposal to investigate the relative comparability of using a more time-consuming and costly screening procedure versus a much more economical screening procedure. Half of these subjects had been randomly selected to receive either packets of complete inventories or a packet of abbreviated inventories. The abbreviated packet contained only those inventory subscales thought to be relevant measures of potential risk factors. Stein (1990) found only one significant group difference between girls assigned to the abbreviated versus intact (full) inventory condition; there was a statistically significant difference between groups on the Eating Disorder Inventory, Ineffectiveness Subscale, $F(1,139) = 8.30, p = .005$, with a standardized mean difference of 0.46.

Additionally, Stein (1990) compared the sample adolescent means and standard deviations to the group statistics of similar subjects published in other studies. He
found that the sample was nearly identical to samples from other studies, in terms of sample means and group variability, on all measures of purported risk factors. Therefore, the sample appeared to be quite similar to other normative samples of adolescent girls in the U.S. who have completed these measures.

Finally, Stein (1990) found that 34 out of the 141 adolescent girls scored at or above the median on all four of the following measures: (a) Beck Depression Inventory, (b) Bulimia Cognitive Distortions Subscale—Physical Appearance, (c) Self-Image Questionnaire for Young Adolescents—Body Image Subscale, and (d) the Eating Disorders Inventory—Ineffectiveness Subscale. These criteria represent a reasonable operational definition of at-risk status for longitudinal research (Stein, 1990). As mentioned previously, the particular measures for the at-risk criteria were based upon a literature review, which revealed that very large standardized mean differences exist between bulimic and control group samples.

Follow-Up (Time #2): Subjects and Inventories

The 34 young women identified as being at-risk in the Stein (1990) study were reassessed in 1995 (Time #2). A reference group of 34 young women was randomly chosen from the original sample of 141 adolescent subjects who completed at-risk measures at Time #1. All 141 of the original subjects in the screening sample were equally eligible for selection into the low-risk group. Random selection of 34 such subjects from the total sample resulted in a low-risk group containing four individuals who actually proved to meet criteria for membership in the high-risk group. Since
one aim of the present study was to examine the incidence and prevalence of eating disorder symptoms in a representative control sample of young women (versus an at-risk sample), there was some overlap in group membership. Thus the control group was thought to contain naturally occurring proportions of both low-risk and high-risk young women.

Subjects and parents were contacted and informed of the follow-up study and all verbally agreed to participate. Consent forms (see Appendix G for subjects at least 18 years old; Appendix H for subjects who were minors), instructions (see Appendix I), and inventory packets were sent to the subjects' homes. All subjects were told that they would receive $5.00, along with a chance to win one of two $50.00 checks that would be given away upon completion of the data collection. The Time #2 data collection began in December 1994 and ended in June 1995. If a subject did not return the inventory packet, a research assistant followed up with a phone call (if possible), and an inventory packet was re-sent. Four subjects of the high-risk group could not be located, and one high-risk subject did not participate (even after the incentive was raised to $20.00 rather than $5.00). Three subjects of the control group could not be located and were replaced by randomly choosing three other subjects from the pilot sample. Four low-risk subjects did not participate (even after five repeated attempts to encourage them to participate).

In addition to completing the paper-and-pencil inventories, subjects also completed a structured clinical interview based on DSM criteria for bulimia nervosa and anorexia nervosa. For the present study, three advanced undergraduate students
and one graduate student were taught how to conduct the DSM clinical interviews. These research assistants practiced giving the DSM interview to volunteers. The present researcher verified that the research assistants conducting the DSM interview met a criterion level of expertise; specifically, they reliably asked all relevant questions and provided all information needed for two other judges (advanced undergraduate students or a doctoral student) to rate the severity of symptoms and determine the diagnosis (based on the review of the audiotapes). If the subject told a research assistant that she was hesitant or did not want to participate in the interview, the author called them, addressed any concerns, conducted the interview, and the research assistants coded the interview.

The DSM interviewers and coders were blind to group membership of the subjects. These same research assistants were taught how to code the DSM interview (discussed previously) and learned with practice audiotapes. Once there was 90% agreement among the research assistants, they coded the actual DSM interviews. The research assistants did not code their own interviews. If there was a discrepancy among the research assistants, the present author, upon consultation with David Stein, coded the particular DSM interview in question.
CHAPTER IV
RESULTS

As mentioned previously, the high-risk group in the present study was composed of adolescent girls who scored at or above the median on each of the following four measures: Beck Depression Inventory, Bulimia Cognitive Distortions—Physical Appearance Subscale, Self-Image Questionnaire for Young Adolescents—Body Image Subscale, and the Eating Disorders Inventory—Ineffectiveness Subscale.

An initial analysis showed that at Time #2, three members of the low-risk group exhibited a "past" (i.e., symptoms occurring over 6 months ago) or "current" (i.e., symptoms occurred within the last 6 months) eating disorder based on the DSM clinical interview data. Interestingly, these three subjects met all of the high-risk criteria, with the exception of being one point below the median on the BCDS Physical Appearance Subscale. Given that cutoff scores for risk criteria were somewhat arbitrary, the cutoff score on the BCDS Physical Appearance Subscale was changed to one point below the median. Thus, originally, there were 28 subjects in the high-risk group and 29 subjects in the low-risk group. After the cut-off score was changed by one point for the Appearance Subscale, 31 subjects met criteria for membership in the high-risk group, while 26 subjects were now in the low-risk group. Thus, the cut-off scores for the high-risk group were a BDI score of 7 or higher, a SIQYA Body Image subtest score of less than 4.10, an EDI Ineffectiveness subtest score of 1 or greater, and a BCDS Appearance subtest score of 18 or higher. It should be emphasized that this change in the grouping of subjects impacted only the
analyses directly comparing high- and low-risk groups (e.g., Time #1 prevalence and incidence); however, overall group analyses (e.g., changes in risk factors which relate to overall group eating disorder symptomatology at Time #2) were not affected by this grouping.

Demographic Characteristics of High and Low Risk Groups

The mean age at Time #1 was obtained for both the high- (n = 31) and low- (n = 26) risk groups. The mean age of the high-risk group at Time #1 was 13.94 (SD = 0.96), and 14.08 (SD = 1.09) for the low-risk group. The effect size for age (high- versus low-risk group), was not significantly different from zero (p = -0.13). The reported mean height and weight (lowest weight within the last 6 months if subject exhibited eating disorder symptoms) at Time #2 was 5'6", 141 lb for the high-risk group, and 5'6", 134 lb for the low-risk group. For the high-risk group, the range of height was 5'1" to 6'0", and range of weight was 108 lb to 250 lb. For the low-risk group, the range of height was 5'3" to 6'1", and range of weight was 100 lb to 170 lb.

The effect size for height at Time #2 (the high- relative to low-risk group) was not significantly different from zero (p = -0.17). The effect size for weight (lowest weight within the last 6 months if subject exhibited eating disorder symptoms) at Time #2, between the high- and low-risk group was moderately significantly different from zero (0.40). This moderately significant effect size may be accounted by the
fact that two people in the high-risk group weighed over 230 lb (one reporting no binge eating or eating disorder symptoms, the other one reporting binge eating twice a month and no other eating disorder symptoms).

Prevalence and Incidence Estimates

**Time #1 (Initial): Prevalence Estimate of Eating Disorder**

Table 1 presents age and course information on specific subjects who, when interviewed at Time #2, appeared to have had an eating disorder sometime in the past or at present. This diagnosis was based on the DSM interview at Time #2, which assessed both current and past symptoms. The table presents subjects' age at Time #1 and Time #2, reported number of years since their eating disorder symptoms began, and subjects' approximate age when the eating disorder symptoms first emerged. Individual subjects in Table 1 are designated by acronyms (e.g., "LR1" refers to Low-Risk Group, Case #1).

Table 1 shows that at Time #1 (first screening, approximately 5 years ago), one low-risk subject (LR1) and three high-risk subjects (HR3, HR5, HR7) were likely already displaying eating disorder symptomatology (based on the DSM interview). However, two low-risk subjects (LR2, LR3), and four high-risk subjects (HR1, HR2, HR4, HR6) were not likely displaying eating disorder symptomatology specifically at Time #1. Thus, they appear to be emergent cases (during the past 5 years).

Table 2 uses the same acronyms as found in Table 1 (i.e., LR1 = Low-Risk Group, Case #1). Table 2 also shows that some subjects exhibit a past or current
Table 1

Onset of Eating Disorders—Time #2 Diagnosis

<table>
<thead>
<tr>
<th>Group</th>
<th>Subjects</th>
<th>Age Time #1</th>
<th>Age Time #2</th>
<th>Years Ago Started</th>
<th>Age Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>LR1</td>
<td>15</td>
<td>20</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>LR2</td>
<td>12</td>
<td>17</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>LR3</td>
<td>15</td>
<td>20</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>High Risk</td>
<td>HR1</td>
<td>13</td>
<td>18</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>HR2</td>
<td>14</td>
<td>19</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>HR3</td>
<td>13</td>
<td>18</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>HR4</td>
<td>13</td>
<td>17</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>HR5</td>
<td>14</td>
<td>19</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>HR6</td>
<td>13</td>
<td>18</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>HR7</td>
<td>13</td>
<td>17</td>
<td>5</td>
<td>12</td>
</tr>
</tbody>
</table>

\(a\) = reported number of years ago eating disorder symptoms began
\(b\) = approximate age eating disorder symptoms began

Table 2

Individual Eating Disorder Cases Identified by DSM Interview: Movement Across Categories

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Anorexia</th>
<th>Bulimia</th>
<th>Eating Disorder NOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (Low R)</td>
<td></td>
<td></td>
<td>LR5(^b)</td>
</tr>
<tr>
<td>Past (Low R)</td>
<td>LR1</td>
<td></td>
<td>LR2,(^b) LR3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HR1,(^a) HR2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HR3,(^c) HR4</td>
</tr>
<tr>
<td>Current (High R)</td>
<td></td>
<td></td>
<td>HR1,(^a)</td>
</tr>
<tr>
<td>Past (High R)</td>
<td></td>
<td></td>
<td>HR3,(^c) HR5, HR6, HR7</td>
</tr>
</tbody>
</table>

Current episode = eating disorder diagnosed by DSM interview, occurring within the last six months
Past episode = eating disorder diagnosed by DSM interview, occurring over six months ago
(Low R) = Low Risk Group; (High R) = High Risk Group
\(^a\), \(^b\), \(^c\) = designation that the subject meets criteria for both a "current" and "past" case
eating disorder, while others exhibit both a past and current eating disorder. Of the four subjects who reported eating disorder symptoms at Time #1 (see Table 1; LR1, HR3, HR5, HR7), only one high-risk subject continued to display these symptoms (HR3) five years later at Time #2 (see Table 2).

Subjects who were diagnosed as bulimic (HR1, HR2) both proved to be members of the high-risk group, and were considered emergent cases (i.e., they developed symptoms during the past 5 years, see Table 1). Table 1 illustrates the point that there appeared to be no consistent age at which eating disorder symptoms began.

**Time #2: Prevalence**

Table 3 shows the prevalence of anorexia nervosa, bulimia nervosa, and eating disorder NOS among the high- and low-risk groups, and totals across both groups. As is shown in Table 3, more subjects display symptoms of eating disorder NOS either currently (within the last 6 months) or anytime in the past (over 6 months ago), than either anorexia nervosa or bulimia nervosa. In the entire sample, 10 of 57 subjects exhibited symptoms of anorexia nervosa, bulimia nervosa, or eating disorder NOS, either currently and/or sometime in the past; the overall prevalence rate in the overall sample is thus 17.5%: 1.4% displayed anorexia nervosa, 3.5% displayed bulimia nervosa, and 12.3% displayed eating disorder NOS (based on the DSM clinical interview). Among these subjects, seven members of the high-risk group (22.6%) exhibited clinically significant symptoms of a diagnosable eating disorder: 6.5% displayed bulimia nervosa, and 16.1% displayed eating disorder NOS (see Table 3). Among the low-risk subjects, three exhibited clinically significant symptoms of a diagnosable eating disorder: 3.8% exhibited past anorexia nervosa, and 7.7% exhibited eating disorder NOS.
Table 3

Time #2 Prevalence Rates

<table>
<thead>
<tr>
<th>Group</th>
<th>Anorexia</th>
<th>Bulimia</th>
<th>ED NOS*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>3.8% (1/26)</td>
<td>0.0% (0/26)</td>
<td>7.7% (2/26)</td>
<td>11.5% (3/26)</td>
</tr>
<tr>
<td>High Risk</td>
<td>0.0% (0/31)</td>
<td>6.5% (2/31)</td>
<td>16.1% (5/31)</td>
<td>22.6% (7/31)</td>
</tr>
<tr>
<td>Total</td>
<td>1.8% (1/57)</td>
<td>3.5% (2/57)</td>
<td>12.3% (7.57)</td>
<td>17.5% (10/57)</td>
</tr>
</tbody>
</table>

*ED NOS = Eating Disorder NOS

Time #2 Incidence: High-Risk and Low-Risk Groups

Incidence was defined two ways: (a) any new occurrence of a case within the last 6 months and (b) any new occurrence of a case within the last 2 years. Table 2 (as shown previously) identifies subjects exhibiting a current episode of an eating disorder (i.e., within the last 6 months), as well as the past episodes (i.e., symptoms occurring over 6 months ago).

Table 2 shows no (current) new cases in the low-risk group, and two new cases in the high-risk group (i.e., one new bulimia nervosa case, HR2, and one new eating disorder NOS case, HR4). Thus, the overall, 6-month incidence rate is 3.5% (2/57, see Table 4), with a rate of 0.0% in the low-risk group (0/26), and 6.5% in the high-risk group (2/31). In the high-risk group, the incidence rate for bulimia nervosa is 3.2% (1/31), and the incidence rate for eating disorder NOS is 3.2% (1/31).

The 2-year incidence rate was discussed previously (see Table 1). Within the last 2 years, four subjects reported emergent eating disorder symptomatology, reflecting a 7.0% (4/57) overall, 2-year incidence rate (see Table 5). In the last 2 years, one low-risk
Table 4

**Time #2–6 Month Incidence Rates**

<table>
<thead>
<tr>
<th>Group</th>
<th>Bulimia</th>
<th>ED NOS*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>0.0% (0/26)</td>
<td>0.0% (0/26)</td>
<td>0.0% (0/26)</td>
</tr>
<tr>
<td>High Risk</td>
<td>3.2% (1/31)</td>
<td>3.2% (1/31)</td>
<td>6.5% (2/31)</td>
</tr>
<tr>
<td>Total</td>
<td>1.8% (1/57)</td>
<td>1.8% (1/57)</td>
<td>3.5% (2/57)</td>
</tr>
</tbody>
</table>

*ED NOS = Eating Disorder NOS

Table 5

**Time #2–2 Year Incidence Rates**

<table>
<thead>
<tr>
<th>Group</th>
<th>Bulimia</th>
<th>ED NOS*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>0.0% (0/26)</td>
<td>3.8% (1/26)</td>
<td>3.8% (1/26)</td>
</tr>
<tr>
<td>High Risk</td>
<td>3.2% (1/31)</td>
<td>6.5% (2/31)</td>
<td>9.7% (3/31)</td>
</tr>
<tr>
<td>Total</td>
<td>1.8% (1/57)</td>
<td>5.3% (3/57)</td>
<td>7.0% (4/57)</td>
</tr>
</tbody>
</table>

*ED NOS = Eating Disorder NOS

subject (LR3) developed an eating disorder (i.e., indicating a 2-year incidence rate of 3.8% [1/26] in the low-risk group). In the high-risk group, three subjects (HR2, HR4, HR6) were identified with an emerging eating disorder (2-year incidence rate of 9.7%, 3/31).
Individual Symptomatology of Subjects Identified as Having an Eating Disorder: Case Descriptions

Specific eating disorder symptoms of each individual identified as having an eating disorder, based on the DSM clinical interview (see Table 2), will now be described, beginning with members of the low-risk group. Any current and/or past bulimic or anorexic traits that the subject reported during the DSM interview will be presented, along with when the first symptoms reportedly began, and whether the subject sought any type of treatment for the eating disorder symptoms (e.g., visiting a psychologist or nutritionist).

As noted previously (see Table 2), three subjects in the low-risk group and seven subjects in the high-risk group were currently, or in the past, diagnosed with an eating disorder, based on the DSM clinical interview.

Low-Risk Case #1 (LR1) was identified as having experienced a past episode (defined as occurring over 6 months ago) of anorexia nervosa. Her only symptom presently (Time #2, DSM interview) was continued rigorous dieting. LR1 reported that she was currently fasting for at least a 12-hour period, one to two times per week. Also, 3 months prior to her DSM interview, she reported fasting at least 12 hours, three times a week. Past symptoms included a subaverage weight (5'9"; 120 lb). Also, she reported a rating of "10" (with the scale ranging from 1 = no fear to 10 = extreme fear) regarding her fear of becoming fat, missing two consecutive menstrual cycles, vomiting five to six times per week, and using four diet pills every day. LR1 reported that her menstrual cycles were often irregular as a young teen. She said she went to a physician about her menstrual irregularity. LR1 stated that the physician told her it was not likely diet-related, and she avowed taking "a pill at age 16 to make them regular." LR1 said her
eating disorder symptoms started approximately 7 years ago. She reportedly never sought treatment, but did visit a nutritionist on one occasion.

Subject LR2 displayed symptoms classified as eating disorder NOS both currently and in the past. LR2 currently reported that her weight during the episode was 108 lbs, 5'9". She also avowed current, rigorous dieting (eating only one meal per day). LR2 reported a "past" lowest weight of 104 lb (at 5'8"), and said she only ate one meal per day. She earned a "subclinical" DSM interview score for self-induced vomiting, because she avowed vomiting one to two times per month for 5 months (approximately 1 1/2 years ago). LR2 reported that her symptoms started approximately 3 years ago, at age 14. She reportedly never sought any type of treatment.

Subject LR3 exhibited no current eating disorder symptoms, but did report past symptoms, and was thus classified as eating disorder NOS. LR3 reported a fairly low body weight (5'4", 108 lb), and provided a rating of "10" (the maximum score possible) on her (appraisal of her) fear of becoming fat. She stated that she engaged in aerobics 2 hours a day, 6 days a week, and that she fasted at least 12 hours every day. Subject LR3 noted that during her past episode she did not eat even one whole meal per day. LR3 reported that her symptoms started approximately 2 years ago. She reportedly never sought any type of treatment.

Subject HR1 reported current and past bulimic symptoms. She reported currently having over 12 binges per month, with her last binge occurring 3 months before the DSM interview. HR1 rated her lack of control over binge eating as a "7" (1 = "total control", and 10 = "total lack of control"). HR1 reported that she currently vomited seven to eight times a day; this started approximately 4 years ago, and continues at present.
said she used one to six diet pills a day, every day for 3 months; however, her last episode of use was reportedly 3-4 months ago. Subject HR1 reported that her past, lowest weight was 88 lb (at 5'5"). She rated her past fear of becoming fat as a "8 or 9" (on a 10-point scale). HR1 said her binge eating was at its worst approximately 1 year ago; she reported binge eating 12 times a day, at least every other day. She rated her lack of control over binge eating as a "10." LR1 reported seeing a psychologist about her eating disorder (in the past) once a week for 2-3 months, and said she saw a nutritionist once. She mentioned that her symptoms started approximately 4 years ago at the age of 14.

Subject HR2’s current eating disorder symptoms were classified as bulimia nervosa. HR2 reported that she engages in binge eating at least 12 times per month; this started approximately 1 year ago. She provided "current" and "past" ratings of "10" with regard to her perception of (lack of) control over binge eating. She avowed (subclinical) laxative use in the past (i.e., she reported using a dozen laxative pills at a time, during three episodes of use). HR2 reported that her worst binge eating episode (within the last 6 months) occurred seven times a week. Currently, she fasts for 12 hours or more, five times a month. HR2 stated that within the last 6 months she has vomited an average of over 15 times per month; her worst period was seven times in one week. At the time of her interview, HR2 reported that she was not vomiting. Also, HR2 reported that her symptoms started approximately 1 year ago, and that they became more severe during the last 6 months. She reportedly sought no type of treatment.

Subject HR3 reported consistent past and current symptoms classifiable as eating disorder NOS. She has reported a "current" and "past" low weight, which would be
considered moderately low (5'8", 125 current; 5'5", 110 lb, past). Also, HR3 avowed a strong fear of becoming fat (a rating of "8"). She reported that she lost the most weight approximately 6 years ago when her symptoms began. HR3 reportedly sought no type of treatment.

Subject HR4 also displayed current symptoms of eating disorder NOS. She reported engaging in aerobic exercise for 2-3 hours a day, 5 days per week (both currently and in the past). HR4 reported trying diet pills, once in the past, one a day, for 1 week. Currently, HR4 reported binge eating three times per week. She stated that she currently vomits three times per week, and that her worst month during the last 6 months involved vomiting one to two times per day. HR4 reported that her symptoms started approximately 1 year ago, and became clinically diagnosable within the last 6 months. She disavowed seeking treatment.

Subject HR5 reported no current, clinically significant symptoms. However, she reported past symptoms that could be classified as eating disorder NOS. HR5 reported a past low weight (5'3", 100 lb), a strong fear of becoming fat (which was rated as a "9"), and binged four times per week at the age of 14. Currently, HR5 reported binge eating twice a week. HR5 reports that her symptoms started approximately 5 years ago. No type of treatment was reportedly sought.

Subject HR6 reported no current eating disorder symptoms. However, she reported several past symptoms between 6-12 months ago, which would be classified as eating disorder NOS. HR6 reported a low weight (5'4", 90 lb). She avowed a strong fear of becoming fat, which she rated as an "8." Also, she said she was using laxatives or diuretics or diet pills, (once a day) every day, and avowed fasting for 24 hours, once
per week. Finally, HR6 was exercising 2 hours a day, 6 days a week (aerobically). HR6 reported that her symptoms started approximately 1 year ago. No treatment was reported.

Subject HR7 also reported past symptoms that would be classified eating disorder NOS. Her only current symptom was a modest low weight (5'5 1/2", 108 lb) and subclinical binge eating, occurring once a month. In the past, HR7 reported a low weight (5'4", 90 lb), and she admitted missing three consecutive menstrual cycles, binge eating two to three times per week (last year), and using laxatives, diuretics or diet pills two to three times per week (while she attended middle school). Also, she avowed 24 hour fasts, two to three times per week while attending both middle school and high school. HR7 did not meet the criteria for bulimia nervosa, since she avowed near normal perceptions of control over binge eating episodes (a rating of only "6"). HR7 said her symptoms began approximately 5 years ago. No type of treatment was reportedly sought.

Means, Standard Deviations, and Effect Sizes for
Risk Factors: Time #1 and Time #2

The means and standard deviations of the high- and low-risk groups on all risk factor measures at Time #1 are presented in Table 6 (Time #1). The table includes other inventory subscales of which the risk factor measures were sometimes a part (e.g., EDI, SIQYA); however, the four risk measures identified for use (a priori) are identified by a superscript in the tables. Table 6 also includes group means and standard deviations of a "clinical group." This clinical group is composed of the five subjects who, after the 5-year study period, exhibited a clinically diagnoseable eating disorder (within the last 6
Table 6

Time #1: Means (Standard Deviations), and Effect Sizes of High-, Low-Risk Groups and Clinical Group

<table>
<thead>
<tr>
<th>Time #1 Risk Factors</th>
<th>High Risk (n = 31) Mean (SD)</th>
<th>Low Risk (n = 26) Mean (SD)</th>
<th>Clinical (n = 5) Mean (SD)</th>
<th>ES High vs Low</th>
<th>ES Cln vs High</th>
<th>ES Cln vs Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEPRE</td>
<td>13.94 (.96)</td>
<td>14.08 (1.09)</td>
<td>13.00 (.71)</td>
<td>-0.13</td>
<td>-0.98</td>
<td>-0.99</td>
</tr>
<tr>
<td>BDI: BECKTOT</td>
<td>14.39 (5.95)</td>
<td>7.50 (8.22)</td>
<td>11.80 (8.58)</td>
<td>+0.84</td>
<td>-0.44</td>
<td>+0.52</td>
</tr>
<tr>
<td>SIQYA: SIETONE</td>
<td>3.98 (.78)</td>
<td>4.92 (.71)</td>
<td>4.62 (.92)</td>
<td>-1.33</td>
<td>+0.82</td>
<td>-0.33</td>
</tr>
<tr>
<td>SIQYA: SIBIMAGE</td>
<td>3.30 (.47)</td>
<td>4.56 (.60)</td>
<td>3.87 (.82)</td>
<td>-2.10</td>
<td>+1.21</td>
<td>-1.15</td>
</tr>
<tr>
<td>EDI: EDITHIN</td>
<td>7.16 (6.00)</td>
<td>3.73 (4.18)</td>
<td>3.80 (2.39)</td>
<td>+0.82</td>
<td>-0.56</td>
<td>+0.03</td>
</tr>
<tr>
<td>EDI: EDIEFFEC</td>
<td>5.77 (3.98)</td>
<td>2.54 (4.55)</td>
<td>5.20 (3.27)</td>
<td>+0.71</td>
<td>-0.14</td>
<td>+0.58</td>
</tr>
<tr>
<td>BCDS: APPEAR</td>
<td>25.39 (5.06)</td>
<td>18.00 (5.87)</td>
<td>21.20 (9.12)</td>
<td>+1.26</td>
<td>-0.83</td>
<td>+0.55</td>
</tr>
<tr>
<td>BCDS: AUTOBEH</td>
<td>39.19 (9.33)</td>
<td>29.46 (9.61)</td>
<td>33.20 (10.38)</td>
<td>+1.01</td>
<td>-0.64</td>
<td>+0.39</td>
</tr>
<tr>
<td>DSM: FEAR1</td>
<td>.13 (.56)</td>
<td>.04 (.20)</td>
<td>.80 (1.30)</td>
<td>+0.46</td>
<td>+1.20</td>
<td>+3.80</td>
</tr>
<tr>
<td>DSM: FLFT1</td>
<td>.32 (.75)</td>
<td>.23 (.65)</td>
<td>.80 (1.10)</td>
<td>+0.14</td>
<td>+0.64</td>
<td>+0.87</td>
</tr>
<tr>
<td>DSM: AWTLS1</td>
<td>.45 (.85)</td>
<td>.42 (1.14)</td>
<td>1.60 (1.82)</td>
<td>+0.03</td>
<td>+1.35</td>
<td>+1.04</td>
</tr>
<tr>
<td>DSM: MENS1</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DSM: BNG1</td>
<td>.48 (1.23)</td>
<td>.04 (.20)</td>
<td>2.60 (1.95)</td>
<td>+2.20</td>
<td>+1.72</td>
<td>+12.8</td>
</tr>
<tr>
<td>DSM: CTRL1</td>
<td>.52 (1.00)</td>
<td>.00 (.00)</td>
<td>1.40 (1.67)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DSM: VOMT1</td>
<td>.42 (1.20)</td>
<td>.00 (.00)</td>
<td>2.40 (2.19)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

(table continues)
<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>High Risk (n = 31) Mean (SD)</th>
<th>Low Risk (n = 26) Mean (SD)</th>
<th>Clinical (n = 5) Mean (SD)</th>
<th>ES High vs Low</th>
<th>ES Clin vs High</th>
<th>ES Clin vs Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSM: LAXD1</td>
<td>.23 (.88)</td>
<td>.00 (.00)</td>
<td>.80 (1.79)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DSM: DIET1</td>
<td>.16 (.45)</td>
<td>.35 (1.02)</td>
<td>1.20 (1.79)</td>
<td>-0.19</td>
<td>+2.31</td>
<td>+0.83</td>
</tr>
<tr>
<td>DSM: EXER1</td>
<td>.23 (.88)</td>
<td>.00 (.00)</td>
<td>.60 (1.34)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DSM: TOT1</td>
<td>2.94 (4.17)</td>
<td>1.08 (2.68)</td>
<td>12.20 (2.68)</td>
<td>+0.69</td>
<td>+2.22</td>
<td>+4.15</td>
</tr>
</tbody>
</table>

*a* = Risk factor names (at Time #1): AGEPRE = Age (at Time #1), BECKTOT = BDI Total Score, SIETONE = SIQYA Emotional Tone Subscale, SIBIMAGE = SIQYA Body Image Subscale, EDITIN = EDI Drive for Thinness Subscale, EDIEFFEC = EDI Ineffectiveness Subscale, APPEAR = BCDS Physical Appearance Subscale, AUTOBEH = BCDS Automatic Behavior Subscale, FEAR1 = DSM Intense Fear of Becoming Fat (criterion A), FLFT1 = DSM Feeling Fat when Emaciated (criterion B), AWTLS1 = DSM Anorexic Weight Loss (criterion C), MENS1 = DSM Loss of Menstrual Cycles (criterion D), BNG1 = DSM binge Eating (criterion E), CTRL1 = DSM Lack of Control for Binge Eating (criterion F), VOMT1 = DSM Self-Induced Vomiting (criterion G), LAXD1 = DSM Use of Laxatives/Diuretics/Diet Pills (criterion G), DIET1 = DSM Rigorous Dieting or Fasting (criterion G), EXER1 = DSM Vigorous Exercising (criterion G), TOT1 = DSM Total Score

*b* designates risk factor measure (selected at Time #1)
months of the study period). It should be noted that the clinical group included four subjects from the high-risk group, and one from the low-risk group (as previously presented in Table 2). Table 6 also reports effect sizes involving the high- versus low-risk group means (i.e., the mean of the high-risk group minus the mean of the low-risk group, divided by the low-risk group standard deviation). Also, Table 6 presents effect sizes involving the clinical group versus high-risk group (i.e., the mean of the clinical group minus the mean of the high-risk group, divided by the high-risk group standard deviation), as well as effect sizes for clinical group versus low-risk group.

A major highlight of Table 6 is the large effect size (-0.99) for age (at the time of initial screening) for subjects who subsequently were considered to have an eating disorder at Time #2 (the clinical group) relative to the low-risk group. Specifically, the clinical group is approximately 1 year younger than both the low- and high-risk groups. The Table 6 effect sizes also show that the clinical group’s means at Time #1 on all risk factors are substantially different from that of the low-risk group. It should be noted that low scores on the SIQYA (SIBIMAGE) reflect poor body image.

Table 6 also shows a large effect size (less than -0.50, greater than +0.50) for the clinical group relative to the low-risk group, on all four risk measures (BECKTOT, SIBIMAGE, EDIEFFEC, APPEAR). However, the mean scores on the four risk factors are not typically more severe at Time #1 than the mean scores of the high-risk group. This likely reflects the fact that all but one clinical subject proved to be members of the high-risk group.

Table 7 presents Time #2 risk factor subscales scores and affiliated inventory measures completed by all subjects 5 years after initial screening. It should be noted that
Table 7

Time #2: Means (Standard Deviations) and Effect Sizes of High-, Low-Risk Groups and Clinical Group

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>High Risk (n = 31) Mean (SD)</th>
<th>Low Risk (n = 26) Mean (SD)</th>
<th>Clinical (n = 5) Mean (SD)</th>
<th>ES High vs Low</th>
<th>ES Cln vs High</th>
<th>ES Cln vs Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAGE</td>
<td>18.55 (.99)</td>
<td>18.81 (1.10)</td>
<td>17.80 (.84)</td>
<td>-0.24</td>
<td>-0.76</td>
<td>-0.92</td>
</tr>
<tr>
<td>REPT2HT</td>
<td>65.74 (2.68)</td>
<td>66.19 (2.70)</td>
<td>66.80 (1.64)</td>
<td>-0.17</td>
<td>+0.40</td>
<td>+0.23</td>
</tr>
<tr>
<td>REPT2WT</td>
<td>140.65 (34.17)</td>
<td>133.73 (17.19)</td>
<td>130.60 (25.53)</td>
<td>+0.40</td>
<td>-0.29</td>
<td>-0.18</td>
</tr>
<tr>
<td>BDI: PBECKTOT*</td>
<td>13.90 (8.15)</td>
<td>7.96 (5.39)</td>
<td>19.00 (11.11)</td>
<td>+1.10</td>
<td>+0.63</td>
<td>+2.05</td>
</tr>
<tr>
<td>SIQYA: PSIETONE</td>
<td>3.97 (.96)</td>
<td>4.91 (.67)</td>
<td>3.44 (1.12)</td>
<td>-1.40</td>
<td>-0.55</td>
<td>-2.19</td>
</tr>
<tr>
<td>SIQYA: PSIBIMAG*</td>
<td>3.50 (.86)</td>
<td>4.18 (.71)</td>
<td>2.95 (1.19)</td>
<td>-0.94</td>
<td>-0.64</td>
<td>-1.73</td>
</tr>
<tr>
<td>BCDS: PAPPEAR*</td>
<td>23.19 (6.10)</td>
<td>17.31 (6.68)</td>
<td>26.20 (3.90)</td>
<td>+0.88</td>
<td>+0.49</td>
<td>+2.28</td>
</tr>
<tr>
<td>BCDS: PAUTOBEH</td>
<td>36.74 (10.49)</td>
<td>27.27 (10.05)</td>
<td>46.20 (11.69)</td>
<td>+0.94</td>
<td>+0.90</td>
<td>+1.88</td>
</tr>
<tr>
<td>EDI: PEDITHN</td>
<td>5.97 (5.41)</td>
<td>2.54 (3.69)</td>
<td>10.40 (7.67)</td>
<td>+0.93</td>
<td>+0.82</td>
<td>+2.13</td>
</tr>
<tr>
<td>EDI: PEDIBUL</td>
<td>1.84 (3.18)</td>
<td>.58 (1.21)</td>
<td>4.60 (6.23)</td>
<td>+1.05</td>
<td>+0.87</td>
<td>+3.32</td>
</tr>
<tr>
<td>EDI: PEDIBDY</td>
<td>11.97 (5.23)</td>
<td>7.08 (5.82)</td>
<td>14.60 (5.94)</td>
<td>+0.84</td>
<td>+0.50</td>
<td>+1.29</td>
</tr>
<tr>
<td>EDI: PDEIEFF</td>
<td>4.45 (5.42)</td>
<td>1.00 (1.81)</td>
<td>6.80 (8.70)</td>
<td>+1.91</td>
<td>+0.43</td>
<td>+3.20</td>
</tr>
<tr>
<td>EDI: PEDIPERF</td>
<td>5.81 (4.60)</td>
<td>5.46 (2.94)</td>
<td>8.60 (3.36)</td>
<td>+0.12</td>
<td>+0.61</td>
<td>+1.07</td>
</tr>
<tr>
<td>EDI: PEDITRST</td>
<td>6.06 (5.53)</td>
<td>1.92 (3.05)</td>
<td>4.80 (4.21)</td>
<td>+1.36</td>
<td>-0.23</td>
<td>+.94</td>
</tr>
<tr>
<td>EDI: PEDIAWAR</td>
<td>5.81 (3.90)</td>
<td>3.35 (2.17)</td>
<td>7.20 (4.32)</td>
<td>+1.13</td>
<td>+0.36</td>
<td>+1.77</td>
</tr>
<tr>
<td>EDI: PEDIMAT</td>
<td>4.23 (5.02)</td>
<td>2.08 (1.98)</td>
<td>8.20 (8.07)</td>
<td>+1.09</td>
<td>+1.91</td>
<td>+3.09</td>
</tr>
</tbody>
</table>

*(table continues)*
<table>
<thead>
<tr>
<th>Time #2: Risk Factors</th>
<th>High Risk (n = 31)</th>
<th>Low Risk (n = 26)</th>
<th>Clinical (n = 5)</th>
<th>ES High vs Low</th>
<th>ES Cln vs High</th>
<th>ES Cln vs Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDI: PEDITOT</td>
<td>46.13 (26.03)</td>
<td>24.00 (14.43)</td>
<td>65.2 (39.33)</td>
<td>+1.53</td>
<td>+0.73</td>
<td>+2.86</td>
</tr>
<tr>
<td>DSM: FEAR2</td>
<td>.48 (1.21)</td>
<td>.42 (1.21)</td>
<td>2.00 (1.87)</td>
<td>+0.05</td>
<td>-0.40</td>
<td>+1.31</td>
</tr>
<tr>
<td>DSM: FLFT2</td>
<td>.65 (.95)</td>
<td>.38 (.80)</td>
<td>1.20 (1.10)</td>
<td>+0.34</td>
<td>+0.58</td>
<td>+1.03</td>
</tr>
<tr>
<td>DSM: AWTL Sys</td>
<td>1.06 (1.57)</td>
<td>.65 (1.26)</td>
<td>2.20 (1.79)</td>
<td>+0.33</td>
<td>+0.73</td>
<td>+1.23</td>
</tr>
<tr>
<td>DSM: MENS2</td>
<td>.16 (.64)</td>
<td>.08 (.39)</td>
<td>.00 (.00)</td>
<td>+0.21</td>
<td>-0.25</td>
<td>-0.21</td>
</tr>
<tr>
<td>DSM: BNG2</td>
<td>.35 (1.11)</td>
<td>.04 (.20)</td>
<td>1.00 (1.73)</td>
<td>+1.55</td>
<td>+0.59</td>
<td>+4.80</td>
</tr>
<tr>
<td>DSM: CTRL2</td>
<td>.32 (.91)</td>
<td>.00 (.00)</td>
<td>.80 (1.79)</td>
<td>---</td>
<td>+0.53</td>
<td>---</td>
</tr>
<tr>
<td>DSM: VOMT2</td>
<td>.13 (.72)</td>
<td>.27 (.87)</td>
<td>1.00 (1.73)</td>
<td>-0.16</td>
<td>+1.21</td>
<td>+0.84</td>
</tr>
<tr>
<td>DSM: LAXD2</td>
<td>.65 (1.38)</td>
<td>.31 (1.09)</td>
<td>1.80 (1.79)</td>
<td>+0.31</td>
<td>+0.83</td>
<td>+1.37</td>
</tr>
<tr>
<td>DSM: DIET2</td>
<td>.29 (.82)</td>
<td>.38 (1.13)</td>
<td>.80 (1.79)</td>
<td>-0.08</td>
<td>+0.62</td>
<td>+.37</td>
</tr>
<tr>
<td>DSM: EXER2</td>
<td>.48 (1.29)</td>
<td>.15 (.78)</td>
<td>.60 (1.34)</td>
<td>+0.42</td>
<td>+0.09</td>
<td>+.58</td>
</tr>
<tr>
<td>DSM: TOT2</td>
<td>4.58 (6.47)</td>
<td>2.69 (5.45)</td>
<td>11.40 (9.24)</td>
<td>+0.35</td>
<td>+1.05</td>
<td>+1.60</td>
</tr>
</tbody>
</table>

* = Risk factor names (at Time #2) PAGE = Age (at Time #2), REPRT2HT = reported height, REPRT2WT = reported lowest weight (in last 6 months), PBRECKTOT = BDI Total Score, PSIETONE = SIQYA Emotional Tone Subscale, PSIBIMAG = SIQYA Body Image Subscale, PAPPEAR = BCDS Physical Appearance Subscale, PAUTOBEH = BCDS Automatic Behavior Subscale, PEDITHIN = EDI Drive for Thinness Subscale, PEDIBUL = EDI Bulimia Subscale, PEDIBDY = EDI Body Dissatisfaction, PEDIEFF = EDI Ineffectiveness Subscale, PEDIPERF = EDI Perfectionism Subscale, PEDITRST = EDI Interpersonal Distress Subscale, PEDIAWAR = EDI Interceptive Awareness Subscale, PEDIMAT = EDI Maturity Fears Subscale, PEDITOT = EDI Total Score, FEAR2 = DSM Intense Fear of Becoming Fat (criterion A), FLFT2 = DSM Feeling Fat when Emaciated (criterion B), AWTL Sys = DSM Anorexic Weight Loss (criterion C), MENS2 = DSM Loss of Menstrual Cycles (criterion D), BNG2 = DSM Binge Eating (criterion E), CTRL2 = DSM Lack of Control for Binge Eating (criterion F), VOMT2 = DSM Self-Induced Vomiting (criterion G), LAXD2 = DSM Use of Laxatives/Diuretics/Diet Pills (criterion H), DJET2 = DSM Rigorous Dieting or Fasting (criterion G), EXER2 = DSM Vigorous Exercising (criterion G), TOT2 = DSM Total Score

b designates risk factor measure (selected at Time #2)
all subjects agreed to complete the entire EDI inventory at Time #2 (i.e., half of all subjects completed the abbreviated packet format, that is, only certain subscales at Time #1). Thus, Table 7 includes many more inventory subscales. However, the four risk factor measures are identified by superscript. Further, Table 7 includes all the DSM interview subscales ratings completed at Time #2.

Table 7 shows that the clinical group generally shows very large effect sizes. For instance, when investigating the effect sizes between the high- and low-risk group regarding the four risk factors, the minimum effect size is ±0.88. The clinical group also exhibits more current, severe general symptomatology (in addition to only eating disorder symptoms) than either the high- or low-risk groups. When looking at four risk factor measures, the minimum effect size is ±1.73 when comparing the clinical group to the low-risk group, and ±0.43 when comparing the clinical group to the high-risk group.

Early (Time #1) Risk Factor Predictors

This section will outline the extent to which early (Time #1) risk factor scores correlate with the Global Severity Index, and anorexic and bulimic clusters of the DSM clinical interview completed at Time #2. First, the zero-order correlations between the DSM interview and risk factor measures will be discussed, followed by multiple correlations.

Correlation Between the DSM Time #2 Interview and Time #1 Risk Factor Measures

The zero-order correlations between the DSM interview indices at Time #2, and the risk factor measure scores and age at Time #1 are presented in Table 8. The DSM
Table 8

Correlations Between DSM Interview and Time #1 Risk Factor Measures Including Age

\((n = 57)\)

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>DSM Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>BECKTOT</td>
<td>.01</td>
</tr>
<tr>
<td>EDIEFFECT</td>
<td>.11</td>
</tr>
<tr>
<td>SIBIMAGE</td>
<td>-.02</td>
</tr>
<tr>
<td>APPEAR</td>
<td>-.07</td>
</tr>
<tr>
<td>AGEPRE</td>
<td>-.30*</td>
</tr>
</tbody>
</table>

* indicates significance at .05 level

Risk Factors: BECKTOT = BDI total score, EDIEFFEC = EDI Ineffectiveness Subscale, SIBIMAGE = SIQYA Body Image Subscale, APPEAR = BCDS Physical Appearance Subscale, AGEPRE = Age at Pretest

The DSM interview can be construed as involving five eating disorder symptom clusters (see Table 8): (a) a total severity score, which is the sum of all weighted (DSM-III-R criteria) scores derived from the DSM interview (TOTAL); (b) an anorexic severity score (ANOREX), which includes responses to DSM interview questions reflecting low weight, fear of getting fat, body image disturbance, and absent menstrual cycles; (c) a binge eating score (BINGE), which includes binge eating episodes and feelings of lack of control; (d) a score reflecting extreme weight loss strategies (EXTREME), consisting of scores for frequency of self-induced vomiting, laxative/diuretic use, fasting, and exercise; and (e) a bulimia score (BULIMIA), which combines the BINGE and EXTREME scores mentioned above.
The only correlation significantly different from zero is the inverse relationship between the total global severity weighted score (TOTAL) and age at Time #1 (AGEPRE), \( r = -0.30 \) (p = .02). This indicates that the younger girls at Time #1, tended to generally acknowledge more eating disorder symptoms during the DSM interview 5 years later at Time #2.

**Multiple Correlation: Optimal Predictors of DSM Symptoms at Time #1**

The present section summarizes the multiple correlations between the Time #2 DSM interview and the Time #1 risk factor measures.

Time #1 age alone appears to be the strongest correlate of current (Time #2) total DSM eating disorder symptoms (\( r = -0.30 \)). Since age might interact with the risk indices, the effects associated with the appropriate cross-products were examined in the multiple regression analyses. Five separate multiple regression equations were tested involving the five dependent (DSM) variables. No statistically significant interaction was found between age and any of the risk factors.

Since pretest age was the strongest univariate correlate of current eating disorder symptoms (DSM interview), pretest age was included with the four risk factor measures in a series of multiple regression analyses. Five separate series of multiple regression equations were tested. Each series included a different DSM interview cluster (TOTAL, ANOREX, BINGE, EXTREME, BULIMIA). The independent variables in each series were Time #1 age and the four risk factor measures. Multiple regression analyses also investigated possible joint effects between Time #1 age and each risk factor.

A significant multiple correlation was found only between the total DSM global
severity score (TOTAL), the EDI Ineffectiveness Subscale (EDIEFFEC), and age at Time #1 (AGEPRE), \( r = -0.33 \) \( (p = .05) \). A small amount of the variance was thus accounted for by including EDI Ineffectiveness to the correlation between age and TOTAL.

Time #1 Versus Time #2 Risk Factor Scores
for High- and Low-Risk Groups

The degree to which changes in risk factor indices over time relate to clinical symptoms at Time #2 will be discussed. Transformation of risk factor measures to average \( z \)-scores allows for comparison of the four risk factor measures on a standardized unit of measure. Those values for high- and low-risk groups at both Time #1 and Time #2 are presented. Also, analyses will be presented that examined whether changes in risk factor scores (from Time #1 to Time #2) correlated with the DSM interview symptom clusters.

\textbf{z-Score Subtest Means}

Figure 2 displays the \( z \)-score subtest means for each of the risk factor measures, for both the high and low risk groups. To eliminate negative \( z \)-score numbers (because of reverse scoring of one measure), a value of 1.0 was added to each \( z \)-score mean. Figure 2 shows that the means of the low and high risk group are dramatically different at both Time #1 and 5 years later at Time #2, with the high-risk group exhibiting more severe and quite stable symptomatology relative to the low-risk group (i.e., statistically significant effect sizes were previously presented in Table 6 and Table 7).
Mean Group Risk Factor z-Scores Over 5 Years
High- Versus Low-Risk Groups

H = High-Risk Group
L = Low-Risk Group

Figure 2. Mean group risk factor z-scores over 5 years: High- versus low-risk groups.
Changes in Risk Factor Measures

Separate regression models tested the proportion of variance accounted for in the five DSM interview symptom clusters assessed at Time #2. In testing each model, all (Time #1) risk factor measures were entered as an initial block. Next, each of the Time #2 risk factor measures, as well as subjects’ age, were tested individually. Finally, age-by-risk factor joint effects were tested.

Table 9 shows the proportion of variance accounted for by each Time #2 risk factor measure, after controlling for all Time #1 risk factor measures (i.e., $r$-squared change). In addition, the overall $R$ value is reported. The overall pattern of the $R$-square change values suggest that change over time in each of the risk factor measures is significantly related to the bulimia and binge-related symptoms, as well as overall (total) symptoms. However, changes in individual risk measures are not similarly related to the anorexia symptom clusters, and only the BCDS and SIQA subtests were significantly related to maladaptive weight loss strategies of subjects. It should be noted that the author found no interaction between age and any Time #2 measures. Also, no linear combination of Time #2 risk measures accounted for more variance in the DSM criterion measures than any single risk measure by itself.
Table 9

Proportion of Variance Accounted for in DSM Interview Cluster Scores by Individual, Time #2 Risk Factors*

<table>
<thead>
<tr>
<th>DSM Interview Clusters</th>
<th>Time #2 Risk Factors: R-Squared Change, p; Overall Multiple R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EDI Ineffectiveness R-Sq Chg, p; R</td>
</tr>
<tr>
<td>1. Anorexia</td>
<td>.00, p=.58; .20</td>
</tr>
<tr>
<td>2. Extreme Behavior</td>
<td>.05, p=.11; .28</td>
</tr>
<tr>
<td>3. Binge Eating</td>
<td>.25, p=.00; .52</td>
</tr>
<tr>
<td>4. Bulimia</td>
<td>.14, p=.01; .39</td>
</tr>
<tr>
<td>5. Total</td>
<td>.08, p=.04; .31</td>
</tr>
</tbody>
</table>

*Controlling for all Time #1 Risk Factor Scores
CHAPTER V
DISCUSSION

In the discussion that follows, the results associated with each of the five research questions will be interpreted and summarized. Also, the limitations of this study and its implications will be discussed. Finally, recommendations for future research will be offered.

Research Questions

Question #1 pertained to the overall prevalence and incidence rates of bulimia nervosa, and eating disorders in general. The overall (combined high and low risk groups) prevalence was 3.5% for bulimia nervosa, 1.8% for anorexia nervosa, and 12.3% for eating disorder NOS (see Table 3). The overall 6-month incidence rate was 1.8% for bulimia nervosa, 0.0% for anorexia nervosa, and 1.8% for eating disorder NOS (see Table 4). The overall 2-year incidence rate was 1.8% for bulimia nervosa, 0.0% for anorexia nervosa, and 5.3% for eating disorder NOS (see Table 5). It is important to emphasize that these prevalence and incidence rates are quite similar to those found in other studies of general samples of adolescents (for review, see Stein, 1991a).

While the original sample from which the high- and low-risk subjects were drawn was small (n = 141), the high-risk group appeared to contain many if not most of the subjects who, at some point, developed bulimia or some other eating disorder. For example, if 2-3% of a representative sample of adolescents is expected to show emergent eating disorders during a 2-year period, then of 141 subjects, 3-4 subjects would ideally have been present in both the representative sample and the select group of high-risk
subjects. Indeed 9.7%, or 3 of 31 high-risk subjects were identified with an emerging eating disorder (2-year incidence rate). This rate compared to only 1 of 26 subjects in the low-risk group.

Question #2 also pertained to prevalence and incidence rates. However, of special interest were comparisons between the high- and low-risk group. In the high-risk group, the current prevalence was 6.5% for bulimia nervosa, 0.0% for anorexia nervosa, and 16.1% for eating disorder NOS (see Table 3). In the low-risk group, the prevalence was 0.0% for bulimia nervosa, 3.8% for anorexia nervosa, and 7.7% for eating disorder NOS. Thus, members of the high-risk group were twice as likely to be diagnosed with a DSM eating disorder as those in the low-risk group.

Another major goal of the present study was to examine whether four commonly cited risk factors increase the likelihood of developing an eating disorder among adolescents (particularly bulimia nervosa). By using the four risk factor cut-off scores (outlined previously), the two subjects who recently developed (i.e., within the last 6 months) eating disorders proved to be members in the high-risk group. That is, the 6-month incidence rate for any eating disorder was 0.0% for the low-risk group, but 6.5% for the high-risk group.

The cut-off risk factor scores correctly classified the two current emergent bulimic cases (HR1, HR2) in the high-risk group. Also, clearly more severe symptoms were found among cases in the high-risk group than the low-risk group.

Question #3 concerned whether there was a risk factor measure that best differentiated clinical and nonclinical samples. Large effect sizes involving the clinical group (those exhibiting a current eating disorder at Time #2) and both the high- and low-
risk groups were found across all risk factor measures at Time #2 (see Table 7). Another significant finding was that that clinical group was found to be 1 year younger at Time #1 than both the high-risk and low-risk groups.

Question #4 pertained to whether there was a linear combination of early risk predictors (identified 5 years ago) that would optimally predict current, overall severity of eating disorder symptomatology. Both zero-order correlations and multiple correlations between the Time #2 DSM interview and Time #1 risk factors measures and age were investigated. Results indicated that Time #1 age alone was the only correlate of current total eating disorder symptoms ($r = -0.30$).

One possible explanation for younger girls tending to report more eating disorder symptoms at Time #2 is that they were faced with a greater number of developmental risk and/or stress periods than older girls (i.e., ending high school at Time #2). However, Rosen and colleagues (1990) and Rosen, Compas, and Tacy (1993) found that eating disorder symptoms predicted stress, but stress per se did not predict eating disorder symptoms. On the other hand, both of these latter studies involved a more limited, 4-month follow-up period only. It may be that a particular subgroup of subjects react to stress by displaying eating disorder symptoms. Another possible explanation for younger girls tending to report more eating disorder symptoms over time is that younger age-of-onset may suggest more serious eating disorder problems later on (without treatment).

Question #5 concerned whether changes in risk factors measures (pre- to post-) predicted global severity of eating disorder symptoms. The results indicated that changes in each of the four risk factor measures are meaningfully related to binge, bulimic, and overall (total) eating disorder symptoms. However, changes in risk factors scores did not
significantly relate to anorexic symptoms. Further, only changes in the SIQYA and
BCDS subtest scores were related to maladaptive weight loss strategies. Also, young
women deemed to be at high risk for developing an eating disorder showed significantly
higher and remarkably stable risk factor scores both at Time #1 and Time #2, compared
to the low-risk group.

The combination of results that addressed question #4 and #5 suggests some clear
conclusions about the nature of being at-risk for an eating disorder. First, the
combination of initial high scores on risk factors does suggest the likelihood of higher
incidence and prevalence (general "caseness"). However, the correlates between initial
risk and future global severity of symptoms are quite low, probably because the predictive
power of the risk factors is modest and the base rate of moderate-to-severe symptoms is
low in most populations, and also, the frequency of above-average risk factor scores was
high. Indeed, if the prevalence and incidence of eating disorders in the high-risk group
had proven to be higher than was found here (30% or more), a large correlation between
initial risk factor measures and global symptoms among all subjects would have been
found.

Present Study Relative to Other Studies

As has been noted, the incidence and prevalence estimates found in the present
study were similar to estimates found in other studies that examined representative
samples of adolescent girls. Also, the present study offers support for the findings of
other longitudinal studies, which assert that eating disorder symptoms correlate with poor
body image, feelings of ineffectiveness, depressed or dysphoric affect, increased weight
dissatisfaction, and/or decreased ratings of attractiveness (Attie & Brooks-Gunn, 1989; Graber et al., 1994; Leung & Steiger, 1991; Striegel-Moore et al., 1989). One recent longitudinal study (Leon et al., 1995) found that depression was not a good predictor of eating disorder symptoms. The present study found that while initial risk factor scores, such as depression, do not appear to correlate with eating disorder symptoms 5 years later, the changes in each of the four risk factors scores did predict later bulimic and total eating disorder symptom severity, in a combined group of high- and low-risk adolescents.

Many individuals in this study reported that their eating disorder symptoms often waxed and waned over time. Also, subjects evidenced various, extreme strategies to control calories or weight over time (e.g., one subject initially used rigorous dieting, but later emphasized laxative use). Such fluctuations in symptoms have been found in other studies (Patton et al., 1990; Striegel-Moore et al., 1989). Such a result suggests a strong need to follow subjects for additional years to investigate whether particular subgroups are more affected by stress and life transitions.

Limitations

One central limitation of this study is the small sample size, and thus, the questionable reliability of incidence and prevalence estimates. Since the sample size was small, the "clinical group" (i.e., diagnosed with an eating disorder within the last 6 months) was composed of both emergent cases (i.e., eating disorder symptoms reportedly started after Time #1; \( n = 4 \)) and one past chronic ongoing case (i.e., eating disordered symptoms reportedly started before Time #1). By merging these two groups (rather than looking at just emergent cases), results are slightly confounded. However, since there
was only one current, chronic case, data analysis comparing emergent versus chronic cases was not conducted.

Another concern involves subject selection and mortality. First, only 62% of subjects responded from the Logan school district at Time #1. However, sample means and score variability at Time #1 was highly similar to those of other published normative samples (Stein, 1990). Secondly, at Time #2 some individuals could not be located or did not wish to participate. It is speculated that due to the embarrassing and secretive nature of persons with eating disorders, some emergent cases may have declined to participate at Time #2 (and were lost to the investigator). Due to the secretive nature of individuals with eating disorder symptoms, some individuals may not have wanted to participate due to the DSM interview. A couple of subjects did make comments to the research assistants about being more honest while answering the questionnaires, rather than during the interview. Also, individuals who were unable to meet in person for the DSM interview did participate in the DSM interview via telephone. Although this was not studied, it would be interesting to investigate whether individuals who were interviewed by telephone were more honest about eating disorder symptomatology (since a telephone interview may be an intermediate step between using questionnaires and an in-person interview).

Implications and Future Directions

A large-scale study with many more subjects, and more follow-ups, would be a desirable goal of future research. Since waxing and waning of symptoms is common in individuals who display eating disorder symptomatology, frequent intermittent data gather (e.g., every 3-4 months), may be helpful in identifying if the purported risk factors
exacerbate before the eating disorder symptomatology gets worse or vice versa.

Also, 4 out of the 10 subjects identified as having a past or current eating disorder were already displaying eating disorder symptoms 5 years ago (based on retrospective recall). With this many subjects displaying eating disorder symptoms at a young age, it is very important that identification, prevention, and early intervention start in elementary school. Individuals diagnosed with eating disorders have a better prognosis if treatment is begun early in the disorder.

It was interesting to note that most individuals did not seek any type of treatment for their eating disorder symptoms, thus increasing the long-term health threat, although some subjects also exhibited recovery from eating disorder symptoms without any formal type of treatment or intervention. This study did not investigate the differences between the individuals who recovered (not currently displaying symptoms) and those who chronically display significant eating disorder symptomatology, nor between individuals identified at high risk, who do and do not develop eating disorder symptoms. Both of these groups are worthy of additional longitudinal investigation because little is known about factors that promote chronicity or spontaneous remission.
REFERENCES


Appendix A

Lifetime Prevalence Rate of Depression in Bulimics

<table>
<thead>
<tr>
<th>Author</th>
<th>Major Mood Disorder</th>
<th>Other Mood Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hudson et al., 1987</td>
<td></td>
<td></td>
</tr>
<tr>
<td>active bulimics</td>
<td>59%</td>
<td>12%</td>
</tr>
<tr>
<td>remitted bulimics</td>
<td>47%</td>
<td>21%</td>
</tr>
<tr>
<td>Hudson et al., 1983</td>
<td>63%</td>
<td>25%</td>
</tr>
<tr>
<td>Keck et al., 1990</td>
<td>72%</td>
<td>—</td>
</tr>
<tr>
<td>Kendler et al., 1991</td>
<td>51.2%</td>
<td>—</td>
</tr>
<tr>
<td>Laessle et al., 1987</td>
<td>46%</td>
<td>54%</td>
</tr>
</tbody>
</table>

Mean = 56.4%  Mean = 28.0%
## Appendix B

### Occurrence of Eating Disorder and Depression

<table>
<thead>
<tr>
<th>Author</th>
<th>Depression at least 1 year before onset of eating disorder</th>
<th>Depression within same year as eating disorder</th>
<th>Depression at least 1 year after onset of eating disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hudson et al., 1983</td>
<td>49.3%</td>
<td>30.4%</td>
<td>20.3%</td>
</tr>
<tr>
<td>(bulimics and anorexic combined)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keck et al., 1990</td>
<td>31.0%</td>
<td>27.0%</td>
<td>42.0%</td>
</tr>
<tr>
<td>Laessle et al., 1987</td>
<td>4.3%</td>
<td>26.1%</td>
<td>69.6%</td>
</tr>
<tr>
<td>(bulimics and anorexics combined)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lee et al., 1985</td>
<td>34.5%</td>
<td>55.2%</td>
<td>10.3%</td>
</tr>
</tbody>
</table>

Mean = 29.8%  Mean = 34.7%  Mean = 35.5%
### Appendix C

**Means and Standard Deviations for Bulimics Versus Controls, and Adolescent Samples on Indices of Risk Factors**

<table>
<thead>
<tr>
<th>Instrument/Author</th>
<th>Bulimic Sample</th>
<th>Bulimia Criteria</th>
<th>Bulimics</th>
<th>Controls</th>
<th>Stand Diff Mean</th>
<th>Conrrols</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Beck Depression Inventory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Katzman &amp; Wolchik (1984)</td>
<td>College Questionnaire</td>
<td>19.73 (12.02)</td>
<td>5.79 (5.69)</td>
<td>2.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordman &amp; Kirschenbaum (1986)</td>
<td>Outpatients Interview</td>
<td>13.32 (8.2)</td>
<td>2.00 (2.54)</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prather &amp; Williamson (1988)</td>
<td>Outpatients Interview</td>
<td>18.4 (--)-a</td>
<td>5.5 (--)-</td>
<td>(-)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rybicki et al. (1989)</td>
<td>Outpatients Interview</td>
<td>22.32</td>
<td>3.73 (3.96)</td>
<td>4.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schlesier-Carter et al. (1989)</td>
<td>Gen. Population Interview</td>
<td>(11.93)</td>
<td>2.31 (3.6)</td>
<td>4.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rossiter et al. (1989)</td>
<td>Outpatients Interview</td>
<td>19.35 (10.1)</td>
<td>4.90 (5.2)</td>
<td>2.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Williamson (1985)</td>
<td>Gen. Population Interview</td>
<td>18.40 (12.2)</td>
<td>4.93 (2.96)</td>
<td>3.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crowther &amp; Cherny (1986)</td>
<td>High School Questionnaire</td>
<td>16.80 (--)-</td>
<td>7.88 (8.37)</td>
<td>1.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross &amp; Rosen (1988)</td>
<td>High School Questionnaire</td>
<td>19.12 (995)</td>
<td>7.53 (8.00)</td>
<td>.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post &amp; Crowther (1985)</td>
<td>High School Questionnaire</td>
<td>13.37 (7.90)</td>
<td>4.52 (3.64)</td>
<td>2.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stein (1990)</td>
<td>Jr/Sr High School Questionnaire</td>
<td>15.25 (8.59)</td>
<td>7.9 (7.10)</td>
<td>(table continues)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument/Author</td>
<td>Bulimic Sample</td>
<td>Bulimia Criteria</td>
<td>Bulimics</td>
<td>Controls</td>
<td>Stand Mean Diff</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>----------------</td>
<td>------------------</td>
<td>----------</td>
<td>----------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Eating Disorder Inventory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. DT = Drive for Thinness Subscale</td>
<td>Gen. Population</td>
<td>Interview</td>
<td>DT: 15.6 (4.8)</td>
<td>2.3 (3.8)</td>
<td>3.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BD: 20.2 (6.7)</td>
<td>5.3 (4.1)</td>
<td>3.63</td>
<td></td>
</tr>
<tr>
<td>2. BD = Body Dissatisfaction Subscale</td>
<td></td>
<td></td>
<td>DT: 10.2 (4.6)</td>
<td>1.8 (2.8)</td>
<td>3.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BD: 11.8 (7.5)</td>
<td>6.1 (8.2)</td>
<td>.70</td>
<td></td>
</tr>
<tr>
<td>3. IE = Ineffectiveness Subscale</td>
<td></td>
<td></td>
<td>IE: 6.3 (5.6)</td>
<td>.8 (1.5)</td>
<td>3.67</td>
<td></td>
</tr>
<tr>
<td>Schlesier-Carter et al. (1989)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordman &amp; Kirschenbaum (1986)</td>
<td>Outpatients</td>
<td>Interview</td>
<td>DT: 10.2 (4.6)</td>
<td>1.8 (2.8)</td>
<td>3.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BD: 11.8 (7.5)</td>
<td>6.1 (8.2)</td>
<td>.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IE: 6.3 (5.6)</td>
<td>.8 (1.5)</td>
<td>3.67</td>
<td></td>
</tr>
<tr>
<td>Gross &amp; Rosen (1988)</td>
<td></td>
<td>Questionnaire</td>
<td>BD: 18.1 (6.0)</td>
<td>10.6 (7.6)</td>
<td>.99</td>
<td></td>
</tr>
<tr>
<td>Johnson et al. (1984)</td>
<td></td>
<td>Questionnaire</td>
<td>DT: 9.9 (6.0)</td>
<td>3.1 (4.0)</td>
<td>1.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BD: 16.2 (5.0)</td>
<td>7.8 (7.7)</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IE: 5.1 (5.1)</td>
<td>.8 (1.5)</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td>Stein (1990)</td>
<td></td>
<td></td>
<td>DT: 4.5 (4.9)</td>
<td></td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BD: 8.3 (7.4)</td>
<td></td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

(table continues)
<table>
<thead>
<tr>
<th>Instrument/Author</th>
<th>Bulimic Sample</th>
<th>Bulimia Criteria</th>
<th>Bulimics</th>
<th>Controls</th>
<th>Stand Mean Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulimia Cognitive Distortion Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Schulman et al., 1986)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS = Full Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APR = Physical Appearance Subscale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB = Automatic Behavior Subscale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schulman et al. (1986)</td>
<td>Outpatients</td>
<td>Interview</td>
<td>FS: 89.9 (17.2)</td>
<td>45.9 (10.4)</td>
<td>4.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>APR: 30.8 (7.3)</td>
<td>18.8 (4.9)</td>
<td>2.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AB: 59.1 (11.4)</td>
<td>27.1 (6.5)</td>
<td>4.92</td>
</tr>
<tr>
<td>Stein (1990)</td>
<td>Jr/Sr High School</td>
<td></td>
<td>FS: 49.9 (17.1)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>APR: 19.3 (7.2)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AB: 30.6 (11.0)</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

* No standard deviations reported
## Appendix D

### Time #1 Risk Factors and Measurement

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalization of Cultural Value of Thinness</td>
<td>Eating Disorder Inventory</td>
</tr>
<tr>
<td>Body Image</td>
<td>Self-Image Questionnaire for Young Adolescents subscales:</td>
</tr>
<tr>
<td></td>
<td>Body Image</td>
</tr>
<tr>
<td></td>
<td>Emotional Tone</td>
</tr>
<tr>
<td>Depression/Mood</td>
<td>Beck Depression Inventory</td>
</tr>
<tr>
<td></td>
<td>Symptom Checklist-90-Revised</td>
</tr>
<tr>
<td>Family Problems</td>
<td>Family Environment Scale</td>
</tr>
<tr>
<td></td>
<td>subscales:</td>
</tr>
<tr>
<td></td>
<td>Cohesion</td>
</tr>
<tr>
<td></td>
<td>Expressiveness</td>
</tr>
<tr>
<td>Irrational Beliefs, Cognitions</td>
<td>Bulimia Cognitive Distortions Scale</td>
</tr>
</tbody>
</table>
Appendix E

DSM Interview Global Severity Rating Form

<table>
<thead>
<tr>
<th>Current Episode</th>
<th>Past Episode</th>
<th>Height</th>
<th>Reported Weight</th>
<th>Actual Weight</th>
</tr>
</thead>
</table>

Clinician's DSM-III-R Interview Rating Form

<table>
<thead>
<tr>
<th>Patient Research ID</th>
<th>Rater's Initials</th>
</tr>
</thead>
</table>

Rate the severity or frequency of each symptom below based on the worst month in the last six months. Rely on your subjective experience as your frame of reference, along with the ratings below, to help describe a typical patient in this treatment program who apparently has the same disorder (e.g., bulimia or anorexia). The typical or usual patient should be assigned a rating of “3” on a symptom. If a letter has two ratings, mark only the category that is appropriate.

1 = Severity or frequency of symptom is extremely low; or symptom is not present
2 = Severity or frequency of symptom is below the norm for treatment group
3 = Severity or frequency of symptom is typical of patients with this disorder, in this program
4 = Severity or frequency of symptom is somewhat above the norm for the treatment program
5 = Severity or frequency of symptom is extremely or unusually high for treatment program

Rating

A. Intense fear of becoming obese, even when underweight (Rating 1-10: 
   1-4 = 1; 5-6 = 2; 7 = 3; 8 = 4; 9-10 = 5)
B. Disturbance in the way in which one's body weight, size or shape is experienced: e.g.,
   claiming to feel fat even when emaciated, belief that one area of the body is ‘too fat’ even when
   obviously underweight
C. Refusal to maintain body weight over a minimal normal weight for age and height:
   weight loss leading to maintenance of body weight 15% below expected, (use weight chart)
   failure to make expected weight gain during period of growth, leading to body weight 15% below
   expected
D. In females, absence of at least three consecutive menstrual cycles when otherwise expected to
   occur (primary or secondary amenorrhea). List the number missed in past 6 months.
   (Rating: 0 missed = 1; 1 missed = 2; 2-3 missed = 3; 4-5 missed = 4; 6 missed = 5)
E. Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete
   period of time, usually less than two hours; at least 1200 calories). List the average number of
   binges during the past month. (0-2 episodes = 1; 3-5 episodes = 2; 6-8 episodes = 3; 9-12
   episodes = 4; > 12 episodes = 5)
F. During the eating binges there is a feeling of lack of control over the eating behavior.
   (Rating 1-10: 1-4 = 1; 5-6 = 2; 7 = 3; 8 = 4; 9-10 = 5)
G. In order to counteract the effects of binge eating, the individual regularly engages in:
   self-induced vomiting. List the average number during the worst month in last six months
   (rating: less than monthly or never = 1; 1-4/month = 2; 5-9/month = 3; 10-15/month = 4; >
   15/month = 5)
   use of laxative or diuretics, diet pills. Rate highest frequency during the worst month in the last
   six months (rating: less than monthly or never = 1; 1-4/month = 2; 5-9/month = 3; 10-
   15/month = 4; > 15/month = 5)
   rigorous dieting or fasting. Rate frequency of 12 to 24 hour fasts during the worst month in the
   last six months (rating: less than monthly or never = 1; 1-4/month = 2; 5-9/month = 3; 10-
   15/month = 4; > 15/month = 5)
   Rate frequency of vigorous exercise (at least 2 hrs per day aerobic exercise) during worst month in
   last six months (rating: less than monthly or never = 1; 1-3/month = 2; 4-6/month = 3; 7-
   10/month = 4; > 12/month = 5)
Appendix F

Height and Weight Chart

<table>
<thead>
<tr>
<th>Height</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
<th>Category 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'10&quot;</td>
<td>Above 100</td>
<td>97-100</td>
<td>93-96</td>
<td>88-92</td>
<td>below 88</td>
</tr>
<tr>
<td>4'11&quot;</td>
<td>Above 102</td>
<td>99-102</td>
<td>94-98</td>
<td>90-93</td>
<td>below 90</td>
</tr>
<tr>
<td>5'0&quot;</td>
<td>Above 105</td>
<td>101-105</td>
<td>97-100</td>
<td>92-96</td>
<td>below 92</td>
</tr>
<tr>
<td>5'1&quot;</td>
<td>Above 107</td>
<td>103-107</td>
<td>98-102</td>
<td>94-97</td>
<td>below 94</td>
</tr>
<tr>
<td>5'2&quot;</td>
<td>Above 109</td>
<td>106-109</td>
<td>101-105</td>
<td>96-100</td>
<td>below 96</td>
</tr>
<tr>
<td>5'3&quot;</td>
<td>Above 111</td>
<td>108-111</td>
<td>103-107</td>
<td>98-102</td>
<td>below 98</td>
</tr>
<tr>
<td>5'4&quot;</td>
<td>Above 118</td>
<td>114-118</td>
<td>109-113</td>
<td>104-108</td>
<td>below 104</td>
</tr>
<tr>
<td>5'5&quot;</td>
<td>Above 120</td>
<td>116-120</td>
<td>110-115</td>
<td>105-109</td>
<td>below 105</td>
</tr>
<tr>
<td>5'6&quot;</td>
<td>Above 122</td>
<td>118-122</td>
<td>113-117</td>
<td>108-112</td>
<td>below 108</td>
</tr>
<tr>
<td>5'7&quot;</td>
<td>Above 124</td>
<td>120-124</td>
<td>115-119</td>
<td>109-114</td>
<td>below 109</td>
</tr>
<tr>
<td>5'8&quot;</td>
<td>Above 128</td>
<td>123-128</td>
<td>118-122</td>
<td>113-117</td>
<td>below 113</td>
</tr>
<tr>
<td>5'9&quot;</td>
<td>Above 130</td>
<td>125-130</td>
<td>120-124</td>
<td>114-119</td>
<td>below 114</td>
</tr>
<tr>
<td>5'10&quot;</td>
<td>Above 132</td>
<td>128-132</td>
<td>122-127</td>
<td>117-121</td>
<td>below 117</td>
</tr>
<tr>
<td>5'11&quot;</td>
<td>Above 134</td>
<td>130-134</td>
<td>124-129</td>
<td>118-123</td>
<td>below 118</td>
</tr>
<tr>
<td>6'0&quot;</td>
<td>Above 137</td>
<td>132-137</td>
<td>126-131</td>
<td>121-125</td>
<td>below 121</td>
</tr>
</tbody>
</table>
Appendix G

Consent Form for Subjects Age 17

Parent/Student Consent Form

Your daughter previously participated as a research subject in the first part of a study examining the relationship between past and present physical and emotional health status. The study occurred about 4 years ago, and investigated health and nutrition, attitudes, perceptions of family cohesiveness, stress, self-esteem, and a variety of general emotional health factors. Your child was one of the adolescents aged 12-16 who completed the questionnaires. We are now interested in conducting the second part of the study, which evaluates how these issues change over time. This is the longest follow-up study of its kind, therefore, it could greatly help in advancing research knowledge that will help identify risk factors for potential health and emotional problems in young women.

We would like to have your daughter to complete the attached packet of self-report inventories, which is identical to the questionnaires she completed four years ago. Subjects are not to put their names or any identifying information on any questionnaires or answer sheets. This will help us maintain confidentiality. We are interested in the responses of groups of subjects, not the responses of individuals. In fact, since the data are pooled, group data, no one will have access to information about individuals in the study. However, parents will be informed if the researcher believes that serious symptoms of illness are present that may require emergency care or treatment.

Completing the packet should take your daughter between one to 2 hours. After we receive your daughter’s packet back, she will be contacted to complete a 40 minute audiotaped interview. Once the interview is completed, she will have a chance to win a $50.00 saving bond in a drawing (approximately 1 in 30 chance).

You or your daughter may choose to withdraw your consent to participate at any time, without consequence. The overall project will be of benefit to doctors and health specialists who treat health and emotional problems. By understanding what combinations of risk factors precede the onset of different health and emotional problems, treatments can be briefer, but more effective. Insurance costs may be reduced, since it is always less expensive to prevent problems, or treat them in their formative stages. Please encourage your daughter to participate in this important research study.

If you have any questions about this study, please contact: Therese Barnett, Ph.D. Psychology graduate student at 797-1460, or David Stein, Ph.D., Director of Training, Psychology Department, Utah State University, at 797-3274.

I have read the above explanation and agree to have my daughter participate:

Student’s name:_________________________ Student’s age ________

Student’s date of birth ___/___/____

Parent’s Name _________________________ Work or Home Phone:________

Address: _______________________________________________________

Parent’s Signature:______________________________________________

ATTENTION: GENERAL INSTRUCTIONS FOR COMPLETING THIS RESEARCH PACKET ARE ON THE BACK SIDE OF THIS CONSENT FORM. PLEASE READ AND FOLLOW ALL DIRECTIONS CAREFULLY. THANK YOU.
Appendix H

Consent Form for Subjects Age 18 or Older

Consent Form

You previously participated as a research subject in the first part of a study examining the relationship between past and present physical and emotional health status. The study occurred about 4 years ago, and investigated health and nutrition, attitudes, perceptions of family cohesiveness, stress, self-esteem, and a variety of general emotional health factors. You were one of the adolescents aged 12-16 who completed the questionnaires. We are now interested in conducting the second part of the study, which evaluates how these issues change over time. This is the longest follow-up study of its kind, therefore, it could greatly help in advancing research knowledge that will help identify risk factors for potential health and emotional problems in young women.

We would like to have you complete the attached packet of self-report inventories, which is identical to the questionnaires you completed four years ago. You are not to put your name or any identifying information on any questionnaires or answer sheets. This will help us maintain confidentiality. We are interested in the responses of groups of subjects, not the responses of individuals. In fact, since the data are pooled, group data, no one will have access to information about individuals in the study. However, you will be informed if the researcher believes that serious symptoms of illness are present that may require emergency care or treatment.

Completing the packet should take you between one to 2 hours. After receiving your packet, you will be contacted to complete a 40 minute personal audiotaped interview. Once the interview is completed, you will have a chance to win a $50.00 saving bond in a drawing (approximately 1 in 30 chance). Also, everyone will receive $5.00 as a “thank you” for participating.

You may choose to withdraw your consent to participate at any time, without consequence.

The overall project will be of benefit to doctors and health specialists who treat health and emotional problems. By understanding what combinations of risk factors precede the onset of different health and emotional problems, treatments can be briefer, but more effective. Insurance costs may be reduced, since it is always less expensive to prevent problems, or treat them in their formative stages. We encourage you to participate in this important research study.

If you have any questions about this study, please contact: Therese Barnett, Ph.D. Psychology graduate student at 797-1460, or David Stein, Ph.D., Director of Training, Psychology Department, Utah State University, at 797-3274.

I have read the above explanation and agree to participate:

Your name: ____________________________  Your age __________

Date of birth ___/___/___

Home Phone: __________________________

Address: _____________________________

Signature: ___________________________

ATTENTION: GENERAL INSTRUCTIONS FOR COMPLETING THIS RESEARCH PACKET ARE ON THE BACK SIDE OF THIS CONSENT FORM. PLEASE READ AND FOLLOW ALL DIRECTIONS CAREFULLY. THANK YOU.
Appendix I

Instructions for Answering Inventories

Instructions

Answering all of the items in this packet will take between 1 and 2 hours. You may take a break along the way if you wish.

Respond to questions by darkening in the letter choices on the scantron ANSWER sheets. Example: You believe that the best answer to question number 1 is choice "C". On the scantron ANSWER sheet you locate item #1 and completely darken in the letter "C" with a pencil. DO NOT DARKEN IN ANY MORE AREA THAN JUST A SINGLE LETTER:

1. A B C D E

Do exactly what the instructions tell you. Each inventory will tell you whether to use the pink or green scantron sheet, and at which number to start. Please use a pencil.

Complete this packet of information in a quiet, private place. No TV or radio or other noises—PLEASE. No help from brothers, sisters, friends etc. We want only your answers. There are no right or wrong answers to these questions or statements.

Read the instructions at the top of each inventory carefully before you begin answering questions on an inventory. When you think you are finished, go back and make sure you have answered all of the questions.

WRITE YOUR NAME, ADDRESS, and ZIP CODE on the outside of the WHITE envelope that is enclosed. Don’t worry about stamps—we have prepaid the postage. You should understand that you must follow all directions and complete all questionnaires in order to have a chance at winning $50.00.

When you are all done, put the CONSENT FORM, and the two scantron ANSWER SHEETS in the WHITE ENVELOPE, and mail it. Do not put THE QUESTIONNAIRES in the white envelope—JUST THROW THEM AWAY. When we receive your white envelope, we will call you to arrange a time to conduct an interview; either in person or on the phone (depending on how far away you live).

THANK YOU VERY MUCH.
EDUCATION

Therese E. Barnett
4034 W. 79th Ct. Apt. 11
Merrillville, IN 46410
(219) 736-9064

Ph.D. Combined Clinical/Counseling/School Psychology
Utah State University, Logan: 1996.

M.A. Clinical Psychology
Mankato State University, Mankato, MN: 1991.

B.S. Psychology and Sociology
Mankato State University, Mankato, MN: 1988.

DISSERTATION TITLE
Risk Factors and Bulimia Outcomes in Adolescent Women: A Longitudinal and Retrospective Analysis

THESIS TITLE
Nurse’s and Nursing Students Treatment Acceptability Ratings of Behavioral, Counseling and Drug Therapy for the Treatment of Depression in either Cognitively Intact or Cognitively Impaired Young or Elderly Case Client

PROFESSIONAL EXPERIENCE

PROFESSIONAL EXPERIENCE (continued)

5/95 - 6/95 Developmental Tester. Utah Early Intervention Program, Logan, Utah. Responsible for conducting the Mullen Scales of Early Learning (MSEL) with young children.


1993-1994 Counseling Center Practicum. Utah State University Counseling Center, Logan, Utah. Responsible for providing individual, marital, and group therapy for university students presenting with a variety of emotional and behavioral problems. Lead and co-lead eating disorder group. Co-lead group on women's issues. Completed intake interviews and psychological evaluations. Conduct case presentations. Supervisors: Mary Doty, Ph.D., Licensed Psychologist, Gwen Couillard, Ph.D., Marriage and Family Therapist, Jan Neece, Ph.D.
PROFESSIONAL EXPERIENCE (continued)


PROFESSIONAL EXPERIENCE (continued)


CONSULTATION EXPERIENCE


RESEARCH EXPERIENCE

1993 Grant involving the Rorschach, Utah State University Psychology Department, Logan, Utah. Scored Rorschach's from psychology 101 students. Supervisor: Susan L. Crowley, Ph.D., Licensed Psychologist.
RESEARCH EXPERIENCE (continued)

1992-1993 Eating Disorders/Addictive Behaviors Research Program, Utah State University Psychology Department, Logan, Utah.

1990-1991 Eating Disorders Research Program, Mankato State University Psychology Department, Riverview Clinic, & Immanuel-St. Joseph’s Hospital, Mankato, Minnesota. Reviewed the literature on eating disorders to set up a program at Immanuel-St. Joseph’s Hospital. Reviewed the literature on the relationship between eating disorders and depression and presented the findings at a state convention. Supervisors: Peggy Sue Hesse, Ph.D., Michael Fatis, Ph.D., Licensed Psychologist.

Spring 1990 Research Program, Mankato State University Psychology Department, Mankato, Minnesota. Published an article reviewing the literature on Ethics in Marital and Family Therapy. Reviewed the literature on behavioral treatments in college populations. Collected data on the effects that a pretherapy interview may have on subsequent evaluations of therapy. Supervisor: Daniel Houlihan, Ph.D., Licensed Psychologist.

1989-1991 Behavioral Health Psychology Research Program, Mankato State University Psychology Department, Mankato, Minnesota. Published article on the results of interviewing former asthma patients and their parent’s about the use and benefit of the treatment they received. Collected data on treatment acceptability of behavioral, counseling, drug interventions for depression among nurses and nursing students. Collected former practicum and internship data on licensed consulting psychologists. Supervisor: Michael Fatis, Ph.D., Licensed Psychologist.
RESEARCH EXPERIENCE (continued)

Fall 1989  Child Behavior Research Program, Mankato State University Psychology Department, Mankato, Minnesota. Conducted literary search for helpful books for children and adolescents regarding stepfamilies. Helped teach mentally retarded individuals about nutrition and weight loss. Supervisor: Nancy Fenrick, Ph.D., Licensed Psychologist.

1988-1989  Sexual Assault Prevention Research Program, Mankato State University Psychology Department, Mankato, Minnesota. Participated in intervention to help decrease rape supporting attitudes and beliefs, and presented the results at a state convention. Supervisor: Howard Levine, Ph.D., Licensed Psychologist.

1988  Undergraduate Research Class, Mankato State University Psychology Department, Mankato, Minnesota. Surveyed college freshman about sexual knowledge, attitudes, and behavior.

TEACHING EXPERIENCE

1988-1990  Teacher Assistant, Mankato State University Psychology Department, Mankato, Minnesota. Responsible for conducting discussion groups for personality development class, prepare lectures, grade tests and papers, show movies. Supervisors: Daniel Houlihan, Ph.D., Licensed Psychologist, Rosemary Krawczyk, Ph.D., Licensed Psychologist.

MANUSCRIPT PUBLICATIONS


PROFESSIONAL PRESENTATIONS AT NATIONAL AND REGIONAL CONVENTIONS


PROFESSIONAL TRAINING CONFERENCES ATTENDED


Minnesota Association for Behavior Analysis. Mankato, MN. April 1991.


Minnesota Association for Behavior Analysis. Mankato, MN. March 1990.


PROFESSIONAL AFFILIATIONS

Student Member, American Psychological Association, 1988-present.

Student Member, Association for the Advancement of Behavior Therapy, 1989-present.

Student Member, Society of Psychologists in Addictive Behaviors, 1992-1993.
UNPUBLISHED MANUSCRIPTS


