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DEVELOPMENT AND VALIDATION OF A SYSTEMATIC TRAINING
PROGRAM FOR THE DIAGNOSIS OF ANOREXIA NERVOSA,
BULIMIA NERVOSA, AND CONCOMITANT CONDITIONS

by

Linda K. Todd

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

of

DOCTOR OF PHILOSOPHY

in

Psychology

Approved:

UTAH STATE UNIVERSITY
Logan, Utah

1992

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Linda K. Todd

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ABSTRACT

Development and Validation of a Systematic Training
Program for the Diagnosis of Anorexia Nervosa,
Bulimia Nervosa, and Concomitant Conditions

by

Linda K. Todd

Utah State University, 1992

Major Professor: Dr. David M. Stein
Department: Psychology

The research concerning eating disorders and concomitant conditions shows that anorexia nervosa and bulimia nervosa are serious disorders that pose many diagnostic and therapeutic challenges to mental health and nutrition professionals. Most psychologists and nutritionists receive broad-based training that likely only superficially touches upon the importance of these diagnostic issues. Nevertheless, effective treatment planning requires that diagnostic issues and concomitant conditions be evaluated and incorporated into the diagnosis and treatment of eating disorders. Thus, there is an increasing need for specialized training in order to better evaluate and treat the complicated clinical picture presented by eating disorder clients.

However to date, no systematic training package has been available to meet this training need. The present study was designed to fulfill this need by developing and initially validating an expert system-based, computer-assisted training program (ES-CAT). The initial validation involved comparing the mean overall post-test scores of 56 subjects. Subjects were randomly assigned to one of three groups [i.e., expert system-based, computer assisted trainer (ES-CAT), expert system-based trainer without computer guidance (ES), and traditional self-study (SS)].

The ES-CAT was shown to be more effective in training subjects in the diagnosis and treatment of eating disorders than either an expert system-based trainer without computer guidance (ES) or a traditional method of training (SS). Indeed, subjects who used the ES-CAT showed large gains in knowledge and mastery of the material at better than 85%.

The addition of the computer-based guidance to the expert system trainer showed more significant gains (from a pre-test to post-test) of learning than the expert system trainer manual only. Furthermore, the expert system-based trainer without computer guidance (ES) was significantly more effective in training subjects than a traditional method of reading and studying textbooks (SS).

The total training time of the ES-CAT was approximately 16 hours. Thus, a reasonable and effective means of training practitioners to better evaluate and treat the complicated clinical picture presented by eating disorder patients was developed and initially validated.

(176 pages)

INTRODUCTION AND STATEMENT OF THE PROBLEM

Anorexia nervosa and bulimia nervosa are increasingly prevalent eating disorders that have become a major U.S. health problem (Mitchell & Eckert, 1987). The significance and seriousness of these eating disorders are reflected in the increasing prevalence rates (e.g., Bemis, 1978; Leichner & Gertler, 1988) and the vast array of consequent nutritional and medical complications (e.g., Densmore-John, 1988).

These serious eating disorders pose many diagnostic and therapeutic challenges to mental health and nutritional professionals (Garfinkel, Garner, & Kennedy, 1985). For example, diagnosis and subsequent treatment planning are especially complicated due to the presence of concomitant emotional/behavioral problems. Some of the concomitant conditions identified in the published literature include (a) medical complications and nutritional consequences, (b) mood disorder, (c) anxiety disorder, (d) personality disorder, (e) substance use disorder, (f) impulse control problems, and (g) difficulties in family relationships. Effective treatment planning requires that diagnostic issues and concomitant conditions be evaluated and incorporated into the diagnosis of and treatment planning for anorexia nervosa and bulimia nervosa (Williamson, 1990).

However, most psychologists and nutritionists receive brief, broad-based training in eating disorders that likely overlooks important nutritional, medical, and psychological concomitant conditions (Williamson, 1990). In addition, the complexity of treatment of persons with eating disorders (i.e., as seen in the practice of multiple simultaneous treatments and specialized inpatient, eating disorder programs) suggests the need for specialized training in eating disorders. Furthermore, eating disorder clients frequently present other psychological disturbances (e.g., lack of cooperation, and basic mistrust of self and others) that provide additional obstacles to effective treatment.

Bruch (1985) stated that treatment must target problems on several fronts simultaneously if it is going to be effective. These fronts include nutritional improvement, unlocking stagnated family interaction patterns, and the resolution of psychological problems. All of the above must be addressed in order for effective treatment to take place (Williamson, 1990) and thus, there is an increasing need for specialized training.

Given the special problems of eating disorder clients and the fact that training of most psychologists and nutritionists is general and broad-based, specialized training is needed in order to better evaluate and treat

the complicated clinical picture presented by eating disorder clients. At present, there are no specific training programs available to train psychologists and nutritionists in the diagnosis and treatment of anorexia nervosa and bulimia nervosa. However, one potentially useful method for training professionals may be an expert system-based, computer-assisted training program. Such a training program can randomly generate an almost unlimited number of case scenarios to assess mastery of concepts. Trainees continue to respond to training stimuli and receive feedback until they have mastered the concept being taught.

Research on the expert system-based trainers has been remarkably consistent. As measured by pre-post/test scores, trainees who use the programs consistently show large gains in knowledge and mastery of the material at better than 85% (Thornburg, Baer, Ferrara, & Althouse, 1990).

The present study assessed the efficacy of an expert system-based, systematic, packaged approach to training psychologists and nutritionists in the diagnosis and treatment of anorexia nervosa and bulimia nervosa. It should be noted that the term "bulimia nervosa" is used to refer to both "bulimia," [American Psychiatric Association

(APA), 1980] and "bulimia nervosa" (a disorder with more stringent diagnostic criteria than "bulimia;" APA, 1987).

In the Review of Literature that follows, the major symptoms and co-morbid conditions associated with eating disorders will be outlined. In addition, the research bearing on the advantages of using an expert systems approach to training will be briefly summarized.

REVIEW OF THE LITERATURE

A critical review of diagnostic issues in anorexia nervosa and bulimia nervosa necessarily requires consideration of the relationship between eating disorders and concomitant conditions outlined above. References cited were located through a search of articles and books on anorexia nervosa and bulimia nervosa, and several computer searches of psychological sources. The bibliographies of these original sources were further inspected for additional references. All relevant articles were examined, except in rare instances wherein the Utah State University Library was unable to acquire an article via interlibrary loan. With these search procedures in mind, the current diagnostic criteria of anorexia nervosa and bulimia nervosa are presented first. Then, co-morbid conditions are presented with particular reference to diagnostic issues.

Diagnosis of Anorexia Nervosa and Bulimia Nervosa

Several authors have proposed different diagnostic nosologies for anorexia nervosa and bulimia nervosa [e.g., American Psychiatric Association (APA), 1980, 1987; Askevold, 1983; Dally, 1969; Fairburn, 1983; Feighner et al., 1972; Garrow et al., 1975; Holmgren et al., 1983; Lacey, Phil, Harte, & Birtchnell, 1986; Munoz, 1984, 1986;

Rollins & Piazza, 1978; Russell, 1970, 1979]. Despite the plethora of diagnostic schemes, perhaps the most useful criteria for clinicians in the U.S. are the revised third edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-III-R; APA, 1987).

The DSM-III-R (APA, 1987) is extensively employed for several reasons. It provides standardization of terminology and has acceptance by third-party payers (i.e., insurance companies). Furthermore, the DSM-III-R (APA, 1987) has been used extensively as a basis for the development of eating disorder inventories and structured interviews. For example, the Interview for Diagnosis of Eating Disorders (Williamson, 1990) was built upon the DSM-III-R (APA, 1987). Lastly, many training programs in clinical psychology include the DSM-III-R (APA, 1987) in courses on assessment and psychopathology. Thus, for the purpose of developing a systematic, packaged training program for the diagnosis of anorexia nervosa and bulimia nervosa, the DSM-III-R (APA, 1987) criteria should be incorporated into its foundation.

Anorexia Nervosa

The DSM-III-R (APA, 1987, p. 67) diagnostic criteria for anorexia nervosa are:

- A. Refusal to maintain body weight over a minimal normal weight for age and height, e.g., weight

loss leading to maintenance of body weight 15% below that expected; or failure to make expected weight gain during period of growth, leading to a body weight of 15% below that expected.

- B. Intense fear of gaining weight or becoming fat, even though underweight.
- C. Disturbance in the way in which one's body weight, size, or shape is experienced, e.g., the person claims to "feel fat" even when emaciated, believes that one area of the body is "too fat" even when obviously underweight.
- D. In females, absence of at least three consecutive menstrual cycles when otherwise expected to occur (primary or secondary amenorrhea). (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen administration).

Nevertheless, the DSM-III-R (APA, 1987) diagnostic criteria for anorexia nervosa have some inherent problems. According to Schlundt and Johnson (1990), the use of body weight and amenorrhea as diagnostic criteria can be problematic. Also, Schlundt and Johnson (1990) point to a lack of specific behavioral criteria for certain features (e.g., methods of patients' losing weight, and how to determine the presence and severity of fear of weight gain and body-image disturbance). In spite of these problems, the DSM-III-R (APA, 1987) diagnostic criteria for anorexia nervosa are practical and the most extensively used diagnostic criteria.

Bulimia Nervosa

The DSM-III-R (APA, 1987, pp. 68-69) diagnostic criteria for bulimia nervosa are:

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

As with anorexia nervosa, the DSM-III-R (APA, 1987) diagnostic criteria for bulimia nervosa have some problems. For example, Schlundt and Johnson (1990) noted that the diagnosis of bulimia nervosa excludes a number of individuals who meet all but one of the diagnostic criteria (e.g., experiencing a loss of control, engaging in binge eating, and/or purging). In addition, the criteria do nothing to help clinicians differentiate binge episodes from regular episodes of overeating.

Despite its shortcomings, the DSM-III-R (APA, 1987) is heavily relied upon by clinicians and is currently the "state-of-the-art" classification nosology. Therefore, the DSM-III-R (APA, 1987) criteria for bulimia nervosa

need to be included in any systematic, packaged, diagnostic training program for eating disorders.

Dual Diagnoses of Anorexia Nervosa
and Bulimia Nervosa

It should be noted that according to the DSM-III-R (APA, 1987), a dual diagnosis of anorexia nervosa and bulimia nervosa may be warranted if the individual meets the diagnostic criteria for both disorders. In fact, the presence of bulimia in anorexia nervosa has diagnostic and prognostic significance. For example, anorexia nervosa patients with bulimia are more likely to (a) have been premorbidly obese, (b) have mothers who were obese, (c) be impulsive as indicated by stealing, substance abuse, self-mutilation, and sexual activity, (d) vomit, (e) be affectively labile, and (f) have a poorer prognosis (Garfinkel, Moldofsky, & Garner, 1980).

Concomitant Conditions

As mentioned earlier, both anorexia nervosa and bulimia nervosa have been associated with a variety of concomitant conditions. Although these conditions are not a part of the formal diagnostic criteria for the diagnosis of anorexia nervosa or bulimia nervosa, they have significant implications for the conceptualization of

eating disorders, as well as for treatment modalities and outcomes. For the sake of clarity, this section of the review is divided into (a) medical complications and nutritional consequences, (b) mood disorder, (c) anxiety disorder, (d) personality traits and disorders, (e) substance use disorder, (f) impulse control problems, and (g) difficulties in family relationships.

Medical Complications and Nutritional Consequences

The need for specialized diagnostic and treatment skill training among clinicians is especially important in eating disorders. There are a number of medical, psychological, and nutritional problems associated with both anorexia nervosa and bulimia nervosa. These range from relatively minor problems to severe and life-threatening conditions. The clinical consequences are evident in the hair, face, lips, tongue, teeth, gums, glands, skin, nails, subcutaneous and muscular skeletal systems (e.g., muscular atrophy), as well as in the internal systems, such as the gastrointestinal, nervous, and cardiovascular systems (Densmore-John, 1988).

Numerous medical and clinical conditions result from the nutritional imbalances associated with anorexia nervosa. For example, anorexia nervosa may lead to

relatively minor conditions, such as thin hair and decreased salivary flow. However, in some cases more serious and life-threatening conditions are present, such as bradycardia, low blood pressure, and severe malnutrition (Densmore-John, 1988). Other complications include edema of the tongue, bleeding gums, enlarged thyroid and parotid, brittle nails, bone marrow hypoplasia, peripheral neuropathy, symptomatic epilepsy, and pericardial effusion (Densmore-John, 1988). Cold intolerance has also been evidenced by many patients (Agras, 1987).

The numerous health consequences of bulimia nervosa also run the gamut from dry hair to cardiac arrhythmias. Bulimic behavior may result in angular stomatitis, dental caries and tooth enamel decalcification, receding gums, enlarged parotid, brittle nails, esophagitis, esophageal tear, gastric rupture, and cardiac arrhythmias (Densmore-John, 1988). Others have documented electrolyte imbalances and hypokalemia as medical and clinical sequelae of bulimia (e.g., Agras, 1987).

In summary, both anorexia nervosa and bulimia nervosa often result in medical and clinical complications that are primarily due to nutritional or behavioral sequelae of the eating disorder. Although medical conditions range in severity from relatively minor to serious and life-

threatening, anorexia nervosa and bulimia nervosa result in a significant number of health-related problems that need to be addressed in any systematic training program for the diagnosis of eating disorders.

Mood Disorder

Several lines of evidence support a relationship between mood and eating disorders, although the exact nature of the relationship is quite controversial (Mitchell, 1990). The evidence can be generally categorized into five different areas (a) rate of concurrent mood disorder, (b) rate of lifetime diagnosis of mood disorder, (c) family history of mood disorder, (d) physiological signs [e.g., response to the Dexamethasone Suppression Test (DST), thyrotropin-stimulating hormone (TSH) response to the administration of thyrotropin-releasing hormone (TRH), and latency of rapid eye movement (REM) onset], and (e) favorable response to antidepressant medications.

Rate of Concurrent Mood Disorder

Several authors have noted an association between concurrent depressive symptoms and eating disorders (e.g., Schlundt & Johnson, 1990), although early assessment of depression did not generally rely on systematic or standardized measures (Hatsukami, Mitchell, & Eckert,

1984). However, later studies employed more systematic measures, such as structured interviews and standardized self-report measures (see Table 1). Thus, the first line of evidence for an association between mood and eating disorders stems from research on the concurrent presence of depression in cases of eating disorders.

As seen in Table 1, 13 studies that specifically examined the co-morbidity of mood disorders in eating disorders were located. Anorexia nervosa and bulimia nervosa were primarily diagnosed using the DSM-III (APA, 1980) diagnostic criteria or some modification thereof, although one study (Biederman, Rivinus, et al., 1985) used the diagnostic criteria of Feighner et al. (1972).

About half of the studies employed some form of interview for the diagnosis of mood disorders, such as (a) Composite International Diagnostic Interview (CIDI; Laessle, Schweiger, Fichter, & Pirke, 1988; Wilson & Lindholm, 1987), (b) Schedule for Affective Disorders and Schizophrenia (SADS; Walsh, Roose, Glassman, Gladis, & Sadik, 1985), (c) National Institute of Mental Health (NIMH) Diagnostic Interview Schedule (DIS; Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a), (d) Clinical Global Impression scale (CGI; Roy-Byrne, Gwirtsman, Edelstein, Yager, & Gerner, 1983), and (e) unspecified structured interview (Hatsukami, Eckert, Mitchell, & Pyle, 1984;

Table 1

Concurrent Affective Disorder Diagnoses in Eating Disorder Patients

Study	Subjects ^a			Affective ^b	Diagnosis (%) ^c				
	Number	Eating disorder	Diagnostic criteria	Measure(s)	Diagnostic criteria	Major Depression	Dysthymia	Cyclothymia	Other
Structured or Semi-Structured Interviews									
Hatsukami, Eckert, et al., 1984	108	Bulimia	DSM	Unspecified	DSM	11	21	5	1
Herzog, 1984	27	Anorexia	DSM	Unspecified	RDC	56			
	55	Bulimia	DSM	Unspecified	RDC	24			
Hudson, Pope, Jonas, Laffer, et al., 1983	73	Anorexia	DSM	DIS	DSM				68
Laessle et al., 1988	62	Mixed	DSM	CIDI	DSM	32			
Roy-Byrne et al., 1983	14	Bulimia	DSM	CGI	DSM	36	43		
Walsh, Roose, et al., 1985	9	Anorexia	DSM	SADS	RDC	33			
	41	Bulimia	DSM	SADS	RDC	29			
Wilson & Lindholm, 1987	57	Bulimia	DSM	CIDI	BDI				28
Standardized Self-Report Affective Measure(s)									
Cooper, Morrison, Bigman, Abramowitz, Levin et al., 1988	58	Bulimia	DSM	SCL	DSM	16	14		2
Herzog, 1984	27	Anorexia	DSM	HRSD	HRSD				41
	55	Bulimia	DSM	HRSD	HRSD				24
Lee et al., 1985	53	Bulimia	DSM	BDI	BDI	23			
				HRSD	HRSD	53			
				SCL	SCL	36			
									(table continues)

Study	Subjects ^a		Affective ^b		Diagnoses (%) ^c				
	Number	Eating disorder	Diagnostic criteria	Measure(s)	Diagnostic criteria	Major Depression	Dysthymia	Cyclothymia	Other
Pertschuk et al., 1986	73	Bulimia	DSM	BDI, BSCI, & STAS	BDI	29			
Piran et al., 1985	47	Both	DSM	BDI, HRSD, MMPI, & SCL	DSM				38
----- Unspecified Affective Measure(s)									
Biederman, Rivinus, et al., 1985	38	Anorexia	DSM & Feighner		DSM	45			
Mendels, 1983	6	Bulimia							67

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Both = Anorexia Nervosa and Bulimia, Bulimia = Bulimia or Bulimia Nervosa, Mixed = Anorexia Nervosa or Bulimia)

Diagnostic criteria = diagnostic criteria used to diagnose the eating disorder (DSM = DSM-III or some modification thereof, Feighner = Feighner et al., 1972)

^b Affective

Measure(s) = measure(s) used to diagnose an affective disorder (BDI = Beck Depression Inventory, BSCI = Beck Self-Concept Inventory, CGI = Clinical Global Impression, CIDI = Composite International Diagnostic Interview, DIS = Diagnostic Interview Schedule, HRSD = Hamilton Rating Scale for Depression, MMPI = Depression score from the Minnesota Multiphasic Personality Inventory, SADS = Schedule for Affective Disorders, SCL = Hopkins Symptom Checklist - 90, STAS = State Trait Anxiety Scale, Unspecified = Unspecified Structured or Semi-Structured Interview)

Diagnostic criteria = diagnostic criteria used to diagnose an affective disorder (BDI > 25, HRSD = moderate to severe range, RDC = Research Diagnostic Criteria, SCL = two standard deviations above the mean)

^c Diagnosis (%) = percent of eating disorder patients with an affective disorder

Herzog, 1984). The summary of interview research results in Table 1 shows that unspecified mood disorder and major depression are present in about 70% and 30% of eating disorder clients, respectively (e.g., Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a). In addition, according to Eckert, Goldberg, Halmi, Casper, and Davis (1982), the severity of depression in anorexia nervosa appears to be associated with bizarre food habits, increased fear of becoming fat, disturbance in eating attitudes and behavior, denial of illness, and tendency to vomit or abuse laxatives. Similarly, Swift, Kalin, Wamboldt, Kaslow, and Ritholz (1985) found that the severity of depressive symptomology in bulimics, who were assessed over a two- to five-year period, seems to be related to more intense bulimic symptomology, abnormal eating attitudes, and prominent psychiatric disturbances.

In contrast, about half of the studies employed one or more standardized self-report measures to aid in the diagnosis of mood disorders (see Table 1). For example, self-report measures included (a) the Depression scale of the Minnesota Multiphasic Personality Inventory (MMPI; Piran, Kennedy, Garfinkel, & Owens, 1985), (b) Beck Depression Inventory (BDI; Lee, Rush, & Mitchell, 1985; Pertschuk, Collins, Kreisberg, & Fager, 1986; Piran et al., 1985), (c) Hopkins Symptom Checklist - 90 (SCL;

Cooper, Morrison, Bigman,, Abramowitz, Levin, et al., 1988; Lee et al., 1985; Piran et al., 1985), (d) Hamilton Rating Scale for Depression (HRSD; Herzog, 1984; Lee et al., 1985; Piran et al., 1985), (e) State Trait Anxiety Scale (STAS; Pertschuk et al., 1986), and (f) Beck Self-Concept Inventory (BSCI; Pertschuk et al., 1986). Based on results obtained using these standardized self-report measures, concurrent major depression seems to be present in 16 to 45% of eating disorder clients.

In summary, major depression, or at least moderate to severe depressive symptomology, is co-morbid in approximately 30% of eating disorder clients. This conclusion is in line with that of Schlundt and Johnson (1990), who estimated that depressive symptomology in anorexics ranges from 25 to 50%. Indeed, 30% represents a significant proportion of clients with anorexia nervosa or bulimia nervosa who have a co-morbid mood disorder or depressive symptomology. Furthermore, after reviewing the relationship between eating disorders and primary mood disorders, Swift, Andrews, and Barklage (1986) concluded that there is more than ample evidence showing that persons with eating disorders experience high levels of depression.

Rate of Lifetime Diagnosis of
Mood Disorder

The second line of evidence for the association of eating and mood disorders comes from prevalence studies of the lifetime diagnoses of mood disorders in clients with anorexia nervosa and/or bulimia nervosa. Lifetime diagnoses attempt to ascertain whether the eating disorder client has had a mood disorder diagnosis at any point in their lifetime. Table 2 presents 10 studies that specifically investigated the lifetime prevalence of mood disorders in clients with anorexia nervosa and/or bulimia nervosa. Again, eating disorders were generally diagnosed using the DSM-III (APA, 1980) criteria, with a few exceptions (Cantwell, Sturzenberger, Burroughs, Salkin, & Green, 1977; Gershon et al., 1983).

Of the lifetime prevalence studies, seven used interviews for the diagnosis of mood disorders, such as (a) CIDI (Laessle et al., 1988; Laessle, Wittchen, Fichter, & Pirke, 1989), (b) SADS (Walsh, Roose, et al., 1985), (c) DIS (Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a; Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1983), and (d) unspecified interview (Cantwell et al., 1977; Hatsukami, Eckert, et al., 1984). Based on interview studies, a diagnosis of lifetime mood disorder averages around 60% among clients with a current diagnosis of anorexia nervosa and/or bulimia nervosa.

Table 2

Lifetime Affective Disorder Diagnosis in Eating Disorder Patients

Study	Subjects ^a				Diagnosis (%) ^c					First ^d		
	Number	Eating disorder	Diagnostic criteria	Affective measure(s) ^b	Major Depression	Dysthymia	Bipolar Disorder	Cyclothymia	Other	Affective disorder	Eating disorder	Same time
Structured or Semi-Structured Interviews												
Cantwell et al., 1977	18	Anorexia	Felghner	Unspecified	44							
	26	Anorexia ¹	Felghner	Unspecified	45							
Hatsukami, Eckert, et al., 1984	108	Bulimia	DSM	Unspecified	24	22	1	5	1			
Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a	16	Anorexia	DSM	DIS	50	19	13			49	30	28
	49	Bulimia	DSM	DIS	59	10	14	2		49	30	28
	25	Both	DSM	DIS	80		12			49	30	28
Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1983	51	Bulimia	DSM	DIS	71	59	0	12				
	19	Bulimia ²	DSM	DIS	68	47	11					
Laessle et al., 1988	37	Anorexia	DSM	CIDI	29				62	71	19	4
	48	Bulimia	DSM	CIDI	44				63	71	19	4
Laessle et al., 1989	41	Anorexia	DSM	CIDI	29	34			61			
	50	Bulimia	DSM	CIDI	38	37			70			
Walsh, Roose, et al., 1985	41	Bulimia	DSM	SADS	90	73	0	2	61	26	74	
	9	Both	DSM	CIDI	77	56	0		55	26	74	
Standardized Self-Report Affective Measures												
Lee et al., 1985	53	Bulimia	DSM	BDI & SCL	55				19	30	6	7

(table continues)

Study	Subjects ^a			Affective measure(s) ^b	Diagnosis (%) ^c					First ^d		
	Number	Eating disorder	Diagnostic criteria		Major Depression	Dysthymia	Bipolar Disorder	Cyclothymia	Other	Affective disorder	Eating disorder	Same time
Piran et al., 1985	14	Anorexia	DSM	BDI, HRSD, MMPI, & SCL	43	93	0			44	22	34
	33	Bulimia	DSM	BDI, HRSD, MMPI, & SCL	36	73	0	9		44	22	34
Unspecified Affective Measure(s)												
Gershon et al., 1983	24	Anorexia	Halmi		50	54	4		33			
	24	Bulimia	DSM		46							

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Both = Anorexia Nervosa and Bulimia, Bulimia = Bulimia or Bulimia Nervosa)

Diagnostic criteria = diagnostic criteria used to diagnose the eating disorder (DSM = DSM-III or some modification thereof, Feighner = Feighner et al., 1972, Halmi = Halmi, Powers, & Cunningham, 1975)

^b Affective measure(s) = measure(s) used to diagnose an affective disorder (BDI = Beck Depression Inventory, CIDI = Composite International Diagnostic Interview, DIS = Diagnostic Interview Schedule, HRSD = Hamilton Rating Scale for Depression, MMPI = Depression score from the Minnesota Multiphasic Personality Inventory, SADS = Schedule for Affective Disorders, SCL = Hopkins Symptom Checklist - 90, Unspecified = Unspecified Structured or Semi-Structured Interview)

^c Diagnosis (%) = percent of eating disorder patients with an affective disorder

^d First = which came first, the affective or eating disorder (Affective disorder = affective disorder preceded the eating disorder by at least one year, Eating disorder = eating disorder preceded the affective disorder by at least one year, Same time = eating and affective disorder occurred about the same time)

¹ parental reports

² remitted

Similarly, a lifetime diagnosis of major depression ranges from 24 to 90%, whereas lifetime dysthymia disorder ranges from 10 to 73% in eating disorder clients. Moreover, a lifetime diagnosis of bipolar disorder has been shown to be present in 0 to 14% of eating disorder clients. Less common is a lifetime cyclothymia disorder that has been shown to be present in less than 12% of clients with anorexia nervosa and/or bulimia nervosa. Furthermore, mood disorders appear to precede the eating disorder by at least one year in the majority of the cases (see Table 2). Thus, based on structured interviews, a significantly high percentage (i.e., 50 to 90%) of clients with anorexia nervosa and/or bulimia nervosa appears to have a lifetime diagnosis of mood disorder that, more often than not, precedes the eating disorder.

In contrast, two of the lifetime prevalence studies employed one or more standardized self-report measures to assist in the diagnosis of mood disorders (see Table 2). Again self-report measures included (a) Depression scale of the MMPI (Piran et al., 1985), (b) BDI (Lee et al., 1985; Piran et al., 1985), (c) SCL (Lee et al., 1985; Piran et al., 1985), and (d) HRSD (Piran et al., 1985). Based on standardized self-report measures, a lifetime diagnosis of mood disorder ranges from 36 to 55% in eating

disorder clients, whereas a lifetime diagnosis of major depression ranges from 73 to 93%.

In conclusion, taking both structured interview and self-report studies together, a lifetime diagnosis of major depression, or some other form of moderate to severe depressive symptomology, ranges from 50 to 90% in eating disorder clients. Truly, a 50 to 90% lifetime diagnosis of mood disorders in eating disorder clients has significant implications for the co-morbidity of depression in eating disorders.

Family History of Mood Disorder

The third line of evidence for a relationship between mood and eating disorders can be inferred from family history studies. Table 3 shows 12 studies that examined the presence of mood disorders in first-degree relatives of eating disorder patients. Again, anorexia nervosa and bulimia nervosa were generally diagnosed using the DSM-III criteria or some modification thereof, although a few studies used other criteria, such as Feighner et al.'s (1972) criteria (Winokur, March, & Mendels, 1980) or Halmi, Powers, and Cunningham's (1975) criteria (Gershon et al., 1983).

Five of the family history studies employed an interview format for the diagnosis of mood disorders, such as the DIS (Hudson, Pope, Jonas, Yurgelun-Todd, &

Table 3

Family History of Affective Disorder in First-Degree Relatives of Eating DisorderPatients

Study	Subjects ^a				Relatives (%) ^c		
	Number	Eating disorder	Diagnostic criteria	Affective measure(s) ^b	Unspecified	Major Depression	Bipolar Disorder
Structured or Semi-Structured Interviews							
Gershon et al., 1984	24	Anorexia	Halmi	Unspecified	17		
	24	Bulimia	DSM	Unspecified	21		
	43	None	DSM	Unspecified	7		
Hudson, Pope, Jonas, Yurgelun-Todd, 1985	89	Both	DSM	Unspecified	53		
	50	Bulimia	DSM	Unspecified	30	24	6
	19	Bulimia ¹	DSM	Unspecified	37	29	8
Stem et al., 1984	27	Bulimia	DSM	Unspecified	56		
	27	None	DSM	Unspecified	30		
Winokur et al., 1980	25	Anorexia	Felghner	Unspecified	43		
	25	None	Felghner	Unspecified	30		
Standardized Self-Report Affective Measures							
Lee et al., 1985	53	Bulimia	DSM	BDI, HRSD, & SCL	17		
Piran et al., 1985	14	Anorexia	DSM	BDI, HRSD, MMPI, & SCL	30		
	33	Bulimia	DSM	BDI, HRSD, MMPI, & SCL	61		
Wilson & Lindholm, 1987	57	Bulimia	DSM	BDI > 10	30		
Unspecified Affective Measure(s)							
Biederman, Rivinus, et al., 1985	57	Anorexia	DSM	DSM	9		

(table continues)

Study	Subjects ^a			Relatives (%) ^c			
	Number	Eating disorder	Diagnostic criteria	Affective measure(s) ^b	Unspecified	Major Depression	Bipolar Disorder
Gershon et al., 1983	23	None	DSM		2		
	24	Anorexia	Halmi			22	
Mendels, 1983	43	None	Halmi			6	
	6	Bulimia			33		
Rivinus et al., 1984	40	Anorexia	DSM			3	
	23	None	DSM			1	

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Both = Anorexia Nervosa or Bulimia, Bulimia = Bulimia or Bulimia Nervosa, None = No Eating Disorder)

Diagnostic criteria = diagnostic criteria used to diagnose the eating disorder (DSM = DSM-III or some modification thereof, Felghner = Felghner et al., 1972, Halmi = Halmi, Powers, & Cunningham, 1975)

^b Affective measure(s) = measure(s) used to diagnose an affective disorder (BDI = Beck Depression Inventory, HRSD = Hamilton Rating Scale for Depression, MMPI = Depression score from the Minnesota Multiphasic Personality Inventory, SCL = Hopkins Symptom Checklist - 90, Unspecified = Unspecified Structured or Semi-Structured Interview)

^c Relatives (%) = percent of first-degree relatives of eating disorder patients who have an affective disorder

¹ remitted

Frankenburg, 1983a) or an unspecified interview (Gershon et al., 1984; Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1987; Stern et al., 1984; Winokur et al., 1980). Based on interviews with first-degree relatives of eating disorder patients, a diagnosis of mood disorder in first-degree relatives ranges from 14 to 56%, with a majority falling around 40%. It should be noted that the percentage of first-degree relatives of anorexics and bulimics with a mood disorder (40%) is significantly higher than that of normal control subjects (17%) (see Table 3). However, the specific mood disorder is not generally delineated.

In contrast, three of the family history studies employed one or more standardized self-report measures completed by relatives of eating disorder patients (see Table 3). Again, self-report measures included (a) Depression scale of the MMPI (Piran et al., 1985), (b) BDI (Lee et al., 1985; Piran et al., 1985; Wilson & Lindholm, 1987), (c) SCL (Lee et al., 1985; Piran et al., 1985), and (d) HRSD (Lee et al., 1985; Piran et al., 1985). Based on three studies that used standardized self-report measures, the range of first-degree relatives with a mood disorder is 17 to 61%. The majority show a prevalence of around 30%. Studies that used unspecified measures (Biederman, Rivinus, et al., 1985; Gershon et al., 1983; Mendels,

1983; Rivinus et al., 1984) show that major depression is present in 3 to 22% of first-degree relatives of eating disorder patients.

Thus, family history research is consistent in that a mood disorder is present in more than 30% of the first-degree relatives of anorexics and bulimics, whereas major depression is present in about 20%. In contrast to first-degree relatives of normal control subjects, the first-degree relatives of eating disorder subjects generally show a higher prevalence of mood disorders. Therefore, the family history studies also tend to support an association between mood and eating disorders.

Physiological Signs

The fourth line of evidence of an association between mood and eating disorders can be found in studies that examine physiological signs of depression [e.g., Dexamethasone Suppression Test (DST) response, Thyroid Stimulating Hormone (TSH) response to administration of Thyroid Releasing Hormone (TRH), rapid eye movement (REM) onset latency] and comparisons of depressive symptomology in primarily depressed or normal individuals versus eating disordered subjects.

The Dexamethasone Suppression Test (DST) response.

The DST is a laboratory test in which patients are given the steroid dexamethasone. This chemical suppresses the

production of cortisol, a hormone produced in the cortex of the brain. Normally, dexamethasone suppresses the level of cortisol in the blood for about 24 hours, whereas in some depressed patients the suppression lasts for a much shorter duration. Numerous studies have been conducted that investigate the DST response of eating disorder clients. For example, Hudson, Laffer, and Pope (1982) found that 56% of bulimic women (N = 9) showed a nonsuppression response similar to depressed clients, but significantly higher than normal clients. Subsequently, Hudson, Pope, Jonas, Laffer, et al. (1983) conducted a larger scale study. Again, results suggested the concomitant presence of depression in bulimics as indicated by nonsuppression in 47% of 47 bulimics studied. Other researchers have also found a significantly higher rate of nonsuppression (i.e., 35 to 67%) in bulimics and/or anorexics (e.g., Gwirtsman, Roy-Byrne, Yager, & Gerner, 1983; Lindy, Walsh, Roose, Gladis, & Glassman, 1985; Mendels, 1983; Mitchell & Bantle, 1983; Roy-Byrne et al., 1983) than in normal subjects. Although the validity of the DST as a diagnostic test for mood disorders is surrounded by controversy (Walsh, Roose, et al., 1985), it appears that a significant proportion of bulimics respond to the DST in a manner consistent with neuroendocrine

abnormalities and/or depression (Halmi, 1985; Hinz & Williamson, 1987).

Thyroid Stimulating Hormone (TSH) response. Other support from physiological signs comes from studies examining the TSH response to administration of TRH. Mood disorder clients typically show a blunted or abnormal response (Hatsukami, Mitchell, et al., 1984). For example, Loosen and Prange (1982) found that anorexics showed abnormal TSH responses to TRH as indicated by a blunted response, delay in peak TSH response, and delay in the fall of TSH. Furthermore, Gwirtsman, Roy-Byrne and associates (Gwirtsman et al., 1983; Roy-Byrne et al., 1983) found blunted TSH responses to TRH administration in 80% of 10 bulimics and 70% of 23 bulimics, respectively.

Thus, the physiological signs of DST response and TSH response to administration of TRH support physiological similarities between eating and mood disorders. However, the physiological similarities do not necessarily lend support to the hypothesis that eating disorders are a variant of mood disorders, because it is likely that weight and caloric restriction result in the neuroendocrine abnormalities seen in DST and TSH response (Altshuler & Weiner; 1985; Levy & Dixon, 1985; Strober & Katz, 1987).

Latency in Rapid Eye Movement (REM) onset.

Comparison studies have also examined latency in REM onset sleep recordings of depressed versus eating disorder clients. For example, Katz et al. (1984) matched 20 anorexics with 10 normal control subjects. All subjects spent one night adapting to sleep polygraph recording equipment. Dependent variables were (a) total time in bed, (b) REM latency, (c) percent of sleep for each stage, (d) number of nocturnal awakenings, (e) number of sleep stage shifts, (f) REM density, and (g) sleep density. Urinary free cortisol excretion per 24 hours [which indicates hypo-thalamic-pituitary (HPA) activation] and HRSD scores were also collected. Only two dependent measures were significantly different between groups (i.e., latency in REM onset and urinary free cortisol). Results showed that eating disorder clients had higher HPA activation and shorter latency in REM onset of 68 minutes (i.e., similar to individuals with primary or secondary depression) compared to 99 minutes for control subjects.

Although other researchers sometimes reported non-significant differences between latencies in REM onset for eating disorder and normal control subjects, most reported latencies in REM onset are similar to those reported by Katz et al. (1984). Specifically, latencies in REM onset for eating disorder versus normal subjects were (a) 78.7

minutes for bulimics, 64.9 minutes for anorexics, and 70.6 for controls (Walsh, Goetz, Roose, Fingerroth, & Glassman, 1985), (b) 68.3 minutes for bulimics, 60.0 minutes for anorexics, and 80.1 minutes for controls (Levy, Dixon, & Schmidt, 1988), (c) 69.2 minutes for bulimics, 61.1 minutes for anorexics, and 80.1 minutes for controls (Levy, Dixon, & Schmidt, 1986), and (d) 62.1 minutes for anorexics with a normal EEG, 97.8 minutes for anorexics with an abnormal EEG, and 90.8 minutes for controls (Neil et al., 1980). Discrepancies in latencies in REM onset between studies may be due to one or more variations in design (e.g., lack of an adaptation night to sleep polygraph recording) or sampling (e.g., exclusion of subjects with concurrent mood disorders and division of subjects by normal and abnormal EEGs). Overall, it appears that eating disorder clients may have decreased latencies in REM onset similar to those of depressed clients.

Bulimic versus depressed subjects. Comparison studies of depressive symptomology in eating disorder versus depressed clients are useful in determining whether depressive symptomology varies between groups. For example, Cooper and Fairburn (1986) compared 35 bulimics who met Russell's (1979) and the DSM-III (APA, 1980) criteria for bulimia with 44 subjects who met the Research

Diagnostic Criteria (RDC) criteria for major depression. All subjects completed a semi-structured interview and numerous self-report measures [i.e., Eating Attitudes Test (EAT), Three Factor Eating Questionnaire (TFEQ), Present State Examination (PSE), Montgomery & Asberg Depression Rating Scale (MADRS), HRSD, and BDI]. Although overall scores were similar for both groups, results suggested that bulimics experienced less sadness and suicidal thoughts, and more sleep, inner tension, situational anxiety, pessimistic thoughts, obsessions, and hypomania, than depressed subjects. A discriminant analysis clearly revealed a distinct bimodal distribution.

Others have confirmed Cooper and Fairburn's (1986) findings. For example, Laessle et al. (1988) used a discriminant function analysis to compare bulimics and primary depression patients on measures of depression. Again, results suggested that the depressive symptomology in eating disorder clients could be clearly differentiated from patients with primary depression. Specifically, eating disorder subjects showed less frequent symptoms of psychomotor retardation, decreased appetite, and reduced sexual energy compared to depressed individuals. Furthermore, the depressive symptomology in eating disorder clients appears to be consistently associated with fluctuations in specific psychopathology, especially

irrational beliefs about shape and weight (Cooper, Morrison, Bigman, Abramowitz, Levin, et al., 1988). Taken together, the studies comparing bulimics with depressed subjects support the hypothesis that eating and mood disorder are distinct syndromes that do not share common etiologies (Strober & Katz, 1987).

Bulimic versus normal subjects. A number of studies have compared bulimics with normal subjects in terms of depressive symptomology (Kaye, Gwirtsman, George, Weiss, & Jameson, 1986; Williamson et al., 1987). For example, Kaye et al. (1986) administered the Brief Psychiatric Rating Scale to 12 bulimic women [as defined by the DSM-III (APA, 1980)] and 7 control females who had no personal or family history of psychiatric disorder. Results indicated that prior to eating, bulimics rated themselves as significantly more depressed and anxious, but less hungry and confused than control subjects. However, after eating, bulimics showed a significantly greater reduction in anxiety. In fact, more than half of the bulimics showed a greater than 50% reduction in depression and/or anxiety between eating cycles. Moreover, Williamson et al. (1987) found that bulimics showed significantly higher elevations on the Depression, Hysteria, and Psychopathic Deviate scales, and significantly lower scores on the Mania scale of the MMPI, than normal controls. Also,

bulimics had significantly higher scores on the Beck Depression Inventory (BDI) and subscales of the Hopkins Symptom Checklist - 90 (SCL) (e.g., Interpersonal Sensitivity, Depression, Anxiety, and Psychoticism) than control subjects.

Antidepressant Treatment Studies

The pharmacological approach to the treatment of eating disorders accepts the premise that favorable response to antidepressant medications directly infers that eating disorders (particularly bulimia nervosa) are a variant of the mood disorders (i.e., affective variant hypothesis) (Agras, 1987). Regardless of the veracity of this premise, the general efficacy of antidepressants in the treatment of eating disorders tends to support the concomitant presence of mood disorders in eating disorders (Hudson, Pope, & Jonas, 1983), although the affective variant hypothesis is not necessarily supported (Mitchell, 1988).

There are two general categories of antidepressant treatment studies for eating disorders (i.e., uncontrolled studies or case reports, and double-blind, placebo-controlled or crossover design studies). First, uncontrolled case studies will be presented followed by double-blind, placebo-controlled research.

Uncontrolled studies. Several uncontrolled case studies of the efficacy of antidepressants have been reported. Fourteen open trial studies were located in the published literature (see Table 4). The classes of drugs used ranged from monoamine oxidase inhibitors and tricyclic antidepressants to newer antidepressants and lithium carbonate. For example, the primary monoamine oxidase inhibitors that have been employed are phenelzine (Hudson, Pope, Jonas, & Yurgelun-Todd, 1985; Pope & Hudson, 1982; Rich, 1978; Walsh et al., 1982) and tranylcypromine (Hudson, Pope, Jonas, & Yurgelun-Todd, 1985; Hudson, Pope, & Jonas, 1985; Walsh et al., 1982). Similarly, traditional tricyclic antidepressants that have been used are (a) imipramine (Hudson, Pope, & Jonas, 1985; Hudson, Pope, Jonas, & Yurgelun-Todd, 1985; Moore, 1977; Pope & Hudson, 1982; White & Schnaultz, 1977), (b) amitriptyline (Mills, 1976; Moore, 1977; Needleman & Waber, 1977), (c) desipramine (Hudson, Pope, & Jonas, 1985; Hudson, Pope, Jonas, & Yurgelun-Todd, 1985; Pope & Hudson, 1982), (d) nortriptyline (Hudson, Pope, & Jonas, 1985; Mills, 1976; Pope & Hudson, 1982), and (e) amoxapine (Hudson, Pope, Jonas, & Yurgelun-Todd, 1985; Pope & Hudson, 1982).

The use of newer antidepressants of trazodone (Hudson, Pope, & Jonas, 1985; Hudson, Pope, Jonas, &

Table 4

Characteristics of Uncontrolled Antidepressant Treatment Studies for Eating Disorder Patients

Study	Subjects ^a			Treatment ^b			Improvement (%) ^c					
	Number	Eating disorder	# binges/wk illness duration (yrs)	Drug	Dosage (mg/day)	Serum level (ng/ml)	Length (wks)	Worse or no change	Unspecified or less than 50%	50 to 74%	75 to 99%	100%
Monoamine Oxidase Inhibitors												
Anorexic Symptoms												
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	1	Anorexia	3	Phenelzine			12			100		
	4	Anorexia	6 <1	Tranylcypromine			37	50		25		25
Binge Eating												
Hudson, Pope, & Jonas, 1985	25	Bulimia	5 9	Tranylcypromine			6		20	12	28	40
Pope & Hudson, 1982	1	Anorexia	4	Phenelzine	60	127	>2	100		25	25	
Rich, 1978	1	Bulimia		Phenelzine			6					100
Walsh et al., 1982	5	Bulimia	6 21	Phenelzine	75						40	60
	26	Bulimia	5 9	Tranylcypromine	40		6		19	12	27	42
Weight Gain												
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	1	Anorexia	3	Phenelzine			12			100		
	4	Anorexia	6 <1	Tranylcypromine			37	75		25		
Traditional Tricyclic Antidepressants												
Anorexic Symptoms												
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	1	Anorexia	3	Amoxapine			6			100		
	2	Anorexia	3 4	Desipramine			25	50		50		

(table continues)

Study	Subjects ^a				Treatment ^b			Improvement (%) ^c					
	Number	Eating disorder	# binges/wk	Illness duration (yrs)	Drug	Dosage (mg/day)	Serum level (ng/ml)	Length (wks)	Worse or no change	Unspecified or less than 50%	50 to 74%	75 to 99%	100%
Binge Eating	7	Anorexia	6	2	Imipramine			4	28	14	29		29
Hudson, Pope, & Jonas, 1985	38	Bulimia	5	9	Desipramine			6		26	21	26	26
	38	Bulimia	5	9	Imipramine			6		26	21	26	26
	38	Bulimia	5	9	Nortriptyline			6		26	21	28	28
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	6	Anorexia	6	2	Imipramine			9			33		67
Moore, 1977	1	Anorexia			Amitriptyline	150		12		100	12	27	42
	1	Anorexia			Imipramine	150		16	100				
Pope & Hudson, 1982	1	Bulimia	2	4	Amoxapine	300		>2	100				
	2	Bulimia	4	6	Desipramine	200		>2		100			
	7	Bulimia	3	6	Imipramine	207		>2	14			71	15
Weight Gain													
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	1	Anorexia	3		Amoxapine			6		100			
	2	Anorexia	3	4	Desipramine			25	100				
	7	Anorexia	6	2	Imipramine			8	57	14	14		15
Moore, 1977	1	Anorexia			Amitriptyline	150		12		100			
	1	Anorexia			Imipramine	150		16	100				
Needleman & Waber, 1977	5	Anorexia		1	Amitriptyline	125		25				100	
White & Schnautz, 1977	2	Anorexia		2	Imipramine	163		4	100				
Mood													
Needleman & Waber, 1977	5	Anorexia		1	Amitriptyline	125		25				100	
White & Schnautz, 1977	2	Anorexia		2	Imipramine	163		4	100				
Global													
Mills, 1976	65	Anorexia			Amitriptyline	200				100			

(table continues)

Study	Subjects ^a				Treatment ^b			Improvement (%) ^c				
	Number	Eating disorder	# binges/wk illness duration (yrs)	Drug	Dosage (mg/day)	Serum level (ng/ml)	Length (wks)	Worse or no change	Unspecified or less than 50%	50 to 74%	75 to 99%	100%
	65	Anorexia		Nortriptyline	40+				100			

Newer Antidepressants												
Anorexic Symptoms												
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	3	Anorexia	3	Trazodone			23	67				
Binge Eating												
Hudson, Pope, & Jonas, 1985	16	Anorexia	5	9	Trazodone		6		75	6	19	
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	3	Anorexia	3		Trazodone		23	33				
Nassr, 1986	5	Bulimia	4	4	Nomifensine	165	5		20			
Pope, Herridge, et al., 1986	12	Bulimia	9	12	Nomifensine	250	18		10	20	40	30
Wold, 1983	3	Bulimia			Trazodone	150			100			
Weight Gain												
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	3	Anorexia	3		Trazodone		23	67		33		
Mood												
Wold, 1983	3	Bulimia			Trazodone	150			100			

Lithium Carbonate												
Binge Eating												
Hsu, 1984	14	Bulimia	4	11	Lithium	900	4			14	14	64
Hsu, 1987	17	Bulimia			Lithium		6			35	65	
Hudson, Pope, Jonas, & Yurgelun-Todd, 1985	1	Anorexia	1	21	Lithium		58					100
Pope & Hudson, 1982	1	Bulimia	4	14	Lithium	1200			100			
Mood												
Hsu, 1984	14	Bulimia	4	14	Lithium	900	4			100		

(table continues)

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Bulimia = Bulimia or Bulimia Nervosa)

binges/wk = mean number of binges per week

Illness duration (yrs) = mean number of years that patients have had their eating disorder

^b Treatment

Drug = drug used in treatment

Dosage (mg/day) = mean dosage of the drug

Serum level (ng/ml) = mean serum level

Length (wks) = mean length of treatment in weeks

^c

Improvement (%) = percent of subjects that improved in each of the percentage categories listed

Yurgelun-Todd, 1985; Wold, 1983) and nomifensine (Nassr, 1986; Pope, Herridge, Hudson, Fontaine, & Yurgelun-Todd, 1986) have also been reported. Lastly, lithium carbonate has been tried in the treatment of anorexia nervosa and bulimia nervosa (Hsu, 1984, 1987; Hudson, Pope, Jonas, & Yurgelun-Todd, 1985; Pope & Hudson, 1982).

It is obvious that there are numerous problems with uncontrolled studies that make any conclusions and generalizations questionable. Indeed, concomitant diagnoses, dosage, length of treatment, and compliance with treatment (as seen in blood serum levels) are rarely reported. Furthermore, the presence of bingeing and vomiting are important prognostic factors that often escape the researchers' attention. Perhaps even more importantly, these studies (a) did not report how the outcome was measured (e.g., interview, observation, or self-report), (b) rarely reported follow-up results, and (c) frequently treated the same person with several antidepressants in combination or consecutively without specifying the drug-free time periods between drug changes (e.g., Hudson, Pope, Jonas, & Yurgelun-Todd, 1985). Lastly, success is not generally reported as a continuous variable, but rather lumped into discrete categories. For example, Hudson, Pope, and Jonas (1985) categorized results in terms of remission (complete remission or 100%

improvement), marked improvement (greater than 75% improvement), moderate improvement (greater than 50% improvement), and little or no improvement (less than 50% improvement).

Taken together, the results of uncontrolled studies are optimistic. For example, several researchers (e.g., Hudson, Pope, & Jonas, 1985; Needleman & Waber, 1977) showed that anorexics treated with tricyclic antidepressants showed improvement by gaining weight, and by reducing their symptoms of depression and abnormal attitudes toward food. Tricyclic antidepressant treatment of bulimics also led to decreased depressive symptomology and occasionally, the number of binge eating episodes (e.g., Pope & Hudson, 1982). In general, similar results were obtained with monoamine oxidase inhibitors, newer antidepressants, and lithium carbonate.

Double-blind, placebo-controlled studies. The successful treatment of eating disorders in uncontrolled trials led to several double-blind, placebo-controlled studies. According to Mitchell (1990), placebo controls are necessary to determine exactly which treatment components (e.g., drug, physician, and/or setting) are really therapeutic. Furthermore, double-blind studies (i.e., cases in which neither experimenters nor subjects know whether a subject is taking a placebo or drug) guard

against experimenter bias. As seen in Table 5, 12 studies were found that used double-blind, placebo controls to study the effectiveness of antidepressants on anorexia nervosa and bulimia nervosa.

Again, the same general classes of drugs were used. Phenelzine (Pope, Hudson, Jonas, & Yurgelun-Todd, 1983; Walsh, Gladis, Roose, Stewart, & Glassman, 1987; Walsh, Stewart, Roose, Gladis, & Glassman, 1984) and tranylcypromine (Pope et al., 1983) were the primary monoamine oxidase inhibitors used, whereas traditional tricyclic antidepressants used were (a) imipramine (Agras, Dorian, Kirkley, Arnow, & Bachman, 1987; Pope et al., 1983), (b) amitriptyline (Biederman, Herzog, et al., 1985; Halmi, Eckert, LaDu, & Cohen, 1986; Mitchell & Groat, 1984), (c) carbamazepine (Kaplan, Garfinkel, Darby, & Garner, 1983), (d) desipramine (Hughes, Wells, Cunningham, & Ilstrup, 1986; Pope et al., 1983), and (e) nortriptyline (Mitchell & Groat, 1984; Pope et al., 1983). Furthermore, the newer antidepressants of trazodone (Pope et al., 1983), mianserin (Sabine, Yonace, Farrington, Barratt, & Wakeling, 1983), and bupropion (Pope et al., 1983) have also been used in double-blind trials. Lastly, lithium carbonate (Gross et al., 1981) and l-tryptophan (Krahn & Mitchell, 1985) have been tried in the treatment of anorexia nervosa and bulimia.

Table 5

Characteristics of Double-Blind, Placebo-Controlled Antidepressant Treatment Studies for Eating Disorder Patients

Study	Subjects ^a				Treatment ^b				Improvement (%) ^c					
	Number	Eating disorder	# binges/wk	Illness duration (yrs)	Drug	Dosage (mg/day)	Serum level (ng/ml)	Length (wks)	< 50%		50 to 75%		100%	
									Drug	Placebo	Drug	Placebo	Drug	Placebo
Monoamine Oxidase Inhibitors														
Binge Eating														
Pope et al., 1983	5	Bulimia	10	7	Phenelzine			6	20	15	60	8	20	69
	12	Bulimia	10	7	Tranylcypromine			6	17	69	34	8	58	15
Walsh et al., 1984	9	Bulimia	11	8	Phenelzine	60		6			77	6		
Walsh et al., 1987	23	Bulimia	12	9	Phenelzine	60		8			64	6		
EAT Scores														
Walsh et al., 1984	9	Bulimia	11	8	Phenelzine	60		6			33	-1		
Mood														
Walsh et al., 1984	9	Bulimia	11	8	Phenelzine	60		6			37	-17		
Traditional Tricyclic Antidepressants														
Binge Eating														
Agras et al., 1987	10	Bulimia		10	Imipramine	167		16			72	43		
Biederman, Herzog, et al., 1985	11	Anorexia		2	Amitriptyline	112	61	20	33	64	67	36		
Hughes et al., 1986	10	Bulimia	10	8	Desipramine	200		6			92	-19		
Kaplan et al., 1983	6	Bulimia		7	Carbamazepine	8		6			17			
Mitchell & Groat, 1984	32	Bulimia		5	Amitriptyline	150	103	9			72	52		

(table continues)

Study	Subjects ^a				Treatment ^b				Improvement (%) ^c					
	Number	Eating disorder	# binges/wk	Illness duration (yrs)	Drug	Dosage (mg/day)	Serum level (ng/ml)	Length (wks)	< 50%		50 to 75%		100%	
									Drug	Placebo	Drug	Placebo	Drug	Placebo
Pope et al., 1983	32	Bulimia		5	Nortriptyline	150	103	9			72	52		
	20	Bulimia	10	6	Imipramine			6	40	77	30	0	25	8
	4	Bulimia	10	5	Desipramine			6	25	77	25	0	50	15
	2	Bulimia	10	11	Nortriptyline			6	50	77			0	15
EAT Scores														
Agras et al., 1987	10	Bulimia		10	Imipramine	167		16			25	21		
Purging														
Agras et al., 1987	10	Bulimia		10	Imipramine	167		16			72	35		
Mood														
Agras et al., 1987	10	Bulimia		10	Imipramine	167		16			51	25		
Biederman, Herzog, et al., 1985	11	Anorexia		2	Amitriptyline	112	61	20	0	14	100	79		
Halmi et al., 1986	23	Anorexia		3	Amitriptyline	160		4			29	19		
Hughes et al., 1986	10	Bulimia	10	8	Desipramine	200		6			24	3		
Mitchell & Groat, 1984	32	Bulimia		5	Amitriptyline	150	103	9			63	30		
	32	Bulimia		5	Nortriptyline	150	103	9			63	30		
----- Newer Antidepressants -----														
Binge Eating														
Pope et al., 1983	1	Bulimia	10	2	Buprioin			6	100	77	0	0	0	15
	10	Bulimia	10	7	Trazodone			6	70	77	30	0	0	15
Mood														
Sablne et al., 1983	20	Bulimia			Mianserin	60		8			-3	5		
----- Other Drugs -----														
Binge Eating														
Krahn & Mitchell, 1985	13	Bulimia	10		l-tryptophan	300		6			24	33		

(table continues)

Study	Subjects ^a				Treatment ^b				Improvement (%) ^c					
	Number	Eating disorder	# binges/wk	Illness duration (yrs)	Drug	Dosage (mg/day)	Serum level (ng/ml)	Length (wks)	< 50%		50 to 75%		100%	
									Drug	Placebo	Drug	Placebo	Drug	Placebo
Mood														
Gross et al., 1981	8	Bulimia			Lithium			4			22	27		

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Bulimia = Bulimia Nervosa)

binges/wk = mean number of binges per week

Illness duration (yrs) = mean number of years that eating disorder patients have had their eating disorder

^b Treatment

Drug = drug used in treatment

Dosage (mg/day) = mean dosage of the drug

Serum level (ng/ml) = mean serum level

Length = mean length of drug treatment in weeks

^c Improvement (%) = percent of subjects that improved in each of the percentage categories listed

Generally unsuccessful or equivocal results for the drug treatment of eating disorders have been reported for (a) carbamazepine (Kaplan et al., 1983), (b) amitriptyline (Biederman, Herzog, et al., 1985), (c) bupropion (Pope et al., 1983), (d) mianserin (Sabine et al., 1983), (e) lithium carbonate (Gross et al., 1981), and (f) l-tryptophan (Krahn & Mitchell, 1985). Small sample sizes and inadequate serum levels may account for the unsuccessful and equivocal results obtained in these studies and replications are warranted before final conclusions on their effectiveness are drawn.

Several double-blind, placebo-controlled studies seem to demonstrate the effectiveness of antidepressant medications. For example, phenelzine appears to significantly reduce the frequency of binge episodes (Walsh et al., 1984, 1987) and abnormal eating attitudes (Walsh et al., 1987). Another monoamine oxidase inhibitor that may effectively reduce the frequency of binge episodes is tranylcypromine (Pope et al., 1983). Effective tricyclic antidepressants are (a) desipramine (Hughes et al., 1986; Pope et al., 1983), (b) imipramine (Agras et al., 1987; Pope et al., 1983), and (c) nortriptyline (Mitchell & Groat, 1984; Pope et al., 1983). Likewise, the newer antidepressant of trazodone appears to

significantly reduce the frequency of binge episodes (Pope et al., 1983).

Overall, the majority of double-blind, placebo-controlled studies seem to demonstrate the efficacy of antidepressant medications in treating eating disorders (particularly bulimia), at least in the short term (Agras & McCann, 1987; Hudson & Pope, 1987; Johnson, Stuckey, & Mitchell, 1983; Judd, Norman, & Burrows, 1987; Kennedy & Walsh, 1987; Mitchell, 1988; Pope & Hudson, 1985, 1986; Pope, Hudson, & Jonas, 1986; Rossiter & Agras, 1989; Treasure, 1988; Walsh, 1988; Wilson, 1986). Moreover, Pope, Hudson, Jonas, and Yurgelun-Todd (1985) followed bulimics treated with antidepressants. After two years, 95% experienced at least partial improvement and 50% experienced complete remission in their bulimic symptoms.

Furthermore, bulimics treated with traditional tricyclic antidepressants also showed significantly superior results compared to a placebo. Specifically, antidepressants contrasted with a placebo promoted a significantly greater reduction in (a) binge frequency (e.g., Pope et al., 1983), (b) purging (e.g., Agras et al., 1987), (c) depression (e.g., Agras et al., 1987), (d) preoccupation with food (e.g., Agras et al., 1987), and (e) higher subjective global improvement scores (e.g., Biederman, Herzog, et al., 1985). Moreover, in a double-

blind, placebo crossover design, Hughes et al. (1986) found that desipramine resulted in a 91% decrease in binge frequency compared to a 19% increase in the placebo group.

Although several antidepressant drug treatments seem effective, one should keep in mind that attrition rates and side effects are often unreported. Also, few studies of the effects of antidepressant medications on anorexia nervosa are available. Other problems with double-blind, placebo-controlled studies make conclusions and generalizations difficult. For example, important treatment factors often go unreported (e.g., concomitant diagnoses, dosage, length of treatment, and compliance with treatment as seen in blood serum levels). Also, the marked variation in placebo response rates across studies (i.e., from 0 to 52% reduction in target behaviors) suggests differences in sampling or concurrent psychotherapy (Herzog & Brotman, 1987; Mitchell, 1990). Moreover, most studies are of limited duration and the mechanism of action is unclear (Mitchell, 1990).

Problems notwithstanding, it seems reasonable to conclude that depression is prevalent in eating disorders and that antidepressants may help reduce both binge frequency and depression, at least in a subgroup of eating disorder clients. Additionally, the antidepressant

studies tend to support a relationship between eating and mood disorders.

Summary of Mood Disorder

There is overwhelming evidence from five major lines of research that mood and eating disorders are associated. Thus, mood disorders (particularly depression) must be assessed when evaluating clients with apparent eating disorders. Although studies are occasionally reported that seem to diagnose a mood disorder based solely on test scores (e.g., Wilson & Lindholm, 1987), the majority of studies that support a relationship between mood and eating disorders employ the stricter diagnostic criteria of the DSM-III (APA, 1980) or RDC. Although the exact nature of the relationship is unclear, any diagnostic training program ought to include a section wherein consideration of specific evaluations for concurrent mood disorders is prompted. Co-morbidity has important diagnostic and treatment implications, in that eating disorder treatment may need to address concurrent mood disorders in order to be comprehensive and effective (Williamson, 1990).

Anxiety Disorder

Compared to the evidence for co-morbid mood disorders in eating disorders, there is less research on concurrent

anxiety disorders. Nevertheless, clinical observation, descriptive studies (e.g., responses to psychological measures of anxiety and reports of mood states throughout the eating cycle), comparison studies, and prevalence studies all suggest that anxiety disorders may be comorbid with eating disorders.

Several authors have noted that anxiety associated with the fear of weight gain is a prominent variable in eating disorder patients (Andersen, 1987; Crisp, 1980; Schlundt & Johnson, 1990). Although the anxiety is not free-floating, weight gain seems to promote further anxiety and self-destructive behavior in anorexics (Crisp, 1980). For bulimics, eating fosters anxiety, feeling out of control, and the desire to purge (Schlundt & Johnson, 1990).

Eating disorder subjects show significant elevations on psychological measures of anxiety (Casper, Eckert, Halmi, Goldberg, & Davis, 1980; Fairburn & Cooper, 1982; Ordman & Kirschenbaum, 1986; Solyom, Freeman, Thomas, & Miles, 1983; Weiss & Ebert, 1983; Williamson, Kelley, Davis, Ruggiero, & Blouin, 1985; Yellowless, 1985) and a high rate of anxiety disorders (Piran et al., 1985). For example, Williamson et al. (1985) matched 15 bulimics on age and height to an equal number of obese and normal subjects. Subjects were administered the MMPI, SCL, BDI,

and a body image assessment. Results showed that bulimics evidenced significantly more psychopathology than obese or normal subjects. In other words, bulimics had significantly higher scores on subscales of depression, anxiety, guilt, obsessive thinking, and preoccupation.

Yellowless (1985) compared 17 restricting anorexics to 15 bulimic anorexics on the Delusional Symptoms and States Inventory. His results suggested that bulimics experienced more self-harm and guilt than restricting anorexics. Furthermore, higher levels of anxiety and depression seem to be associated with poorer treatment outcomes in eating disorder clients. Fairburn, Cooper, Kirk, and O'Connor (1985) randomly assigned 24 bulimics to cognitive-behavior therapy or short-term focal psychotherapy. Subjects were interviewed and completed several standardized self-report measures (i.e., EAT, PSE, and MADRS). Although both groups improved in their eating habits (as indicated by a significant reduction in EAT scores), poorer outcomes were associated with higher levels of both anxiety and depression at the end of treatment.

The DSM-III-R (APA, 1987) classifies obsessive-compulsive disorder under the rubric of anxiety disorders. Eating disorder patients (particularly bulimics) appear to be highly obsessive-compulsive (Ordman & Kirschenbaum,

1986). Indeed, eating disorder patients may be even more obsessive-compulsive (as indicated by anxiety, ruminations, and difficulty making decisions) than phobics (Solyom et al., 1983) or substance abusers (Johnson & Connors, 1987).

Furthermore, bulimics asked to describe their mood states before, during, and after binge episodes frequently report symptoms of anxiety (Abraham & Beumont, 1982; Carroll & Leon, 1981; Mitchell, Hatsukami, Eckert, & Pyle, 1985). For example, Abraham and Beumont (1982) found that precipitants of bingeing were tension, eating, and thinking about food. Moreover, before bingeing, eating disorder subjects often described physical concomitants of anxiety, whereas many subjects reported relief from anxiety during and after binge episodes.

Table 6 presents five prevalence studies involving the co-morbidity of anxiety and eating disorders. All the studies used interviews to assess the degree of co-morbidity of anxiety and eating disorders. Although there are obvious problems associated with interviews (e.g., unknown reliability and possible experimenter bias that may exaggerate true prevalence rates), it seems reasonable to conclude that anxiety is a prevalent and significant problem for a vast number of eating disorder patients.

Table 6

Presence of Anxiety Disorders in Eating Disorder Patients

Study	Subjects ^a				Diagnosis (%) ^c					
	Number	Eating disorder	Diagnostic criteria	Anxiety measure ^b	Agoraphobia	Generalized Anxiety Disorder	Obsessive-Compulsive Disorder	Panic Disorder	Simple Phobia	Social Phobia
Cantwell et al., 1977	18	Anorexia	Feighner	Unspecified				30	33	
Hudson, Pope, Jonas, & Yurgelun-Todd, 1983	16	Anorexia	DSM	DIS	13		69	38	25	
	25	Both	DSM	DIS	24		44	44	4	
	49	Bulimia	DSM	DIS	10		24	39	12	
	51	Bulimia	DSM	DIS	<14		33	<14		
Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1983	19	Bulimia ¹	DSM	DIS	<26		32	<26		
	28	None	DSM	DIS	<14		7	<14		
	41	Anorexia	DSM		10		10	5	15	32
Laessle et al., 1989	50	Bulimia	DSM		16		16	8	24	52
Walsh, Roose, et al., 1985	41	Bulimia	DSM	SADS		2		0		

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Both = Anorexia Nervosa and Bulimia, Bulimia = Bulimia or Bulimia Nervosa, None = No Eating Disorder)

Diagnostic criteria = diagnostic criteria used to diagnose the eating disorder (DSM = DSM-III or some modification thereof, Feighner = Feighner et al., 1972)

^b Anxiety measure = measure used to diagnose anxiety disorders (DIS = Diagnostic Interview Schedule, SADS = Schedule for Affective Disorders, SADS = Schedule for Affective Disorders and Schizophrenia, Unspecified = Unspecified Structured or Semi-Structured Interview)

^c Diagnosis (%) = percent of eating disorder subjects who have an anxiety disorder

¹ remitted

In fact, anxiety disorders of agoraphobia, obsessive-compulsive disorder, panic disorder, and phobias (i.e., simple and social) are all common in eating disorders (see Table 6). The only anxiety disorder that does not seem co-morbid with eating disorders is generalized anxiety disorder. This is in line with Crisp's (1980) conclusion that the anxiety experienced by eating disorder clients is not "free-floating." Nonetheless, social phobia (32 to 52%) and obsessive-compulsive disorder (10 to 69%) are the most common anxiety disorders in eating disorder clients, followed by panic disorder (0 to 44%), simple phobia (4 to 33%), and agoraphobia (10 to 24%). Overall, the concomitant presence of anxiety disorders in eating disorders (i.e., about 20%) seems significantly higher than prevalence rates for normal subjects (i.e., about 14%).

In summary, anxiety problems appear to play a major role in the onset, perpetuation, and maintenance of eating disorders (Andersen, 1987). The anxiety-reduction hypothesis purports that binge eating increases anxiety, whereas purging reduces the anxiety levels of eating disorder patients (Andersen, 1987). Thus, the concomitant presence of anxiety disorders in eating disorders is significant and ought to be considered in evaluating and planning treatment for eating disorder clients.

Personality Traits and Disorders

Like studies of anxiety disorders among persons with eating disorders, research supports an association between dysfunctional personality characteristics and eating disorders. Chapters of books have been published that specifically deal with personality profiles of anorexics (e.g., Johnson & Connors, 1987) and treating bulimics with borderline personality disorder (e.g., Dennis & Sansone, 1989). In considering personality issues, the concept of traits will be discussed first, followed by personality disorders.

Personality Trait Assessment

Certain dysfunctional personality traits appear to be frequent in eating disorder clients as indicated by structured interviews, such as the (a) Diagnostic Interview for Borderlines (DIB; Bram, Eger, & Halmi, 1982), (b) DIS (Yates, Sieleni, & Bowers, 1989), and (c) Psychiatric and Social History form (Bram et al., 1982). Also, standardized self-report personality questionnaires have been extensively used to determine specific personality traits in individuals with an eating disorder. These include the (a) California Psychological Inventory (CPI; Strober, 1980), (b) Delusional Symptoms and States Inventory (DSSI; Yellowless, 1985), (c) Eysenck

Personality Inventory (EPI; Smart, Beumont, & George, 1976; Strober, 1980), (d) High School Personality Questionnaire (HSPQ; Strober, 1981), (e) History and Personality Questionnaire (HPQ; Leon, Lucas, Colligan, Ferninande, & Kamp, 1985), (f) Leyton Obsessional Inventory (LOI; Smart et al., 1976, Strober, 1980), (g) MMPI (Leon et. al., 1985; Norman & Herzog, 1983; Prather & Williamson, 1988), (h) Personality Attributes Questionnaire (PAQ; Katzman & Wolchik, 1984), (i) Personality Diagnostic Questionnaire (PDQ; Yates, Sieleni, & Bowers, 1989), (j) Sixteen Personality Factor Questionnaire (16PF; Nagelberg, Hale, & Ware, 1984), and (k) SCL (Cooper, Morrison, Bigman, Abramowitz, Blunden, et al., 1988; Ordman & Kirschenbaum, 1986; Prather & Williamson, 1988; Strober, 1980).

Differential Prevalence of Traits

Overall, certain dysfunctional personality traits seem to be more common in eating disorder patients than in normal controls or other comparison groups. Prevalent dysfunctional personality traits in eating disorder clients are (a) withdrawal tendencies, alienation, avoidance of (and difficulty with) interpersonal relationships (Casper, 1987; Dennis & Sansone, 1989; Ordman & Kirschenbaum, 1986), (b) low self-esteem, poor self-concept, self-criticism, guilt, external locus of

control, and lack of assertiveness (Casper, 1987; Dennis & Sansone, 1989; Katzman & Wolchik, 1984; Ordman & Kirschenbaum, 1986; Pertschuk et al., 1986; Yellowless, 1985), (c) labile affect and high distress (Dennis & Sansone, 1989; Garfinkel & Garner, 1982; Katzman & Wolchik, 1984; Norman & Herzog, 1983; Pertschuk et al., 1986; Smart et al., 1976; Yellowless, 1985), (d) high self-expectations and need for approval (Katzman & Wolchik, 1984), (e) impulsiveness (Dennis & Sansone, 1989; Ordman & Kirschenbaum, 1986), and (f) perfectionism (Ordman & Kirschenbaum, 1986).

Some authors (Strober, 1981; Wolf & Crowther, 1983) have performed discriminant function analyses to determine whether eating disorder patients could be distinguished from other anxiety disorder subjects. For example, Strober (1981) found that anorexics could be distinguished from anxiety and conduct disorder subjects by their greater conformity, neurotic anxieties, control of emotionality, and stimulus avoidance. Furthermore, binge eating can be predicted on the basis of anorexic-like eating attitudes, dissatisfaction with body image, and poor self-image (Wolf & Crowther, 1983).

Thus, dysfunctional personality traits appear to be common in eating disorder clients (particularly instability in self-concept, mood, and interpersonal

relationships) as indicated by structured interviews and self-report personality measures. Uncontrolled studies and discriminant function analyses suggest a significant prevalence of dysfunctional personality traits in eating disorder patients. Although these personality traits may not be severe enough to warrant a diagnosis of personality disorder, they may interfere with the treatment process, and should be considered during assessment and treatment planning (Swift & Wonderlich, 1988).

Formal Personality Disorder

Certain personality disorders also appear to be comorbid in eating disorder patients. For example, comparative analyses show that bulimics are more likely than anorexics to meet the diagnostic criteria for borderline personality disorder (Bram et al., 1982) and that purgers (i.e., bulimics and bulimic anorexics) generally have lower "will-power," self-esteem, and regard for social demands than non-purgers (Nagelberg et al., 1984). Furthermore, eating disorder patients with comorbid personality disorders are more likely (than eating disorder clients without personality disorders) to have poorer adjustment. For example, dually-diagnosed personality and eating disorder subjects had a history of major depression and suicide attempts, as well as higher EDI scores (e.g., Drive for Thinness, Body

Dissatisfaction, Ineffectiveness, and Personal Distress subscales) (Yates, Sieleni, & Bowers, 1989) and SCL scores (e.g., Interpersonal Sensitivity, Phobic Anxiety, Paranoid Ideation, and Depression) (Cooper, Morrison, Bigman, Abramowitz, Blunden, et al., 1988) than eating disorder clients without personality disorders.

In addition, several studies have examined the comorbid prevalence of personality disorder (particularly antisocial and borderline personality disorder) among eating disorder subjects (see Table 7). Although nine reports were found, many were uncontrolled studies (Cantwell et al., 1977; Johnson, Tobin, & Enright, 1989; Levin & Hyler 1983; Roy-Byrne et al., 1983). About half of the studies employed some control measures, such as comparison groups (Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1983; Pope, Frankenburg, Hudson, Jonas, & Yurgelun-Todd, 1987; Yates, Sieleni, Reich, & Brass, 1989) and blind evaluation (Bram et al., 1982; Pope et al., 1987). Furthermore, the majority of studies used a structured interview to diagnose personality disorders, such as the Personality Diagnostic Questionnaire (PDQ; Levin & Hyler, 1983; Yates, Sieleni, Reich, et al., 1989).

The problem with "non-blind" structured interviews and the PDQ is that bias may result in false positives

Table 7

Presence of Personality Disorders in Eating Disorder Patients

Study	Subjects ^a				Diagnosis (%) ^c									
	Number	Eating disorder	Diagnostic criteria	Personality measure(s) ^b	Antisocial	Avoidant	Borderline	Compulsive	Dependent	Histrionic	Narcissistic	Paranoid	Schizoid	Schizotypal
Uncontrolled Studies														
Cantwell et al., 1977	26	Anorexia ¹	Feighner	Unspecified	12									
	18	Anorexia	Feighner	Unspecified	17									
Johnson et al., 1989	94	Both	DSM	BSI			46							
Levin & Hyler, 1983	24	Bulimia		PDQ			44							
Roy-Byrne et al., 1983	14	Bulimia					50							
Controlled Studies														
Bram et al., 1982	6	Anorexia	DSM	DIB	33		17							
Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a	16	Anorexia	DSM	DIS	0		0			0				
	25	Both	DSM	DIS	20		12							
	49	Bulimia	DSM	DIS	2		10			8				
Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1983	52	Bulimia	DSM	DIS	2		2			0				
	19	Bulimia ²	DSM	DIS	5									
Pope et al., 1987	28	None	DSM	DIS	3									
	52	Bulimia	DSM	DIB			25							
Yates, Sieleni, Reich, et al., 1989	13	None	DSM	DIB			8							
	30	Bulimia	DSM	DIS & PDQ	3	3	13	37	33	33	3	3	7	33

(table continues)

Study	Subjects ^a				Diagnosis (%) ^c									
	Number	Eating disorder	Diagnostic criteria	Personality measure(s) ^b	Antisocial	Avoidant	Borderline	Compulsive	Dependent	Histrionic	Narcissistic	Paranoid	Schizoid	Schizotypal
	30	None	DSM	DIS & PDQ	0	0	0	20	23	3	0	0	0	10

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Both = Anorexia Nervosa and Bulimia, Bulimia = Bulimia or Bulimia Nervosa, None = No Eating Disorder)

Diagnostic criteria = diagnostic criteria used to diagnose the eating disorder (DSM = DSM-III or some modification thereof, Feighner = Feighner et al., 1972)

^b Personality measure(s) = measure(s) used to diagnose a personality disorder (BSI = self-report inventory that taps seven operational criteria listed in the DSM-III for Borderline Personality Disorder, DIB = Diagnostic Interview for Borderlines, DIS = Diagnostic Interview Schedule, PDQ = Personality Diagnostic Questionnaire, Unspecified = Unspecified Structured or Semi-Structured Interview)

^c Diagnosis (%) = percent of eating disorder subjects with a personality disorder

¹ parental reports

² remitted

(i.e., cases in which personality disorder diagnoses are given, although subjects do not truly have a personality disorder). In turn, the true prevalence rate may be exaggerated (Pope & Hudson, 1989). Another confound is that the DSM-III-R (APA, 1987) diagnostic criteria for borderline personality disorder involves eating binges as one of the diagnostic criteria. Thus, all bulimics will have at least one borderline characteristic, according to the DSM-III-R (APA, 1987).

Although the true prevalence of personality disorders among eating disorder clients has likely been over-estimated, research shows that antisocial and borderline personality disorders may be the most common co-morbid personality disorders (see Table 7). Uncontrolled studies show the prevalence of antisocial personality disorder to range from 12 to 17% in eating disorder clients, whereas controlled studies range from 0 to 33%. Furthermore, borderline personality disorder appears to range from 44 to 50% and from 0 to 25% in uncontrolled and controlled studies, respectively. Other personality disorders are also possible, but there is little research to support their co-morbid presence in eating disorders. Although it appears that there is a wide variability in prevalence rates of concurrent personality disorders, co-morbidity is a significant problem because personality disorders may

negatively affect the treatment process. Therefore, personality disorders need to be evaluated and considered in diagnosing and treating eating disorder patients (Swift & Wonderlich, 1988).

Substance Use Disorder

As with personality disorders, substance use disorders appear to be more common among female eating disorder patients than the general population of women (Schlundt & Johnson, 1990). Some authors have conceptualized eating disorders per se as encompassed within the spectrum of addictive behaviors. Indeed, Hardy and Waller (1989) compared bulimic behavior to the DSM-III-R (APA, 1987) diagnostic criteria for psychoactive substance dependence disorders and concluded that bulimics generally met the criteria. Namely, bulimics show more preoccupation with, and consumption of, the substance (food) than intended during binges. Also, bulimics evidenced (a) a strong desire to stop substance use, but failed in their efforts to control their substance use, (b) social adjustment problems, (c) renouncement of important activities in order to seek the substance, and (d) continued substance use despite social, occupational, and financial consequences. In addition, Hatsukami, Owen, Pyle, and Mitchell (1982) noted tendencies of bulimics to

be secretive about their behavior and to use the substance to cope with stress and/or negative mood states.

Furthermore, Hatsukami et al. (1982) compared MMPI scores and profiles of 52 bulimic women with 120 inpatient substance abusers. MMPI results suggested that both groups show elevated scores on the Depression, Psychopathic Deviate, Psychoasthenia, and Schizophrenia subscales. The elevated scores indicated depression, impulsiveness, anger, rebelliousness, anxiety, rumination, withdrawal, and idiosyncratic thinking. Also, bulimics and substance abusers shared two out of the three most common profiles per group. Specifically, a within-normal-limits profile and a 2-4-8 profile were common to both groups. (A profile that is within normal limits has no significant elevations, whereas a 2-4-8 profile suggests unpredictability, argumentativeness, insecurity, repeated difficulties with interpersonal relationships, depression, anxiety, and social withdrawal.)

Other authors have described the co-morbidity trend of substance use and eating disorders. For example, Jones, Cheshire, and Moorhouse (1985) observed substance abuse in a series of 27 eating disorder cases. The time between onset of the eating disorder and the substance use disorder was less than five years in 44% of the cases. Moreover, 26% of the cases had at least one first-degree

relative with a substance use disorder. Also, Weiss and Ebert (1983) compared 15 bulimic women with 15 normal controls and found that bulimics had higher rates of substance use than normals. In fact, bulimics used significantly more marijuana, cocaine, amphetamines, and barbiturates, and tended to use more phencyclidine (PCP), acid (LSD), glue, and alcohol than normal control subjects.

Lastly, 15 studies that specifically examined the prevalence rates of substance use disorders in eating disorders support the co-morbidity of substance use and eating disorders (see Table 8). For example, alcohol abuse or dependence ranges from 0 to 10%, 33 to 36%, and 2 to 39% in anorexics, bulimic anorexics, and bulimics, respectively. Likewise, other substance use disorders range from 2 to 19%, 24 to 33%, and 8 to 39% in anorexics, bulimic anorexics, and bulimics, respectively.

As seen in Table 8, studies that employed the DIS (Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a; Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1983; Laessle et al., 1989) and SADS (Walsh, Roose, et al., 1985) seem fairly consistent in that alcohol abuse or dependence in bulimics averages around 25%. In contrast to studies that used the DIS or SADS, there is more variability in rates (i.e., from 0 to 14%) of alcohol abuse or dependence in

Table 8

Presence of Substance Use Disorders in Eating Disorder Patients and Their First-Degree Relatives

Study	Subjects ^a				Diagnosis (%) ^c			Relatives
	Number	Eating disorder	Diagnostic criteria	Substance use measure(s) ^b	Alcohol Abuse or Dependence	Amphetamine Abuse or Dependence	Other	
Cantwell et al., 1977	18	Anorexia	Felghner	Unspecified	0		16	
Halmi & Lonely, 1973	94	Anorexia	Felghner	Unspecified				7
Hatsukami, Eckert, et al., 1984	108	Bulimia	DSM	Unspecified	14		10	
Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a	16	Anorexia	DSM	DIS	6		13	19
	25	Both	DSM	DIS	36	28	24	
	49	Bulimia	DSM	DIS	22	6	8	
Hudson, Pope, Jonas, & Yurgelun-Todd, 1983b	13	Anorexia	DSM	Unspecified				6
	20	Both	DSM	Unspecified				18
	55	Bulimia	DSM	Unspecified				27
Hudson, Pope, Jonas, Yurgelun-Todd, & Frankenburg, 1983	51	Bulimia	DSM	DIS	39		39	
	19	Bulimia ¹	DSM	DIS	26		26	
	28	None	DSM	DIS	11		7	
Hudson et al., 1987	50	Bulimia	DSM	Unspecified				20

(table continues)

Study	Subjects ^a				Diagnosis (%) ^c			
	Number	Eating disorder	Diagnostic criteria	Substance use measure(s) ^b	Alcohol Abuse or Dependence	Amphetamine Abuse or Dependence	Other	Relatives
	19	Bulimia ¹	DSM	Unspecified				17
Laessle et al., 1989	41	Anorexia	DSM	CIDI & DIS	10		2	
	50	Bulimia	DSM	CIDI & DIS	16		24	
Lee et al., 1985	53	Bulimia	DSM	Unspecified				22
Mitchell et al., 1988	275	Bulimia	DSM	Unspecified				37
Mitchell, 1990	275	Bulimia	DSM	Unspecified			23	
Pyle et al., 1981	34	Bulimia	DSM	Unspecified			24	
Rivinus et al., 1984	40	Anorexia	DSM & Feighner	RDC				8
	23	None	DSM & Feighner	RDC				5
Stern et al., 1984	27	Bulimia	DSM	Unspecified				30
	27	None	DSM	Unspecified				4
Walsh, Roose, et al., 1985	9	Both	DSM	SADS	33		33	
	41	Bulimia	DSM	SADS	10		15	

^a Subjects

Eating disorder = the diagnosed eating disorder (Anorexia = Anorexia Nervosa, Both = Anorexia Nervosa and Bulimia, Bulimia = Bulimia or Bulimia Nervosa, None = No Eating Disorder)

Diagnostic criteria = diagnostic criteria used to diagnose the eating disorder (DSM = DSM-III or some modification thereof, Feighner = Feighner et al., 1972)

^b Substance use measure(s) = measure(s) used to diagnose a substance use disorder (CIDI = Composite International Diagnostic Interview, DIS = Diagnostic Interview Schedule, RDC = Research Diagnostic Criteria, SADS = Schedule for Affective Disorders and Schizophrenia, Unspecified = Unspecified Structured or Semi-Structured Interview)

^c Diagnosis (%) = percent of eating disorder subjects with a substance use disorder (Relatives = substance use disorders in first-degree relatives)

¹ remitted

studies that used an unspecified interview (Cantwell et al., 1977; Halmi & Lonely, 1973; Hudson, Pope, Jonas, & Yurgelun-Todd, 1983b; Hudson et al., 1987; Lee et al., 1985; Mitchell, 1990; Mitchell, Hatsukami, Pyle, & Eckert, 1988; Pyle, Mitchell, & Eckert, 1981; Stern et al., 1984).

The prevalence rates for alcohol abuse or dependence is significantly higher for anorexic bulimics (35%) and bulimics (19%) than for normal (11%) or depressed (8%) subjects. Like alcohol abuse, bulimic anorexics and (to a lesser extent) bulimics appear to have significantly higher rates of amphetamine abuse or dependence than anorexics. Also, other substance use disorders (e.g., cocaine abuse or dependence) are more prevalent in eating disorder subjects (9 to 26%) than in normal subjects (7%). Finally, rates of substance use disorders are significantly higher in first-degree relatives of bulimics (33%) compared to anorexics (7 to 8%) and normal controls (4 to 5%). Thus, it appears that the prevalence of substance use disorders is significantly higher in eating disorder subjects (particularly bulimics and their first-degree relatives) than in normal controls.

In summary, substance use disorders and eating disorders share common conceptual similarities as "addictive behaviors." Also, the co-morbidity of substance use disorders and eating disorders is supported

by numerous studies. Since co-morbidity has important prognostic, diagnostic, and treatment implications, substance use disorders need to be mentioned as potential concomitant conditions in designing any systematic, packaged training program for the diagnosis of eating disorders.

Impulse Control Problems

Although considered separately above, substance use disorders may also be conceptualized as difficulty with impulse control. Other impulse control problems, especially shoplifting and suicide attempts, are frequently present in eating disorder clients. Several researchers have found a high prevalence of stealing in eating disorder patients, particularly bulimics. For example, Jones et al. (1985) reviewed the histories of 27 eating disorder patients with a concurrent substance abuse problem and found that stealing was remarkably prevalent.

In fact, there was definitive evidence of theft in approximately 52% of the cases. Similarly, Carroll and Leon (1981) found that 50% of 37 eating disorder patients had a history of stealing, whereas Pyle et al. (1981) found that 65% of 34 bulimics were actively shoplifting. Furthermore, 26% of the bulimics admitted to stealing prior to the onset of the eating disorder, whereas 12%

continued to shoplift after the onset of bulimia. However, Fairburn and Cooper (1984) found a significant, but lower rate of shoplifting (i.e., 33%) in outpatient bulimics. Numerous other authors have also reported a high rate of stealing in eating disorder subjects (Hudson, Pope, Jonas, & Yurgelun-Todd, 1983a; Norton, Crisp, & Heath, 1985; Welbourne & Purgold, 1984). Indeed, the rate of shoplifting for bulimics is higher than that for either restricting anorexics (Garfinkel et al., 1980) or normal controls (Casper et al., 1980; Weiss & Ebert, 1983).

Although the most common item stolen is food (Carroll & Leon, 1981; Pyle et al., 1981; Welbourne & Purgold, 1984), other items (e.g., cosmetic, clothes, and jewelry) are also shoplifted (Pyle et al., 1981; Welbourne & Purgold, 1984). Stealing may follow financial stress subsequent to eating binges or may be a desperate cry for help and need for love (Welbourne & Purgold, 1984). However, not all eating disorder patients steal. In an effort to identify variables that discriminate bulimic anorexics on the basis of stealing, Norton et al. (1985) compared 13 stealing bulimic anorexics to 40 non-stealing bulimic anorexics on illness, social, and personal factors. Results indicated that stealers were significantly more likely to (a) be older at the onset of the eating disorder, (b) be older when first seeking

treatment for their eating disorder, (c) binge, (d) purge, (e) be unable to eat in the presence of others, (f) lie, (g) flirt, (h) be sexually active, and (i) experience higher rates of free-floating anxiety. Regardless of the factors involved, shoplifting is present in a significant number of eating disorder patients.

Another well-documented impulse control problem is self-destructive behavior and suicide attempts. For example, Weiss and Ebert (1983) compared 15 bulimics to 15 normal controls and found that 40% of the bulimics versus 0% of the controls attempted suicide at least once. Russell (1979) found that 37% of 30 bulimics attempted suicide and inflicted physical harm on themselves, whereas Abraham and Beumont (1982) found that 28% of their eating disorder sample attempted suicide. Furthermore, Welbourne and Purgold (1984) noted mild self-harming behavior in 12% of their eating disorder clients and moderate to severe self-destructive behavior in an additional 12%.

Although other impulse control problems, such as compulsive spending and sexual promiscuity, are possible (Welbourne & Purgold, 1984), there is not much documentation available. Nonetheless, the concomitant presence of shoplifting and suicide attempts in eating disorder patients is well-documented. Given the comorbidity and implications for treatment, impulse control

problems should be considered in any systematic, packaged training program for the diagnosis of eating disorders.

Family Relationships

The research on family relationship problems and their relation to eating disorders has consisted primarily of speculative case reports. However, appropriately controlled studies have recently begun to appear. Since all types of research are helpful in delineating relationship dysfunctions in eating disorder families, all will be reviewed. Therefore, clinical descriptions, uncontrolled self-report studies, controlled comparison studies, and observational studies will be examined.

Clinical Descriptions of Families

Based on clinical observation, several common family patterns surface. For example, enmeshment and weak boundaries (i.e., entanglement between people in terms of separation and individuation) have been well-documented (Hall, 1987; Kramer, 1988; Liebman, 1987; Minuchin, Rosman, & Baker, 1978; Rakoff, 1983; Sours, 1980; Stierlin & Weber, 1987). Similarly, overprotectiveness has also been frequently reported in eating disorder families (Cauwels, 1983; Hedblom, Hubbard, & Andersen, 1982; Hall, 1987; Kramer, 1988; Liebman, 1987; Minuchin et al., 1978; Sours, 1980; Stierlin & Weber, 1987), as well as rigidity

(Hall, 1987; Kramer, 1988; Leibman, 1987; Stierlin & Weber, 1989) and an unwritten creed of self-sacrifice (Minuchin et al., 1978; Stierlin & Weber, 1987, 1989). Superficially, anorexic families function well; however, the family relationships are characterized by lack of conflict resolution and/or conflict avoidance (Crisp, 1984; Hall, 1987; Kramer, 1988; Liebman, 1987; Sours, 1980), involvement of the anorexic in parental conflicts (Hall, 1987; Kramer, 1988; Sours, 1980), dependence (Beattie, 1988; Bruch, 1973; Williamson, 1990), low cohesion (Williamson, 1990), intense sibling rivalry (Hall, 1978), and family loyalty (Stierlin & Weber, 1987). Other characteristics include an emphasis on external appearance (Sours, 1980), fairness (Stierlin & Weber, 1987, 1989), self-control (Bruch, 1973; Rakoff, 1983; Stierlin & Weber, 1989), perfectionism (Cauwels, 1983; Kramer, 1988; Rakoff, 1983) and achievement (Cauwels, 1983; Stierlin & Weber, 1989), in addition to ambivalence (Beattie, 1988; Hall, 1978) and lack of affective expression (Kramer, 1988; Williamson, 1990).

Thus, clinical observations of eating disorder families show (a) enmeshment and/or fragile boundaries, (b) avoidance of conflict and/or lack of conflict resolution, (c) overprotectiveness, (d) rigidity, and (e) involvement of the eating disorder client in parental

disputes are common patterns. Also, the fact that many inpatient eating disorder treatment programs emphasize the family's involvement in treatment (e.g., Hedblom et al., 1982) additionally suggests the importance of considering family interaction patterns in treatment planning.

Uncontrolled Self-Report Studies of Families

The results of clinical observations have generally been confirmed by several self-report studies that failed to use comparison groups. For example, Perednia and Vandereycken (1989) administered the Own Memories of Child-Rearing Experience, Parental Bonding Instrument, and the SCL to a group of eating disorder patients, as well as the Maudsley Marital Questionnaire to their parents. Results showed that the eating disorder patients feared contact with others and were nervous, quiet, obedient, perfectionistic, spoiled, overprotected, and dependent. Moreover, both the mothers and patients themselves experienced more rejection from their mothers than fathers. Lastly, mothers were also described as overprotective.

Crisp, Harding, and McGuinness (1974) administered the Middlesex Hospital Questionnaire twice (i.e., at the time of admission and at the time of patients' weight restoration) to the parents of new eating disorder

inpatients. Although there were no significant differences between the mothers' and fathers' scores, the results showed that parental scores changed during treatment. Namely, at the time of admission, both parents had significantly low somatic and high hysteria scores. However, at the time of patients' weight restoration, both parents had higher scores overall, especially on the anxiety and phobic subscales. Thus, parental self-reports suggest that more problems are present with regard to adjustment and anxiety after their eating disorder child has reached an acceptable weight.

Finally, Kalucy, Crisp, and Harding (1977) interviewed and administered self-report measures to families with an anorexic member. Results showed that the families had significant histories of weight and eating pathology, as well as phobic avoidance and marked obsessional traits.

In summary, self-report measures show that eating disorder patients and their parents report high anxiety and phobic avoidance, hysteria, perfectionism, rejection, and parent-child dependence. In addition, distinct symptoms may be reported by parents at different phases of treatment of their eating disorder child (e.g., hysteria at the onset of treatment). This is in contrast to the significant anxiety and phobic avoidance that is present

once their eating disorder child has reached an acceptable weight.

Controlled Comparison Studies of Families

Numerous comparison studies that examined family relationships in eating disorder versus normal or other control families have been reported. Although the Family Adaptability and Cohesion Evaluation Scales (Humphrey, 1986a; Ordman & Kirschenbaum 1986) and the Family Environment Scale (Humphrey, 1986a; Ordman & Kirschenbaum, 1986; Stern et al., 1989) are the most common instruments used for these comparisons, others are the (a) Conflict Inventory (Van Buren & Williamson, 1988), (b) Dyadic Adjustment Scale (Van Buren & Williamson, 1988), (c) Family Assessment Measure (Garfinkel et al., 1983; Kog, Vertommen, & Vandereycken, 1989), (d) Leuven Family Questionnaire (Kog & Vandereycken, 1989a), (e) Relationship Belief Inventory (Van Buren & Williamson, 1988), and (f) Relationship Inventory (Houben, Pierloot, & Vandereycken, 1989).

Based on the above self-report measures, eating disorder families (especially bulimics) almost universally report lower cohesion (Ordman & Kirschenbaum, 1986; Stern et al., 1989), higher conflict (Humphrey, 1986a; Kog & Vandereycken, 1989a, 1989b; Kog et al., 1989; Ordman &

Kirschenbaum, 1986; Stern et al., 1989), conflict avoidance (Kog & Vandereycken, 1989a, 1989b; Van Buren & Williamson, 1988), and less affective expression (Garfinkel et al., 1983; Ordman & Kirschenbaum, 1986; Stern et al., 1989) in their families than normal controls. Other frequently reported family patterns include (a) more disorganization (Kog et al., 1989), (b) more marital dissatisfaction and discord (Van Buren & Williamson, 1988), (c) high achievement orientation (Stern et al., 1989), (d) less autonomy (Ordman & Kirschenbaum, 1986), (e) weak boundaries (Kog & Vandereycken, 1989a, 1989b), and (f) less problem-solving (Van Buren & Williamson, 1988). Furthermore, families of restricting anorexics appear to be more similar to normals than bulimics or bulimic anorexics (Kog et al., 1989; Stern et al., 1989).

In general, these comparison studies lend even more convincing evidence for the presence of common dysfunctional family relationships, such as low cohesion, lack of affective expression, and high conflict in eating disorder families.

Family Observation Studies

Perhaps a major development in the research on relationships in eating disorder families has been in vivo observational studies that use a standardized coding

system, such as the Structural Analysis of Social Behavior (SASB; Humphrey & Benjamin, 1986) or Marital Interaction Coding System (MICS; Robin & Weiss, 1980). Humphrey (Humphrey, 1986a, 1986b, 1988a, 1988b, 1989a, 1989b; Ströber & Humphrey, 1987) has been the predominant leader in this area. Moreover, when the SASB and MICS are used together, they reliably discriminate between eating disorder and normal families (Humphrey, Apple, & Kirschenbaum, 1986).

Kog, Vandereycken, and Vertommen (1985) conducted in vivo observations of 10 families with an anorexic member and did not find a consistent interaction pattern. However, Humphrey (1986b) compared the parental relationships in 80 bulimic, bulimic anorexic, anorexic, and normal families using the SASB. Observation results showed that both bulimic subgroups had deficits in parental nurturance and empathy relative to normals. Anorexic families also had deficits in empathy relative to normal controls. Moreover, all eating disorder patients perceived their parents as more blaming, rejecting, and neglectful than normal controls. These results have been confirmed in several other studies with other subjects (Humphrey, 1988a, 1989a, 1989b). Furthermore, fathers of eating disorder clients appear to be more watchful, managing, belittling, and blaming, as well as less

helpful, protective, and trusting than fathers of normal controls (Humphrey, 1988b). Again, family relationships in restricting anorexics (versus bulimics) appear to be more similar to controls (Humphrey, 1988a).

Although the research on family relationships seems to converge on several common relationship problems, one should keep in mind that the research is limited by a number of factors. For example, the clinical syndrome of anorexia nervosa is heterogeneous (Garfinkel & Garner, 1982; Yager, 1982). Moreover, several methodological problems exist, such as (a) an overwhelming number of impressionistic and speculative studies in which observer bias may contaminate the results (Kog & Vandereycken, 1985; Yager, 1982), (b) few studies with appropriate comparison groups (Garfinkel & Garner, 1982; Yager, 1982), (c) the retrospective nature of nearly all the research (Garfinkel & Garner, 1982), (d) lack of consideration of social desirability in self-report studies (Kog & Vandereycken, 1985), (e) small number of subjects (Kramer, 1988), and (f) the variable sampling methods that limit generalizability (Kramer, 1988). One exception is Goldstein's (1981) longitudinal prospective study in which families of adolescents, who presented themselves to a clinic, were followed up using the RDC. Factors that discriminated anorexic families from normals were

communication deviance and dependency-insecurity. Hence, the convergence on family problems of the various types of research is remarkable.

Although no single family constellation is present in eating disorder families (Garfinkel & Garner, 1982; Johnson & Flach, 1985; Kog et al., 1985), the research strongly suggests that common family patterns emerge (e.g., enmeshment and/or weak boundaries, conflict avoidance and/or lack of conflict resolution, overprotectiveness, rigidity, and involvement of the eating disorder patient in marital discord). Because family dysfunction may have a direct impact on treatment for eating disorder patients, one should include the consideration of family relationships in any systematic, packaged training program for the diagnosis of eating disorders.

Expert Systems and Enhancement of Learning

Expert systems is a subarea of artificial intelligence computer technology; and artificial intelligence is that area of computer science that develops computer programs to replicate human characteristics, such as understanding, learning, reasoning, and problem-solving (Barr & Feigenbaum, 1981). Thus, an expert system is a type of artificial

intelligence program that replicates the decision-making or problem-solving processes used by persons who are knowledgeable and experienced in a particular field (Hofmeister & Ferrara, 1987).

A major hub of expert systems research has been the Technology Division of Utah State University. Several expert systems have been developed by the Technology Division to assist in clinical decision-making and training.

Clinical Decision-Making

Expert systems designed to assist with clinical decision-making have primarily been related to behavior management and to special education eligibility decisions. For example, Behavior Consultant (Ferrara, Baer, & Serna, 1986) was designed to assist school psychologists and teachers with decisions regarding appropriate methods for recording and modifying problem behaviors exhibited by students. Research on Behavior Consultant (Giere, Baer, Prater, Thornburg, & Ferrara, 1990) has shown the program to be an effective tool for assisting school personnel in designing and implementing behavior management programs. Of 22 teachers who used the system, 83% were able to design and implement a program that was judged to be successful (i.e., met a pre-established goal) or partially successful (i.e., partially met a pre-established goal).

Other clinical decision-making systems that have been developed by the Technology Division include various expert systems designed to give second opinions on whether or not students qualify for special education services. First opinions in such cases can be gleaned from federal and state statutes, as well as discrepancies between ability and achievement. However, these expert systems also systematically question the user to consider exclusion factors in qualifying children for special education services. For example, the Technology Division has developed the following expert systems to aid in decisions: (a) Class.LD2 (Ferrara & Hofmeister, 1984), (b) Class.IH (Giere, Williams, & Ferrara, 1988), (c) Class.BD/SED (Ferrara, Baer, & Althouse, 1987), (d) Mandate Consultant (Parry, 1986), and (e) Referral Consultant (Baer, Likens, Casdorff, Althouse, & Ferrara, 1990).

Training

The Technology Division's early experiences with expert systems showed that as people repeatedly used them, they began to learn the underlying principles used in making decisions. This led the staff to consider whether expert systems could be modified to become training tools.

As a result, over the last few years, several expert system-based, computer-assisted training programs have

been developed and validated. These expert system-based, computer-assisted trainers include (a) BD/SED.Trainer (Thornburg, Baer, Althouse, & Ferrara, 1988), (b) LD.Trainer (Prater, 1986), (c) IH.Trainer (Giere, Baer, Ferrara, Elwell, & Althouse, 1988), and (d) Behavior Management Trainer for Teachers (Baer & Althouse, 1990).

Research on the expert system-based trainers described above has been remarkably consistent. As measured by pre-post/test scores, learners who use the programs consistently show large gains in knowledge and mastery of the material at better than 85% (Thornburg et al. 1990).

Summary of the Review of the Literature

Eating disorders are complex and serious disorders that are a major health problem (Mitchell & Eckert, 1987). These disorders pose many diagnostic and therapeutic challenges to mental health professionals (Garfinkel et al., 1985). The challenges primarily involve concomitant conditions that are not part of the formal diagnosis of eating disorders. Nonetheless, co-morbid conditions may directly impact the prognosis and interfere with the treatment of eating disorder clients.

A substantial research literature documents the medical complications and nutritional consequences, as

well as the co-morbidity of mood, anxiety, personality, and substance use disorders. Furthermore, impulse control problems and family relationship dysfunctions are common. Since the purpose of diagnosis is to drive treatment planning and improve prognosis, any "state-of-the-art" systematic training program for the diagnosis of eating disorders should caution diagnosticians about important co-morbid factors.

Research has shown that expert system-based, computer-assisted trainers are effective in training. Indeed, subjects who have used such trainers consistently show enhanced learning as measured by pre/post-test scores (Thornburg, et al., 1990).

Outline of Research Rationale and Objectives

Overall, the literature highlighted the complexity of eating disorder cases and supported the need for the present study. This investigation assessed the efficacy of a systematic, packaged approach (i.e., expert system-based, computer-assisted trainer; ES-CAT) for training psychologists and nutritionists in the diagnosis and treatment of anorexia nervosa and bulimia nervosa. The ES-CAT approach to training has a great deal of utility. For example, ES-CAT approaches consistently show large gains in knowledge and mastery of the material at

better than 85% (e.g., Thornburg et al., 1990). Also, ES-CAT approaches can be readily exported and easily updated as the diagnostic criteria of eating disorders change or research knowledge increases.

All three training groups (ES-CAT, ES, and SS) are important in determining the utility of the expert system-based, computer-assisted trainer (ES-CAT) relative to the other learning approaches. Clinicians typically learn about the diagnosis of eating disorders through self-study of texts, such as the DSM-III-R (APA, 1987) and Assessment of Eating Disorders: Obesity, Anorexia, and Bulimia Nervosa (Williamson, 1990). A self-study (SS) group would make it possible to compare the expert system-based, computer-assisted trainer (ES-CAT) to a traditional method of learning. Comparisons of learning between the ES-CAT and ES group (expert system-based trainer without computer exercises) would help to assess the contribution of the computer guidance to training or content learning. Documentation of the total amount of time subjects spent studying would help determine whether the three training groups were equivalent in terms of training time.

The objectives of the present study were:

1. To develop an expert system-based, computer-assisted training program (ES-CAT) for training subjects

in the diagnosis and treatment of anorexia nervosa and bulimia nervosa.

2. To compare the expert system-based, computer-assisted training approach (ES-CAT) with a traditional self-study textbook method (SS) in terms of level of mastery (i.e., content knowledge) of important eating disorder concepts.

3. To compare the expert system-based, computer-assisted training approach with (ES-CAT) and without (ES) the use of computer exercises.

It was hypothesized that:

1. Subjects completing the ES-CAT program will achieve post-test scores (on a test assessing knowledge of diagnostic and treatment issues in eating disorders; see Appendix A for the post-test) of about 85%.

2. Persons completing the ES-CAT program will achieve significantly higher post-test scores than persons in the SS training group.

3. Persons in the ES-CAT program group will achieve significantly higher post-test scores than persons in the ES group.

METHOD

Subjects

Subjects were 59 college students at Utah State University recruited via posters that publicized an extension course entitled "Training in Eating Disorders" offered over three consecutive quarters from Summer 1991 through Winter 1992. However, five subjects withdrew from the course, resulting in a total attrition rate of 8% and a sample size of 54. All subjects who paid a \$30 fee and completed the course received two college credits of Psychology 590 (Independent Study). In addition, all subjects were given an overview of the project and offered an opportunity to participate or decline to participate. Subjects who choose to participate signed an informed consent document (see Appendix B).

Three training groups were used. The first was an experimental group, the expert system-based, computer-assisted trainer (ES-CAT). Two control groups were used: expert system trainer without computer exercises (ES) and traditional self-study (SS). Each group consisted of 18 subjects. Table 9 presents mean ages and standard deviations of the subjects broken down by training group. As seen in Table 9, the mean age of the subjects was 28.1

years, 29.0 years, and 29.7 years, for the ES-CAT, ES, and SS group, respectively.

Table 9

Means and Standard Deviations of Age by Group^a

	Group		
	ES-CAT	ES	SS
Age (years)	28.1 (7.7)	29.0 (8.7)	29.7 (9.8)

^astandard deviation in parenthesis

The question of potential differences in age across groups was analyzed via a one-way analysis of variance (ANOVA) as presented in Table 10. The groups did not differ significantly in age: $F(2,51) = .164$, $p > .05$. To test the assumption of homogeneity of variance of age, a Bartlett's Box F was conducted. The result was not significant, indicating homogeneity of variance (i.e., Box $F = .443$, $p > .05$). See Table 11 for demographic information (e.g., college major, year in college, and quarter the class was taken) broken down by group.

Materials and Study Period

An expert system-based, computer-assisted trainer was developed according to the Procedures section below. The

Table 10

One-Way Analysis of Variance for Age by Group

Source	DF	SS	MS	F	Significance
Between Groups	2	25.1	12.6	.164	p > .01
Within Groups	51	3922.6	76.9		
Total	53	3947.7			

Diagnostic Trainer for Eating Disorders: Anorexia Nervosa, Bulimia Nervosa, and Concomitant Conditions

(DTED; Todd, 1991b; Todd & Althouse, 1991) is a systematic, packaged training approach designed to teach subjects to diagnose eating disorders (e.g., anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified) using the DSM-III-R (APA, 1987) diagnostic criteria. The DTED (Todd, 1991b; Todd & Althouse, 1991) also teaches subjects to decide when to refer clients for evaluation of concomitant conditions that directly affect treatment planning outcomes.

The DTED consists of a manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) to enhance mastery of diagnostic issues and concepts in eating disorders. The manual (Todd, 1991b) is broken down into four major sections and 13 sequential lessons or chapters. The content of the 13 chapters was derived from a critical

Table 11
Demographic Information of Subjects by Group^a

	Group			
	ES-CAT (%)	ES (%)	SS (%)	Total (%)
College major				
Psychology	6 (11.1)	6 (11.1)	2 (3.7)	14 (25.9)
Social Work ¹	1 (1.9)	4 (7.4)	1 (1.9)	6 (11.1)
Nutrition ²	7 (13.0)	3 (5.6)	5 (9.3)	15 (27.8)
Medical ³	2 (3.7)	1 (1.9)	2 (3.7)	5 (9.3)
Other ⁴	2 (3.7)	4 (7.4)	8 (14.8)	14 (25.9)

Year in college				
Freshman	3 (5.6)	4 (7.4)	3 (5.6)	10 (18.5)
Sophomore	2 (3.7)	1 (1.9)	3 (5.6)	6 (11.1)
Junior	2 (3.7)	3 (5.6)	2 (3.7)	7 (13.0)
Senior	4 (7.4)	4 (7.4)	4 (7.4)	12 (22.2)
Graduate	7 (13.0)	6 (11.1)	6 (11.1)	19 (35.2)

Quarter				
Summer 1991	3 (5.6)	4 (7.4)	3 (5.6)	10 (18.5)
Fall 1992	3 (5.6)	3 (3.7)	2 (3.7)	8 (14.8)
Winter 1992	12 (22.2)	11 (20.3)	13 (24.1)	36 (66.7)

^apercentages in parenthesis

¹Social Work = Social Work or Family and Human Development

²Nutrition = Nutrition or Medical Dietetics

³Medical = Nursing or Pre-Medicine

⁴Other = Special Education, Elementary Education, Business, Anthropology, Liberal Arts, Art, Home Economics, Exercise Science, or Undeclared

review of the literature on diagnostic issues in eating disorders (Todd, 1991a). Each chapter presents material on an important diagnostic concept of eating disorders or concomitant conditions. The four major sections and chapters are as follows:

1. Introduction (Chapter 1)
2. DSM-III-R Diagnostic Criteria (APA, 1987) of Eating Disorders
 - a. Anorexia Nervosa (Chapter 2)
 - b. Bulimia Nervosa (Chapter 3)
 - c. Dual Diagnosis of Anorexia Nervosa and Bulimia Nervosa (Chapter 4)
 - d. Eating Disorders Not Otherwise Specified (Chapter 5)
3. Concomitant Conditions
 - a. Medical Complications and Nutritional Consequences (Chapter 6)
 - b. Mood Disorders: Major Depression and Dysthymia (Chapter 7)
 - c. Anxiety Disorders: Panic Disorder, Agoraphobia, Phobias, and Obsessive-Compulsive Disorder (Chapter 8)
 - d. Personality Traits and Disorders: Borderline and Antisocial Personality Disorders (Chapter 9)

- e. Psychoactive Substance Use Disorders (Chapter 10)
 - f. Impulse Control Problems: Stealing and Self-Destructive Behavior (Chapter 11)
 - g. Family Relationship Problems (Chapter 12)
4. Training Assimilation
- a. Complex Case Scenarios (Chapter 13).

Also, each lesson has an introduction to the chapter; objectives; diagnostic criteria (for eating disorders) or guidelines for referral (for concomitant conditions); example and nonexample case scenarios; and fill-in-the-blank pre- and post-tests.

The computer program (Todd & Althouse, 1991) involves fill-in-the-blank questions and randomly generated case scenarios in which the trainee is asked to correctly identify the diagnostic criteria fulfilled and to accurately diagnose the eating disorder(s). The computer program (Todd & Althouse, 1991) is additionally designed to ensure mastery by prohibiting access to more advanced lessons until mastery criteria are met for previous lessons. Consistent with other expert system-based trainers, mastery criteria for the DTED (Todd, 1991b; Todd & Althouse, 1991) are 100% on fill-in-the-blank questions and five consecutively correct case scenarios. The DTED (Todd, 1991b; Todd & Althouse, 1991) assumes no formal

background in diagnosing eating disorders or using computers.

The ES-CAT group (N = 18) completed the expert system-based, computer-assisted training program (Todd, 1991b) with computer exercises (Todd & Althouse, 1991); whereas the ES group (N = 18) read the same material, but did not complete the computer exercises. The SS group (N = 18) read relevant sections from the DSM-III-R (APA, 1987), such as eating, mood, anxiety, personality, substance use, and impulse control disorders. In addition, the SS group read Assessment of Eating Disorders: Obesity, Anorexia, and Bulimia Nervosa (Williamson, 1990). Additional readings included chapters one and five from Eating Disorders (Hsu, 1990), chapter one from Eating Disorders: Assessment and Treatment (Schlundt and Johnson, 1990), and Densmore-John (1988).

All three training groups came to one, 2-hour class period for 10 consecutive weeks. Subjects were asked to complete pre- and post-tests on each section during this time. In addition, all three groups were administered the same written test, which comprehensively covered the content of the training materials on a pre/post-test basis (see Appendix A). The pre/post-tests included important concepts, such as co-morbid conditions (e.g., medical complications and nutritional consequences; mood, anxiety,

personality, and substance use disorders; and impulse control and family relationship problems) and DSM-III-R (APA, 1987) diagnostic criteria. Also, the pre/post-tests were made as "generic" as possible (i.e., relevant to the content of all modes of instruction).

Procedure

The most appropriate model for the development of a training program is the research and development (R & D) model which grew out of the need to develop effective products. R & D models involve developing an initial version of the product, and then, through a series of field tests, collecting data that provides a basis for making revisions to further improve the product. The specific model that was followed by the present study is a modified version of the R & D model described by Borg and Gall (1989). Specific steps that were followed are described below.

Step 1: Research and Information Collection

The major task of this step was conducting a literature review, making observations to delineate a problem, and proposing a solution. Specifically, comprehensive information was gathered on the concomitant conditions of anorexia nervosa and bulimia nervosa. Based

on the literature review, a paper that critically reviewed and described the concomitant conditions was prepared (Todd, 1991a).

Step 2: Expert Review

A panel of experts was assembled with expertise in eating disorders diagnosis and treatment. The following people served as members of the expert review panel:

1. David M. Stein, Ph.D. - Department of Psychology, Utah State University (USU), Logan, Utah. Dr. Stein is currently an Associate Professor in the Department of Psychology at USU. He is also Director of the Psychology Department Community Clinic. Dr. Stein is responsible for the Eating Disorders and Addictive Behaviors Research, and the Treatment Clinic.

2. John P. Foreyt, Ph.D. - Baylor School of Medicine, Houston, Texas. Dr. Foreyt is currently an Associate Professor of Experimental Medicine (Department of Medicine) and Psychology (Department of Psychiatry) at Baylor College of Medicine in Houston, Texas. He has an international reputation in the area of eating disorders and behavioral medicine. Dr. Foreyt is a licensed psychologist in the state of Texas and has been the recipient of six grants related to eating disorders.

3. Cheryl S. Bupp, Ph.D. - MacKay-Dee Institute for Behavioral Medicine, Ogden, Utah. Dr. Bupp is currently Director of the Eating Disorders Program at MacKay-Dee Institute for Behavioral Medicine. She is a licensed psychologist in Utah and has more than 11 years of experience in psychology. Also, she coordinates and/or leads three community groups and one therapy group for clients with eating disorders. In addition, Dr. Bupp is the P.T.A. Health Commission Co-chair for the Eating Disorders Task Force.

4. Phyllis White-Phelan, Ph.D. - Dr. White-Phelan is currently in private practice and specializes in the treatment of eating disorders. She has had several years of experience in treating clients with eating disorders.

5. Noreen Schvaneveldt, R.D., M.S., C.D. - Medical Dietetics Program, Department of Nutrition and Food Sciences, USU, Logan, Utah. Noreen Schvaneveldt is currently Assistant Director and Clinical Instructor in the Medical Dietetics Program at USU. She is a member of the American Dietetic Association, Utah Dietetic Association, American Diabetes Association, American Public Health Association, and Utah Public Health Association.

These experts scrutinized the paper (Todd, 1991a) that critically reviewed diagnostic issues and concomitant

conditions of anorexia nervosa and bulimia nervosa. In addition, the experts provided written comments on the content of the proposed training program.

Step 3: Prototype Development

After a consensus was reached on the content of the training program, a prototype was developed. Drafts of each lesson were written and computer exercises for each were programmed.

Step 4: Expert Review

A copy of the prototype was sent to each member of the expert review panel. Again, the expert review panel provided written feedback regarding the prototype.

Step 5: Main Field Test

The experimental design used during the main field test included 59 subjects who were randomly assigned to one of three groups. However, the attrition rate was 8% overall (i.e., 3% for the ES-CAT group, 3% for the ES group, and 2% for the SS group), resulting in a final sample size of 54 subjects or 18 subjects per group.

Appendix A presents the overall pre/post-test which was used to measure effects of training or content learning. Items for the overall pre/post-test were

written after the training materials for each group were packaged. Only items that were judged to be covered in all three sets of training materials were chosen for inclusion in the overall pre/post-test. A draft of the overall pre/post-test was submitted to Dr. David Stein for review and revision.

All subjects came to the same classroom during scheduled class time to complete pre/post-tests on every lesson. Subjects agreed to read and study their materials independently, as well as to document the amount of time they spent on each section. The order of tests administered was (a) overall pre-test (see Appendix A), (b) introduction pre/post-test, (c) anorexia nervosa pre/post-test, (d) bulimia nervosa pre/post-test, (e) dual diagnosis pre/post-test, (f) eating disorder not otherwise specified pre/post-test, (g) medical complications and nutritional consequences pre/post-test, (h) mood disorders pre/post-test, (i) anxiety disorders pre/post-test, (j) personality disorders pre/post-test, (k) substance use disorders pre/post-test, (l) impulse control problems pre/post-test, (m) family relationship problems pre/post-test, (n) complex case scenarios pre/post-test, and (o) overall post-test (see Appendix A).

All three training programs were equivalent in terms of topics and content as appraised by two judges. For

example, the ES-CAT and ES group used the same training manual, which covered the diagnostic criteria of eating disorders and concomitant conditions. The material used in the SS group was chosen because it covered the same topic areas and content as the ES-CAT and ES groups.

RESULTS

Effects of Training

Equivalence of Groups

All three groups (i.e., ES-CAT, ES, and SS) completed an overall pre-test (i.e., same as the overall post-test; see Appendix A) before reading any of the training material. Table 12 presents the means and standard deviations of the overall pre-test scores for each group. The mean overall pre-test score (percent correct) was 44.3%, 40.3%, and 38.1%, for the ES-CAT, ES, and SS group, respectively.

Table 12

Means and Standard Deviations of Overall Pre-test Scores
(% by Group^a)

Dependent Variable	Group		
	ES-CAT	ES	SS
Overall Pre-test	44.3 (13.2)	40.3 (10.9)	38.1 (11.3)

^astandard deviations in parenthesis

The overall pre-test results were analyzed via a one-way analysis of variance (ANOVA) and are presented in Table 13. To test the assumption of homogeneity of

variance of overall pre-test scores, a Bartlett's Box F was conducted. The result was not significant, indicating homogeneity of variance (i.e., Box F = .345, $p > .05$). As seen in Table 13, there were no significant differences in mean overall pre-test scores between the groups, $F(2,51) = 1.28$, $p > .05$.

Table 13

One-Way Analysis of Variance for Mean Overall Pre-test Scores by Group

Source	DF	SS	MS	F	Significance
Between Groups	2	3.58	1.79	1.28	$p > .01$
Within Groups	51	71.51	1.40		
Total	53	75.09			

Overall Post-test Differences

Table 14 presents the means and standard deviations of the overall post-test scores by group. The mean overall post-test score (percent correct) was 85.2%, 77.1%, and 64.3%, for the ES-CAT, ES, and SS group, respectively. Figure 1 presents the mean gain from overall pre-test to post-test score by group. Also, note that the standard deviation for the ES-CAT group from pre-test to post-test was reduced by half, whereas the other groups remained approximately the same.

Table 14

Means and Standard Deviations of Overall Post-test Scores (%) by Group^a

	Group		
	ES-CAT	ES	SS
Overall Post-test	85.2 (6.38)	77.1 (9.85)	64.3 (13.5)

^astandard deviations in parenthesis

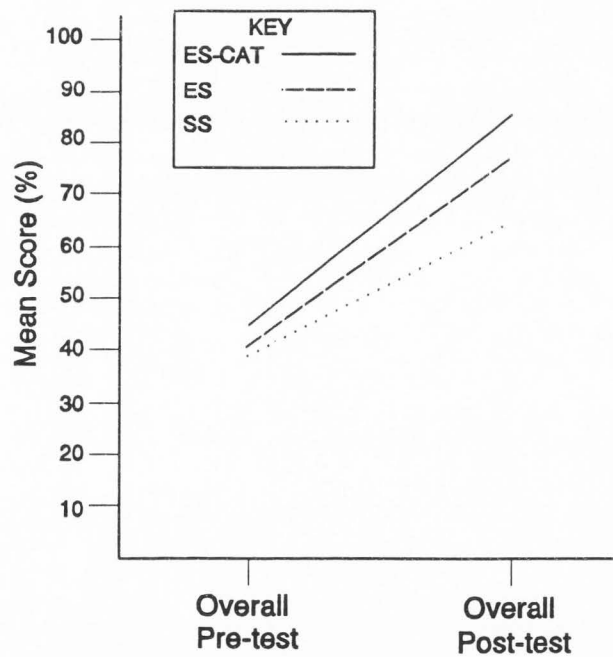


Figure 1. Mean gain from overall pre-test to post-test scores by group.

The mean overall post-test results were analyzed via a one-way ANOVA and are presented in Table 15. As seen in Table 15, there were significant differences in mean post-test scores between the groups, $F(2,51) = 18.6$, $p < .01$.

Table 15

One-Way Analysis of Variance for Mean Overall Post-test Scores by Group

Source	DF	SS	MS	F	Significance
Between Groups	2	39.85	19.92	18.6	$p < .01$
Within Groups	51	54.63	1.07		
Total	53	94.48			

To further examine whether there are significant differences between the groups in post-test scores, a Student Newman Keuls procedure was conducted as presented in Table 16. The ES-CAT group obtained significantly higher scores than either the ES or SS group. Also, the ES group obtained significantly higher scores than the SS group.

Total Training Time

Table 17 presents the means and standard deviations of the total training time for each group. The mean total

Table 16

Results of the Student Newman Keuls Procedure on Mean Overall Post-test Scores

Group	ES-CAT	ES	SS
ES-CAT			
ES	p < .05		
SS	p < .05	p < .05	

training time (hours) was 16.0, 12.0, and 15.3, for the ES-CAT, ES, and SS group, respectively.

Table 17

Means and Standard Deviations of Mean Total Training Time by Group^a

	Group		
	ES-CAT	ES	SS
Total Training Time	16.0 (8.8)	12.0 (4.8)	15.3 (7.2)

^astandard deviations in parenthesis

The mean total training time results were analyzed via a one-way ANOVA as presented in Table 18. To test the assumption of homogeneity of variance of total training time, a Bartlett's Box F was conducted. The result was not significant, indicating homogeneity of variance (i.e.,

Box F = 2.81, $p > .05$). There were no significant differences in mean total training time between the groups, $F(2,51) = 1.66, p > .01$.

Table 18

One-Way Analysis of Variance for Mean Total Training Time by Group

Source	DF	SS	MS	F	Significance
Between Groups	2	607,563	303,781	1.66	$p > .01$
Within Groups	51	9,357,647	183,483		
Total	53	9,965,211			

DISCUSSION

The present study initially validated the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) as an effective means for training subjects in the diagnosis and treatment of eating disorders. There were no significant differences between the groups in age (see Tables 9 and 10), overall pre-test scores (see Tables 12 and 13), or total training time (see Tables 17 and 18), which supported the equivalency of groups prior to training.

All groups showed a significant gain from overall pre-test to post-test scores (on a test assessing knowledge of diagnostic and treatment issues in eating disorders, see Appendix A). These gains suggest that all groups benefitted from the training in terms of content knowledge (see Figure 1). The mean gain from overall pre-test to post-test was 40.9%, 36.8%, and 26.2%, for the ES-CAT, ES, SS group, respectively.

After training, the group completing the DTED manual (Todd, 1991b) and computer program [ES-CAT] (Todd & Althouse, 1991) achieved a mean overall post-test score of 85.2%. This demonstrated that the ES-CAT group mastered the majority of the training content. These results are consistent with Thornburg et al. (1990) who showed that trainees who use expert system-based trainers consistently

show large gains in knowledge and mastery of the material (at better than 85%).

Indeed, the ES-CAT group learned significantly more of the training material than either the ES group [DTED manual (Todd, 1991b) without the computer program] or the SS group (traditional self-study group). The ES-CAT group obtained a mean overall post-test score of 85.2% versus 64.3% for the SS group. Mean gains in content knowledge were 40.9% and 26.2% for the ES-CAT and SS group, respectively. This result demonstrated that the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) are significantly more effective in training practitioners to master knowledge of eating disorder concepts and to refer accurately for concomitant conditions than a traditional method of learning.

Furthermore, the ES-CAT group learned significantly more of the training content than the ES group. The ES-CAT group obtained a mean overall post-test score of 85.2% versus 77.1% for the ES group. Mean gains in content knowledge were 40.9% and 36.8% for the ES-CAT and ES group, respectively. These results substantiated the effectiveness of using the DTED computer program (Todd & Althouse, 1991) in addition to the DTED manual (Todd, 1991b).

Similarly, the ES group obtained significantly higher overall post-test scores than the SS group. Again, this result showed that the DTED manual (Todd, 1991b) alone is significantly more effective than a traditional method of learning.

SUMMARY AND CONCLUSIONS

A critical review of the literature on anorexia nervosa and bulimia nervosa reveals that eating disorders are increasingly prevalent (Bemis, 1978; Leichner & Gettler, 1988) and have become a major U.S. health problem (Mitchell & Eckert, 1987). Eating disorders pose many diagnostic and therapeutic challenges to mental health and nutrition professionals (Garfinkel et al., 1985). The seriousness of eating disorders is reflected in the vast array of consequent nutritional and medical complications (Densmore-John, 1988), as well as the presence of concomitant emotional/behavioral problems (e.g., mood, anxiety, personality, and substance use disorders, and problems with impulse control and family relationships). Effective treatment planning requires that diagnostic issues and concomitant conditions be evaluated and incorporated into the diagnosis and treatment of anorexia nervosa and bulimia nervosa (Williamson, 1990).

However, psychologists and nutritionists likely receive broad-based training that only superficially touches upon these important diagnostic issues and therapeutic challenges. Although no systematic training programs are available, there is an increasing need for specialized training to better evaluate and treat the

complicated clinical picture presented by eating disorder patients.

The present study was designed to develop a useful method of training professionals to correctly diagnose eating disorders and concomitant conditions. As a result, the Diagnostic Trainer for Eating Disorders: Anorexia Nervosa, Bulimia Nervosa, and Concomitant Conditions [DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991)] were developed.

The present study was also designed to initially validate the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991). The initial validation involved comparing the mean, overall post-test scores of 56 subjects randomly assigned to one of three groups. These groups were (a) expert system-based, computer-assisted trainer (ES-CAT), (b) expert system-based trainer without computer guidance (ES), and (c) traditional self-study (SS). There were no significant differences between the groups in age, overall pre-test scores, or total training time, which supported the equivalency of groups prior to training.

All three groups showed a mean gain from overall pre-test to post-test score (on a test assessing knowledge of diagnostic and treatment issues in eating disorders). This suggested that all three groups benefitted from

training in terms of content knowledge. The mean gain from overall pre-test to post-test score was 40.9%, 36.8%, and 26.2% for the ES-CAT, ES, and SS group, respectively.

Subjects in the ES-CAT group showed large gains in knowledge and mastery of the training material (at better than 85%). This was consistent with previous research on other expert system-based, computer-assisted trainers (e.g., Thornburg et al., 1990). Indeed, the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) were shown to be a more effective means of training subjects in the diagnosis of eating disorders and recognition of concomitant conditions than either the DTED manual (Todd, 1991b) alone or a traditional method of training.

The addition of the computer program (Todd & Althouse, 1991) to the DTED manual (Todd, 1991b) significantly increased content knowledge more than using the DTED manual (Todd, 1991b) alone. Moreover, the DTED manual (Todd, 1991b) alone was significantly more effective in training subjects than a traditional method of self-study of textbooks.

The total training time of the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) was approximately 16 hours. The training time appeared reasonable in that subjects can master a large amount of

training content in a minimum amount of time. Expert system-based, computer-assisted trainers are designed for independent study so that individual schedules can be easily accommodated. Expert system-based, computer-assisted trainers are also readily exported and easily revised as the diagnosis of eating disorders changes or as the research knowledge base increases. Thus, an efficient and effective means of training professionals to better evaluate and treat the complicated clinical picture presented by eating disorder clients was developed and initially validated.

There are several implications of the present study. Expert system-based, computer-assisted trainers can be developed for any clinical area where there is a need for training and a consistent knowledge base. In addition, these trainers can be easily revised to reflect the current "state-of-the-art" in any given area and they are readily exportable.

Limitations of the present study include the use of college students and the lack of follow-up. Consequently, future research concerned with training professionals to accurately diagnose eating disorders and concomitant conditions might address the following questions:

1. Are subjects trained via the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) more

accurate in diagnosing "real-life" eating disorder patients than traditionally trained subjects?

2. Are subjects trained via the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) more likely to consider the presence of concomitant conditions than traditionally trained subjects?

3. Do psychologists and nutritionists trained via the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) learn the training content at the same rate as students?

4. Would general psychology students (who may be less motivated than the present sample) master the training content at approximately the same rate?

5. What is the retention of the training content over a six-month or one-year period for subjects trained via the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) versus traditionally trained subjects?

6. Do psychologists and nutritionists trained via the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991) relearn the training content easier than traditionally trained subjects?

7. How do subjects trained via the DTED manual (Todd, 1991b) and computer program (Todd & Althouse, 1991)

compare to traditionally trained subjects on other measures of training or learning?

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APPENDICES

APPENDIX A

Overall Pre/Post-test

PART I: Multiple Choice -- circle the best answer

1. Which one of the following is not included in the DSM-III-R diagnostic criteria for anorexia nervosa?
 - a. presence of a body image disturbance
 - b. intense fear of gaining weight
 - c. refusal to maintain a normal body weight
 - d. feeling of lack of control

2. One common characteristic in eating disorder families is their _____.
 - a. lack of affective expression
 - b. flexibility
 - c. lack of conflict
 - d. independence

3. Which one of the following is not included in the DSM-III-R diagnostic criteria for bulimia nervosa?
 - a. amenorrhea
 - b. feeling of lack of control
 - c. persistent overconcern about body weight
 - d. recurrent binge eating

4. Which one of the following is not a method of purging?
 - a. self-induced vomiting
 - b. vigorous exercise
 - c. use of laxatives
 - d. use of diuretics

5. "Forbidden foods" are foods that are restricted by the _____.
 - a. family
 - b. patient
 - c. therapist
 - d. physician

6. Which one of the following is not a common problem in individuals with eating disorders?

- a. major depression
 - b. obsessive-compulsive disorder
 - c. bipolar disorder
 - d. alcohol dependence
7. How many consecutive menstrual cycles (if any) must be absent before a female client can be diagnosed with anorexia nervosa?
- a. 0
 - b. 2
 - c. 3
 - d. 6
8. Anorexics eat very little due to their _____.
- a. loss of appetite
 - b. fear of becoming fat
 - c. difficulty swallowing food
 - d. loss of taste sensitivity
9. To meet the first part of the fourth DSM-III-R diagnostic criterion for bulimia nervosa, an individual must have a minimum average of _____ binge eating episodes a _____.
- a. 1, week
 - b. 1, month
 - c. 2, week
 - d. 2, month
10. According to the fourth DSM-III-R diagnostic criterion for bulimia nervosa, an individual must have experienced a minimum average of binge eating episodes for _____.
- a. 1 month
 - b. 3 months
 - c. 6 months
 - d. 1 year
11. In order for a diagnosis of "eating disorder not otherwise specified" to be given, an individual must have _____.
- a. an eating disorder
 - b. anorexia nervosa
 - c. bulimia nervosa
 - d. anorexia nervosa and bulimia nervosa

12. The prevalence of substance abuse is _____ in the general population compared to the population of eating disorder individuals.
- about the same
 - lower
 - higher
 - more significant
13. Major depression involves a depressed mood accompanied by other associated symptoms for at least _____.
- 1 week
 - 1 month
 - 6 months
 - 2 weeks
14. Which one of the following should not be considered evidence of a relationship between mood and eating disorders?
- rate of concurrent mood disorders
 - family history of mood disorders
 - unfavorable response to antidepressant medications
 - similar physiological signs in depressed and eating disorder clients
15. Dysthymia involves a chronic depressed mood most days for at least _____.
- 2 years
 - 1 year
 - 6 months
 - 3 months
16. The first DSM-III-R criterion for anorexia nervosa suggests a body weight at least _____ below normal for expected age and height.
- 5%
 - 10%
 - 15%
 - 25%
17. The DSM-III-R diagnostic criterion of anorexia nervosa related to amenorrhea does not apply to _____.

- a. males
 - b. females who have had a hysterectomy
 - c. both a and b
 - d. neither a nor b
18. _____ and _____ behavior are characteristic in anxiety disorders.
- a. Anxiety, avoidance
 - b. Avoidance, depressive
 - c. Anxiety, depressive
 - d. Rigidity, obsessive
19. Which one of the following is not usually required in medical evaluations for clients with an eating disorder?
- a. electroencephalogram
 - b. electrocardiogram
 - c. complete blood count
 - d. serum electrolytes
20. Which one the following is the least common anxiety disorder diagnosis in eating disorder clients?
- a. panic disorder
 - b. post-traumatic stress disorder
 - c. agoraphobia
 - d. obsessive-compulsive disorder
21. Obsessions are persistent, recurrent, illogical, and intrusive _____ that the person tries to ignore or suppress.
- a. thoughts
 - b. behaviors
 - c. both a and b
 - d. neither a nor b
22. Incomplete development is technically called _____.
- a. hypothermia
 - b. hypotension
 - c. hypoplasia
 - d. peripheral neuropathy
23. _____ personality disorder involves a serious instability of mood, self-image, and interpersonal relationships.

- a. Histrionic
 - b. Antisocial
 - c. Dependent
 - d. Borderline
24. Irregular heart beats are also known as _____.
- a. cardiac arrhythmias
 - b. pericardial effusions
 - c. bradycardia
 - d. tachycardia
25. Psychoactive substance abuse refers to pathological patterns of psychoactive substance use that do not meet the criteria for _____.
- a. intoxication
 - b. withdrawal
 - c. dependence
 - d. tolerance
26. One of the most common impulse control problems in eating disorder clients is _____.
- a. stealing
 - b. lack of anger control
 - c. both a and b
 - d. neither a nor b
27. A common personality trait in eating disorder clients is low _____.
- a. self-criticalness
 - b. self-confidence
 - c. self-expectations
 - d. self-esteem
28. Which of the following combinations can be diagnosed in the same client?
- a. eating disorder not otherwise specified, bulimia nervosa
 - b. eating disorder not otherwise specified, anorexia nervosa
 - c. anorexia nervosa, bulimia nervosa
 - d. none of the above
29. Low blood pressure is _____.

- a. hypothermia
- b. hypotension
- c. hypoplasia
- d. peripheral neuropathy

30. _____ is a physically-caused disturbance of nervous system function resulting from abnormal electrical activity of the brain.

- a. Peripheral neuropathy
- b. Abnormal EEGs
- c. Hypoplasia
- d. Symptomatic epilepsy

PART II: True or False -- fill in blank with a T (true) or F (false)

- _____ 31. Persons with anorexia nervosa often flunk out of school.
- _____ 32. Anxiety is frequently associated with eating disorders.
- _____ 33. Depression is frequently associated with eating disorders.
- _____ 34. Psychosis is frequently associated with eating disorders.
- _____ 35. Alcohol abuse is less frequent in eating disorders than in the population at large.
- _____ 36. An eating disorder client who has been drinking is less likely to binge or purge.
- _____ 37. Both anorexia nervosa and bulimia nervosa can be diagnosed in the same client.
- _____ 38. Higher rates of dental caries (or tooth decay) is seen in clients with bulimia nervosa.
- _____ 39. Individuals with eating disorders often have high self-esteem.
- _____ 40. Clients with bulimia nervosa are not often secretive about their behavior.

- _____ 41. To be diagnosed as having anorexia nervosa, a client's body weight should be at least 25% below what is normal for their age and height.
- _____ 42. An "emetic" is a strong laxative.
- _____ 43. A significant proportion of eating disorder clients attempt suicide.
- _____ 44. Anxiety usually decreases after a bulimic binge.
- _____ 45. Impulse control problems are rarely seen in eating disorder clients.
- _____ 46. Compulsions are repetitive behaviors designed to prevent discomfort.
- _____ 47. Clients with anorexia nervosa often feel a lack of control over their eating behavior.
- _____ 48. There is general agreement on the definition of an eating "binge."
- _____ 49. Secondary psychopathology (or concomitant conditions) is (are) rare in eating disorders.
- _____ 50. Eating disorder clients who have other psychopathology tend to have a poorer prognosis than those without other psychopathology.
- _____ 51. Treatment planning for clients eating disorders should not include secondary psychopathology.
- _____ 52. Some physical disorders mimic anxiety symptoms.
- _____ 53. A common family relationship problem in eating disorder clients is lack of conflict resolution.
- _____ 54. Anorexia nervosa is an example of a residual category in the DSM-III-R.
- _____ 55. Anorexia nervosa involves a true loss of appetite.

PART III: Fill-in-the-Blank

56. _____ disorders are disturbances that generally involve either elation or depression.
57. If a client has an eating disorder that does not meet the criteria for a specific eating disorder, then diagnose _____.
58. _____ often reduces anxiety in bulimics.
59. A(n) _____ is a drug used to induce vomiting.
60. _____ disorder is a disorder in which there are recurring panic attacks.
61. _____ personality traits or disorders are often present in eating disorder clients.
62. The most common item that bulimics steal is _____.
63. _____ intoxication may result in fighting, grandiosity, agitation, and impaired judgement.
64. A common personality trait in eating disorder clients is _____.
65. _____ is a fear of being in places or situations in which help might not be available, or escape might be embarrassing or difficult.
66. One concomitant condition frequently seen in cases of eating disorders is _____.
67. _____ is a significantly reduced effect of a drug on a client with repeated use the same amount of substance.
68. _____ is a example of purging behavior.
69. Persistent overconcern about body weight, size, or shape is a DSM-III-R diagnostic criterion of _____.
70. When you take "Milk of Magnesia," the main effect is _____.
71. When you take "Syrup of Ipecac," the main effect is _____.

72. _____ evaluations are needed in cases of eating disorders because there are potentially life-threatening conditions that result from the behavioral and nutritional sequelae of eating disorders.
73. An intense fear of gaining weight or becoming fat is a DSM-III-R diagnostic criterion of _____.
74. Distinct periods of extreme fear are also called _____.
75. A history of conduct problems is seen in _____ personality disorder.
76. Of all the eating disorder clients, _____ have the highest prevalence of stealing.
77. A decreased interest (pleasure) in activities is often a sign of _____.
78. Repeated shifts in aspects of identity (e.g., change in friends, goals, etc.) is a sign of _____ personality disorder.
79. Purging behavior by eating disorder clients is often used to prevent _____.
80. _____ often precedes the development of problems with bingeing.

PART IV: Case Scenarios -- circle the appropriate answer(s)

81. Sarah is a 5 foot, 6 inch medium frame female who weighs 105 pounds. The minimum normal weight for a 5 foot, 6 inch medium frame female is 130 pounds. She has an intense fear of gaining weight and she believes that her stomach and hips are "too fat." In addition, Sarah has missed her period for 2 consecutive months and has been bingeing for the last month. She averages 1 binge a week, but feels like she has control over her eating behavior during binges. Sarah also admits that she uses laxatives about once a week in order to prevent weight gain. Lastly, she is extremely concerned about her body weight and shape.

Which of the following is the most appropriate diagnosis for Sarah?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating not otherwise specified
 - e. none of the above
82. Bill is a 6 foot large frame male who weighs 175 pounds. The minimum normal weight for a 6 foot large frame male is 164 pounds. He feels that his belly is "too fat," but does not fear gaining weight. Bill also stated that he has been bingeing for the last 6 months with an average of 2 binges a week. He does not really want to gain any weight so he forces himself to throw-up after every binge episode. Bill also reported that he felt like his bingeing behavior was out-of-control. Lastly, he admits that he is extremely concerned about his body shape and weight.

Which of the following is most appropriate diagnosis for Bill?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating disorder not otherwise specified
 - e. none of the above
83. Debra is a 4 foot, 11 inch small frame female who weighs 87 pounds. The minimum normal weight for a 4 foot, 11 inch small frame female is 103 pounds. She has an intense fear of gaining weight and she believes that her buttocks are "too large." In addition, Debra has missed her period for 4 consecutive months and has been bingeing for the last 3 months. She averages 2 binges a week and feels like she does not have control over her eating behavior during binges. Debra also admits that she uses diuretics about three times a week in order to prevent weight gain. Lastly, she is extremely concerned about her body weight and shape.

Which of the following is most appropriate diagnosis for Debra?

- a. anorexia nervosa
- b. bulimia nervosa
- c. anorexia nervosa and bulimia nervosa
- d. eating disorder not otherwise specified
- e. none of the above

84. Greg is a 5 foot, 8 inch small frame male who weighs 118 pounds. The minimum normal weight for a 5 foot, 8 inch small frame male is 140 pounds. He feels that his belly is "too big" and really fears becoming fat. Greg also stated that he has never binged for fear that he would lose control over his eating and get fat.

Which of the following is most appropriate diagnosis for Greg?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating disorder not otherwise specified
 - e. none of the above
85. Tammy is a 5 foot, 3 inch small frame female who weighs 106 pounds. The minimum normal weight for a 5 foot, 3 inch small frame female is 111 pounds. She feels that her body is "okay," but she would like to lose 5 pounds. Tammy has had a hysterectomy due to ovarian cancer and consequently, does not have menstrual cycles. She admits to snacking between meals, but does not eat large amounts of food when snacking. Tammy also uses diuretics twice a week to control excess water weight.

Which of the following is most appropriate diagnosis for Tammy?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating disorder not otherwise specified
 - e. none of the above
86. Tom is a 5 foot, 9 inch medium frame male who weighs 130 pounds. The minimum normal weight for a 5 foot, 9 inch medium frame male is 148 pounds. He realizes he is underweight, but does not want to become fat. Tom also stated he used to binge 6 months ago, but no longer does so. He likes being underweight, but is not extremely concerned about his body weight or shape.

Which of the following is most appropriate diagnosis for Tom?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating disorder not otherwise specified
 - e. none of the above
87. Susan is a 5 foot, 5 inch large frame female who weighs 120 pounds. The minimum normal weight for a 5 foot, 5 inch large frame female is 137 pounds. She has an intense fear of gaining weight and she believes that her body shape and size are "just right." In addition, Susan has missed her period for 1 month and has been bingeing for the last 12 months. She averages 3 binges a week and feels like she loses control over her eating behavior during binges. Susan also admits that she uses diuretics about two times a week in order to prevent weight gain. Lastly, she is extremely concerned about her body weight and shape.

Which of the following is most appropriate diagnosis for Susan?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating disorder not otherwise specified
 - e. none of the above
88. Joe is a 6 foot, 3 inch large frame male who weighs 145 pounds. The minimum normal weight for a 6 foot, 3 inch large frame male is 176 pounds. He feels that his stomach is "too fat" and is extremely afraid of becoming fat. Joe also stated that he experiences binge eating episodes an average of three times a week. When bingeing, Joe feels like his eating is out-of-control and he will never stop. Joe also reports that he has binged for the last 6 months. In order to keep his weight down, Joe exercises vigorously 5 days a week. Lastly, he reports that he is troubled almost daily about his body weight and shape being too heavy.

Which of the following is most appropriate diagnosis for Susan?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating disorder not otherwise specified
 - e. none of the above
89. Cheryl is a 5 foot, 7 inch medium frame female who weighs 130 pounds. The minimum normal weight for a 5 foot, 7 inch medium frame female is 133 pounds. She has an intense fear of gaining weight and has regular menstrual cycles. Cheryl has been bingeing for the last month. She averages 2 binges a week and feels like she does not have control over her eating behavior during binges. Cheryl also admits she uses diuretics about three times a week in order to prevent weight gain. Lastly, she is extremely concerned about her body weight and shape.

Which of the following is most appropriate diagnosis for Cheryl?

- a. anorexia nervosa
 - b. bulimia nervosa
 - c. anorexia nervosa and bulimia nervosa
 - d. eating disorder not otherwise specified
 - e. none of the above
90. Rich is a 6 foot, 1 inch medium frame male who weighs 135 pounds. The minimum normal weight for a 6 foot, 1 inch medium frame male is 160 pounds. He feels that his stomach is "too fat" and is extremely afraid of becoming fat. Rich also states that he experiences binge eating episodes an average of two times a month, although he feels like he can stop bingeing at any time. Rich also reports that he has binged for the last 4 months. In order to keep his weight down, Rich exercises once a week. Lastly, he reports that he is troubled almost daily about his body weight and shape being too heavy.

Which of the following is most appropriate diagnosis for Rich?

- a. anorexia nervosa
- b. bulimia nervosa
- c. anorexia nervosa and bulimia nervosa
- d. eating disorder not otherwise specified
- e. none of the above

91. Ellen has been diagnosed with anorexia nervosa. She complains of insomnia and suicidal ideation. Her last complete medical evaluation was 6 months ago. Ellen is also afraid of heights, but her fear does not cause her any undue stress or impairment.

Ellen should be referred for evaluation of which of the following? (Mark all that apply, however points will be deducted for incorrect marking.)

- a. medical evaluation
 - b. mood disorder
 - c. anxiety disorder
 - d. personality disorder
 - e. psychoactive substance use disorder
 - f. impulse control problems
 - g. family relationship problems
 - h. none of the above
92. Jimmy has been diagnosed with bulimia nervosa. His last medical evaluation was 2 days ago and included serum electrolytes, serum protein, serum calcium and magnesium, plasma glucose, complete blood count, renal, liver, and thyroid function tests, and an electrocardiogram. Jimmy also reports that he uses cocaine and misses work an average of twice a week because he was "making connections" to obtain more cocaine. He also states he no longer participates in any social activities because he would rather stay home and "get high." With regard to his family, Jimmy says that his parents never show any emotion and often involve him in their disputes.

Jimmy should be referred for evaluation of which of the following? (Mark all that apply, however points will be deducted for incorrect marking.)

- a. medical evaluation
 - b. mood disorder
 - c. anxiety disorder
 - d. personality disorder
 - e. psychoactive substance use disorder
 - f. impulse control problems
 - g. family relationship problems
 - h. none of the above
93. Mary has been diagnosed with anorexia nervosa. She had a complete medical evaluation yesterday. Mary has stable moods except for relatively normal ups and downs, but spontaneously reports she hates herself.

She cannot tolerate making mistakes because she will feel even more worthless than she already does. In fact, Mary frequently contemplates suicide, especially after she steals jewelry.

Mary should be referred for evaluation of which of the following? (Mark all that apply, however points will be deducted for incorrect marking.)

- a. medical evaluation
- b. mood disorder
- c. anxiety disorder
- d. personality disorder
- e. psychoactive substance use disorder
- f. impulse control problems
- g. family relationship problems
- h. none of the above

94. Bob has been diagnosed with bulimia nervosa. His last medical evaluation was yesterday and it included serum protein, serum calcium and magnesium, plasma glucose, and complete blood count. Bob avoids all social situations, because he is afraid he will say something foolish or be unable to continue speaking. He perspires profusely, trembles, and shakes when he has to speak in front of people. Bob's fear has resulted in a significant amount of distress and impairment. He also complains off feelings of extreme guilt.

Bob should be referred for evaluation of which of the following? (Mark all that apply, however points will be deducted for incorrect marking.)

- a. medical evaluation
- b. mood disorder
- c. anxiety disorder
- d. personality disorder
- e. psychoactive substance use disorder
- f. impulse control problems
- g. family relationship problems
- h. none of the above

95. Gloria has been diagnosed with anorexia nervosa and bulimia nervosa. She has had a complete medical evaluation 1 month ago. Gloria has a persistent fear of contamination. Consequently, she washes her hands in excess of 50 times a day. Indeed, Gloria's frequent handwashing has left her hands dry, red, chapped, and painful. She has been getting behind in

her occupational duties because she goes to the restroom so often that she can't keep up with her job duties. In addition, Gloria is cautious in her actions and considers the consequences of her actions beforehand.

Gloria should be referred for evaluation of which of the following? (Mark all that apply, however points will be deducted for incorrect marking.)

- a. medical evaluation
- b. mood disorder
- c. anxiety disorder
- d. personality disorder
- e. psychoactive substance use disorder
- f. impulse control problems
- g. family relationship problems
- h. none of the above

96. Keith has been diagnosed with anorexia nervosa. His last complete medical evaluation was 3 days ago. Keith shows appropriate affect (i.e., a full range of emotions from happiness to sadness depending on the situation). He used to sleep 8 hours a night, but now he sleeps an average of 4 hours a night because he can't stop thinking. Keith has also experienced unexpected episodes of heart palpitations, trembling, and nausea. He has had these attacks an average of once a week for the last 3 months. In addition, Keith is extremely afraid that he will suffer another attack in the near future.

Keith should be referred for evaluation off which of the following? (mark all that apply, however points will be deducted for incorrect marking)

- a. medical evaluation
- b. mood disorder
- c. anxiety disorder
- d. personality disorder
- e. psychoactive substance use disorder
- f. impulse control problems
- g. family relationship problems
- h. none of the above

97. Kim has been diagnosed with eating disorder not otherwise specified. Her latest comprehensive medical evaluation was yesterday. She reports that she frequently uses her credit card, although she cannot pay for the items she buys with credit. Kim

is seriously overdue in her credit payments and the credit card company is threatening to turn her into a collection agency. The interviewer also noted that Kim's moods change quickly from minute to minute. She also has significant marital problems and complains that no one understands her. Kim also reports using amphetamines to lose weight and burn off calories. However, other signs of psychoactive substance use disorders ruled out in a careful interview.

Kim should be referred for evaluation of which of the following? (mark all that apply, however points will be deducted for incorrect marking)

- a. medical evaluation
- b. mood disorder
- c. anxiety disorder
- d. personality disorder
- e. psychoactive substance use disorder
- f. impulse control problems
- g. family relationship problems
- h. none of the above

98. Craig has been diagnosed with bulimia nervosa. His latest medical evaluation was 2 months ago. He reports that he steals food almost daily in order to support his binge eating. Craig spontaneously stated that he never plans to steal food, but rather "it just happens on the spur of the moment." Craig also has a chronic history of school problems such as truancy and instigating fights. He has never held down a job for more than 2 weeks at a time due to his frequent tardiness. When confronted with his behavior, Craig simply shrugs his shoulders and regularly blames each person with whom he has a conflict.

Craig should be referred for evaluation of which of the following? (mark all that apply, however points will be deducted for incorrect marking)

- a. medical evaluation
- b. mood disorder
- c. anxiety disorder
- d. personality disorder
- e. psychoactive substance use disorder
- f. impulse control problems
- g. family relationship problems
- h. none of the above

99. Amy has been diagnosed with anorexia nervosa. Her latest medical evaluation was 1 year ago. She is 18 years old and lives with her parents. Amy claims that her parents do not let her do things on her own because they are afraid she will get hurt. For instance, Amy states that her parents have resisted allowing her to get her driver's license because they fear that she will get killed in a car accident if she learns how to drive. In addition, they are attempting to talk her into attending a local junior college, despite the fact that a major state university is only 30 miles away. Amy also reports that her parents typically ask her to mediate in their disputes.

Amy should be referred for evaluation of which of the following? (mark all that apply, however points will be deducted for incorrect marking)

- a. medical evaluation
 - b. mood disorder
 - c. anxiety disorder
 - d. personality disorder
 - e. psychoactive substance use disorder
 - f. impulse control problems
 - g. family relationship problems
 - h. none of the above
100. Billy is an adolescent who has been diagnosed with eating disorder not otherwise specified. His last complete medical evaluation was 2 days ago at which time it was found that Billy has hypotension and hypothermia. In an interview, Billy claimed that expression of emotions are not permitted in his family. Careful questioning with Billy and his family revealed that non other family relationship problems were present. His teacher also reported that Billy was irritable, apathetic, and unable to concentrate in class. Indeed, his teacher has sent his parent three notes with the past week about Billy's behavior problems and poor school work.

Billy should be referred for evaluation of which of the following? (mark all that apply, however points will be deducted for incorrect marking)

- a. medical evaluation
- b. mood disorder
- c. anxiety disorder
- d. personality disorder
- e. psychoactive substance use disorder
- f. impulse control problems
- g. family relationship problems
- h. none of the above

APPENDIX B

Informed Consent

Dear Participant:

During the 1990-1992 academic years, Linda Todd will be collaborating with the Department of Psychology and Department of Nutrition and Food Sciences at Utah State University in a dissertation research project that investigates the learning efficiency of various training programs in diagnosing and planning treatment for anorexia nervosa and bulimia.

Subjects in this project will be asked to complete one of three training programs. All training programs generally consist of reading and studying written materials on anorexia nervosa and bulimia, as well as completing a written pre- and post-test covering the training program content. It is estimated that the training will take subjects a total of 20 hours which may be completed at the subject's leisure within a one to two month period.

There are no foreseeable risks associated with participation and prospective benefits include the acquisition of an adequate knowledge base about diagnosing and planning treatment for anorexia nervosa and bulimia. Four-digit codes will be substituted for names in order to

track pre/post-test scores and to maintain confidentiality. Thus, all identifying information will be kept confidential.

Participation is voluntary and refusal to participate will not result in any penalty or loss of benefits to which the subject is otherwise entitled. Moreover, subjects may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled. If you have questions about the research or subject's rights at any time, you may contact Linda Todd (W. 750-3734 or H. 563-9340).

If you are willing to participate, please sign the lower portion of this form and return it to Linda Todd, Department of Psychology, Utah State University, Logan, Utah 84322-2810.

Signature

Date

Major

Phone

VITA

LINDA K. TODD

EDUCATION:

Utah State University	<i>Ph.D. in Psychology, 1993</i>
Department of Psychology	Professional/Scientific
Logan, Utah 84322-2810	Psychology

Dissertation: *Development and Validation of a Systematic Training Program for the Diagnosis of Anorexia Nervosa, Bulimia Nervosa, and Concomitant Conditions.*

University of Nevada	<i>M.A. in Psychology, 1988</i>
Department of Psychology	Clinical Emphasis
Las Vegas, Nevada 89154	

Thesis: *Factors affecting MMPI subtle-obvious discrepancies.*

Winona State University	<i>B.A. in Psychology, 1985</i>
Department of Psychology	
Winona, Minnesota 55987	

CLINICAL EXPERIENCE:

Clinical Supervisor August, 1990 - August, 1992
 Intermountain Sexual Abuse Treatment Center
 862 South Main Street, Suite #4
 Brigham City, Utah 84302

Supervised two staff therapists. Provided individual, group, marital, and family therapy to children, adolescents, and adults who have been sexually abused or who have sexually offended; educational programs in parenting, sexual abuse dynamics, sexual abuse prevention, and interpersonal relationships. Conducted psychological evaluations. Provided expert witness services pertaining to legal decisions involving client sexual abuse.

Volunteer Co-Therapist September 1990 - March 1991
 AIDS Family and Friends Support Group
 Bear River Mental Health Center
 90 East 200 North
 Logan, Utah 84321

Provided group therapy to persons with AIDS (or who HIV seropositive), as well as to their family and friends.

Counseling Practica September 1989 - March 1990
Utah State University Counseling Center
Logan, Utah 84322

Provided individual psychotherapy for sexual and physical abuse, motivational problems, developmental issues, interpersonal problems, coping with stress, anxiety, and major depression. Group therapy focused on eating disorders. Prepared and led in-service workshops for counseling center staff.

Psychological Examiner September 1989 - December 1989
Cache County School District Testing Services
2063 North 1200 East
North Logan, Utah 84321

Conducted psychological assessments including: child and teacher interviews; administration of intelligence, achievement, and visual-motor tests; classroom observation; and report writing.

School Practica March 1989 - August 1989
Clinical Services
Center for Persons with Disabilities
Utah State University
Logan, Utah 84322-6800

Assessed and diagnosed learning, behavioral, and/or emotionally handicapped children. Coordinated cases. Performed a wide variety of supervised assessments. Conferred with school officials and other agencies regarding children's problem solving approaches and other difficulties. Compiled all testing results in a written report. Presented assessment results to parents and relevant agencies. Performed follow-up counseling as requested. Designed behavioral remediation strategies.

Clinical Practica October 1988 - March 1989
Community Clinic
Department of Psychology
Utah State University
Logan, Utah 84322-2810

Provided individual, marital, and group therapy. Conducted psychological and neuropsychological assessments. Interviewed clients and administered

objective and projective tests. Scored psychological instruments and interpreted results. Wrote psychological evaluations. Problem areas included personality disorders, major depression with suicidal ideation, eating disorders, sexual abuse sequelae, marital conflict, and adult developmental issues.

Clinical Practica January 1987 - August 1987
Child Sexual Abuse Treatment Program
701 South Highland Drive
Las Vegas, Nevada 89103

Provided group therapy to child and adolescent victims of sexual abuse, as well as to mothers of sexual abuse victims. Group therapy focused on: lack of trust; feelings of betrayal, fear, anger, guilt, and depression; co-dependency issues; and sexual abuse prevention. Documented client progress and made treatment recommendations.

Clinical Practica August 1986 - January 1987
Montevista Centre
5900 West Rochelle Avenue
Las Vegas, Nevada 89103

Provided individual and group therapy to adolescents and adults. Worked with clients with a variety of diagnoses, ranging from substance abuse and eating disorders to major depression and dementia. Used cognitive-behavioral orientations to object relations and reality therapy. Documented client progress and developed treatment plans. Organized and conducted film sessions and discussions.

TEACHING EXPERIENCE:

Teaching Assistant August 1988 - August 1989
American Indian Support Projects
Department of Psychology
Utah State University
Logan, Utah 84322-2810

Tutored American Indian and Alaska Native graduate psychology students in Psychometrics, Inferential Statistics, and Correlation & Regression.

Teaching Assistant October 1986 - May 1988
Department of Psychology
University of Nevada, Las Vegas
Las Vegas, Nevada 89154

Conducted included library research. Constructed tests, proctored and graded examinations. Maintained grades for the following undergraduate psychology courses: Introduction to Psychology, History and Systems of Psychology, Personality, and Organizational Psychology.

Teaching Assistant August 1985 - November 1985
Department of Psychology
Winona State University
Winona, Minnesota 55987

Conducted review sessions, tutored, and graded examinations for a Honors General Psychology course. Selection for this position was highly competitive.

RESEARCH EXPERIENCE:

Research Assistant January 1991 - December 1991
Technology Division
Center for Persons with Disabilities
Utah State University
Logan, Utah 84322-6800

Assisted in the research of *Class.BD* (an expert systems based computer software for classifying children under the category of Behavior Disordered in order to receive special education services).

Survey Coordinator March 1991 - July 1991
Technology Division
Center for Persons with Disabilities
Utah State University
Logan, Utah 84322-6800

Coordinated telephone survey research for determining needed services for traumatically brain injured persons. Responsible for data collection and statistical analyses.

Field Supervisor November 1990 - January 1991
Effective Instructional Materials and Systems
1780 North Research Parkway, Suite #12
Logan, Utah 84321

Supervised approximately 50 employees directly involved in the field testing trials of *Estimator 4.0* software (a calculation program designed to give probability statements regarding the likelihood that a child is

learning disabled) on IBM, Apple, and MacIntosh computers.

Research Assistant June 1989 - July 1990
Technology Division
Center for Persons with Disabilities
Utah State University
Logan, Utah 84322-6800

Assisted in research activities (e.g., collecting, entering, and analyzing data, and in-service training) in Utah and South Dakota Schools under *Referral Consultant* grant (an expert system designed to assist teachers in making more accurate referrals of children for special education assessment).

Research Assistant August 1988 - August 1989
American Indian Support Projects
Department of Psychology
Utah State University
Logan, Utah 84322-2800

Maintained and conducted computerized statistical analyses of an American Indian/Alaska Native student data base. Assisted in grant proposals and library research.

Research Assistant March 1985 - November 1985
Department of Psychology
Winona State University
Winona, Minnesota 55987

Entered data and conducted computerized statistical analyses (SPSS) of psychological research.

OTHER RELATED EXPERIENCE:

Evaluator April 1990 - May 1992
Technology Division
Center for Persons with Disabilities
Utah State University
Logan, Utah 84322-6800

Performed yearly evaluations of projects funded by the Governor's Council for Persons with Developmental Disabilities.

Mental Health Tech III August 1987 - August 1988
Horizons Hospital
Southern Nevada Adult Mental Health Services
Las Vegas, Nevada 89158

Developed a token economy and behavioral observation coding system for adult psychiatric inpatients and conducted related in-service workshops. Provided individual and group therapy. Supervised Mental Health Technicians I and II.

Volunteer Counselor April 1985 - December 1985
Suicide Prevention Hotline
Las Vegas, Nevada 89104

Assessed suicide potential. Provided crisis counseling and referred clients to appropriate agencies.

PUBLICATIONS/PRESENTATIONS:

- Todd, L. K. (1987). Behavioral observation system. Unpublished manuscript.
- Todd, L. K. (1987). Point system. Unpublished manuscript.
- Todd, L. K. (1988). Factors affecting MMPI subtle-obvious discrepancies. Unpublished master's thesis, University of Nevada, Las Vegas.
- Todd, L. K. (1988, April). MMPI subtle-obvious discrepancies in disability and employment applicants. Poster presented at the annual convention of Western Psychological Association, Burlingame, California.
- Todd, L. K. (1989, May). Psychosocial aspects of AIDS. In L. K. Todd, R. Koronas, & P. Dyk (Chairs), AIDS: Attitudes, education, and issues in the workplace. Symposium presented at Utah State University, Logan, Utah.
- Todd, L. K. (1990, April). MMPI subtle-obvious discrepancies: Validation and relation to response bias measures. Paper presented at the annual convention of Rocky Mountain Psychological Association, Tucson, Arizona.

Todd, L. K., Stein, D. M., & Hess, H. F. (1990). MMPI subtle-obvious discrepancies: Validation and relation to response bias measures in disability and employment applicants. Journal of Psychology and the Behavioral Sciences, 5, 43-54.

Todd, L. K. (1991, May). Diagnostic trainer for eating disorders: Anorexia and bulimia nervosa, and concomitant conditions. Workshop presented at the annual convention of Rocky Mountain Conference on Eating Disorders, Colorado Springs, Colorado.

GRANTS:

MMPI Subtle-Obvious Discrepancies: Graduate Student Association at the University of Nevada, Las Vegas, 1988. \$532

HONORS AND AWARDS:

1992: Employee of the Month, Intermountain Sexual Abuse Treatment Center

1991: Dean's List, Utah State University

1990: Vice President's Research Fellowship, College of Education, Utah State University

Dean's List, Utah State University

1989: Graduate Assistantship, Technology Division, Center for Persons with Disabilities, Utah State University

Dean's List, Utah State University

1988: Graduate Assistantship, American Indian Support Projects, Utah State University

Dean's List, Utah State University

Second Place in Psi Chi Theory and Research Poster Contest, Western Psychological Association, Burlingame, California

Psi Chi Certificate of Recognition for Excellence in Research

1987: Graduate Assistantship, Department of Psychology, University of Nevada, Las Vegas

Dean's List, University of Nevada, Las Vegas

1986: Graduate Assistantship, Department of Psychology,
University of Nevada, Las Vegas

Dean's List, University of Nevada, Las Vegas

1985: Dean's List, Winona State University

1984: Dean's List, Winona State University

PROFESSIONAL MEMBERSHIPS:

American Psychological Association (current)
Rocky Mountain Psychological Association (1989)
Western Psychological Association (1988)

EXTRACURRICULAR ACTIVITIES:

Horseback riding, skiing, hiking, camping, fishing,
drawing, sports, and reading.

REFERENCES:

Elwin Nielsen, Ph.D.
Program Chair
Professional/Scientific Program in Psychology
Utah State University
Logan, Utah 84322-2810
(801) 750-1463

David Stein, Ph.D.
Associate Professor
Utah State University
Logan, Utah 84322-2810
(801) 750-3274

Richard Baer, Ph.D.
Technology Division
Center for Persons with Disabilities
Utah State University
Logan, Utah 84322-2810
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