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Escape theory, cognitive narrowing, and binge eating : a laboratory analysis

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ESCAPE THEORY, COGNITIVE NARROWING, AND BINGE EATING: A LABORATORY ANALYSIS

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TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

CHAPTER I

INTRODUCTION AND REVIEW OF RELATED LITERATURE

Bulimia nervosa has received increasing attention over recent years, with Fichter (1990) reporting an increase in bulimia-related articles since the late 1970's. This disorder is diagnosed in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition, revised (DSM-III-R; American Psychiatric Association, 1987) by the presence of episodes of binge eating over which the individual feels little sense of control. These binges number over two per week for a period of at least three months and are regularly followed either by "purgative" behaviors such as self-induced vomiting, or by strict dieting. Bulimia nervosa occurs primarily in young women, with the DSM-III-R reporting a prevalence rate of 4.5 percent in this population.

Mizes (1985) reports that physiological abnormalities associated with bulimia nervosa include hypokalemia, which can lead to weakened skeletal muscles, "cardiac arrhythmias, and potentially cardiac arrest" (p. 116). He also reports on studies on women with bulimia which find electrolyte abnormalities, throat soreness and infection, salivary gland enlargement, gastric dilation, bowel irregularities, dehydration, diabetes, amenorrhea and other menstrual irregularities, hypoglycemia, dry skin, and hair breakage. Although

these are associated primarily with the purge, it is generally accepted that bulimics rarely purge unless they perceive having binged.

In addition, several researchers have suggested that depression can result from recurrent binge eating (Fairburn, 1982, 1983; Hinz & Williamson, 1987; Johnson-Sabine, Wood, & Wakeling, 1984). Such a causal sequence is controversial, but it is clear that women with bulimia nervosa consistently show signs of depression more often than the general population (Laessle, Kittl, Fichter, Wittchen, & Pirke, 1987). Moreover, as many as 60 percent of bulimics report suicidal thoughts and 20 percent have attempted suicide (Viesselman & Roig, 1985). Clearly this disorder, characterized by recurrent binge eating, has potentially severe consequences.

This pattern of binge behavior is not exclusive to women with bulimia nervosa, however. Researchers have noted that many individuals binge without meeting the full criteria for bulimia nervosa (Devlin, Walsh, Spitzer, & Hasin, 1992). Consequently, the inclusion of a binge eating disorder (BED) as a distinct entity was suggested by the committee responsible for revisions in the eating disorders criteria for the DSM-IV. Individuals with this proposed disorder would not meet the full criteria of bulimia nervosa, but would instead be diagnosed by episodes of binge eating, with an accompanying loss of control and marked distress, at least twice a week for six months (Wilson & Walsh, 1991).

Spitzer et al. (1992) attempted to establish the prevalence of BED across multiple samples. Estimates range from .7% from a community telephone survey to 71.2% from a sample drawn from Overeaters Anonymous. Eating disorders are secretive behaviors (Martin & Wollitzer, 1988), so community surveys, especially those conducted by telephone, are likely to underestimate the prevalence of such disorders. In contrast, individuals in treatment groups are encouraged to be open to admitting problems, while overweight individuals tend to binge more frequently than their normal weight counterparts (Heatherton, Polivy, & Herman, 1991), suggesting that the Overeaters Anonymous sample overstates the prevalence of BED in the general population. The actual prevalence of BED likely falls between these two estimates. Across all 10 of Spitzer et al.'s samples, the average prevalence estimate of BED was 18.1%, with periodic binge eating occurring in 27.2% of the participants. This is similar to rates reported by Connors and Johnson (1987) who, after reviewing the available epidemiological literature, suggest that binge eating occurs in between 26% and 61% of women, and between 28% and 42% of men.

Binge eating is not synonymous with bulimia nervosa and BED is qualitatively different from bulimia nervosa; bulimia nervosa is associated with a level of pathology far beyond that of binge eating alone (e.g., Katzman & Wolchik, 1984; Ruderman & Grace, 1988; Schmidt & Telch, 1990). However,

binge eating is central to both bulimia nervosa and BED, the former less prevalent but quite dangerous, the latter apparently less dangerous but quite prevalent. Despite the apparent need to understand the common phenomenon of binge eating, the mechanisms involved in its development and maintenance are still unclear.

The Restraint Theory Approach

One potential explanation for the development and maintenance of binge eating is called the restraint theory. This theory asserts that individuals high in dietary restraint, that is, those who consciously restrict their eating behavior, may be more prone to binge behavior than those low in dietary restraint. These binges reflect disinhibition, the loss of dietary control caused by interference with restraint. "Dietary disinhibitors may be cognitive, emotional, or pharmacological" (Ruderman, 1986, p. 249).

Support

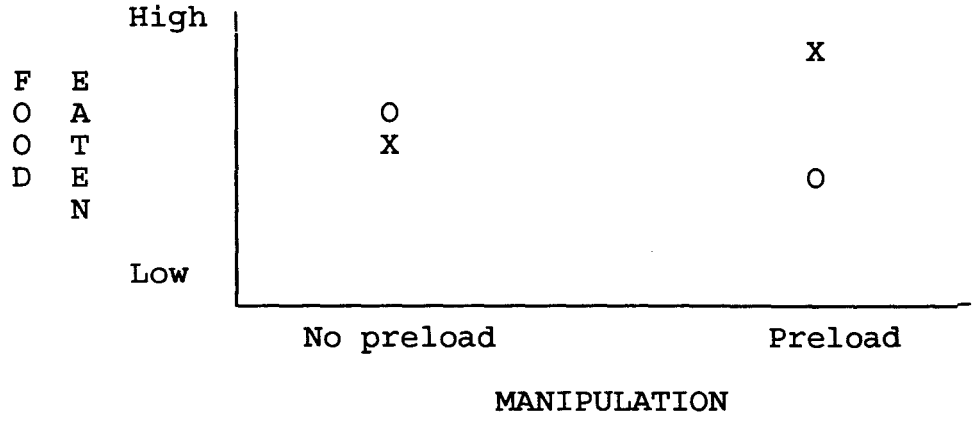
The restraint theory is supported by laboratory studies on "restrained" and "unrestrained" eaters. Although methodology varies, the most prevalent design begins by administering a dietary restraint questionnaire either nested among several instruments or on a separate "unrelated" occasion. Participants are classified as high or low restrainers based upon either a median split or arbitrary cutoffs established by previous work utilizing a median split. Volunteers are told that they are to take part in a "taste test" in which

the effect of tasting one flavor ("preload") upon later taste perception is being studied. In the laboratory, participants are typically asked either to drink all of a milk shake preload or no such preload, then left alone in the room with three preweighed bowls of ice cream of different flavors. They are then instructed to taste as much of each flavor as they need to make accurate ratings (rating sheets are provided), and that afterwards they may eat as much of the remaining ice cream as they desire because it is going to be thrown out anyway. The amount of ice cream eaten after a prescribed time (generally between 10 and 20 minutes) is the dependent measure.

When using the Restraint Scale (RS; Herman, Polivy, Pliner, Threlkeld, & Munic, 1978), typical results show the interaction illustrated in Figure 1 (c.f., Ruderman, 1986). High scorers on the RS typically eat more after drinking the preload than when in a no-preload condition, a phenomenon called "counterregulation" or "disinhibition." Low scorers, in contrast, generally eat somewhat less after drinking the preload than when in a no-preload condition. These results suggest that the use of a preload causes disinhibited eating among high scorers. Recent work has found that mere visual and olfactory exposure to preloads results in disinhibition in restrained eaters but not controls (Jansen & van den Hout, 1991; Rogers & Hill, 1989). Although in each case an independent physiological mechanism might be posited, a

single psychological explanatory system might more parsimoniously account for these results.

Figure 1. Typical interaction of Restraint Scale Scores with Preload Manipulation.



X = High scorers on the Restraint Scale
O = Low scorers on the Restraint Scale

Cognitive-based disinhibition is suggested by the finding that perceived "forbiddenness," not caloric content of a preload (Knight & Boland, 1989) and perceived "fillingness" of identical "vitamin" pills (Heatherton, Polivy, & Herman, 1989) can cause a disruption in restraint, leading to increased eating. Affect-based disinhibition is supported by experiments in which induced anxiety, depression, and elation cause increased eating among restrained eaters (e.g., Cools, Schotte, & McNally, 1992; Wardle & Beales, 1988). Although experimental results are mixed, there is

also evidence "that under certain circumstances, alcohol knowingly consumed may increase consumption among restrained eaters" (Ruderman, 1986, p. 254).

Finally, bulimia treatment studies provide indirect evidence for the restraint theory approach. Psychotherapy results in a lowering of restraint, whereas pharmacotherapy either has no effect on or increases dietary restraint, as evidenced in unchanged or reduced food intake during drug treatment (e.g., Craighead & Agras, 1991; Fairburn et al., 1991). The relapse rate of bulimia nervosa after discontinuation of drug treatment is substantially higher than that of psychotherapies (Freeman & Munro, 1988). In failing to reduce dietary restraint, pharmacotherapy may place a temporary physiological block on binge behavior while leaving restraint, an underlying cause of disordered eating intact (Craighead & Agras, 1991).

Weaknesses

Despite this support, the data are not as clear as might be assumed. There is increasing evidence that several variables, such as self-esteem and self-awareness, may interact with dietary restraint (Freeman & Prentice-Dunn, 1990; Polivy, Heatherton, & Herman, 1988). This points to a basic problem of heterogeneity of restrained eaters (Cooper & Charnock, 1990; Tuschl, 1990; Westenhoefer, 1991).

Moreover, although researchers utilizing the Restraint Scale (RS) have consistently found restraint X preload

disinhibitory effects (Ruderman, 1986), those utilizing the restraint subscales of the Three Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985) and the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defores, 1986) have failed to do so (Huon, Wooton, & Brown, 1991; Lowe & Maycock, 1988; Wardle & Beales, 1987). It appears that differing results across scales may be due to difficulty in operationalizing "restraint." The RS appears to measure chronic unsuccessful dieting, characterized by alternating restraint and disinhibition. In contrast, the TFEQ and DEBQ tap a more successful restraint pattern (Heatherton, Herman, Polivy, King, & McGree, 1988, Lowe, 1993). Although Heatherton et al. (1988) consider chronic unsuccessful dieting to be characteristic of the typical dieter, Lowe (1993) draws a distinction between current dieting and a history of unsuccessful dieting, suggesting that TFEQ scores are more related to the former, while RS scores are more related to the latter. Thus, an unambiguous definition of restraint has yet to be established.

Finally, although the restraint theory explains the disruption of restraint which occurs during binge eating, it does not explain <u>why</u> people binge eat. That is, it does not explain the motivation behind binge eating or what benefit this behavior has for the individual. Consequently, although the restraint theory approach is "exciting and inno-

vative" (Charnock, 1989, p. 343), it requires and is undergoing considerable refinement.

The Escape Theory Approach

In one such refinement, Heatherton and Baumeister (1991) report an application of the escape theory which explores the motivation behind binge eating. They propose that binge eaters do so during a period of "low level cognition" which is prompted by a desire to escape aversive self-awareness. To better introduce the concept of low level cognition and its relation to escape from the self, I now review the basic tenets of action identification theory.

Action Identification Theory

Action identification theory, described in detail by Vallacher and Wegner (1985, 1987), works off of the assumption that people can identify what they are doing. Although universal, this identification of personal action may exist on many levels. For example, an individual can identify what he or she is doing as "moving a paintbrush" or, alternatively, "creating a masterpiece" (example from Vallacher & Wegner, 1985). The action remains the same, but the identification of that action is quite different. Moreover, the latter identification can be viewed as being at a "higher level;" although one can create a masterpiece by moving a paintbrush, one can not move a paintbrush by creating a masterpiece. In essence, "creating a masterpiece" holds a higher place in an identity hierarchy under which "molding

clay" or "welding steel" might also fall. Action identification theory holds that for any action there are very low levels of identification which can be arranged into a number of identity hierarchies for which higher-level identifications provide abstraction, order, and consistency.

Although levels of identification are relative, low level identities are characterized by concrete, immediate description, whereas high level identities carry more abstract meaning and temporal significance. Additionally, high level identities are typically accomplished "by" low level identities. For example, one "shows creativity" by "moving a paintbrush." Of the various levels of identification available to the individual, it is assumed that only one of these can be prepotent. That is, at any given time the individual identifies an action on only one level. This assumption, made by Vallacher and Wegner (1985), is consistent with a number of other theoretical perspectives, including those of G. H. Mead, F. Heider, and G. Kelly (pp 19-20).

According to action identification theory, although level of identification is prone to change, under most circumstances individuals prefer higher level identities to lower level ones. Identities at higher levels provide order and stability to our actions, both reflecting the lower order identities which they subsume and guiding later action. For instance, someone who is "riding a bicycle" may

shift consecutively to the higher level identities of "staying in shape" and "staying healthy." This final identity both subsumes the two lower level identities and can guide later behavior by suggesting "eating well" as a consistent action.

However, there are limitations to this tendency towards high level identification. Actions made in a disruptive context, which are particularly difficult, or with which the individual has little experience are optimally identified at lower levels. When first beginning to drive, for example, "applying the brakes" is a more useful identification than "going shopping" because the unfamiliar mechanical action of braking requires more conscious attention. Moreover, when presented with personal failure, individuals tend to use lower levels of identification than when they perceive a successful personal action (Vallacher, Wegner, & Frederick, 1987). This may be due to an avoidance of negative ascriptive identifications and attributions. As noted by Vallacher and Wegner (1985):

> Identities at relatively low level, such as "moving a paintbrush," tend to be limited in meaning, and by themselves they have little in the way of ascriptive significance. Relatively high level identities, however, are much richer in meaning--meaning which often points to the actor as well as the action. The higher the level at which an action is identified, then, the more the action reflects on the nature of the agent producing the action. (p. 188)

An individual who wishes to escape negative feelings and attributions about the self can therefore shift to low level

thinking patterns. By using low level identities, he or she is able to either avoid making negative self-evaluations or, once made, avoid facing these negative self-evaluations. In essence, the individual is escaping the self. Baumeister (1991) explains:

> Escape from the self is escape from the meaningful aspects of the self . . . The mind must be directed to stop at the level of sensations and impressions, or just to observe events without exploring all the implications for the self. (p. 18-19)

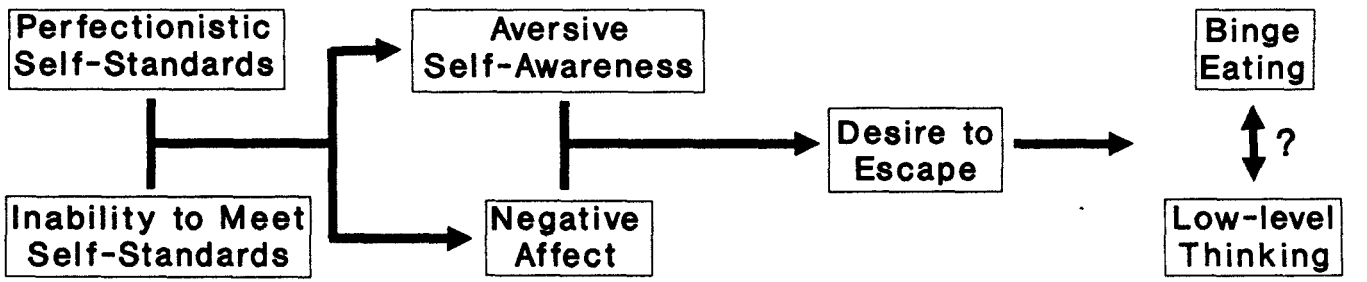
It is during these times of escape when the binge is theorized to occur.

The Escape Theory Causal Sequence

Although the reader is directed to Heatherton and Baumeister (1991) for a more detailed exposition, I briefly review the causal sequence proposed by the escape theory of binge eating. As illustrated in Figure 2, the escape theory asserts that binge eaters are trying to escape aversive self-awareness. It begins by noting that binge eaters hold themselves against high standards. As self-awareness is defined as the comparison of the self against relevant standards, aversive self-awareness results from the individual's inability to meet consistently these high standards. Aversive self-awareness by definition entails negative affect, including anxiety and depression. To escape this aversive self-awareness and the associated negative affect, the binge eater attempts to "cognitively narrow" her or his thoughts by shifting to low-level thinking patterns. Al-

Figure 2

Escape Theory of Binge Eating



though Heatherton and Baumeister (1991) do not specifically make this connection, the concepts of low level thinking and narrowed cognition are extremely similar to low level identification as defined by action identification theory. This similarity is illustrated by the following quote:

> Low levels of meaning involve narrow, concrete, temporally limited awareness of movement and sensation in the immediate present. High levels of meaning invoke broader time spans and broader implications. High levels also involve comparison of events (and the self) against broad standards such as norms and expectations. . . High levels of awareness are thus based on meaningful constructs that link immediate events to distal ones, whereas low levels of awareness may be considered as deconstructed. . . The deconstruction process may be an appealing way to escape from worries, threats, and pressures. (Heatherton & Baumeister, 1991, p. 88)

As discussed earlier in regard to action identification, the shift to low level cognition allows temporary relief from aversive self-awareness. However, this shift also results in a loss of the higher-level cognitive tasks of reasoning and inhibition. During these times, dietary restraint (inhibition) gives way to binge behavior in those prone to binge eating. The binge is therefore theorized to be related to a motivated shift to low level thinking patterns during which aversive self-awareness is temporarily alleviated.

Implications for Therapy

The escape theory represents a significant advancement over past conceptualizations of binge eating. Not only does it account for the breaking of dietary restraint, but it also addresses the motivation behind this break. This is

important because an understanding of the development and maintenance of binge eating allows for more effective prevention and intervention. The theory suggests that such intervention should involve a strong cognitive component.

A review of two popular alternative treatment approaches highlights the contributions of the escape theory. As previously noted, pharmacotherapy appears effective in the short-term alleviation of binge behavior, but has very high relapse rates once the drugs are discontinued. As Craighead and Agras (1991) suggest, this may be due to the fact that such treatment actually facilitates restraint. Because dietary restraint has been linked to binge eating, when the pharmacological block on binge behavior is removed the patient may actually be more prone to binge eating. Similarly, behavior therapy may initially reduce binge behavior but may fail to address the basic personality features (e.g., perfectionism, aversive self awareness) which underlie the binge (Fairburn et al., 1991). As noted by Hsu (1990), "the urges to binge do not always disappear even when the patient has begun to eat normally. There is, therefore, a need for greater understanding of the cognitions and feelings that occur before and during a binge/vomit episode" (p. 60).

The escape theory contributes to such understanding of the cognitive and affective components of binge behavior. The theory suggests that behavioral and pharmacological

interventions focusing exclusively upon the binge are poor long-term interventions because they do not address the perfectionism, aversive self-awareness, cognitive narrowing, and negative affect which are thought to exist in binge eaters. In addition to higher relapse rates, Heatherton and Baumeister (1991) suggest that such interventions may lead participants to turn to other means of escape, such as substance abuse.

Instead, these etiologically significant personality features need to be addressed directly:

> One approach would therefore be to try to alter the high standards and perceived expectations that place great pressure upon the individual. . . A second approach would focus on the aversive awareness of the self that precedes the binge. As long as bulimics have low liking, respect, and esteem for themselves, awareness of the self will tend to be aversive. . . A third approach would be to reshape the individual's cognitive responses (see Fairburn & Cooper, 1987). The goal here is to break the escalating cycle of negative thoughts about the self (and the attendant negative affect). (Heatherton & Baumeister, 1991, p. 102)

By treating the causes of binge eating directly, the symptoms and consequences of binge eating and the often associated purge behaviors will theoretically be ameliorated simultaneously with many personality characteristics which might otherwise lead to further self-destructive behaviors. Although such cognitive intervention may appear intuitive, the continued focus on strict behavioral and pharmacological/medical models of binge eating by many researchers and practitioners attest to the fact it is not. Consequently, continued testing and refinement of the escape theory is a

necessary part of emphasizing cognition in effective therapy efforts.

Implications for Research

The escape theory offers a unique set of expectations about individuals who counterregulate in the laboratory (see page 6, above, for an illustration of the typical counter-regulation effect). Although Heatherton and Baumeister do not use this term, their theory implies a "binge-prone personality," a connected set of personality features which are causally linked to binge eating. For example, people who counterregulate in the laboratory would be expected to hold high standards for themselves. That is, they should be perfectionistic. "Although the escape theory of binge eating emphasizes the relevant standards of dieting and slimness, any high standards could conceivably give rise to escapist motivations and binge eating" (Heatherton & Baumeister, 1991, p. 90). Consequently, this perfectionism may be global, body-specific, or eating-specific.

According to this theory, however, perfectionistic standards are not sufficient to lead to binge eating. Rather, aversive self-awareness mediates binge eating in perfectionistic individuals. This aversive self-awareness requires both a high level of self-focus and a negative view of the self. Consequently, binge eaters should be expected to be highly self-conscious and have low self-esteem. In fact, self-consciousness and self-esteem have each been

found to interact with dietary restraint in producing disinhibited eating (Freeman & Prentice-Dunn, 1990; Polivy et al., 1988).

A further hypothesized mediating factor is affect, as aversive self-awareness is closely linked to negative affect. Binge eaters are hypothesized to try to avoid both negative affect and negative self-awareness through cognitive narrowing. In research, high restraint volunteers may become increasingly depressed when forced to eat a laboratory preload (Rogers & Hill, 1989). Consequently, depressive symptoms are expected in binge eaters.

Finally, the escape theory predicts that, during a binge, cognitive narrowing occurs. Unfortunately, this narrowing has proven difficult to measure. For example, Jansen, Merckelbach, Oosterlaan, Tuiten, & van den Hout (1988) were unable to discriminate between "binging" and "non-binging" individuals' self-talk in the laboratory, thereby failing to find evidence of this cognitive narrowing. Moreover, they could find no association between dietary restraint and several measures of irrational thinking. To date, no one has studied the action identification styles of binge eaters. During the binge, the hypothesized "cognitive narrowing" should be manifested in low-level action identifications, characterized by concrete, immediate description. Consequently, binge eaters should be prone to lower level identification. No published research to date

has directly manipulated level of cognition to determine its effect upon eating behavior.

Although there is considerable indirect evidence for the escape theory approach to binge eating (see Heatherton & Baumeister, 1991), the approach is largely based upon the restraint theory, and is prone to many of the criticisms cited earlier. Moreover, laboratory work on restrained eating to date has not directly tested the escape theory. Research has focused on the interactions of one or two constructs (e.g., restraint, self-esteem) with a manipulation (e.g., preload, affect) to cause eating behavior. A prohibitively expensive longitudinal higher-order factorial design would be necessary to test concurrently all of the components of the "binge prone personality." Consequently, no direct evidence of a group of binge-prone individuals is available.

On a less global level, Heatherton and Baumeister (1991) note:

> A particular ambiguity in the evidence is whether the binge eating is a cause, or merely a consequence, of the escape from self-awareness. It does seem apparent that reductions in self-awareness are important in removing inhibitions against eating and thus fostering the binge. It may also be, however, that the process of eating can absorb the person's attention and therefore facilitate the narrowing of attention and resultant escape from self-awareness. (p. 102)

The causal sequence relating narrowed attention to binge eating remains undetermined.

CHAPTER II

THESIS OVERVIEW AND HYPOTHESES

This study represented an attempt to evaluate the escape theory in two parts: an experiment and a cluster study. The experiment sought to determine whether dropping chronic unsuccessful dieters' level of cognition would lead to laboratory "binge eating." Referring to Figure 2, this was an evaluation of the causal nature of the combination of diet-related perfectionism and the inability to maintain a diet when moderated by a shift in level of cognition. Volunteers were grouped into "chronic unsuccessful dieters" and "normals" based upon a median split of the Revised Restraint Scale (RRS; Heatherton et al., 1988). This natural grouping variable was crossed with an experimental manipulation of level of action identification. Participants then engaged in an ice cream "taste test," with amount eaten as the dependent variable.

Although Heatherton and Baumeister (1991) are admittedly uncertain about the causal sequence, it was predicted that a significant interaction would occur. It was predicted, based upon the tenets of the escape theory, that chronic unsuccessful dieters who were asked to think on a low level would eat significantly more than their counterparts who

were asked to think on a high level. In essence, it was predicted that a shift to low level cognition would cause chronic unsuccessful dieters to "binge." It was further predicted that this effect would be mediated by degree of aversive self-awareness/negative affect.

In the cluster study, a partial reanalysis was performed on the data from this experiment to determine whether the implied binge-prone personality was distinct. That is, was there a distinct cluster of people who showed evidence of perfectionistic self-standards, aversive self-awareness, and negative affect? Further, of the clusters which were found, what were the characteristics of those who "binged" in the laboratory setting? Measures of various personality features were used to cluster participants into natural groups. This natural groups variable was then crossed with the level of cognition manipulation in the experiment. Based upon Kristeller and Rodin's (1989) work, between four and six clusters were expected. The escape theory implies that one of these should have included individuals who were high in global, eating, or body- specific perfectionism, high in self-consciousness, low in self-esteem, high in depression, and prone to lower-order thinking. Moreover, these individuals were expected to counterregulate in the laboratory.

The following is a detailed description of the experiment and cluster study. Because the cluster study was a

partial reanalysis of the data obtained during the experiment, the method section is identical and consequently combined. The results and discussion sections are differentiated as relevant to either the experiment or cluster study.

CHAPTER III

METHOD

Participants

A total of 158 undergraduate women were drawn from the subject pool of Loyola University of Chicago, each receiving course credit for her participation. During recruitment, these women were explicitly informed that they could not participate if they were allergic to dairy products. Although this represents a convenience sample, women in this age group appear particularly at risk for developing eating disorders (American Psychiatric Association, 1987).

As will be described later, a questionnaire near the end of the experiment asked participants what they believed the hypotheses of the study were. This questionnaire was intended to help ensure that the volunteers believed the "taste test" cover story. A total of 17 women have been excluded from most analyses because they indicated on this hypothesis inquiry that they believed that the amount they ate was of interest. The remaining 141 participants had a mean age of 18.6 years (SD=1.1 years) and tended to be in either their first (65 percent) or second (22 percent) year of college. Most (67 percent) were Caucasian, 18 percent were Asian-American, and 9 percent were African-American.

The actual sample sizes for each analysis varied slightly due to occasional missing data, and will consequently be reported with each analysis.

Materials

The measures employed are summarized in Table 1. Most of these measures were utilized solely in cluster study analyses, but are described here because they were administered during the experiment. With the exception of the Behavior Identification Form (BIF), described later, all of these instruments have been utilized in smaller factorial designs studying dietary restraint. All non-standardized instruments are provided in APPENDIX A. Although validity and reliability information based upon previous research is given with the description of each measure, Table 2 shows the internal consistency and intercorrelation coefficients for the current sample.

Personality Measures

General Perfectionism. General perfectionism, as tapped by the Eating Disorders Inventory Perfectionism subscale (EDI-P; Garner, Olmstead, & Polivy, 1983), measures "excessive personal expectations for superior achievement" (p. 18). The EDI-P has shown an internal consistency of .73 in college students (Garner et al., 1983), and has been found to correlate with need for achievement (Coles & Edelmann, 1987) and performance in school (Vanderheyden, Fekken, & Boland, 1988). The EDI-P includes six statements which

Table 1

Measure Summary.

Construct		Measures
	Escape Theory Components	
Perfectionism	-- Global	EDI-P
	-- Body-Specific	EDI-DT
	-- Eating-Specific	RRS, TFEQ-R, self-report dieting
Aversive Self-Awareness	-- Self-focus	SCS-PR
	-- Negative Self-view	SES
Negative Affect (Depressive Symptoms)		BDI
Cognitive Narrowing		BIF
	Cluster Analysis Validation	
Bulimic Tendencies		BULIT-R

Table 2

Measure Internal Consistencies and Intercorrelations.

	EDI-P (1)	SES (2)	SCS (3)	BDI (4)	BIF (5)	RRS (6)	TFEQ-R (7)	EDI-DT (8)	BULIT-R (9)
1	.82 (141)								
2	-.03 (139)	.85 (139)							
3	.15 (138)	-.10 (136)	.73 (138)						
4	.02 (140)	-.63[d] (138)	.18[a] (137)	.88 (140)					
5	.18[a] (138)	.06 (137)	.11 (135)	-.04 (137)	.81 (138)				
6	.14 (141)	-.25[c] (139)	.15 (138)	.21[a] (139)	.08 (138)	.74 (141)			
7	.15 (139)	-.16 (137)	.14 (136)	.06 (138)	.00 (136)	.70[d] (139)	.90 (139)		
8	.21[a] (140)	-.40[d] (138)	.20[a] (137)	.22[b] (139)	-.02 (137)	.64[d] (140)	.73[d] (138)	.86 (140)	
9	.13 (137)	-.43[d] (136)	.17[a] (134)	.37[d] (136)	.06 (135)	.58[d] (137)	.38[d] (138)	.68[d] (136)	.93 (137)

Numbers on the diagonal are Alpha coefficients for each scale. Numbers off the diagonal are measure intercorrelations.

Two-tailed significance: [a]$p<.05$, [b]$p<.01$, [c]$p<.005$, [d]$p<.001$

are rated on a 1-6 scale anchored by "strongly disagree" and "strongly agree." A sample item reads: "Only outstanding performance is good enough in my family."

Drive for thinness. Body-specific perfectionism is manifested in an extreme drive for thinness. As measured by the Eating Disorders Inventory Drive for Thinness subscale (EDI-DT), drive for thinness includes "excessive concern with dieting, preoccupation with weight and entrenchment in an extreme pursuit of thinness" (Garner et al., 1983, p. 17). Factor analyses have confirmed the connection of the EDI-DT to disordered eating (Laessle, Tuschl, Kotthaus, & Pirke, 1989; Vanderheyden et al., 1988), while Vanderheyden and Boland (1987) report the EDI-DT to be a significant predictor of binge eating over time. Garner et al. (1983) report an alpha coefficient of .85 in a college sample. One item from this seven-item scale reads "I eat sweets and carbohydrates without feeling nervous" (this item is reverse-scored). These items are rated on the same 1-6 scale as the EDI-P.

Dietary restraint. Restrained eating reflects eating-specific perfectionism. The Revised Restraint Scale (RRS; Heatherton et al., 1988) "measures the extent to which people (a) display (overconcern) with their weight and (b) chronically diet to control it" (Heatherton et al., 1988, p. 26). The RRS is a 10-item scale which includes items such as "How often are you dieting? (Circle) Never, Rarely,

Sometimes, Often, Always" and "What is your maximum weight gain within a week? (Circle) 0-1, 1.1-2, 2.1-3, 3.1-5, 5.1+."

Unlike the RRS, which combines both restraint and disinhibition into a single composite score (i.e., "chronic unsuccessful dieting"), the Three Factor Eating Questionnaire (TFEQ; Stunkard and Messick, 1985) has separate Restraint, Disinhibition, and Hunger subscales. However, although a factor analysis of the TFEQ confirmed the unifactorial nature of the Restraint subscale, this was not so of the other two subscales, which blended into two new factors bearing little resemblance to the original Disinhibition and Hunger subscales (Hyland, Irvine, Thacker, Dann, and Dennis, 1989). Consequently, only the TFEQ Restraint subscale (TFEQ-R) was included in this study as a measure of relatively successful dietary restraint. The TFEQ-R is a 21-item scale which incorporates some items from the RRS while adding a series of true-false items, such as "Life is too short to worry about dieting" (this item is reverse-scored).

Internal consistency estimates range between .78 and .82 for the RRS and between .89 and .90 for the TFEQ-R (Allison, Kalinsky, & Gorman, 1992; Laessle et al., 1989). Laessle et al. also performed a factor analysis with these scales and several other eating measures, concluding that the RRS and TFEQ-R validly measure related but distinct components of dietary restraint. They concluded that the

RRS measures weight concerns and an inability to maintain a diet (marked by weight fluctuations), while the TFEQ-R measures more "the actual restriction of food in everyday life" (p. 506).

The RRS was utilized in the experiment to divide participants into two natural groups based upon a median split. Women scoring above the median RRS score of 14 were placed in the "chronic unsuccessful dieters" group. Women scoring at or below this median were labelled "normals." This technique has been frequently used in the literature (cf. Ruderman, 1986). Recall that the RRS taps failure to maintain a diet as well as weight-related concerns, whereas the TFEQ-R does not tap the inability to maintain a diet. Because the causal chain outlined by Heatherton and Baumeister (1991) emphasizes both perfectionism and an inability to achieve this perfectionism, the RRS was chosen over the TFEQ-R for this grouping variable.

Current dieting status. As Lowe (1993) points out, the RRS and TFEQ-R are primarily historical measures. That is, they measure prevailing past dietary patterns. Although past patterns often carry into the present, a high score on the RRS or TFEQ-R does not presuppose current dieting. Because current dieting status appears important independent of history of dietary restraint (Cooper & Bowskill, 1986; Lowe, Whitlow, & Bellwoar, 1991), participants were asked to

rate how strictly they were currently dieting from "not at all" (coded 0) to "extremely strictly" (coded 6).

Self-consciousness. Self-consciousness represents the first component of aversive self-awareness. The Private Self-Consciousness Scale (SCS-PR; Fenigstein, Scheier, & Buss, 1975) assesses "a cognitive, private mulling over the self" (p. 525). Fenigstein et al. report 2-week retest reliabilities of .84 for the SCS-PR and review several studies attesting to its validity. A sample item from this ten-item scale reads: "I reflect about myself a lot." Participants rated these items on a 1-4 scale from "extremely uncharacteristic" to "extremely characteristic."

Self-esteem. The Rosenberg Self-Esteem Scale (SES, Rosenberg, 1965) was included to measure the second component of aversive self-awareness. Wylie (1989) reviewed the reliability and validity evidence for the SES. She reports alpha coefficients between .72 and .92 and a retest reliability of .85 at 2 weeks for this instrument. Factor analytic studies have either confirmed the unidimensionality of the SES or simply discriminate items worded positively from those worded negatively (due to method variance). This two-factor solution is likely to be the result of a response set and is not strong evidence against the unidimesionality of the measure. Wylie also reviews several multitrait-multimethod matrices, reporting that self-esteem - self-concept "correlations exceeded all heterotrait-monomethod

and heterotrait-heterotrait correlations in the matrix, indicative of discriminatory as well as convergent validity" (p. 30). Finally, the SES has been found to correlate with depression, anxiety, interpersonal insecurity, loneliness, and self-confidence (Wylie, 1989). Participants were asked to rate the ten items of this measure on a 1-4 scale from "strongly disagree" to "strongly agree." A sample item reads: "I feel that I have a number of good qualities."

Depressive Symptoms. The Beck Depression Inventory (BDI; Beck et al., 1979) was utilized to measure negative affect. Beck, Steer, and Garbin (1988) review the extensive validity evidence for the BDI. Beck et al. (1988) also report alpha coefficients for the BDI between .73 and .92 and stability estimates between .62 (4 months) and .90 (2 weeks) in nonpsychiatric samples. Each of the 21 BDI items includes four statements representing increasing symptom severity. Participants were asked to circle all statements which were applicable to them in the past week. For example, the first item read: "(0) I do not feel sad, (1) I feel sad, (2) I am sad all the time and I can't snap out of it, (3) I am so sad or unhappy that I can't stand it." For exploratory analyses, participants were classified as "non-depressed" if they scored below ten on this scale, and as "depressed" if they scored ten or above. This cutoff has been widely used and validated in the literature (c.f., Beck et al., 1988).

Level of Cognition Tendencies. The Behavior Identification Form (BIF; Vallacher and Wegner, 1985, 1989) taps individual tendencies to identify actions at high versus low levels of identification. Test-takers are asked to choose which of two options best describes how they define a series of 25 actions, one of which is of a higher level of identification than the other. For example:

1. Making a list
   a) Getting organized
   b) Writing things down

The BIF score reflects a style of action identification, binge eaters presumably tending to use low level identities. Consequently, the BIF was entered as a clustering variable in the cluster study. Vallacher and Wegner (1985, 1989) report an alpha of .85 and a 2-week retest reliability of .96 among college students. They also present several studies attesting to the convergent and discriminant validity of the BIF.

Bulimia. The cluster analysis, described later, resulted in several plausible cluster solutions. The Bulimia Test-Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991) was utilized as a criterion measure to determine which solution, derived from the other personality measures, was most useful. Thelen et al. (1991) report an alpha coefficient of .97 and 2 month retest correlation of .95. They also report several studies attesting to the validity of the BULIT-R as screening instrument for bulimia nervosa. Simi-

larly, Brelsford, Hummel, & Barrios (1992) report alpha coefficient estimates of .92 and .93 at two administrations and a test-retest reliability of .83 after 4-6 weeks. They also found the BULIT-R to be "highly related to the symptom-specific measures of binge eating and purging" included in their study (p. 401). The BULIT-R is a 28-item scale in which test-takers choose from 5 responses to each item. One item reads: "I am presently satisfied with my eating patterns; 1. agree, 2. neutral, 3. disagree a little, 4. disagree, 5. disagree strongly" (this item is reverse-scored). Higher scores on this scale indicate increased eating pathology.

Food Preference, Hunger, Hypothesis Inquiry, Consumption Estimate, and Demographics

Because both the general liking of our experimental food and overall hunger were likely to play roles in the amount eaten, 6-point food preference scales and a 0-6 hunger scale were provided. Degree of liking of ice cream (hereafter "ICELIKE") was operationalized as the mean preference rating for vanilla and chocolate ice cream. Also, as noted earlier, to screen for individuals who have "caught on" to the true dependent measure of the study, each woman was asked to guess the purpose of the experiment after the "taste test." Additionally, for exploratory purposes, an item was included asking participants to estimate how much ice cream they ate during the "taste test." Finally, the

demographic characteristics of current estimated body weight, height, age, and year in school were assessed.

Taste-test Rating Scales

Participants were asked as part of the "taste test" to rate each flavor on five Likert-type scales. These scales are numbered -4 through 4, left to right. One scale reads:

SWEET

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

The other scales are similarly formatted, but refer to "creamy," "flavorful," "rich," and "tasty," as suggested by Freeman and Prentice-Dunn (1990). These scales were utilized to maintain the "taste test" pretense and are not included in any analyses presented here.

Pilot Measures

After the completion of the experiment, participants were asked to complete one of two pilot questionnaires. Of little analytic interest here, these questionnaires consisted of a task in which participants were asked either to describe the act of eating ice cream in five different ways or to rate how accurately 26 listed descriptions of the act of eating ice cream described what they did in the experiment. These pilot questionnaires were being tested for a separate study related to action identification and are not presented in analyses here.

Procedure

The procedure has been outlined in Table 3. Participants were run individually between 1 pm and 4 pm. This was based upon past research methodology and was intended to reduce the effects of hunger/satiety. Participants were informed that the study concerned how people with different personality types have differences in taste perception (See APPENDIX B). After obtaining informed consent, the experimenter asked the participant to complete the first packet of instruments, including the SES, SCS-PR, EDI-P, BIF, BDI, and the level of cognition manipulation.

Table 3

Procedure Summary.

Event	Approximate Timing
Introduction Informed Consent	:05
Subject Completes Packet 1 (SES, SCS-PR, BIF, EDI-P, BDI, Level of Cognition Manipulation	:15
Taste-test instructions Subject taste test Experimenter leaves room, returning in 10 min	:26
Experimenter returns, places bowls in garbage can Subject completes Packet 2 (RRS, TFEQ-R, EDI-DT, BULIT-R, Demographics Questionnaire, Hypothesis Inquiry, Pilot Questionnaire)	:40
Closing Statements	:50

Level of cognition manipulation

Participants were randomly assigned to either the high level identification condition or the low level identification condition. Each woman was asked to think about a recent interaction which they had experienced with a person of the same sex. Participants in the low-level identification condition were then be asked to:

> Try to recall five specific things you did in this interaction with this person. Provide as much detail as you can; that is, indicate the particular comments you made, questions you asked, or behaviors you performed.

Participants in the high-level identification condition were asked to:

> Try to recall five things about yourself that you feel you demonstrated in your interaction with this person. Be somewhat general in your answers; that is, indicate what opinions and values you communicated, or perhaps what personality traits you demonstrated.

This procedure replicated that used successfully by Wegner, Vallacher, Kiersted, and Dizaldi (1986, p. 30) in an experiment testing one of the tenets of action identification theory.

While each participant generated these descriptions, the experimenter retrieved three preweighed bowls of ice cream from either a freezer or styrofoam cooler for "tasting." As in the traditional paradigm, participants were then left alone for 10 minutes to "rate" the three flavors of ice cream (3 1/2 fluid oz. each of vanilla, chocolate swirl, and strawberry swirl). In the instructions on rat-

ing, the women were told that "we will be throwing out any left-over ice cream, so after you finish all your ratings, feel free to go back and help yourself to as much of any flavor as you like" (see APPENDIX B). After the 10-minute taste test, participants completed a final questionnaire packet, consisting of the hypothesis inquiry, RRS, TFEQ-R, EDI-DT, BULIT-R, the demographics questionnaire, and the pilot measure.

Each woman was thanked for her participation and told that she would be called at the end of the semester with more information about the experiment. Each was provided the name and mailing address of the experimenter in the event she had questions prior to this time (none contacted the experimenter). Once each participant had left, the remaining ice cream was retrieved and reweighed. The dependent measure of the study, amount of ice cream eaten, was operationalized as the mass of the ice cream remaining after the taste-test subtracted from the mass of the ice cream before the taste-test.

At the end of the semester, participants were debriefed by telephone and offered a written debriefing outlining the true nature of the study (see APPENDIX B).

CHAPTER IV

EXPERIMENT RESULTS

Manipulation Check

Before further analyses, it was necessary to determine whether participants responded appropriately to the level of cognition manipulation. Recall that each participant was asked to list five descriptions of an interaction they had recently had with another woman either in general and self-reflective terms (high-level condition) or specific and detailed terms (low-level condition). As a manipulation check, the author and an undergraduate research assistant, both familiar with the concept of action identification but blind to each subject's assignment to condition, rated each of the responses given by the participants during this manipulation.

As suggested by Wegner et al. (1986), this procedure involved a three-point rating scale. Clearly low-level responses were assigned a 1, clearly high-level responses were assigned a 3, with a 2 being assigned to responses which mixed high-level and low-level elements. In addition to this three-point scale, a fourth rating, "not applicable," was added for those cases in which participants either failed to include enough responses or provided responses

which did not fit the level of action identification rating scheme. For example, one participant's fourth and fifth responses were rated "not applicable" because only three were listed, while another participant failed to describe her own actions ("she explained why and told me I could return the item"), completely disregarding the manipulation instructions.

Each statement was retyped to allow raters to be completely blind to the participants' assignment to conditions. Responses were placed into five lists, consisting of participants' first, second, third, fourth, and fifth responses. Participants' first responses were used as practice items and were not included in inter-rater reliability analyses. Participants' second responses were then independently rated and inter-rater reliability analyses, described below, were computed. On those responses where ratings disagreed, the raters then discussed their ratings and came to a consensual agreement. They then moved on to the participants' third responses, independently rating them and computing inter-rater reliability. This was, in turn, followed by a discussion of discrepant ratings of the third responses and establishment of consensual rating agreement. Finally, they proceeded in the same manner through the fourth and fifth responses. It should be emphasized that, although the raters discussed their ratings for each list of responses before moving on to the next list (e.g., they

discussed discrepant ratings on the second response list before moving on to the third response list), inter-rater reliability analyses for each list were based upon the independent ratings for that list.

Because this manipulation check was intended only to determine whether the manipulation by and large affected participants' descriptions of a recent interaction and was not intended to be a screening device, the manipulation check was considered independent of all other analyses. Consequently, all 158 participants were included in the manipulation check. They were considered to have completed the manipulation if two or fewer of their last four responses received the "not applicable" rating. Three participants did not successfully complete the manipulation according to this criterion, leaving a sample size of 155 participants for remaining analyses. Because the rating system involved both categorical (1-3 ratings versus "not applicable") and interval (1-3 ratings) level data components, two inter-rater reliability analyses were conducted. The first analysis, a test of categorical agreement, consisted of a series of computations of Kappa coefficients. Kappa coefficients for categorical agreement for participants' responses were satisfactory: second responses: kappa=.71, third: kappa=.88, fourth: kappa=.91, and fifth: kappa=.83. The second analysis used interval-level data, throwing out all responses which at least one rater considered "not applicable." In

this analysis, Pearson's correlations were computed between raters: participants' second responses, r=.75 (n=152); third responses, r=.90 (n=150); fourth responses, r=.92 (n=144); and fifth responses, r=.85 (n=140).

Because satisfactory inter-rater reliability had been established, participants' mean levels of action identification could be determined. Recall that any response ratings which were under dispute were discussed and a consensual agreement was reached by the two raters. Consequently, each participants' last four responses had one established consensual rating (first responses, as noted above, were used exclusively for ratings practice). A given participant's mean level of action identification was defined as the mean of these consensually reached ratings for the last four responses given by that participant, excluding responses which were deemed "not applicable." For example, a participant whose last four responses were consensually rated 3, 1, 2, and "not applicable" would have a mean action identification level of 2. A one-way ANOVA was then executed with participants' mean level of action identification as the dependent variable and manipulation group as the independent variable. This ANOVA yielded strong evidence that the manipulation had an effect ($F(1,153)=238.03$; $p<.0001$). Participants in the low-level manipulation group (M=1.26, n=77) scored significantly lower than participants in the high-level manipulation group (M=2.55, n=78). Consequently,

when asked to express themselves at a given level, participants by and large did so, suggesting that they were responding to the manipulation of their level of cognition.

Comparison of Participants Who Mentioned Amount of Ice Cream in Their Hypothesis Guesses to Those Who Did Not

As noted earlier, I decided to exclude participants from most analyses if they mentioned in the hypothesis inquiry that they believed that the amount eaten was of any interest in the experiment. Table 4 shows the results of comparing the volunteers who were excluded from further analyses to those who were not. To correct for the number of comparisons made, a significance cutoff of $p=.003$ (.05 divided by 17) was set for a series of independent samples t-tests. Comparison with this conservative significance cutoff suggested that observed differences on the BULIT-R and self-reported dieting measures may have been due to chance factors. This fact, when combined with the observation that it is conceptually contradictory for someone to score high on the current dieting measure and low on the BULIT-R, indicated that observed differences on these two measures were likely spurious.

Even with the conservative significance cutoff, women who mentioned amount of ice cream in their hypothesis guesses were significantly (if slightly) younger and more likely to be in their first year of college than those who did not. Aside from age and educational level, however, there was

Table 4

Comparison of Participants Included In and Excluded From Analyses.

Variable	mean or mode[a] and sample sizes included	excluded	t-value or chi-square[a]	p value
EDI-P	8.84 (141)	8.76 (17)	- .07	ns*
Dieting Status	2.27 (139)	1.44 (16)	-2.03	.044
RRS	13.86 (141)	13.59 (17)	- .16[b]	ns
TFEQ-R	10.66 (139)	10.50 (16)	- .10	ns
EDI-DT	6.29 (140)	8.41 (17)	1.08[b]	ns
BULIT-R	50.48 (137)	59.59 (17)	2.07	.041
SES	33.89 (139)	32.06 (17)	-1.49	ns
BDI	7.76 (140)	9.94 (16)	1.27	ns
SCS-Pr	30.20 (138)	29.82 (17)	- .31	ns
BIF	17.20 (138)	17.65 (17)	.37	ns
Hunger Rating	2.37 (125)	2.47 (17)	.27	ns
ICELIKE	4.10 (141)	4.41 (17)	1.02	ns
Weight	132.3 (141)	129.4 (17)	- .46	ns
Height	65.15 (141)	65.65 (17)	.63	ns
Age	18.64 (141)	18.12 (17)	-4.29[b]	.000
Year in school	1.51 (140)	1.00 (17)	-7.44[b]	.000
Amount eaten	68.58 (137)	72.47 (17)	.38	ns
Manipulation group	high-lvl[a] (141)	low-lvl[a] (17)	.68[a]	ns
Ethnicity	cauc.[a] (125)	cauc.[a] (17)	.20[a]	ns

[a]nominal variables have modal and chi-square values listed;
[b]t-test based upon unequal variance computations; *ns=p>.10

little evidence to suggest that the two groups were different on the measures included in this study. Nevertheless, because of the necessity of maintaining the deception involved in the study, those women who mentioned amount of ice cream in their hypothesis guesses were excluded from all further analyses.

Are These Data Suitable for the Planned Analyses?

I planned to utilize a 2 X 2 X 2 analysis of covariance (ANCOVA) with the amount eaten as the dependent measure, the manipulation group and the median splits of the RRS and BDI as independent measures, and the degree of liking of ice cream (hereafter abbreviated "ICELIKE"), hunger ratings, and weight as covariates. However, a number of assumptions needed to be checked before executing this analysis.

The first assumption was that the dependent variable approximated a normal distribution. Unfortunately, a statistic used to test the normality of distributions called this assumption into question. The Lilliefors test on the amount of ice cream eaten (see Norusis, 1990) yielded a probability value less than .03, indicating that the hypothesis that the variable was normally distributed should be rejected. This result suggested that some normalization of the data was required. Consequently, I transformed the data such that a variable I will call EATEN equals the square root of the amount of ice cream eaten by each subject. The Lilliefors test ($p>.20$) indicated that the distribution of

EATEN was approximately normal. Consequently, all further analyses calling for the amount of ice cream eaten as a dependent measure instead used the normalized variable EATEN. However, the mean amounts of ice cream eaten, in their original units, will also be reported to aid interpretation.

I now address assumptions specifically related to the use of covariates. First, it was assumed that multiple covariates each provided a unique influence on the dependent variable. Second, it was assumed that covariates which were found to exert a unique influence on the dependent variable correlated with the dependent variable to approximately the same degree at each level of each independent variable (homogeneity of regression). The first of these assumptions was addressed by three regression equations. In each, two of the three potential covariates were entered together, followed by the independent entry of the third potential covariate into an equation predicting EATEN. As can be seen in Tables 5-7, ICELIKE was the only variable which contributed significantly ($p=.016$) to the prediction of EATEN beyond the influence of the other two potential covariates. Moreover, as shown in Table 8, neither self-reported hunger nor weight contributed significantly once ICELIKE had been entered in a stepwise regression predicting EATEN. These results strongly suggested that only ICELIKE should be retained as a potential covariate.

Consequently, only ICELIKE was checked against the assumption of homogeneity of regression. Unfortunately, among subjects who were asked to think at a low level, the correlation between ICELIKE and EATEN was .18 (n=67; p>.10), whereas among subjects who were asked to think at a high level, the correlation between ICELIKE and EATEN was .38 (n=69; p=.001). Using Fisher's z' transformation (see Cohen

Table 5

Regression of ICELIKE, Hunger, and Weight on EATEN, Hunger Entered Last.

Step and Variables	df	Multiple R	R^2	Change in R^2	p of change
(1) ICELIKE & Weight	2,117	.260	.068	.068	.017
(2) Hunger	3,116	.291	.085	.017	.141

Table 6

Regression of ICELIKE, Hunger, and Weight on EATEN, Weight Entered Last.

Step and Variables	df	Multiple R	R^2	Change in R^2	p of change
(1) ICELIKE & Hunger	2,117	.282	.080	.080	.008
(2) Weight	3,116	.291	.085	.005	.413

Table 7

Regression of ICELIKE, Hunger, and Weight on EATEN, ICELIKE Entered Last.

Step and Variables	df	Multiple R	R^2	Change in R^2	p of change
(1) Hunger & Weight	2,117	.194	.038	.038	.106
(2) ICELIKE	3,116	.291	.085	.047	.016

Table 8

Stepwise Regression of ICELIKE, Hunger, and Weight on EATEN.

Step and Variable	df	Multiple R	R^2	Change in R^2	p of change
(1) ICELIKE	1,118	.252	.064	.064	.005
(2) Hunger	2,117	.282	.080	.016	.157
(3) Weight	3,116	.291	.085	.005	.413

& Cohen, 1975, pp 50-51), these correlations proved to be different at the "trend" level of significance (z=1.26; p=.10). Consequently, there was reason to believe that the assumption of homogeneity of regression had been violated.

Although these results suggested that none of the three investigated variables were appropriate covariates for analyses in which EATEN was the dependent variable and the

level of cognition manipulation was an independent variable, they did not preclude the use of these measures as independent variables. That is, ICELIKE, hunger, and weight could have been entered as factorially crossed independent variables in analyses in which EATEN was the dependent variable. However, using median splits of all three in a factorial design would have required dividing the number of sample sizes per cell by eight. To avoid this division (and the resultant loss in statistical power), I chose to utilize a median split of only ICELIKE. As the above analyses show, this variable predicted a significant amount of variance in EATEN. Consequently, it was potentially quite useful in analyses. However, neither hunger nor weight significantly added to this prediction, supporting the exclusion of these two variables from further analyses. Thus, the proposed experimental analysis was changed to a 2 X 2 X 2 Analysis of Variance (ANOVA) with EATEN as the dependent variable and the level of cognition manipulation and median splits of ICELIKE and the RRS as independent variables.

I then tested the assumption of homogeneity of variance for this amended design. The variances of EATEN should have been approximately the same across all of my 8 proposed cells. "The Levene test is a homogeneity-of-variance test that is ... particularly useful with analysis of variance" (Norusis, 1990, p. 99). The Levine statistic for this

analysis (.3633; df=1,128; p=.92) indicated that it was safe to make the assumption of homogeneity of variance.

Analysis of Chronic Unsuccessful Dieting, Liking of Ice Cream, and Level of Cognition.

In review, participants were divided into "chronic unsuccessful dieters" and "normals" based upon a median split of the RRS, and into "like ice cream" and "dislike ice cream" groups based upon a median split of ICELIKE. These two subject variables were crossed with one another and the level of cognition manipulation (i.e., high-level versus low-level identification) in a 2 X 2 X 2 factorial design. An ANOVA with EATEN as the dependent variable was executed to analyze these data for main and interaction effects. The only effect to reach statistical significance was the main effect of the median split of ICELIKE ($F(1,127) = 10.801$; $p=.001$). Not surprisingly, participants who reported liking ice cream ate significantly more ($M = 80.3$ grams) than those who reported disliking ice cream ($M = 58.5$ grams). All other main and interaction effects were non-significant (all $ps>.40$).

This lack of significant results involving the RRS was contrary to predictions, and precluded meaningful analysis of mediating mechanisms. In short, there was no effect to mediate. Consequently, although negative affect was hypothesized to be a mediator in the causal pathway illustrated in Figure 2, its role as such could not be tested. However, as

seen in this figure, the escape theory causal model might also justify the exploration of negative affect in its own right as an influence on eating behavior. It is possible that the more distal elements on the causal chain (i.e., perfectionistic self-standards and the inability to meet these standards), although etiologically important in the development of aversive self-awareness, were simply too far removed from the hypothesized end result, binge eating, to show significant effects. Because aversive self-awareness and negative affect are more proximal to binge eating in the escape theory causal model, these variables may have shown effects moderated by the level of cognition manipulation which were not evident in analyses utilizing the RRS. To more thoroughly investigate the hypothesized effect of level of cognition upon eating, I chose to investigate the main and interactive effect of one of these more proximal variables, negative affect, in exploratory analyses.

Exploratory Analysis of Negative Affect, Liking of Ice Cream, and Level of Cognition.

In this exploratory analysis, participants were classified as "non-depressed" if they scored below a ten on the BDI or as "depressed" if they scored at or above a ten on this measure. The cutoff score of ten is well-established (Beck et al., 1988). This natural groups variable was crossed with the median split of ICELIKE and the level of cognition manipulation in a 2 X 2 X 2 factorial design. The

Levene statistic for this design (.7210; df=7,127; p=.65) suggested that the variance of EATEN was relatively homogeneous across the 8 cells of this design, so a 2 X 2 X 2 ANOVA was executed. Results are shown in Table 9.

As can be seen, the main effect of ICELIKE ($F(1,127) = 10.8$; $p=.001$) and the 3-way interaction of ICELIKE, the BDI, and the level of cognition manipulation ($F(1,127) = 4.6$; $p=.03$) were each statistically significant. The effect due to degree of liking of ice cream was identical to that described above, but the 3-way interaction was intriguing. Consequently, two follow-up ANOVAs were conducted with EATEN as the dependent variable. Both ANOVAs crossed the level of cognition manipulation with the median split of the BDI as independent variables, one ANOVA utilizing only participants scoring below the median on ICELIKE (Table 10), the other with participants scoring above the median on ICELIKE (Table 11).

No significant effects were found for participants who reported disliking ice cream, while a significant interaction effect between the BDI and level of cognition was found for participants who scored high on ICELIKE. Simple effects analyses revealed that depressed women who reported enjoying ice cream ate significantly more when asked to think on a high level than when asked to think on a low level ($F(1,127) = 6.47$, $p<.025$). In contrast, non-depressed women who reported liking ice cream ate slightly (but not significantly)

less when asked to think on a high level than when asked to think on a low level ($F(1,127)=.36$, $p>.10$). Table 12 shows the mean amount of ice cream eaten (in raw score units) and sample sizes for each cell involved in the three-way ICELIKE X BDI X manipulation interaction. Figure 3 displays the interaction.

Table 9

BDI X ICELIKE X Manipulation ANOVA with EATEN as the Dependent Variable.

Source	Sum of Squares	df	Mean Square	F	p
ICELIKE	57.207	1	57.207	10.801	.001
BDI	2.177	1	2.177	.411	ns*
Manipulation	2.621	1	2.621	.495	ns
ICELIKE X BDI	.793	1	.793	.150	ns
ICELIKE X Manip.	1.158	1	1.158	.219	ns
BDI X Manip.	10.224	1	10.224	1.930	ns
3-way Interact.	24.338	1	24.338	4.595	.034
Error	672.670	127	5.297		

*ns means $p>.10$

Table 10

BDI X Manipulation Follow-up ANOVA for Participants who Dislike Ice Cream with EATEN as the Dependent Variable.

Source	Sum of Squares	df	Mean Square	F	p
BDI	3.836	1	3.836	.724	ns*
Manipulation	.684	1	.684	.129	ns
BDI X Manip.	.297	1	.297	.056	ns
Error (from omnibus analysis)	672.670	127	5.297		

*ns means p>.10

Table 11

BDI X Manipulation Follow-up ANOVA for Participants who Like Ice Cream with EATEN as the Dependent Variable.

Source	Sum of Squares	df	Mean Square	F	p
BDI	.003	1	.003	.001	ns*
Manipulation	1.941	1	1.941	.366	ns
BDI X Manip.	34.264	1	34.264	6.469	<.02
Error (from omnibus analysis)	672.670	127	5.297		

*ns means p>.10

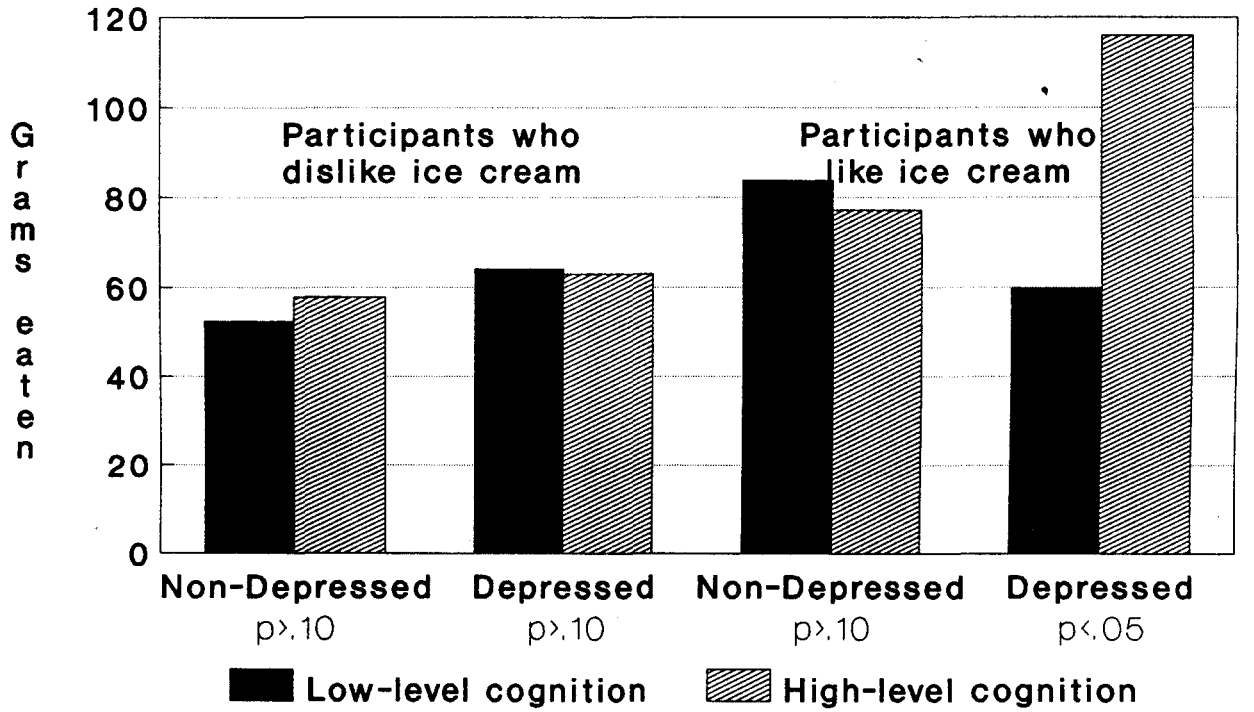
Table 12

Mean Amounts Eaten (in raw score units) and ns per cell in the ICELIKE X Level of Cognition Manipulation X BDI design.

			Low Scorers on ICELIKE		High Scorers on ICELIKE		
			BDI			BDI	
COGNITIVE	LEVEL		Low	High		Low	High
		Low	52.47 (19)	64.07 (14)	Low	83.92 (24)	59.78 (9)
		Hi	57.80 (25)	62.92 (13)	Hi	77.22 (27)	116.00 (5)

Figure 3

BDI X Manipulation X Liking of Ice Cream



CHAPTER V

EXPERIMENT DISCUSSION

Certain limitations of these results should be kept in mind during interpretation. First, although every attempt has been made to ensure that the underlying assumptions of the various statistical techniques utilized were met, one key assumption required to generalize beyond the present sample may have been compromised: sample size. Due to the unanticipated entry of ICELIKE as a factorially crossed independent variable in analyses, the number of participants in certain cells was low, in one case dropping to five. Although it appears clear that including this variable in analyses was crucial to understanding the data, doing so may have reduced the generalizability of results. Second, the analysis which included the BDI, although intriguing, was admittedly exploratory. Third, in the case of the difference in magnitude of ICELIKE-EATEN correlations across levels of the action identification manipulation, the effect reached only the "trend" level of significance. In all three cases, although effects will be discussed at face value in the ensuing discussion, the reader should keep in mind that these results require replication.

The Effect of Level of Cognition Upon the Relative Influence of Internal and Situational Factors in Determining Behavior

Before discussing the factorial analysis, I would like to briefly address the serendipitous finding that ICELIKE correlated more strongly with EATEN for those women who were asked to think at a high level than for those who were asked to think at a low level. Vallacher and Wegner (1987) noted that individuals who are thinking at a high level tend to post hoc attribute their actions more to internal causes and less to situational causes than do individuals who are thinking at a low level.

The current results add to this observation. Women in the current study made ice cream preference ratings before eating the ice cream. Consequently, the fact that this internal factor was more influential in determining the amount of ice cream eaten among participants who were asked to think on a high level than among those asked to think at a low level suggests that its relative influence cannot be the result of post hoc attribution. Rather, it appears that the internal factor of ice cream preference was, in fact, more influential in determining the amount eaten in conditions of high-level thought than low-level thought. This suggests that not only do people's post hoc attributional reports vary in this way, but the actual relative influence of personal versus situational factors in determining behavior can vary depending upon their level of thinking. When

people are thinking on a high level, they tend to act more according to internal influences, such as hunger and food preference, than when they are thinking at a low level.

This may be important in future research, as there is increasing evidence that individuals who are recurrent unsuccessful dieters are highly influenced by external eating cues (e.g., Heatherton et al., 1989; Ogden & Wardle, 1990). Lowe (1993) even suggests that the more chronic the pattern of unsuccessful dieting, the more susceptible an individual becomes to external cues to overeat. This would help explain why individuals scoring high on the RRS show the classic "disinhibitory" effects of a milk shake preload. Because they are more sensitive to external (over)eating cues, when chronic unsuccessful dieters are signalled that the experimenter wants them to eat a large volume of high calorie foods (e.g., via a preload), they do just that! As Lowe (1993) put it: "The critical 'disinhibitory' aspect of the various preload manipulations used in eating regulation studies may be the information such preloads convey about the kind of eating behavior deemed appropriate in such studies" (p. 109). Future research might look into whether manipulating level of cognition, which appears to have an effect on the relative amount of influence of internal cues in determining behavior, affects chronic unsuccessful dieters tendencies towards "disinhibitory" eating after a preload. Based upon Lowe's (1993) hypothesis, chronic unsuc-

cessful dieters who are presented with a preload and asked to think on a high level (increased internal focus) should eat less than chronic unsuccessful dieters who are asked to think on a low level (increased external focus).

Factorial Analyses Discussion

Returning to the current study, the results failed to support the hypothesis that lowering chronic unsuccessful dieters' level of cognition causes binge eating. In fact, prevailing dietary pattern, as measured by the RRS, was of little main or interactive significance in determining the amount of ice cream eaten in this study. At least three explanations could account for this finding. First, the manipulation might have been ineffective in leading participants to think at a high or low level. However, results of the manipulation check, the just discussed effect of the manipulation upon correlational findings, as well as the finding that the manipulation interacted with degree of liking of ice cream and the BDI all argue against this conclusion. Second, the experimental "taste test" design may have been flawed. However, this design closely mirrors those used in the dietary restraint literature utilizing the RRS with significant results. Third, the hypotheses may have simply been incorrect. That is, change in level of cognition may not account for the disinhibition found in these restraint theory studies.

Returning to Lowe's (1993) recent contribution, it is clear in hindsight why manipulating level of cognition may not have affected women with a history of unsuccessful dieting (i.e., a high score on the RRS) any more than those without such history. The current study did not systematically vary cues to participants of how much ice cream they were expected to consume. Consequently, whether they were heavily influenced by external cues to overeat, as Lowe suggests high scorers on the RRS are, was irrelevant. No systematic external overeating cues were provided! Although one might argue that the "demand characteristics" of the environment provided an external eating cue, a distinction should be made between a cue to eat and a cue to overeat. In the present study, participants were requested to merely taste the ice cream. This contrasts with the preload studies in which certain subjects were requested to fully consume a high calorie drink. The request to take a small taste of a food (eating cue) is quite different from the request to fully consume it (overeating cue). In the present study, no strong cue to overeat was presented, and chronic unsuccessful dieters ate about as much as other participants.

Instead, the results indicate that, of participants who reported enjoying eating ice cream, those high in depressive symptoms ate significantly more when asked to think on a high level than when asked to think on a low level, whereas

those low in depressive symptoms ate somewhat (but not significantly) less when asked to think at a high level than when asked to think at a low level.

Interestingly, participants who reported disliking ice cream showed no effect due to our manipulation, their degree of depressive symptomatology, or the interaction of the two. Although this stands to reason, research to date has not taken into account ideographic food preferences, potentially leading to misleading results. For example, past null findings may have been due to the use of food which a substantial number of participants disliked. In fact, research in this area has relied heavily upon ice cream as an experimental food without a measure of how much each participant cares for this food. Minimally, future research should include such a measure. In addition, it may be fruitful to allow participants to choose from a number of experimental foods, then to run separate analyses for each of these foods. Because effects occurred only when participants reported liking ice cream, I focus on this group in further discussion.

As noted earlier, high-level cognition tends to be much more self-referential than low-level cognition (Baumeister, 1991). The manipulation check indicated that those whom we asked to think at a given level by and large did so, suggesting the conditions were characterized by either highly self-referential (high-level) or less self-referential (low-

level) thought. Participants who were high in depressive symptoms and asked to think at a high level may not have enjoyed the resultant increase in self-awareness, leading them to eat significantly more than their counterparts who were asked to think at a low level. Placed in light of the escape theory, the former participants may have sought to escape aversive self-awareness by eating. However, the hypothesis that this eating provided escape by lowering level of cognition is questionable; women who were low in depressive symptoms and already thinking at a low level ate about as much as their symptomatic high-level counterparts. It remains to be explored why these women, already thinking at a low level and with no theorized desire to escape, would eat as much as women who are theorized to desire escape from aversive self-awareness.

Consequently, these results provide only partial support for the escape theory of binge eating. It appears that an increase in aversive self-awareness may be related to increased eating, but the present study found no evidence that this is a mediating mechanism in a causal chain linking chronic unsuccessful dieting to binge eating. Moreover, the present data call into question Heatherton and Baumeister's (1991) contention that "reductions in self-awareness are important in removing inhibitions against eating and therefore fostering the binge" (p. 102, emphasis added). In fact, it would appear that quite the opposite was true for

women who were high in depressive symptoms; inhibitions were removed by an increase in self-awareness.

This result may, however, relate to findings that intense affect can disrupt restraint (e.g., Cools et al., 1992; Wardle & Beales, 1988). In fact, Vallacher and Wegner (1987) review a number of studies in which strong emotions such as evaluation apprehension can lead to performance impairment. It may be that strong negative itself affect disrupts dietary restraint. Arnow, Kenardy, and Agras (1992) described two antecedents to binge eating among the obese: strong negative affect and perceived abstinence violations. In their sample of binge eaters, strong negative affect was most closely associated with binge eating among those who were not actively restricting their diets. Their conclusion: "negative mood may on its own precipitate a binge, even in the absence of a restrictive eating pattern" (p. 164). The present results appear to bear out this conclusion in a student sample.

Left unanswered is how the link between negative affect and eating in the general population might lead to chronic disordered eating. As noted earlier, occasional binge eating is not equivalent to an eating disorder. Eating disorders such as bulimia nervosa are associated with a much greater level of psychopathology than binge eating alone (e.g., Katzman & Wolchik, 1984; Ruderman & Grace, 1988; Schmidt & Telch, 1990). Moreover, the purgative behavior of

bulimics is uncharacteristic, even in mild degree, of the typical dieter (Lowe, 1993). Consequently, it should be recognized that the occasional binge eating of many individuals in response to negative affect may not represent the low end of a continuum with severe eating pathology at the high end. Instead, affective lability (Greenberg & Harvey, 1987), personality disorder (e.g., Johnson & Wonderlich, 1992), a "body image disorder" (Rosen, 1992), or some other factor may be necessary to send the individual into a downward spiral into an eating disorder. At this point, whether eating patterns should be viewed in qualitative or quantitative terms remains hotly debated (c.f., Ruderman & Besbeas, 1992).

Even so, Lowe (1993) reviews a number of lines of evidence suggestive of behavioral conditioning in the binge eating of chronic unsuccessful dieters. Although physiologically it should be expected that emotional distress would lead to a reduction in appetite (Heatherton, Polivy, & Herman, 1991), chronic unsuccessful dieters may have had successive pairings of negative affect and binge eating. The current study suggests that women who are high in depressive symptoms respond to heightened self-awareness by eating. When this eating represents a violation of a personal diet, the individual may strive to achieve a more restrictive diet, while at the same time experience an increase in depressive symptoms due to their perception of

dietary failure. This increase in negative affect may, in turn, make them more susceptible to overeating, completing the downward spiraling pattern described by Heatherton and Polivy (1992). If this pairing of negative affect to eating continues, this spiral could provide a powerful source of conditioning. "The frequent past pairings of negative affect and overeating in chronic dieters may transform from an unconditioned stimulus for reduced eating into a conditioned stimulus for increased eating" (Lowe, 1993, p. 110).

Although intriguing, this potential connection between eating in response to negative affect among normal women and the negative affect eating observed among eating disordered women is highly speculative, requiring further research. Moreover, although this explanation is consistent with the results presented here, it fails to account for why people tend to eat in response to negative affect. Further research will be necessary to determine whether binge eating lowers level of cognition and consequently reduces aversive self-awareness, is simply the result of a disruption of restraint in the presence of food deprivation, has a direct physiological effect, or produces some other effect. The current results make clear the need to look at self-awareness and depression in such research.

CHAPTER VI

CLUSTER STUDY RESULTS

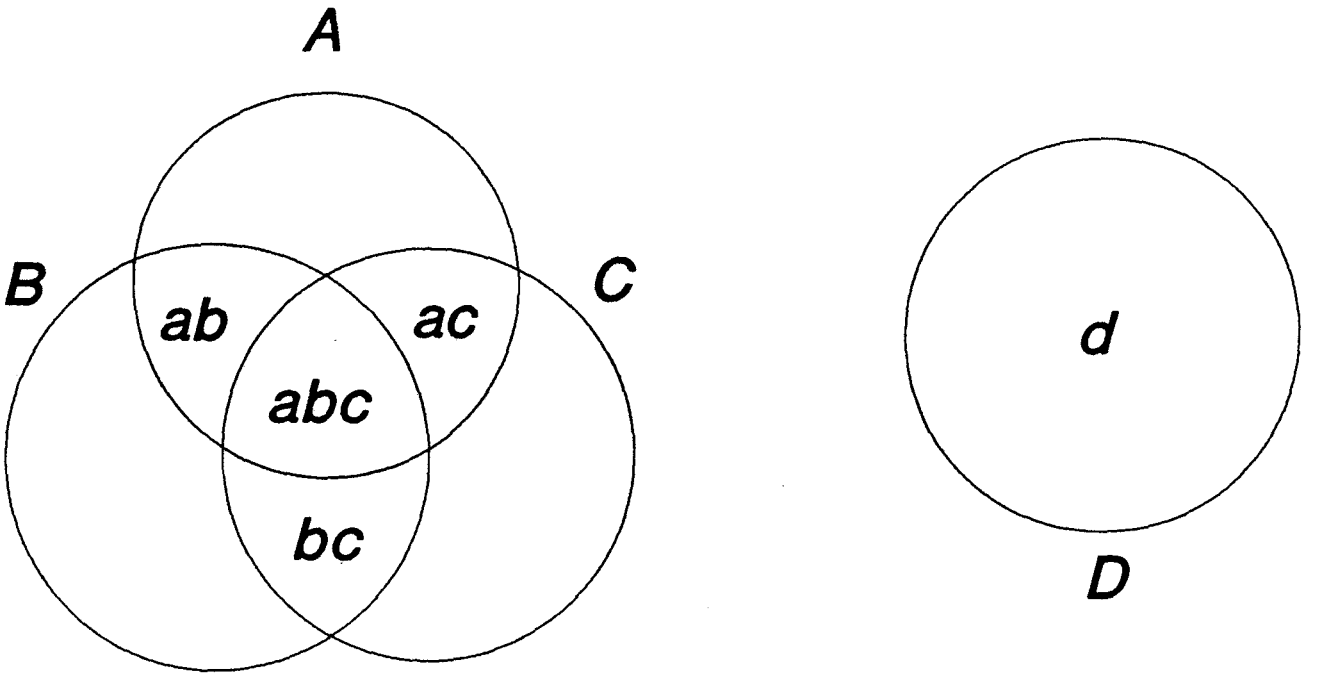
Data analysis for the cluster study fell into several steps: 1) data transformation, in which data were factor analyzed, resulting in three orthogonal factor scores for each subject; 2) cluster analysis, in which twelve potential cluster solutions were generated; 3) evaluation and choice of cluster solutions, in which two of these twelve were selected for further analyses; 4) factorial analysis, in which the interactive and main effects of the cluster solutions upon eating behavior were explored; and 5) cluster comparison, in which the clusters from the most promising cluster solution were compared on a number of measures.

Step 1 -- Data Transformation

Before executing the cluster analysis, it was necessary to consider which scales would be included. Because a number of the scales utilized in this study were highly correlated, it seemed inappropriate to enter them untransformed into the cluster analysis. This is because correlations between measures represents a sharing of variance, such that, insofar as two measures are correlated, there will be, to some degree, a redundancy in variance. For example, in Figure 4, A, B, C, and D represent the variance

Figure 4

Diagram of Hypothetical Measure Variance



accounted for by four different measures. As one can see, the variance represented by areas ab, ac, and bc is measured twice, while the variance represented by the area area abc is accounted for three times. In contrast, the variance represented by d is measured only once. If we were to enter variables A, B, C, and D untransformed into a cluster analysis, the outcome would be the result of a differential weighing of variance such that abc would be counted three times, ab, ac, and bc would be counted twice, but d would be counted only once. Unwittingly, we would have allowed certain bits of variance to be more important than others based entirely upon the correlation between measures rather than a priori decisions.

Applying this to the current study, if I were to enter a number of highly correlated variables such as the RRS, TFEQ-R, BULIT-R, and EDI-DT into a cluster analysis with the BDI (which shows much weaker correlations with other measures in the study), the shared variance in the four dietary measures would be weighed more heavily than that of depression due to measure-intercorrelation alone. Given the results of the experimental analyses, it would be dangerous to assume that dietary patterns should be of primary importance in determining the cluster solution. Consequently, an orthogonal factor analysis was executed to eliminate the problem of redundant variance.

> Factor analysis or principal component analysis is often used when the researcher knows most of the vari-

> ables used in the study are highly correlated. The uncritical use of highly correlated variables to compute a measure of similarity is essentially an implicit weighing of these variables. (Aldenderfer & Blashfield, 1984, p. 21)

Using the outcome of factor analyzing the current data prevented an implicit weighing of any variables.

A factor analysis of dieting status, SES, EDI-P, EDI-DT, BDI, RRS, TFEQ-R, and the BIF with a Varimax (orthogonal) rotation was performed to transform these data. Three factors were extracted based upon an examination of scree and the cutoff eigenvalues of one. The rotated factor loadings, eigenvalues, and percent of variance accounted for are presented in Table 13. The first factor showed high loadings from the RRS, TFEQ-R, EDI-DT, and self-report dieting status, suggesting that this factor represents the individual's degree of dieting behavior and dietary restraint. The second factor showed high loadings of the BDI and (in a negative direction) the SES, and, to a lesser degree, the SCS-PR, suggesting that this factor represents negative affect and aversive self-awareness. Finally, the third factor was comprised most strongly by the BIF, EDI-P and SCS-PR. This final factor appears to involve degree of perfectionistic self-focus.

Scores for each of the three factors were computed for each subject using the regression estimation method, an "exact procedure" of computing factor scores (Gorsuch, 1974). The exact procedures contrast with "approximation

Table 13

Factor Loadings, Eigenvalues, and Percent of Variance Accounted For.

Variable	Factor 1	Factor 2	Factor 3
RRS	.83695	.13357	.10282
TFEQ-R	.91793	.01649	.06871
EDI-DT	.82104	.27361	.12192
Dieting status	.85766	.07531	-.07434
SES	-.22333	-.84822	.03178
BDI	.07678	.88724	.00269
SCS-PR	.06306	.31179	.54741
BIF	-.11136	-.06353	.74988
EDI-P	.21980	-.14737	.67818
Eigenvalue	3.38556	1.48139	1.29316
% of Variance	37.6	16.5	14.4

Note: Variables loading above .30 are underlined to aid interpretation

procedures" of computing factor scores (e.g., "the unity method") in that the former take all of the variance of a given sample (including "error variance") into account in computing scores, whereas the latter restrict the computations to certain variables thought to be particularly salient to each factor (c.f., Gursuch, 1973). Although factor scores derived though approximation techniques appear to be more reliable upon replication than those derived through exact procedures (Gorsuch, 1973, p. 245), this is an issue of inference, rather than description. Instead, in descriptive analyses, emphasis is placed upon representing the true

common factor scores for a given sample. Using slightly different terminology, Rummel (1970) notes that:

> The common factor score regression estimates make use of all of the information contained in the standardized data and the factor loadings. They are therefore better estimates of the true common factor scores [of descriptive statistics] than the composite and basic variable estimates [two approximation procedures]. (p. 438)

It was concluded that, although an approximation procedure appears to be the logical method of computing factor scores for inferential statistics, an exact method, such as the regression technique, appears more suitable for descriptive work. Because cluster analysis is a descriptive, not an inferential, technique, the latter route was taken, and factor scores were computed for each participant through the regression estimation procedure. These factor scores were then entered as a matrix into the cluster analysis.

Step 2 -- Cluster Analysis

Although step 1 was relatively straightforward, step 2, cluster analysis, was more complicated:

> The use of cluster analysis in practice does not involve simply the application of one particular technique to the data being studied, but instead involves a series of steps each of which may be dependent upon the results of the preceding one. It is generally impossible a priori to anticipate what combinations of variables, similarity measures and clustering techniques are likely to lead to interesting and informative classifications. (Everitt, 1980, p. 103)

Consequently, seven hierarchical agglomerative clustering methods were employed at this preliminary step. All seven methods involved a stepwise progression, in the first step

of which all of the points (one per participant) were laid out as individual "clusters." These points were then progressively combined to form larger clusters which were themselves combined until, after a number of steps, all of the points were combined into a single heterogenous cluster. In my analyses, clusters were put together based upon the squared Euclidian distance formula:

$$\text{Distance}^2 = (\text{factor1a}-\text{factor1b})^2 + (\text{factor2a}-\text{factor2b})^2 + (\text{factor3a}-\text{factor3b})^2,$$

in which "factor1a" is the factor 1 score for one cluster, "factor1b" is the factor 1 score for a comparison cluster, and so on.

The exact use of this distance formula in combining clusters varied with the clustering method employed. Although each method will be sketched out here, the reader is referred to Aldenderfer and Blashfield (1984), Everitt (1980), and Norusis (1990) for more thorough expositions of cluster analytic techniques. In the single linkage method, clusters were joined based upon the distance between their two closest points. At the first step, this simply meant joining the two closest points. At later steps, this involved computing the distance between clusters based upon their closest points. Clusters whose closest points were the least distant from one another were successively com-

bined. The process was similar in the complete linkage method, except that cluster distances were determined by the distance between their two farthest (rather than closest) points.

In the average linkage between groups method, rather than looking at one point in each cluster to compute distance, every point in a cluster was compared to each point in the comparison cluster. Distance was then computed as the average distance across these between-cluster pairs. The average linkage within groups method combined clusters to minimize the distance between pairs of cases within (rather than between) clusters.

In contrast to these methods, the centroid method did not involve pairing off of individual points. Rather, a mean score on each of the three factors was computed across cases within each cluster. The distance between clusters was then computed based upon a comparison of the cluster means. In a similar fashion, the median method compared clusters based upon their median (rather than mean) within-cluster values.

Finally, in Ward's method, a hybrid of the centroid and average linkage within groups methods, the mean score on each variable was computed across cases within each cluster. Then, still within each cluster, the distance between each case and the cluster mean was computed. Clusters were then

combined such as to minimize the distances between each case and its corresponding cluster mean.

Because all seven of these techniques combined clusters stepwise until all cases were placed in a single cluster, it was necessary to "cut off" the process at a useful point. Although this cut-off point is somewhat arbitrary in cluster analysis, Aldenderfer and Blashfield (1984) suggest an examination of fusion coefficients at each step. The fusion coefficient represents the distance between the pair of clusters which were combined at a given step. A large "jump" in a list of fusion coefficients indicates that two clusters may have been joined inappropriately, signaling that the clustering process should be cut off at the previous step. For example, in Table 14, the fusion coefficients were increasing slowly and steadily until step 126, when a "jump" occurred. This indicated that, for the median method with these data, the appropriate cluster solution was the 4-cluster solution found at step 125.

Not all of the cut-off points were as clear as in the median technique, however. Several cut-off points appeared reasonable for the average linkage within groups and Ward's methods. Consequently, several solutions were generated for each of these methods. In all, 12 solutions appeared plausible: 2-, 3-, and 4-cluster solutions from the average linkage within groups method, a 2-cluster solution from the average linkage between groups method, a 3-cluster solution

Table 14

Portion of the Agglomeration Schedule for the Median Technique.

Step	Clusters in Solution	Fusion Coefficient
121	8	3.405674
122	7	3.700638
123	6	4.046055
124	5	4.611880
125	4	4.932259
126	3	8.760168
127	2	10.608168
128	1	13.779575

from the single linkage method, a 3-cluster solution from the complete linkage method, a 2-cluster solution from the centroid method, a 4-cluster solution from the median method, and 2-, 3-, 4-, and 5-cluster solutions from Ward's method. These 12 solutions were then compared in the next step of analyses.

Step 3 -- Cluster solution validation against the BULIT-R

These 12 solutions were subjected to validation against BULIT-R scores. This involved a series of one-way ANOVAs with the BULIT-R as the dependent measure and each cluster solution as an independent measure. Table 15 shows the results of these analyses. Effect sizes (eta squared) are not reported because, in cluster comparison, this statistic is misleading. Recall that, in the first step of each heirarchical cluster analytic technique, each participant

Table 15

Cluster Validation Against the BULIT-R (series of ANOVAs).

Technique	Cluster BULIT-R Means 1	2	3	4	5	F	p
Single Linkage	50	41	87			2.501	.086
Complete Linkage	52	45	61			7.305	.001
Average/Between	50	87				4.719	.032
Average/Within	61	45				33.739	.000
Average/Within	58	45	74			22.375	.000
Average/Within	58	44	74	48		15.359	.000
Centroid	50	87				4.719	.032
Median	47	72	49	38		14.611	.000
Ward's	47	68				34.983	.000
Ward's	47	46	68			17.417	.000
Ward's	42	46	68	57		17.757	.000
Ward's	42	53	68	57	42	15.338	.000

represents a different "cluster." If all of these "clusters" are entered into an ANOVA with any dependent variable, the effect size is 1.00. All of the variance in scores on the dependent variable across paricipants is accounted for by the "cluster solution" because each cluster corresponds to one and only one participant. Moreover, as the number of clusters in the "solution" declines with the combination of clusters, the effect sizes on the dependent measure naturally diminishes until it approximates zero. Consequently, it is inappropriate to compare clustering techniques on the basis of their relative effect sizes. Instead, some consideration of degrees of freedom needs to be made. The F statistic, representing the ratio of effect size to degrees

of freedom, allows for such consideration. Consequently, only F statistics are reported and were used to compare the cluster solutions obtained in Step 2.

Although a number of solutions yielded significant differences in mean BULIT-R scores between groups, the 2-cluster solution from Ward's method and the 2-cluster solution from the average linkage within groups method yielded clearly higher F values than the other 10 solutions. Consequently, only these two cluster solutions were kept for further analyses.

Step 4 -- Factorial Analysis

The factorial analysis can be viewed as further validation of the cluster solutions chosen in step 3. Essentially, this analysis detected variability in eating behavior across clusters due to the level of cognition manipulation and degree of liking of ice cream. Two 3-way (clusters X manipulation X median split of ICELIKE) ANOVAs were executed with EATEN as the dependent variable, one ANOVA each for the 2-cluster Ward's and 2-cluster average linkage within groups solutions. Results are shown in Tables 16 and 17.

It was predicted that significant interactions would occur, such that only certain clusters would show disinhibited eating due to the manipulation. Although neither ANOVA showed such a significant interaction, Ward's 2-cluster solution did interact with the manipulation and ICELIKE in a manner approaching statistical significance ($p=.056$).

Table 16

Ward's 2-Cluster Solution X ICELIKE X Manipulation ANOVA.

Source	Sum of Squares	df	Mean Square	F	p
Manipulation	3.286	1	3.286	.617	ns*
Ward's Clustering	2.750	1	2.750	.516	ns
ICELIKE	66.016	1	66.016	12.394	.001
Man. X Clusters	4.947	1	4.947	.929	ns
Man. X ICELIKE	.300	1	.300	.056	ns
Clusters X ICELIKE	2.645	1	2.645	.497	ns
3-way interaction	19.844	1	19.844	3.726	.056
Error	623.189	117	5.326		

*ns means p>.10

Table 17

Average Linkage Within Groups 2-Cluster Solution X ICELIKE X Manipulation ANOVA.

Source	Sum of Squares	df	Mean Square	F	p
Manipulation	3.374	1	3.374	.613	ns*
Avg/Within Clusters	8.013	1	8.013	1.456	ns
ICELIKE	68.289	1	68.289	12.406	.001
Manip. X Clusters	.019	1	.019	.003	ns
Manip. X ICELIKE	.031	1	.031	.006	ns
Clusters X ICELIKE	.315	1	.315	.057	ns
3-way interaction	.784	1	.784	.142	ns
Error	644.005	117	5.504		

*ns means p>.10

Consequently, although these results are admittedly exploratory, I performed two follow-up analyses on this interaction, one including only participants who scored below the median on ICELIKE, the other including only those who scored above the median on this measure. Two ANOVAs were conducted with EATEN as the dependent variable and Ward's 2-cluster solution and the level of cognition manipulation as independent variables (see Tables 18 and 19). Similar to the experimental results, a 2-way interaction effect was found only among those women who reported liking ice cream. Simple effects analyses revealed that this interaction was such that Ward's cluster 2 participants who reported liking ice cream ate significantly more when asked to think at a high level than when asked to think at a low level (F=4.79, p<.05). There was no effect due to the manipulation among Ward's cluster 1 participants who liked ice cream (F=.03, p>.10). Table 20 shows the mean amount of ice cream eaten (in raw score units) and sample sizes for each cell involved in the three-way cluster-manipulation-ICELIKE interaction. Figure 5 illustrates this interaction.

Step 5 -- Cluster Comparison

Given the interaction effect found in step 4 and the main effect found on the BULIT-R, it was important to examine the characteristics of both of the clusters found through Ward's method. That is, what were the personality factors which differed between these clusters which might

Table 18

Ward's 2-Cluster Solution X Manipulation for Participants Who Reported Disliking Ice Cream.

Source	Sum of Squares	df	Mean Square	F	p
Manipulation	1.093	1	1.093	.21	ns*
Ward's Clusters	4.720	1	4.720	.89	ns
2-way Interaction	1.922	1	1.922	.36	ns
Error (from omnibus ANOVA)	623.189	117	5.326		

*ns means p>.10

Table 19

Ward's 2-Cluster Solution X Manipulation ANOVA for Participants Who Reported Liking Ice Cream.

Source	Sum of Squares	df	Mean Square	F	p
Manipulation	2.782	1	2.782	.52	ns*
Ward's Clusters	.000	1	.000	.00	ns
2-way Interaction	22.869	1	22.869	4.29	<.05
Error (from omnibus ANOVA)	623.189	117	5.326		

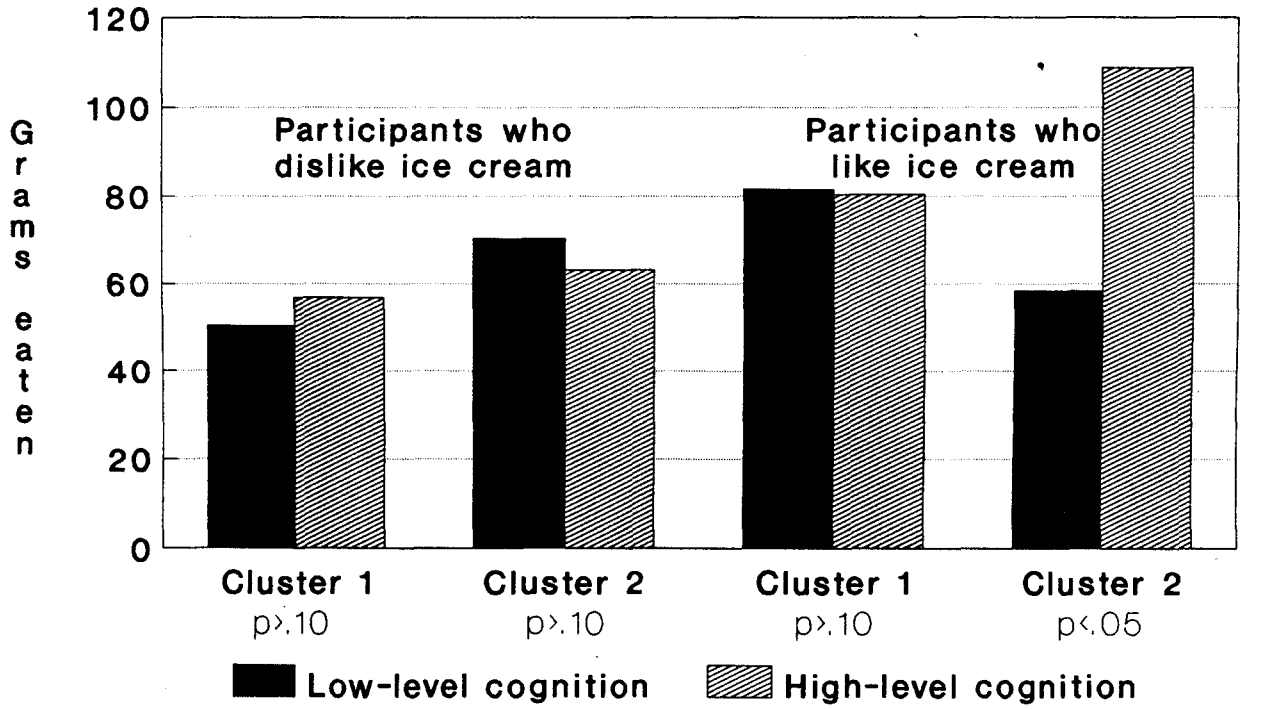
*ns means p>.10

Table 20

Means and ns per cell in ICELIKE X manipulation X Cluster design.

COGNITIVE LEVEL		Low Scorers on ICELIKE			High Scorers on ICELIKE	
		Cluster 1	Cluster 2		Cluster 1	Cluster 2
	Low	50.41 (22)	70.38 (8)	Low	81.52 (27)	58.40 (5)
	Hi	56.79 (29)	63.20 (5)	Hi	80.32 (25)	108.80 (5)

Figure 5
Cluster X Manipulation X ICELIKE



have contributed to these effects? To explore this question I first converted participants' self-reported dieting status and SES, EDI-P, EDI-DT, BDI, RRS, TFEQ-R, BIF, and BULIT-R scores into standard (z) score units. These converted scores were thenentered as dependent variables in a MANOVA with Ward's 2-cluster solution as the independent variable. Because the multivariate effect was significant (F=23.47, p<.001), a series of univariate analyses were conducted. Mean cluster z-scores and results of the univariate tests for each measure are shown in Table 21.

Table 21

Mean z-scores and Univariate Statistics for each Measure and Cluster.

Variable	cluster 1	cluster 2	eta^2	univariate F	p
Dieting Status	- .09	.41	.04	5.05	.026
EDI-P	- .01	- .02	.00	.00	ns*
SES	.34	-1.54	.52	135.85	.000
SCS-PR	- .08	.45	.04	5.76	.018
BDI	- .34	1.50	.52	138.37	.000
BIF	.02	.14	.00	.26	ns
RRS	- .10	.53	.06	7.65	.007
TFEQ-R	- .03	.38	.03	3.27	.073
EDI-DT	- .16	.85	.14	21.38	.000
BULIT-R	- .22	1.02	.22	34.98	.000

All univariate tests have 1,127 degrees of freedom except for the BULIT-R which, due to missing data, has 1,125 degrees of freedom. Cluster 1 has 106 participants and cluster 2 has 23 participants on all measures except for the BULIT-R, for which cluster 1 has 104 participants due to missing data. *ns means p>.10

Because the cluster analytic method maximizes differences between the clusters and this cluster solution was validated against the BULIT-R, it was not surprising to find significant effects for most of these variables. Still, it is striking the degree to which women in the second cluster were more depressed and had lower self-esteem than those in the first cluster. In addition, women in cluster 2 clearly appeared to be more prone to dysfunctional eating patterns as measured by the BULIT-R, EDI-DT, and the RRS. Finally, these women showed a relatively high degree of self-consciousness and a tendency to be dieting more strictly. Interestingly, no differences were found between the clusters in degree of general perfectionism or cognitive level tendencies.

CHAPTER VII

CLUSTER STUDY DISCUSSION

Factor Analytic Data Reduction

Before discussing results based upon the cluster solutions, the preliminary factor analysis warrants mention. As noted above, the first factor reflects degree of dieting, as measured by simple self-report, the RRS, TFEQ-R, and EDI-DT. Interestingly, whereas the EDI-DT, TFEQ-R, and self-report dieting are measures of desire for and action towards successful dietary inhibition, the RRS measures both dietary inhibition and disinhibition. Despite efforts at psychometrically removing disinhibition from measures of dietary restraint (as was attempted in the TFEQ-R), it appears that, in an unselected population, dietary inhibition and disinhibition are closely related. This statistically confirms Heatherton et al.'s (1988) observation that "the restrained eater who is exclusively restrained ... is not representative of restrained eaters in general, whereas the restrained eater who occasionally splurges is... Most dieters (to their regret) display both restraint and disinhibition" (p. 20).

Moreover, this calls Lowe's (1993) distinction between current dieting and a history of unsuccessful dieting into

question. Although Lowe considers these two factors distinct, it appears rare to find, at least in the college student population, a current dieter without a history of unsuccessful dieting or a woman with a history of unsuccessful dieting who is not still trying to diet. Rather, it appears that, for most young women, the more they diet, the more they break their diets (and vice versa).

The second factor, related to negative affect and aversive self-awareness, replicated the generally accepted negative association between depression and self-esteem. Interestingly, private self-consciousness also loaded, albeit at a relatively low level, on this factor. There is some evidence that not only is this relationship between negative affect and self-focused attention reliable, but that the induction of negative affect can cause an increase in self-consciousness (Wood, Saltzberg, & Goldsamt, 1990). However, it is uncertain whether and under what conditions increases in self-consciousness can lead to increases in negative affect.

Self-consciousness loaded more strongly on the third factor, which appears to tap perfectionistic self-focus. These data bear out the previously mentioned theoretical observation that high-level thinking is related to self-consciousness and attention to personal standards (e.g., Baumeister, 1991). It appears that individuals who tend to

think at a high level tend also to think about themselves and their personal goals.

Cluster Analysis Discussion

These factors, when entered into cluster analysis, yielded a number of potential cluster solutions. However, based upon the validation of these solutions against the BULIT-R, two appeared to be the best discriminators of degree of bulimic symptomatology. Of these two, only the 2-cluster solution from Ward's method showed an interactive effect with the level of cognition manipulation. As in the experimental analyses, this interactive effect held true only for women scoring above the median on degree of liking of ice cream. That is, when participants reported disliking ice cream, there were no main or interactive effects involving the manipulation or the two clusters. However, among those participants who reported liking ice cream, those in cluster 2 ate nearly twice as much ice cream when asked to think on a high level as when asked to think on a low level (see Figure 4). Cluster 1 women showed no such significant difference. These results, in concert with the finding that cluster 2 participants scored significantly higher than cluster 1 participants on the BULIT-R, strongly suggest that these individuals are prone to binge eating. Moreover, this binge eating may be triggered by an increase in self-focus (inherent in higher-level thinking) in the presence of a food which they enjoy. Given these findings, it is impor-

tant to explore the characteristics differentiating this "binge-prone" group (cluster 2) from the "normals" of cluster 1.

The binge-prone group was strikingly more depressed and lower in self-esteem than the normals. In this sense, the 3-way interaction between the cluster solution, degree of liking of ice cream, and the level of cognition manipulation on amount of ice cream eaten replicates the results of the experimental analyses. Beyond this, the cluster analysis demonstrated that such a group was naturally distinguishable. That is, the binge-prone group "naturally" emerged through statistical techniques without resorting to the arbitrary and exploratory median split technique utilized earlier. Moreover, the cluster results suggest that there was more to the binge-prone group than depressed mood and low self-esteem. After all, only 18 percent of the women were in the binge-prone group, whereas by definition roughly half scored above the median on the BDI.

Turning to other measures, it appears that a strong drive for thinness was associated with binge-prone individuals. This appears to represent the paradox identified by dietary restraint researchers: it is precisely those women who strive for the thin ideal who are most likely to prevent their attainment of this ideal by binge eating (e.g., Heatherton & Baumeister, 1991). The significant difference on the self-report dieting scale and the RRS suggest that

binge-prone women may attempt to attain the thin ideal by dieting, both currently and in the past (Heatherton & Polivy, 1992). Although not naturally more likely to think on a different level than others, when induced to think at a high level, these already somewhat self-conscious women turned to a food which they enjoyed, thereby breaking their diets.

Aside from the effect of the manipulation, it is impossible with these data to do more than guess at the potential causal sequences among the personality characteristics of the binge-prone group. However, the escape theory may be applied here with some modifications. To begin, unlike Heatherton and Baumeister's (1991) assertion, I failed to find evidence that perfectionism on a global level predisposes one to binge eating. Rather, it appears that these women are perfectionistic primarily as it relates to body image. Although such emphasis on women's external appearance is unfortunately normative in popular society (e.g., Hooker & Convisser, 1983), the current study suggests that binge-prone women take a more extreme stance than most. This likely leads them to diet more often and more strictly than most women, among whom dieting is accepted practice (e.g., Rosen & Gross, 1987).

Poor self-esteem and depression may play a part in taking the sociocultural pressures on body shape and dieting to an extreme. These women may turn to dieting in the

belief that their lives will be dramatically improved if only they had a better body (e.g., Rosen, 1992). The recurring inevitable failure in which these chronic dieters break their diets or fail to maintain body changes may exacerbate their poor self-esteem and depression (e.g., Heatherton & Polivy, 1992). However, the question then remains: Why do they break their diets? The current results suggest that level of cognition is involved. In particular, it appears that binge-prone individuals, at least when in the presence of an enjoyable food, will overeat when asked to think on a high level. As noted earlier, this may be due to the increase in aversive self-awareness which is likely to result from high-level, self-reflective thinking among depressed individuals.

However, it is uncertain exactly what function such eating serves. Although the current study has helped to elucidate the characteristics most prevalent in binge-prone women and the triggers of binge eating in these individuals, the reasons why these women turn to food need to be investigated more fully in future research. In addition, the limitations outlined in the experiment discussion above (p. 57), including small cell sizes, are largely applicable here. These findings were descriptive and exploratory, in need of replication and refinement. Moreover, the external validity of the cluster study was limited by the representativeness of the sample. Cluster analysis is essentially a

descriptive technique, and as such the cluster solutions may have been affected by the unique characteristics of the current sample. However, because the only other study to date to use cluster analysis to analyze eating style "types" neither used standardized instruments nor validated the cluster solution against a behavioral measure (Kristeller & Rodin, 1989), the current cluster study represents a substantial step towards understanding the nature of disordered eating.

CHAPTER VIII

ETHICAL CONSIDERATIONS

The long-term risks to participants due to the experiment appear minimal because a) exposure to similar foods is likely to be an integral part of most college students' lives, and b) even in restrained eaters, research has shown that disinhibiting effects do not carry over outside of the laboratory (Wardle & Beales, 1987). Additionally, the informed consent form which each participant signed provided all procedural information which might have affected their willingness to participate, and made clear that participants could have withdrawn from the study without penalty at any time.

Of some ethical concern was the use of deception regarding the dependent measure (amount of ice cream eaten) of the study. However, this deception was justified by the potential reactivity of participants to this knowledge. Participants who were aware of the dependent measure were not likely to yield usable results (and were consequently excluded from analyses if they so indicated). The delay in debriefing was justified by the high profile which the study had. Word of "the ice cream study" spread rapidly throughout the subject pool. Knowledge of the deception would

likely have spread just as rapidly if I had not delayed debriefing, leading to useless results. Moreover, this delay did not put the volunteers at risk. Unlike some deceptions (e.g., sham intelligence test results) with potential long term negative consequences (e.g., dropping out of school), it is inconceivable how having people believe that their taste ratings were of primary interest would have led to any negative consequences.

In the debriefing (See APPENDIX B), these issues were made clear to each woman as the true nature of the study was revealed. Additionally, the name and mailing address of the experimenter was provided to participants immediately following the experiment in the event of long-term negative effects or further questions before the end of the semester. None contacted the experimenter before the end of the semester. Finally, as noted to the participants, all data analyses and results have been reported in such a way that their identities are kept in strict confidence. Consequently, it appears that this study was in accordance with all APA-mandated ethical guidelines.

APPENDIX A
NON-STANDARDIZED INSTRUMENTS

Self-Report Dieting, Food Preference Ratings, and Hunger

Instructions: Please read each of the following questions and place an "X" at the appropriate point along the scale.

How strictly are you currently dieting?

not at all 0---1---2---3---4---5---6 extremely strictly

How much do you enjoy each of the following foods?

	not at all						extremely enjoy
Vanilla Yogurt	0	1	2	3	4	5	6
Chocolate Ice Cream	0	1	2	3	4	5	6
Chocolate Pudding	0	1	2	3	4	5	6
Fruit Yogurt	0	1	2	3	4	5	6
Vanilla Pudding	0	1	2	3	4	5	6
Vanilla Ice Cream	0	1	2	3	4	5	6

How hungry are you currently?

not at all hungry 0--1--2--3--4--5--6 extremely hungry

Demographic Information

What is your ethnic background? (circle)

african-american caucasian asian-american other:_____

What year in college are you? (circle)

Fresh Soph Jr Sr Other

What is your current weight in pounds? _____

What is your age? _____

What is your approximate height? _____

Level of Cognition Manipulation*

Instructions: Think about an interaction you have had with a person of the same sex within the last week or so. This interaction could be a chat at school, a discussion of some kind, a conversation at a party or at work, and so forth. Any interaction at all is fine.

[*Low-level manipulation*]
Try to recall five specific things you did in this interaction with this person. Provide as much detail as you can; that is, indicate the particular comments you made, questions you asked, or behaviors you performed.

[*High-level manipulation*]
Try to recall five things about yourself that you feel you demonstrated in your interaction with this person. Be somewhat general in your answers; that is, indicate what opinions and values you communicated, or perhaps what personality traits you demonstrated.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

* This manipulation is a slight adaptation of that used by Wegner et al. (1986).

Taste Test Ratings

Please taste the **FIRST** flavor and rate it below.

SWEET

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

CREAMY

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

FLAVORFUL

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

RICH

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

GOOD-TASTING

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

Please taste the **SECOND** flavor and rate it below.

SWEET

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

CREAMY

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

FLAVORFUL

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

RICH

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

GOOD-TASTING

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

Please taste the **THIRD** flavor and rate it below.

SWEET

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

CREAMY

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

FLAVORFUL

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

RICH

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

GOOD-TASTING

not at all -4 -3 -2 -1 0 1 2 3 4 extremely

Food Consumption Estimate

In your estimation, how much of the ice cream did you eat in this experiment?

none of it +----+----+----+----+----+----+----+ all of it

Hypothesis Inquiry

What is your best guess at what this study was designed to assess? Please guess even if you are not sure.

_____

_____

_____

_____

APPENDIX B
SCRIPTS

Experimenter Script

[USHER SUBJECT INTO ROOM]

Thank you for coming. It has been suggested that people with different personality types may perceive the taste of food differently. In this experiment, we are trying to determine whether this is true. To do this, we will be asking you to fill out several questionnaires, then to take part in an experimental taste test of ice cream. First, however, I need you to sign this informed consent form.

[HAND SUBJECT INFORMED CONSENT FORM]

Do you have any questions?

[ANSWER QUESTIONS, WAIT FOR SIGNATURE, THEN TAKE INFORMED CONSENT FORM. GIVE QUESTIONNAIRE PACKET 1A or 1B, DEPENDING ON WHICH IS GIVEN TO YOU (THESE ARE IN RANDOM ORDER)]

Thank you. First, please complete these questionnaires as honestly as possible. Remember, all your responses will be kept strictly confidential. Let me know when you are finished.

[WAIT FOR SUBJECT TO COMPLETE QUESTIONNAIRE PACKET. WHEN SHE HAS COMPLETED IT, IMMEDIATELY RETRIEVE ICE CREAM AND RATING SHEET. RECORD THE SUBJECT # (AS SHOWN ON THE ICE CREAM) ON THE QUESTIONNAIRE PACKET AND RATINGS SHEET. DROP THE QUESTIONNAIRE PACKET IN THE "DROP BOX"]
Thank you.
[HAND THE SUBJECT THE RATING SHEET AND PLACE ICE CREAM IN FRONT OF HER]

"Please taste and rate these three flavors of ice cream. Take as much as you need to be sure of your rating before going on to the next flavor. Please do not change a rating for any previous flavor after having tasted any subsequent flavor -- once you have tasted a new flavor you may not go back and change any ratings of another flavor.

"Please rate the three flavors in the order in which they are laid out in front of you so that the tastes do not get mixed up. By the way, we will be throwing out any left-over ice cream, so after you finish all your ratings, feel free to go back and help yourself to as much of any flavor as you like. It is important, however, that you don't change any of your ratings."

Do you have any questions?

[ANSWER QUESTIONS]

I'll be back in about 10 minutes.

[LEAVE ROOM. AFTER 10 MINUTES, RETURN, TAKE BOWLS AND RATING SHEET, GIVE QUESTIONNAIRE PACKET 2]

Please fill out these questionnaires and let me know when you are finished. Please answer as honestly as possible. Remember, all responses are confidential.

[STACKS BOWLS TOGETHER, INCLUDING THE LIDS, AND PLACE THEM IN THE GARBAGE CAN, SUCH THAT IT APPEARS THAT THEY ARE THROWN OUT BUT MAKE SURE THEY ARE EASILY RETRIEVED. DROP RATINGS SHEET IN DROP BOX. WAIT FOR SUBJECT TO COMPLETE QUESTIONNAIRE PACKET.]

Thank you for participating in this experiment. This experiment was designed to test how personality factors and thinking on a specific, detailed level versus a general, self-reflective level interact to affect eating behavior. We will be calling you at the end of the semester with more information and will at that time be prepared to send you a letter describing the study in detail. You may contact the individual on this sheet if you have further questions before the end of the semester.

[HAND SUBJECT THE CLOSING SHEET, SIGN NECESSARY PAPERWORK FOR CLASS CREDIT]

Thank you. Have a good day.

[USHER SUBJECT OUT. RECORD THE SUBJECT # ON QUESTIONNAIRE PACKET 2 AND DROP IT IN THE "DROP BOX". RECORD THE SUBJECT NUMBER ON THE EXPERIMENTER RECORD, AS THIS WILL BE USED TO LOOK UP THE INITIAL WEIGHT OF THE ICE CREAM.]

[IF YOU HAVE TIME AND HAVE ACCESS TO A SCALE (i.e, YOU ARE WORKING IN DEAN'S OFFICE), WEIGH BOWLS AND LIDS IMMEDIATELY FOLLOWING EACH SUBJECT SO THAT YOU CAN THROW THEM AWAY FOR GOOD.]

[IF YOU DO NOT HAVE TIME BETWEEN SUBJECTS OR ARE NOT RUNNING SUBJECTS IN DEAN'S OFFICE, RETRIEVE THE BOWLS AND LIDS FROM THE GARBAGE AND HIDE THEM BEFORE RUNNING THE NEXT SUBJECT. BRING THEM TO DEAN'S OFFICE TO WEIGH THEM AT 4 PM, AFTER THE LAST SUBJECT IS RUN.]

Debriefing Script

Hello. My name is _____ and I'm calling with regard to an experiment you participated in earlier in the semester. Do you remember the experiment in which you filled out a number of questionnaires and tasted three kinds of ice cream?

[WAIT FOR A RESPONSE. IF SUBJECT DOES NOT REMEMBER THE EXPERIMENT, GIVE MORE DETAILS]

After you finished that experiment we promised to call you with more details. That is what I'm doing now. Do you have a few minutes?

[IF NO, ASK WHEN A BETTER TIME WOULD BE TO CALL AND THEN MAKE NOTE OF IT, THANK THE SUBJECT, AND PROMISE SOMEONE WILL CALL THEM LATER]

First, we want to once again thank you for participating in the experiment. The experiment was designed to test how personality factors and thinking on a specific, detailed level versus a general, self-reflective level interact to affect eating behavior.

We were interested in both your taste perception ratings and how much of the ice cream you ate. We believe that people with different personality features will rate the ice cream differently and will eat different amounts of ice cream after thinking on different levels.

Unfortunately, to insure that the results would be unbiased, we could not tell you that the amount you ate was also of interest. Otherwise you might have been focusing on how much you ate and not on your ratings, and might not have eaten the same amount as you did naturally.

Since other people will be taking this experiment, it is crucial that you do not talk to anyone about this experiment until the end of the year. In the same way that my telling you the true nature of this experiment might have biased our results, so might your telling them. In fact, this might even invalidate all the important information you gave us today. Do you understand?

[PAUSE]

At this time I would like to offer you a chance to have a more detailed, written description of the experiment and its goals. Would you like such a description?

[WAIT FOR RESPONSE.]

[IF NO:]
Well, at the end of the experiment we gave you the name of the experimenter in charge of the experiment. You may contact him if you want more information in the future. Would you like me to repeat the address? ["DEAN BEEBE, PSYCHOLOGY DEPARTMENT, LOYOLA UNIVERSITY OF CHICAGO, 6525 NORTH SHERIDAN ROAD, CHICAGO, ILLINOIS 60626"] Thank you for your time. Good-bye.

[IF YES:]
Do you live on campus?

[IF YES] Can we mail the written feedback to your campus address?

[IF YES] What is that address? [TAKE ADDRESS] You will be receiving this written feedback in the near Future.

[IF NO] I can arrange for you to pick to feedback up at a later date. You will be receiving a call in the near future to schedule a pick up time. Thank you for your time. Good-bye.

[IF NO] Can we mail the written feedback to your home or office?

[IF YES] What is that address? [TAKE ADDRESS] You will be receiving this written feedback in the near future.

[IF NO] I can arrange for you to pick to feedback up at a later date. You will be receiving a call in the near future to schedule a pick up time. Thank you for your time. Good-bye.

*This portion of the script is quoted from Polivy et al. (1988, p. 355).

APPENDIX C
INFORMED CONSENT FORM

I agree to take part in experiment #[31 or 14]. I realize that my participation in this particular experiment is voluntary and that I may withdraw from this experiment at any time for any reason without penalty. I also understand that data collected in this experiment are going to be used as a group, and that both my identity and my connection with any particular response will be kept strictly confidential.

I understand that this experiment will involve the completion of several personality questionnaires as well as several taste-tests of ice cream. I certify that, to my knowledge, I have no allergy to ice cream or other dairy products.

I understand that, upon completion of this experiment, I will receive one experimental credit to help either in completing a course requirement or course extra credit. I understand that if I have any questions in the future about this experiment, I may contact the person listed at the bottom of the page and will receive prompt feedback.

Finally, I understand that a detailed explanation of the experiment will be offered to me both verbally and in writing at the end of the semester. I authorize the experimenter to contact me by telephone at that time.

_____
Subject Signature

_____
Date

For further information contact:

Dean Beebe
Department of Psychology
Loyola University of Chicago
6525 North Sheridan Road
Chicago, Illinois 60626

APPENDIX D
CLOSING SHEET

Thank you for participating in experiment #[31 or 14]. Your effort will make a definite contribution to this study and our knowledge of psychology. If you have any further questions about this experiment, or would like more detailed information about the theoretical background or hypotheses of the experiment, please contact:

Dean Beebe
Department of Psychology
Loyola University of Chicago
6525 North Sheridan Road
Chicago, Illinois 60626

APPENDIX E
EXPERIMENTER RECORD

Experimenter:_____
Date:_____

1 pm

Subject #:_____ NOTES

Mass of bowls and lids of bowls:

Before taste test:
\- After taste test :_____
Total consumed :

2 pm

Subject #:_____ NOTES

Mass of bowls and lids of bowls:

Before taste test:
\- After taste test :_____
Total consumed :

3 pm

Subject #:_____ NOTES

Mass of bowls and lids of bowls:

Before taste test:
\- After taste test :_____
Total consumed :

SPECIAL NOTES (UNUSUAL SUBJECT BEHAVIOR, MECHANICAL DIFFICULTIES, INCONSISTENCIES IN PROCEDURE, ETC.):

_____

_____

_____

_____

_____

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THESIS APPROVAL SHEET

The thesis, "Escape Theory, Cognitive Narrowing, and Binge Eating: A Laboratory Analysis," submitted by Dean W. Beebe has been read and approved by the following committee:

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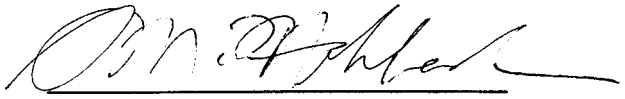
The final copies have been examined by the director of the thesis committee and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of master of arts.



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