Emotion and Eating in Obesity:
A Review of the Literature

Richard M. Ganley, Ph.D.

Do emotions influence the eating patterns of obese individuals? This paper reviews 30 years of clinical and experimental research in order to answer this question. The result is a picture of considerable complexity in which emotions appear to influence eating by obese subjects, but only if individual variability and several qualities of emotional eating are considered. That is, unlike Kaplan and Kaplan’s (1957) simplistic anxiety-reduction model, current research indicates that individual differences in food choice and type of emotion precipitating eating need to be considered. In addition, secrecy surrounding the eating and an episodic quality related to overall level of stress need to be taken into consideration. When these parameters are included, it appears that in certain emotional situations obese people eat more than normal-weight individuals. Such eating appears to have an affect-reducing effect, especially for negative emotions such as anger, loneliness, boredom, and depression. Problems with current research including methodological shortcomings are discussed.

The concept that emotions induce eating in obese individuals has received greatest attention in psychosomatic models of obesity. The last major review on this subject was done in 1957 by Kaplan and Kaplan. They concluded that “the ultimate cause of the great majority of cases of obesity is psychologically determined hyperphagia” (p. 199). Their anxiety-reduction model proposed that overeating by obese individuals reduces anxiety and that this is responsible for the development and maintenance of the hyperphagia believed to cause obesity. The concept that emotion strongly influences eating, hereafter referred to as “emotional eating,” has generated considerable interest in clinical and experimental studies.

The purpose of this paper is to review the post-1957 literature on the relationship between emotion and eating in adult obesity. This literature can be divided between the clinical and other nonlaboratory studies and the studies that use laboratory procedures. Most of the nonlaboratory studies have used

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self-report, structured interviews or questionnaires to investigate obese adults seeking treatment for weight loss. Most laboratory studies have used experimental or quasi-experimental designs with college undergraduates. Because psychosomatic concepts were derived from clinical research with adults, and because it is these concepts that the laboratory studies have attempted to evaluate, the clinical studies are reviewed first. The clinical studies are also the only research in which subjects are usually significantly overweight. “Significantly” is defined here as more than 30% overweight, the level at which obesity may begin to affect health. [For discussions of health risks, see Brownell (1983) and Weiss (1984).]

The clinical research is divided into treatment versus nontreatment studies because of speculations that treatment subjects represent a biased sample (Rodin, 1982). The treatment studies are subdivided into studies with subjects more than 75% overweight (massive to morbid obesity) versus subjects 15–75% overweight (mild to severe obesity) using categories provided by Hanna, Loro, and Power (1981). Degree of obesity has been raised as a potential moderator variable (Brownell, 1983; Hanna et al., 1981). Socioeconomic status (SES) and cultural variables (Goldblatt, Moore, & Stunkard, 1973) and sex-related differences (Hoiberg, Berard, & Watten, 1980) are also discussed. SES is emphasized because of speculations that more emotional and psychological factors are associated with obesity among middle- and upper-class women because of strong social stigmas against obesity (Leon, 1982; Spitzer & Rodin, 1981). The type of emotional arousal associated with eating (Slochower, 1983), the quality of hunger sensations accompanying ingestion (Blundell, 1980), and the type of food, eating locale, and presence or absence of others during eating (Stunkard & Kaplan, 1977; Krantz, 1979) are also discussed. Studies with nonadult subjects, or with “obese” subjects where many were less than 15% overweight, are not reviewed.

CLINICAL AND NONLABORATORY RESEARCH

Weight-loss Treatment Studies Utilizing Massively to Morbidly Obese Subjects

Castelnuovo-Tedesco and Schiebel (1975) studied women slated for jejuno-ileal bypass surgery. “Most” of the women reported the tendency to overeat when depressed, lonely, or bored. The authors concluded that “food typically came to be used as a readily available and reliable source of support, comfort, satisfaction and consolation” (p. 470). Hockley (1979) studied female patients shortly after surgery or at a 6–12-month follow-up. These women reportedly experienced difficulties in interpersonal situations and overate in an attempt to feel better. Rosen and Aniskiewicz (1983) studied both a surgical and a dietary treatment group. “Seventy-one percent of the bypass patients and 93% of the non-bypass patients were identified as reactive eaters (i.e., excessive eating in reaction to emotional or environmental cues)” (p. 55). Population characteristics for this section are presented in Table 1.

Atkinson and Ringuette’s (1967) subjects were either beginning a long-term “starvation” program or were not being treated. Two-thirds reported eating triggered by emotional arousal, including stress in family and occupational re-
Table 1. Demographic data for massively obese subjects in weight-loss programs.

<table>
<thead>
<tr>
<th>Study</th>
<th>n/sex</th>
<th>Obesity*</th>
<th>Mean Age</th>
<th>SES‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atkinson &amp; Ringuette (1967)</td>
<td>10 F + 11 M</td>
<td>Over 100%</td>
<td>33</td>
<td>50% lower, 50% middle</td>
</tr>
<tr>
<td>Castelnuovo-Tedesco &amp; Schielbeib (1975)</td>
<td>12 F</td>
<td>300-350 lb</td>
<td>(18-30)</td>
<td>Lower and lower-middle</td>
</tr>
<tr>
<td>Fink, Gottesfeld, &amp; Glickman (1962)</td>
<td>24 F + 7 M</td>
<td>83.5%</td>
<td>(17-57)</td>
<td>Most lower, some middle</td>
</tr>
<tr>
<td>Hockley (1979)</td>
<td>7 F</td>
<td>246-330 lb</td>
<td>(22-49)</td>
<td>NR</td>
</tr>
<tr>
<td>Kollar, Atkinson, &amp; Albin (1968)</td>
<td>4 F + 6 M</td>
<td>Over 100%</td>
<td>27.2</td>
<td>NR</td>
</tr>
<tr>
<td>McCully, Glucksman, &amp; Hirsch (1968)</td>
<td>3 F + 3 M</td>
<td>213-407 lb</td>
<td>24.5</td>
<td>NR</td>
</tr>
<tr>
<td>Rosen &amp; Aniskievicz (1983)</td>
<td>14 F (bypass)</td>
<td>Over 100%, 317 lbs</td>
<td>34</td>
<td>Mostly lower-middle</td>
</tr>
<tr>
<td></td>
<td>14 F (dieters)</td>
<td>Over 100%, 272 lbs</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Rotmann &amp; Becker (1970)</td>
<td>29 F + 4 M</td>
<td>76%</td>
<td>31</td>
<td>NR</td>
</tr>
</tbody>
</table>

Note: NR = not reported.
*Minimum overweight criterion, mean percentage above ideal weight, mean absolute weight, or range of weights as reported in original study.
‡SES = socioeconomic status (social class).

In massively obese subjects seeking treatment, emotional eating appears to be extremely common. Where specific figures were supplied, it was believed relationships, depression, and boredom. Stress-related weight gains of 25 lbs or more were reported by 76% of the subjects. A third of the subjects reported night eating and/or binge eating that was believed to be reactive to emotional distress. Kollar, Atkinson, and Albin (1968) studied patients during and following a starvation program. They concluded that “food consumption increased with stress and major weight gains often occurred during personal and family crises” (p. 135).

McCully, Glucksman, and Hirsch (1968) studied men and women hospitalized on a liquid diet. Well-defined nutritional responses on the Rorschach, such as those dealing with food or with organs of digestion, were exceedingly high (18%). This, in addition to the finding that chromatic cards elicited over three times as many nutritional responses as achromatic cards, led the authors to suggest that a strong relationship existed between emotions and nutritional ideation. The results were consistent at pretreatment, during dieting, and at follow-up.

Rotmann and Becker’s (1970) patients were assessed prior to a 4-6-week starvation program. The authors reported a strong association between weight gain and events triggering feelings of helplessness and hopelessness. Temporary or permanent separation from an important person (e.g., a spouse) was the single most common event. Fink, Gottesfeld, and Glickman (1962) investigated urban, low-income subjects, three-quarters of whom reported eating related to emotional stress. Half reported the “night eating syndrome” which Stunkard (1959b) described as stress related; half reported eating in direct response to being emotionally upset.

Summary
In massively obese subjects seeking treatment, emotional eating appears to be extremely common. Where specific figures were supplied, it was believed...
to be prominent in 60–90% of such individuals. In the remaining studies, it was described in summary statements as representative of “most” or “all” subjects, or in other terms suggesting a strong relationship. Such eating has been associated most often with negative emotions or stressful life events. It tends to be episodically related to these emotions or events and may not occur on a regular basis. (The term “episodic” will be used to refer to eating having this stress-related, intermittent quality.)

Contrary to claims that emotional eating is an artifact of investigating upper-middle-class women who seek treatment, the four studies reporting social class dealt with lower- and lower-middle-class subjects (see Table 1). Finally, in the three studies with equal numbers of men and women (see Table 1), no sex differences were reported. Thus, it appears that emotional eating is prevalent in massively obese persons across socioeconomic levels. More information is needed on variables such as sex.

Among massively obese subjects binge eating and night eating have been related to emotional stress. Some research has connected binge eating to the “disinhibition” of excessive dietary restraint by emotions or other “triggers,” especially in normal weight subjects (Ruderman, 1986; Wardle & Beinart, 1981). However, in the current research five of the eight studies assessed subjects prior to treatment, making it less likely that the binge eating was a dietary artifact. Ruderman’s (1986) review has also indicated that the restraint model does not appear sufficient to explain eating by obese subjects.

Care should be taken in generalizing from the above studies because most subjects were seeking treatment, sample sizes were small (see Table 1), and no control groups were used. The reliance on self-report data is also hazardous because of potential influences from selective recall, conscious withholding, and observer bias. In addition, the popular belief that emotions affect eating might bias subjects to selectively attend to data confirming this cultural perspective.

Weight-loss Treatment Studies Utilizing Mildly to Severely Obese Subjects

Leon studied subjects either successful (“maintainers”) or unsuccessful (“regainers”) in maintaining a weight loss (Leon, 1975; Leon & Chamberlain, 1973a, b). Both groups reported eating when emotionally aroused, especially between meals, and both differed significantly from normal weight control subjects in this area. Regainers had difficulty during a wide variety of emotional states, mostly negative ones (e.g., lonely, frustrated, angry), whereas maintainers had difficulty mainly with loneliness and boredom. Buchanan (1973) studied subjects undergoing long-term group therapy. Eating in these obese subjects was often related to negative emotions such as feeling isolated, angry, or depressed. Buchanan speculated that “their eating binges are frequently substitutes for expressing anger” (p. 36). Population characteristics for this section are presented in Table 2.

Hamburger (1957) described four eating patterns. The first involved overeating in response to nonspecific emotional tensions (reported for 54% of the subjects). When these individuals felt “nervous, anxious, lonely, bored or blue a snack would in some way make them feel better—even, at times, when they
Table 2. Demographic data for mild to severely obese subjects in weight-loss programs.

<table>
<thead>
<tr>
<th>Study</th>
<th>n/sex</th>
<th>Obesity</th>
<th>Mean Age</th>
<th>SESb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buchanan (1973)</td>
<td>7 F + 2 M</td>
<td>65%</td>
<td>NR</td>
<td>Upper-middle</td>
</tr>
<tr>
<td>Gormally, Black, Daston, &amp; Rardin (1982)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample 1</td>
<td>65 F</td>
<td>34.6%</td>
<td>39.3</td>
<td>White, middle class</td>
</tr>
<tr>
<td>Sample 2</td>
<td>32 F + 15 M</td>
<td>48.9%</td>
<td>41.2</td>
<td></td>
</tr>
<tr>
<td>Hamburger (1957)</td>
<td>14 F + 4 M</td>
<td>156-365 lb</td>
<td>26.9</td>
<td>NR</td>
</tr>
<tr>
<td>Hoiberg, Berard, &amp; Watten (1980)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marines</td>
<td>635 M</td>
<td>4.06c</td>
<td>18.5</td>
<td>military and dependents</td>
</tr>
<tr>
<td>Navy males</td>
<td>309 M</td>
<td>4.71c</td>
<td>36.5</td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>934 F</td>
<td>2.92c</td>
<td>33.9</td>
<td></td>
</tr>
<tr>
<td>Hudson &amp; Williams (1981)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dieters</td>
<td>26 ?d</td>
<td>Over 20 lb</td>
<td>adult</td>
<td>NR</td>
</tr>
<tr>
<td>Control</td>
<td>36 ?d</td>
<td>NR</td>
<td>adult</td>
<td></td>
</tr>
<tr>
<td>Keefe, Wyshograd, Weinberger, &amp; Agras (1984)</td>
<td>38 F + 6 M</td>
<td>46.6%</td>
<td>45</td>
<td>NR</td>
</tr>
<tr>
<td>Leon (1975)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful</td>
<td>8 F</td>
<td>154 lb</td>
<td>41.0</td>
<td>White, middle class</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>6 M</td>
<td>215 lb</td>
<td>40.5</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>28 F + 11 M</td>
<td>164 lb</td>
<td>38.9</td>
<td></td>
</tr>
<tr>
<td>Leon &amp; Chamberlain (1973a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regainers</td>
<td>30 F + 4 M</td>
<td>176 lbs.</td>
<td>middle-aged</td>
<td>White, middle class</td>
</tr>
<tr>
<td>Maintainers</td>
<td>19 F + 3 M</td>
<td>158 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>28 F + 11 M</td>
<td>126 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leon &amp; Chamberlain (1973b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regainers</td>
<td>26 F + 2 M</td>
<td>+ 88%f</td>
<td>middle-aged</td>
<td>White, middle class</td>
</tr>
<tr>
<td>Maintainers</td>
<td>17 F + 3 M</td>
<td>- 24%f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>19 F + 1 M</td>
<td>Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loro &amp; Orleans (1981)</td>
<td>230 F</td>
<td>60.4%</td>
<td>41.7</td>
<td>Upper</td>
</tr>
<tr>
<td>50 M</td>
<td>64.6%</td>
<td>44.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marcus, Wing, &amp; Lamparski (1985)</td>
<td>432 F</td>
<td>47.4%</td>
<td>39.3</td>
<td>NR</td>
</tr>
<tr>
<td>Mendelson, Weinberg, &amp; Stunkard (1961)</td>
<td>25 M</td>
<td>64% (median)</td>
<td>38</td>
<td>Lower &amp; lower-middle</td>
</tr>
<tr>
<td>Stunkard (1959a)</td>
<td></td>
<td></td>
<td>(median)</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>17 F</td>
<td>62%</td>
<td>30</td>
<td>Matched on race, SES, education</td>
</tr>
<tr>
<td>Control</td>
<td>18 F</td>
<td>No weight problems</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Swanson &amp; Dinello (1970)</td>
<td>1 F + 24 M</td>
<td>over 50%</td>
<td>39</td>
<td>NR</td>
</tr>
<tr>
<td>Weintraub &amp; Aronson (1969)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>18 F</td>
<td>54%</td>
<td>23-47</td>
<td>Lower-middle</td>
</tr>
<tr>
<td>Control</td>
<td>23 ?d</td>
<td>Normal</td>
<td>18-45</td>
<td></td>
</tr>
</tbody>
</table>

Note: NR = not reported.
*Minimum overweight criterion, mean percentage above ideal weight, mean absolute weight, or range of weights as reported in original study.
'SES = socioeconomic status (social class).
'Body mass index: different formulas used for males and females.
'Sex of subjects not reported.
'Successful = at least 14 lb weight loss maintained at 6-month follow-up.
'Percentage of the original weight loss that was regained or additional amount that was lost.
had recently eaten a full meal" (p. 778). An eating pattern in which food was believed to help compensate for intolerable life situations was reported for 39% of the subjects. In the third pattern (44% of the subjects) eating was believed to ward off symptoms of an underlying disorder, frequently depression or hysteria. Finally, 44% were believed to have an insatiable craving for, or addiction to, food. The categories were not mutually exclusive.

Hoiberg et al. (1980) found significant correlations between an "Emotional Eater" dimension on a questionnaire (eating when depressed, bored, angry, anxious, frustrated, or lonely) and body mass indices (BMI) in three U.S. Navy groups. When Overweight History, Food Obsession, and Physical Activity dimensions were controlled, the relationship remained significant only for females. However, the Emotional Eater dimension correlated about .90 with each of the other dimensions, which also showed high intercorrelations. This suggests that a single factor which probably included emotional components was being measured. Mendelson, Weinberg, and Stunkard (1961) reported that 44% of their male outpatients increased food intake when they felt upset or depressed. Two specific patterns, night eating and binge eating which "occur primarily during periods of life stress" (p. 664), were reported by 24% of the subjects.

Stunkard (1959a, b) reported incidence rates for night eating and binge eating, both believed to "occur during periods of life stress" (1959a, p. 289). In his first study, 47% of the obese women at an outpatient clinic reported night eating, compared with none in a control group. In the second study, 65% of the 40 women at a "special studies" clinic reported night eating, 8% exhibited the binging pattern. In 100 obese individuals at a nutrition clinic, 12% reported night eating, whereas none reported binging. A control group of 38 normal-weight women did not report either pattern. (The 1959b study is not included in Table 2 because it did not report criteria for obesity or other subject characteristics.)

Swanson and Dinello's (1970) male subjects all reported "some variety of episodic eating" (p. 122), mostly in response to anxiety and frustration with bosses, wives, customers, and other people. For some subjects the episodes were quite regular, occurring daily, whereas for others there was no obvious pattern of recurrence. All of Weintraub and Aronson's (1969) female subjects "shared a certain pattern of overeating which may be described as follows: the craving for food was generally preceded by feelings of depression or 'loneliness.' These feelings of 'loneliness' commonly were precipitated by minor incidents of 'rejection' or 'abandonment'" (p. 740). Eating at such times involved rapid consumption of great quantities of food (binging), which "assuaged" the negative emotions. Hudson and Williams (1981) compared obese treatment subjects to normal-weight controls. The obese subjects more frequently associated anger, hostility, boredom, and depression with eating. Their eating was also more frequently done when alone and more often involved secrecy and attempts to hide or sneak food.

Four studies focused on binge eating. Marcus, Wing, and Lamparski (1985) reported serious binging problems in 46% of their subjects, moderate problems in 36%, and little or no problem in 18%. Binge eating scores for an intensively studied group (n = 66) were significantly correlated with "Disinhibition" (which included questions on emotional eating) and "Perceived Hunger" scores.
Emotion and Eating (Stunkard & Messick, 1982). Loro and Orleans (1981) found that 51% of their 280 obese adults binged on at least a weekly basis. Only 20% had never binged, and the remaining 29% reported less severe binging. Anxiety, frustration, depression, and boredom were believed to be important antecedents of binge episodes. Gormally, Black, Daston, and Rardin (1982) reported chronic binging in 23% of their subjects, with less frequent binge eating found in an additional 55%. "High dietary standards" and "low personal efficacy" were believed to be predisposing factors. In the fourth study (Keefe, Wyshograd, Weinberger, & Agras, 1984) severe, DSM-III bulimic-like binging was reported by 52% of the subjects. An additional 20% reported less severe binging, whereas 27% did not binge.

All four studies indicated that binge eating is highly prevalent in obese groups. The studies by Marcus et al. (1985) and Loro and Orleans (1981) suggest that emotions influence binging and, thus, that binging may be a form of emotional eating in obese populations. Other factors, including attitudes toward dieting, were implicated by Gormally et al. (1982). These studies, combined with Ruderman's (1986) review of cognitive factors in binge eating by normal-weight individuals suggest that binge eating may be multiply determined.

Clinical evidence also comes from professionals specializing in the treatment of obesity. Bruch (e.g., 1973) has reported on "developmental" and adult-onset ("reactive") forms of obesity. In both conditions, emotional eating and stress-related binging are prominent. Bruch also reported a third type considered to be primarily biological and relatively uninfluenced by emotional factors. Perhaps more important than Bruch's typology is her distinction between "active phases" of obesity, in which weight is gained in spurts and emotional eating is prominent, and "stable phases," characterized by weight stability and less labile emotional functioning. These "phases" suggest that emotional factors, even when they are important, may not be present all of the time. A type of obesity with severe emotional eating resembling Bruch's developmental category has been reported by Kornhaber (1970). Wolman (1982) reported on obese emotional eaters who fit Bruch's reactive category. Finally, behavioral researchers, in the face of disappointing, long-term treatment results, have begun to suggest that more attention be given to emotional factors (e.g., Stalones, Perri, & Kerzner, 1984; Wilson, 1980).

Summary

Emotional eating is reported in about three-fourths of the mild to severely obese subjects seeking treatment and is found at all socioeconomic levels (see Table 2). The studies consistently report that emotional eating is most often precipitated by negative emotions such as anger, depression, boredom, anxiety, and loneliness and often bears an episodic relationship to stressful periods of life. (There are occasional reports of positive emotions precipitating eating.) White female subjects were used in most studies, and the findings are most well established for this group. Two studies suggested that emotional eating is less common in obese males.

Seven studies were conducted during weight-loss treatment, three prior to treatment, and four at posttreatment follow-ups. The time of assessment (and probable dietary status) did not exhibit any apparent relationship to emotional
eating. This seems to be in agreement with Ruderman’s (1986) conclusion that dietary restraint, by itself, is not sufficient to explain eating patterns in obese individuals. As with the studies of the massively obese, caution must be used in generalizing from these results because subjects seeking treatment may represent a biased sample. Five studies did include normal-weight control groups, and all of them found obese-normal differences in emotional eating on the specific patterns studied (Hudson & Williams, 1981; Leon, 1975; Leon & Chamberlain, 1973a; Stunkard, 1959a, b). The use of larger samples (see Table 2) also improved the methodological quality of these studies.

Obese Subjects Not in Weight-loss Programs

Because treatment subjects may be a biased sample (Rodin, 1982), research on subjects from other settings is important in evaluating the generality of emotional influences on eating. Rand, Stunkard, and Glucksman compared obese and normal-weight individuals undergoing psychotherapy (Glucksman, Rand, & Stunkard, 1978; Rand, 1982; Rand & Stunkard, 1977, 1978). The 147 subjects were matched for age, education, socioeconomic status, and therapist. Weight-loss procedures were not part of therapy, and few obese subjects (6%) had sought treatment for obesity. “Many more obese patients (98 percent) than nonobese patients (43 percent) were reported to eat when they were depressed, anxious, or angry” (Rand, 1982, p. 183). In addition, weight changes associated with emotional processes were reported significantly more often in obese than in normal subjects; weight gains related to negative factors (90% versus 14%), weight losses associated with positive emotions (83% versus 26%), and stress-related weight gains of 10 lb or more (79% versus 9%). These findings raise important issues because they suggest that mild forms of emotional eating may be present in many normal-weight individuals but may not have a significant effect on their weight. Population characteristics for this section may be found in Table 3.

Woodman (1980) reported that for upper-middle-class obese subjects food often becomes a focus for “depression,” “repressed anger,” “anxiety,” and “repressed sexuality” (p. 20). Eating was associated with each of these emotions in 95–100% of the obese subjects but in less than 10% of the normal group. Emotional eating was reported to increase primarily with negative emotions and to decrease in the presence of positive ones. Holland, Masling, and Copley (1970) studied lower-class white females seeking routine medical care at a county-run medical clinic. The authors concluded that “obese and hyperobese, compared to normal weight subjects, eat when not hungry, and when anxious and depressed” (p. 351). Plutchik (1976) correlated responses from an eating-patterns questionnaire with deviation weights (the number of pounds a subject deviates from desirable weight). Two conclusions were reported. First, overweight subjects were aware that they overeat. Second, “overeating is related to emotional difficulties in three major areas: depression, anxiety and impulsivity” (p. 23).

Edelman (1981) reported a study of binge eating in which the data seem to lead to different conclusions than presented in the article. Based on the fact that 52% (n = 21) of the binge eaters were overweight while 48% (n = 19) were normal weight, Edelman reported that “there was no relationship between de-
gree of overweight and binge eating” (p. 743) among the 100 subjects in the study. However, no data were reported on the proportion within each group exhibiting the pattern. It was mentioned that 25 subjects were overweight and, because most results were reported as overweight versus nonoverweight (apparently including normal and underweight), it appears that the remaining 75 subjects belonged to the “normal” group. Thus, it appears that 25% (19 of 75) of the nonoverweight subjects, compared with 84% (21 of 25) of the obese group, exhibited the binge pattern. Obese subjects also reportedly binged more frequently and consumed greater quantities during binges; thus, even if group sizes had been equal, obese subjects unquestionably showed greater problems with binging. Binge eating was associated with “anxiety, tiredness, loneliness, family discord, being on a diet for a long time, feeling sorry for oneself, and frustration with work” (p. 743). Such eating reportedly reduced the negative affect in 70% of the binge eaters.

Two nonlaboratory studies used college students. Lowe and Fisher (1983) had female students record food intake for 12 days as well as their mood preceding eating. “Obese subjects were more emotionally reactive and more likely to engage in emotional eating than normals, but these findings applied only to snacks, not to meals” (p. 135). Hawkins and Clement’s (1984) study of binge eating correlates in college students included data for one overweight female

Table 3. Demographic data for subjects not in weight-loss programs.

<table>
<thead>
<tr>
<th>Study</th>
<th>n/sex</th>
<th>Obesity*</th>
<th>Mean Age</th>
<th>SESb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edelman (1981)</td>
<td>49 F + 51 M</td>
<td>Over 30%, normal, thin</td>
<td>21-55</td>
<td>Army center employees</td>
</tr>
<tr>
<td>Hawkins &amp; Clement (1984)</td>
<td>86 F</td>
<td>40%</td>
<td>Students</td>
<td>College students</td>
</tr>
<tr>
<td>Overweight</td>
<td>276 F</td>
<td>Normal</td>
<td>Students</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holland, Masling, &amp; Copley (1970)</td>
<td>16 F</td>
<td>79%</td>
<td>35</td>
<td>Lower</td>
</tr>
<tr>
<td>Hyperobese</td>
<td>16 F</td>
<td>33%</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>16 F</td>
<td>−9%</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowe &amp; Fisher (1983)</td>
<td>17 F</td>
<td>31%</td>
<td>Students</td>
<td>College students</td>
</tr>
<tr>
<td>Obese</td>
<td>30 F</td>
<td>−3.8%</td>
<td>29</td>
<td>NR</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plutchik (1976)</td>
<td>42F + 18M</td>
<td>−55 to +120 lb</td>
<td>18-50</td>
<td>80% middle</td>
</tr>
<tr>
<td>Rand, Stunkard, &amp; Glucksman series (see text)</td>
<td></td>
<td></td>
<td></td>
<td>60% college</td>
</tr>
<tr>
<td>Obese</td>
<td>64 F</td>
<td>47%</td>
<td>18-50</td>
<td>Upper-middle</td>
</tr>
<tr>
<td>Control</td>
<td>20 M</td>
<td>42%</td>
<td>18-50</td>
<td></td>
</tr>
<tr>
<td>Woodman (1980)</td>
<td>46F + 17M</td>
<td>Normal</td>
<td>19-64</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>20 F</td>
<td>40 lb</td>
<td>18-54</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>20 F</td>
<td>Normal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: NR = not reported.

*Minimum overweight criterion, mean percentage above ideal weight, mean absolute weight, or range of weights as reported in original study.

**SES = socioeconomic status (social class).

The number of subjects per weight group was not reported.
sample. High percentages of both normal and overweight groups responded yes to the question, "Do you ever binge?" (85.7% versus 94.2%, respectively). However, the "modal binge" of the overweight group was reported to be more frequent, to last longer, to be terminated more often by feelings of being painfully full (but not vomiting), and to be associated with more negative feelings about the eating.

Summary
Although verbal self-report, questionnaires, and clinical ratings continued to be the primary sources of data, the use of subjects not involved in weight-loss treatment and the inclusion of control groups in most studies greatly improved the methodological sophistication of the nontreatment studies. Their strong support for the prominence of emotional eating in obese subjects adds considerable generality to the weight-loss treatment research. Thus, the reported relationship between emotion and eating in the obese does not appear to be merely an artifact of a biased sample that seeks treatment. All of the studies found differences between obese subjects and normal-weight control groups or significant weight-dependent correlations in the area of emotional eating. Estimates of the prevalence of overeating in response to a variety of emotional states ranged from 84% (Edelman, 1981) to 100% (Woodman, 1980) for obese women, with lower percentages reported for single emotions or single eating patterns. Two studies found emotional eating less common in men than women.

Emotions such as depression, anxiety, and anger were again the most frequently reported precipitants of emotional eating. Consistent with the treatment studies, emotional eating was found across a wide variety of SES groups (see Table 3), many obese individuals were aware that their eating was excessive, problems controlling the intake of high-calorie foods were prominent, and emotional eating and weight gain were related to episodes of stress.

Special Issues in Emotional Eating
Hunger and Eating
The concept of hunger is important in theories assuming that chronic hunger, cognitive restraint of hunger, or abnormal hunger/satiety mechanisms are determinants of obesity. Eating in obese subjects (especially emotional eating), however, often seems to be initiated in the absence of perceived hunger. For example, eating when not hungry has significantly differentiated obese subjects from control groups (Holland et al., 1970; Hudson & Williams, 1981; Leon & Chamberlain, 1973b) and is frequently reported clinically (e.g., Edelman, 1981; Plutchik, 1976; Swanson & Dinello, 1970). More dramatic is emotional eating during which subjects stuff themselves, in an apparent absence of hunger, to the point of nausea, distension, headaches, and even vomiting (e.g., Fink et al., 1962; Hamburger, 1957; Kornhaber, 1970; Loro & Orleans, 1981). These observations suggest that words such as "craving" or "desiring," which are free of physiological connotations, are often more appropriate than hunger; that hunger should not be assumed to be present just because eating occurs; and that greater specification is needed when "hunger" is used as a theoretical construct in theories of obesity.
Determinants of Emotional Eating

Affect reduction appears to be prominent in emotional eating. Edelman (1981) found that “seventy percent (n = 30) of the subjects used one of the following adjectives to describe their physical state following emotional distress related eating: tired, relaxed, loggy, groggy, bloated, too full to move, sleepy, sluggish, or calm” (p. 744). Swanson and Dinello (1970) concluded that subjects “were convinced that they obtained some relief from anxiety and frustration by eating” (p. 123). Eating would “regularly produce sluggishness and drowsiness. Although sedation was not the professed goal” (p. 126). Affect reduction was reported in nine other studies (Bruch, 1973; Fink et al., 1962; Hockley, 1979; Kornhaber, 1970; Loro & Orleans, 1981; Robinson, Folstein, Simonson, & McHugh, 1980; Rottman & Becker, 1970; Weintraub & Aronson, 1969; Wooley, Wooley, & Dyrenforth, 1979). In over two-thirds of the studies that discussed determinants of emotional eating, affect reduction was believed to be a prominent factor. [Guilt, regret, and self-hatred sometimes follow such eating; e.g., Bruch (1973), Gormally et al. (1982), and Stunkard (1959b).]

Complex social determinants may also be important. Castelnuovo-Tedesco and Schiebel (1975) hypothesized that in response to disappointments in family life, “food typically came to be used as a readily available and reliable source of support, comfort, satisfaction and consolation” (p. 470). Craddock (1978) speculated that 81% of his unsuccessful dieters used eating as a compensation for specific disappointments or general unhappiness with life. Rand (1982) reported that “significantly more obese (79 percent) than nonobese (9 percent) had gained 10 or more pounds during periods of major life stress (e.g., marriage, divorce, occupational change, death of family member, etc.).” Idiosyncratic themes, such as eating to avoid social encounters or to ward off sexual feelings, have also been reported (e.g., Glucksman et al., 1978; Swanson & Dinello, 1970; Wolman, 1982). In addition, associations between family relationships and obesity onset, subsequent weight changes, or sabotage of weight-loss attempts, have frequently been reported (e.g., Atkinson & Ringguette, 1967; Bruch, 1973; Castelnuovo-Tedesco & Schiebel, 1975; Ganley, 1986; Marshall & Neill, 1977; Rand, Kowalske, & Kuldau, 1984; Rand & Stunkard, 1978). Although social determinants have rarely been the focus of investigation, these studies suggest that obesity and emotional eating may be deeply embedded in relationship attitudes, roles, interactions, and the regulation of emotion (Ganley, 1986, 1988b).

Leon and Roth (1977) and Rodin (1982) did not find affective or social determinants to be important. This is most likely because they relied more heavily on laboratory studies. However, as reviewed later, recent laboratory research also supports the importance of emotional influences on eating.

Eating Patterns

First, emotional eating and weight changes among obese persons tend to be episodic. Reactive weight gains, stress-related onset of obesity, eating in response to interpersonal crises, and the general episodic quality of emotional eating have frequently been reported (e.g., Atkinson & Ringguette, 1967; Bruch, 1973; Kollar et al., 1968; Rand & Stunkard, 1977; Woodman, 1980). These studies suggest that emotional eating may occur only when there is sufficient overall stress and not necessarily during brief or transitory bouts of emotion. Differ-
ences in emotional eating and snacking have also been found even when there were no differences in mealtime consumption (Leon & Chamberlain, 1973a, b). Thus, obese and normal-weight individuals may often have similar eating patterns, but at certain times [dynamic/active phase (Kulesa, 1982)] or under certain conditions (e.g., stress or snacking) obese people tend to eat more.

Second, emotional eating is often done secretively. Loro and Orleans (1981) reported that binge eating is typically done in private, in isolation from family and friends. Hudson and Williams (1981) found that questions about emotional eating, involving words such as alone, sneak, hide, and secretive, significantly differentiated obese and control groups. Swanson and Dinello (1970) reported that privacy was preferred by most of their subjects during episodic eating bouts. Third, emotional eating usually involves the ingestion of high-calorie or high-carbohydrate food, often with idiosyncratic choices (e.g., Loro & Orleans, 1981; Rand & Stunkard, 1977, 1978; Stunkard & Kaplan, 1977). Finally, different emotions (e.g., anger, depression, boredom) precipitate emotional eating in different obese individuals (e.g., Edelman, 1981; Mendelson et al., 1961).

In summary, emotional eating in obesity is often episodic, shrouded in secrecy, associated with different emotions in different individuals, and characterized by use of a favorite high-calorie or high-carbohydrate food. Studies of public eating, typical eating styles, and short-term dietary records (see reviews by Spitzer & Rodin, 1981; Stunkard & Kaplan, 1977; Wooley et al., 1979) may not pick up emotional eating because of these parameters. Studies done in public would not be sensitive to secrecy; studies conducted over brief periods of time may not find many obese subjects in the throes of sufficient emotional turmoil; and studies that do not observe subjects under a variety of conditions may not be sensitive to individual differences in type of emotion and food that precipitate eating. Investigations of single emotions (e.g., anxiety) or single patterns (e.g., severe, stress-related binging) may also underestimate emotional eating because there does not appear to be a characteristic "obese pattern."

LABORATORY RESEARCH

Studies Using Experimental and Quasi-Experimental Designs

Two studies used adult subjects. Pine (1985) induced anxiety through the threat of painful electric shock during a taste test of nuts. A significant Weight × Anxiety interaction led Pine to conclude that obese subjects, compared with controls, responded to anxiety by increasing their intake. Anxiety reduction was not studied. Robinson et al. (1980) asked subjects who had fasted for several hours to consume a standardized, high-calorie liquid meal. Extreme, moderate, and previously obese subjects showed greater reduction in anxiety than either a matched control group or a control group of nurses.

The remaining studies used college students who volunteered or were given course credit or small monetary remuneration. Obese groups averaged about 27% overweight. McKenna (1972) induced anxiety in male students through the threat of intrusive medical procedures. He also manipulated food palatability. The prediction that obese subjects would eat more than normal weight subjects in response to high versus low anxiety was confirmed by a significant
Weight × Anxiety interaction. This was mainly accounted for by obese subjects increasing their intake of the more palatable food under high anxiety, whereas normal weight subjects decreased consumption. (The obese group’s simple main effect approached significance, p < .10). Anxiety reduction for obese subjects was not found.

Slochower focused on “emotional labeling” and “perceived control” over arousal (Slochower, 1976, 1983; Slochower & Kaplan, 1980; Slochower, Kaplan, & Mann, 1981). In the 1976 study, false-heart-rate feedback was used to induce high or low arousal in males. Subjects were either provided a “label” for their arousal or given no information (unlabeled condition = analog of free-floating anxiety). Significant Subject × Label and Subject × Label × Arousal interactions indicated that overweight subjects responded to diffuse arousal by eating more cashews, and that eating reduced arousal. The 1980 study with males added a “self-perceived control” condition (opportunity to learn relaxation techniques). “As predicted, obese subjects’ eating increased significantly when they felt anxious . . . when they could not label what they were feeling . . . and when they did not feel they could control their anxiety state” (p. 80). Anxiety reduction occurred and was related to the amount of cashews consumed.

In 1981 female subjects were tested during final exams (rated by subjects as unpredictable and uncontrollable) and 3 weeks later (no “general” stressor). During exams the obese group ate seven times more M & M candies than controls. The groups did not differ during the postexam period. Thus, “the overeating of the obese group emerged only under conditions of high stress” (p. 120). Within the obese group, subjects ate significantly more during exams than at the later session and, without the exam stress, their eating (but not controls) correlated significantly with degree of depression, worthlessness, unhappiness, and anger. Thus, in addition to the obese-normal differences, there was a significant relationship within the obese group between eating, the degree of general stress, and individual perceptions of stress. Anxiety reduction was not investigated.

Ruderman (1983) induced high anxiety by having females try to impress an unresponsive male stooge (low anxiety = casual conversation with a man; relaxation = listening to a relaxation tape). Using an ice cream taste test, she found a significant Weight × Anxiety interaction. Contrary to psychosomatic predictions, obese, low-anxiety subjects ate the most, significantly more than obese, high-anxiety subjects. No relationship was found between eating and anxiety reduction. Resnick and Balch (1977) studied anxiety (threat of electric shock for incorrect answers on a sham IQ test) and response cost (unwrapped versus partially wrapped Hershey Kisses). There were no significant differences or interactions in amount eaten. A nonparametric test showed that more obese subjects ate something (versus nothing) in the low-anxiety/low-response cost compared with the high-anxiety/high-response cost condition. The elimination of nine subjects as a result of suspicion probes suggests there may have been problems with the deception procedures in this study.

Four college studies used crackers as the test food. Schachter, Goldman, and Gordan (1968) used induced fear, Abramson and Wunderlich (1972) used fear and interpersonal anxiety, Abramson and Stinson (1977) induced boredom, and Baucom and Aiken (1979) manipulated depressed mood. None of these studies found increased consumption of crackers in response to arousal for
obese subjects. Schachter et al. did find a significant Weight × Fear interaction but this was mainly accounted for by decreased intake in normal weight subjects. Baucom and Aiken found a significant Failure × Dieting effect. They interpreted this to indicate that dietary restraint, rather than obesity, explains emotional eating.

Discussion of Results from Laboratory Studies

Emotional Eating

The results appear equivocal since only 5 of 11 studies found increased consumption for obese subjects in response to arousal [Robinson et al. (1980) did not study differential consumption]. However, all four studies using crackers had negative findings, raising the possibility that this kind of test food affected the results. Supportive of this are the consistent reports reviewed earlier that emotional eating usually involves high-calorie or high-carbohydrate foods. Crackers hardly seem to qualify and have even been referred to by Schachter et al. (1968) as a “rather uninspiring food.” McKenna (1972) also found that food palatability is an important factor in emotional eating. Kaplan and Kaplan (1957) did not specify the type of food involved in emotional eating, and the cracker studies may have been attempting to minimize food influences by choosing a bland food. In light of current information about food choice and the absence of eating differentials in all of the studies using crackers, it appears that crackers do not allow for a valid test of emotional eating in obesity. The finding that crackers are eaten when restraint is disrupted in normal-weight students (Baucom & Aiken, 1979) suggests that the same type of food may have different effects in different populations.

Five of the seven studies using foods more typically found in emotional eating (chocolate chip cookies, M & M candies, nuts, and ice cream) found higher levels of eating in overweight than normal weight groups. It may be more accurate to say five out of six studies, because Resnick and Balch (1977) used food of questionable palatability. In an attempt to manipulate response cost they used unwrapped versus partially wrapped Hershey Kisses. It seems probable that subjects exposed to the altered wrapper of a candy everyone is familiar with would wonder why the food had been tampered with and what might have been done to it. The large number of subjects dismissed during the suspicion probe suggests that subjects were unusually wary. Overall, the laboratory studies using higher palatability foods support the hypothesis that overweight, compared with normal-weight, individuals increase their eating in response to emotional distress.

Affect Reduction

Of the six higher palatability studies investigating this area, only three found greater affect reduction. Robinson et al. (1980) found that a standard liquid meal reduced anxiety more for obese than normal-weight subjects. Slochower (1976) and Slochower and Kaplan (1980) found that diffuse, difficult-to-label arousal could be reduced through eating. Slochower argued that this type of arousal more closely parallels the in vivo anxiety that Bruch (1973) and others believed is involved in emotional eating. She also argued that experimental
manipulations, such as the threat of electric shock, provide easily labeled sources of arousal and are less likely to lead to emotional eating.

All three studies where affect reduction did not occur used easily labeled sources of arousal [McKenna (1972), intrusive medical procedures; Resnick and Balch (1977), electric shock; Ruderman (1983), unresponsive man]. Finally, Slochower and Kaplan’s (1980) study demonstrated that self-perceived control over the anxiety can inhibit emotional eating. Taken together, the laboratory studies provide tentative evidence that diffuse and difficult-to-label emotional arousal, and lack of self-perceived control over the arousal, may be important determinants of emotional eating and affect reduction.

Caveats

Although laboratory studies allow better control of variables than clinical studies, a number of threats to validity remain. First, when college subjects are used the restrictions on age, social class, and degree of obesity may limit the generalizability of results. Second, in view of the reported episodic qualities of emotional eating, the brief time-frame studies may encounter few obese subjects under sufficient overall stress that relatively mild induction procedures will trigger eating. Third, studies that use a single induction procedure, in a single highly standardized setting, and with a single standardized food, are unlikely to be sensitive to individual variability in eating patterns, types of emotions, and food choice [even though such procedures may elicit more than one affect (Polivy, 1981)]. Fourth, the social/interactive aspects of the experimental situation (Orne, 1962; Rosenthal & Rosnow, 1969) may suppress emotional eating because of the secrecy that often surrounds it. Even though the laboratory eating usually occurs in isolation, the food, the opportunity to eat, and the situation itself are furnished by a stranger. Fifth, the 5–15 minutes during which eating occurs may be insufficient for differences in emotional eating (or any other type of eating) to emerge. Finally, most college studies have used a 10–15% minimum overweight criterion based on the 1959 Metropolitan tables. In view of the 5–10% increase in average weight for most women on the 1983 tables, it is questionable if many of the “obese” students would be considered obese by current standards.

CONCLUSIONS AND DISCUSSION

The obesity literature strongly suggests that emotional eating is highly prevalent in obese individuals who seek treatment. The finding that emotional eating significantly differentiates obese subjects from normal-weight control groups in nontreatment studies adds considerable generality to this finding. The literature also suggests that emotional eating is prevalent across social class and level of obesity. Its prominence is most clearly established for obese women, with less consistent findings for obese men. Even studies of mildly overweight college students, when more palatable foods than crackers are used, support the prominence of emotional eating among the obese. Several characteristics of emotional eating may make it difficult to investigate. These include its frequent occurrence in the absence of hunger; its episodic relation-
ship to stress; the individual variability with respect to emotion, food, and environment; the various eating patterns (e.g., night eating, binging); and the great secrecy that often surrounds it. These parameters need to be included in future research so that the narrowness of studies that focus on single parameters (e.g., anxiety reduction) can be avoided.

The clinical studies, as well as the limited laboratory research, suggest that a major determinant of emotional eating is its ability to reduce negative emotions such as anger, depression, loneliness, boredom, and anxiety. Because the major source of this conclusion is self-report data, it needs to be validated with other methods. It will also be important to research positive emotions, since there are occasional reports that they also precipitate eating. Clinical reports that emotional eating sometimes serves a compensatory function, and is influenced by family interactions and individual dynamics, suggest that emotional eating and obesity have other determinants as well. To investigate these areas, theories that allow for complex biopsychosocial interactions will be needed.

Research can be improved in several ways. First, studies need to include a broad range of subjects with more frequent use of control groups. Second, laboratory research needs to continue going beyond the single induction procedure, single food, single setting designs, to develop methods that more accurately reflect the complexity of emotional eating (Lowe & Fisher, 1983). It is also recommended that more adult subjects be used and that a higher criterion of obesity be adopted so that mildly overweight individuals whose weight may be of little social or medical significance are eliminated. Third, when obese-normal comparisons are made, it is desirable to eliminate normal-weight individuals with a history of weight or eating problems from control groups. This will allow clearer comparisons with individuals who have never had eating or weight-related difficulties. The Emotional Eating factor (Ganley, 1988a), derived from Stunkard and Messick’s (1982) Eating Inventory, and scales sensitive to anorexia and bulimia may be useful. Finally, attempts should be made to identify whether obese subjects are in a stable weight period, or a period of active weight change, because eating patterns (Kulesa, 1982) and emotional responses (Bruch, 1973) may be different in each of these phases. A measure of overall stress would also be useful in view of the episodic quality of emotional eating and the correlations found in this area by Slochower (1983).

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