Exposure with Response Prevention and Energy Regulation in the Treatment of Bulimia

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ABSTRACT

The separate and additive effects of exposure with response prevention (ERP) and energy balance training (EB) in the treatment of bulimia were evaluated in six female bulimics. A multiple-baseline design was used in which exposure with response prevention was designed to reduce vomiting frequency and energy balance training was designed to reduce the frequency of food intakes. The treatments were not independent as they led to changes in the target as well as the nontarget behaviors. Inconsistent self-monitoring and the small sample size limit definite conclusions beyond the fact that both treatments are potentially promising as interventions for bulimia.

Bulimia is a newly identified eating disorder occurring predominantly in females. The disorder has three major characteristics, including a fear of obesity, binge eating and/or eating "forbidden" foods, and purging by self-induced vomiting or laxative use (Garfinkel, Moldofsky, & Garner, 1980; Russell, 1979). Until recently, descriptive data documenting the nature of bulimia in the absence of anorexia had been lacking. However, Fairburn and Cooper (1982) report responses to a questionnaire from a large sample of British women. Over 80% of the approximately 400 bulimic women in this study had

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difficulty controlling their eating and also reported using vomiting as a weight-control strategy. Fairburn and Cooper's descriptive data are consistent with clinical reports (e.g., White and Boskind-White, 1981; Rosen & Leitenberg, 1982) and together they had led to two conceptualizations of bulimia with accompanying therapeutic interventions.

These conceptualizations have been referred to as the *anxiety disorder* (AD) and the *energy balance* (EB) models of bulimia (Johnson & Brief, 1983). The anxiety disorder model considers bulimia as similar to obsessive-compulsive neurosis. According to this conceptualization, a fear of weight gain experienced by bulimics is induced by eating high calorie foods or large meals that cause a bloated sensation. The bulimic gradually learns that vomiting can reduce bloatedness and the fear of weight gain by eliminating these foods. Thus, vomiting is negatively reinforced by the anxiety reduction associated with removal of ingested foods, and it becomes an effective means of controlling the fear associated with the consequences of binge eating (Rosen & Leitenberg, 1982).

In contrast, the energy balance model traces the origin of bulimia to deficits in knowledge and/or skill concerning the maintenance of an appropriate weight through the regulation of food intake and activity (Johnson & Brief, 1983; Wardle, 1980). According to this model, weight gain and the resulting fear of obesity motivate dietary restrictions. Because these restrictions do not produce the desired weight loss, they become increasingly severe, unrealistic, and impossible to maintain. Soon thereafter, the dieter alternates between semistarvation and episodes of binge eating with no weight loss. Continued inability to control eating leads to the binge/purge cycle, which eventually becomes a necessary strategy for regulating energy balance.

These behavioral models have slightly different implications for the treatment of bulimia. According to the anxiety disorder model, the treatment of bulimia should parallel that of obsessive-compulsive symptoms. Here, vomiting becomes the target of intervention, and exposure with response prevention (ERP) is the treatment of choice. This intervention involves having bulimic subjects eat until they experience an urge to vomit. Subjects are then instructed to focus on the cues associated with eating (e.g., feelings of bloatedness, urge to vomit, and so on) that elicit the fear of weight gain. Subjects remain in the eating situation and are prevented from vomiting until the urge to vomit has dissipated (Rosen & Leitenberg, 1982).

The focus of the energy balance model is on the self-regulation of eating behavior and activity in order to maintain an acceptable weight. Attention is directed to binge eating, which is considered to be similar to the uncontrolled eating observed in many obese people. Additionally, since the majority of bulimics ignore energy output in their attempt to control weight via restricted intake alone, regular aerobic exercise is a crucial therapeutic goal. A number of behavioral techniques have been successfully employed for the modification of eating and exercise, and together they attempt to teach eating and exercise patterns that lead to effective weight control. These techniques include the

stimulus control of eating, eating topography modification, self-reinforcement for goal attainment, meal planning, and regular aerobic exercise (see Johnson & Stalonas, 1981).

Support for ERP is provided in two studies by Rosen and colleagues (Rosen & Leitenberg, 1982; Rosen, Gross, Peterson, & Leitenberg, Note 1). With the exception of the uncontrolled report of Fairburn (1981), studies evaluating the EB model are limited to obesity (Jeffrey, Wing, & Stunkard, 1976; Johnson, Stalonas, Christ, and Pock, 1979).

The separate conceptualizations of bulimia and the interventions based upon them are not necessarily antagonistic but perhaps complementary. The present study, then, examined the separate and additive effectiveness of ERP and EB in the treatment of bulimia.

METHOD

Design

The two interventions (ERP and EB) were evaluated in a multiple-baseline design across subjects over vomiting and the number of food intakes. ERP was designed to reduce the frequency of vomiting, while EB was designed to reduce the number of food intakes. Treatment order was varied, with subjects being randomly assigned to one of the two treatment orders (e.g. ERP-EB; EB-ERP). There was a one-week baseline prior to the first intervention, with physical and self-report inventory measures taken before, during, and after the interventions.

Subjects

Subjects were recruited via media coverage and medical/psychological referrals in Spring 1982. Seven bulimics were identified and, based on willingness to participate in an experimental treatment, six female subjects ranging in age from 16 to 29 (mean = 23) were selected for the study. Four subjects were single, one was married, and one was divorced. The initial body weights ranged from 106 to 215 pounds (mean = 141 pounds). The age of onset of the bulimic behavior fell in the age range of 14 to 27 years (mean = 18 years), with the duration of the problem ranging from 2 to 14 years (mean = 6 years).

Assessment Measures

Intake Interview. Each subject was interviewed individually prior to onset of the study. During this intake interview, information was collected on the subject's eating behavior, social adjustment, vocational status, medical history, and the typical chain of behavior involved in the binge/purge cycle. A number of self-report questionnaires were administered immediately following the intake interview, at the end of the first treatment, and at the end of the second

treatment. Because of the small number of subjects, these data will not be reported.

Physical Measures

At the initial session and at each of the weekly treatment sessions, weight, height, waist girth, and triceps skin fold were measured. Subjects were also asked if they had menstruated during the previous week.

Self-Monitoring

Subsequent to the initial session, all subjects were instructed to monitor daily all instances of eating, including the following: kind and amount of food eaten, the time of the eating episode, whether other people were present, the place where eating occurred, the events that occurred before and after eating, and the mood before and after eating. Subjects also recorded whether self-induced vomiting occurred after each eating episode. If vomiting occurred, the subjects noted its time of occurrence and their mood following vomiting. This information was recorded on a printed form for each eating episode.

Therapists

Three therapists were involved in the treatment study. Each therapist conducted both treatments on different occasions. Each subject saw two therapists, one for each treatment component. One therapist was an experienced clinical psychologist (WGJ), while the other two were Ph.D. level psychologists on their clinical internship (DGS, MLK). All therapists conducted both treatments with different subjects.

Treatment Methods

The ERP Intervention. The objective of ERP was to extinguish vomiting behavior by repeatedly exposing subjects to eating situations and preventing the occurrence of vomiting. In this study, each session was begun by having subjects rate their anxiety, fear, bloatedness, and urge to vomit, and by measuring their heart rate. Subjects were then given moderate to large amounts of food to eat. The type of food was individually tailored to fit individual eating and binging habits. Subjects were instructed to eat until they experienced a strong urge to vomit or until they had consumed all of the available food. While eating, attention was focused on eating-related cues, such as the sight and smell of the food, and on feelings of fullness.

Immediately after eating, subjects again rated their fear, anxiety, bloatedness, and urge to vomit, and their heart rate was also taken. Attention was then directed toward feelings of fullness, fear of gaining weight, and on the social consequences of being overweight. Exposure to these cues was con-

tinued for 30 to 45 minutes, until subjects reported no longer having an urge to vomit. The ratings and heart rates were repeated at the end of the session.

During ERP, it was emphasized that the feelings of fullness and the fears of weight gain would subside in time. At the end of each session, the subjects were instructed to refrain from vomiting for the rest of the day and to practice the ERP procedure on at least one occasion between sessions.

The first session of ERP was always conducted in the lab. Each session thereafter was conducted either in the lab or in a situation where the subjects binge (e.g., restaurant, home, car, and so on). One subject became ill with a viral infection during the study and required hospitalization; ERP sessions were administered to her in the hospital.

The EB Intervention. The primary target of EB was binge eating and, secondarily, teaching effective weight control without the necessity of unrealistic caloric reductions. This intervention was designed to teach subjects proper eating habits, appropriate nutrition, and regular aerobic exercise in order to regulate their energy balance and to achieve a desirable weight.

The major techniques of the EB treatment were extracted from the weight-control program of Johnson and Stalonas (1981). These components included scheduled eating, increased aerobic exercise, stimulus control, a balanced diet, eating topography modification, cognitive restructuring, and self-reward. Homework was assigned at each session to promote incorporation of the new skills into the subjects' behavioral repertoire. In addition to keeping eating records, subjects also monitored their daily exercise.

RESULTS

Table 1 presents the number of sessions of each treatment completed by each subject, the extent of their self-monitoring, and why treatment was terminated. Five of the six subjects were considered to have successfully completed treatment either by having attended a requisite number of sessions or by having reached the goals of an intervention in less than six sessions. S4 completed only two sessions of ERP because she was no longer vomiting. The compliance

TABLE 1

Summary of Treatment Received and Compliance with Treatment

Subject Number	Order	Sessions EB	Sessions ERP	% Weeks Self-Monitored	Reason for Stopping
1	ERP-EB	5	6	79%	Completed protocol
2	ERP-EB	4	5	66%	Completed protocol
3	ERP-EB	6	6	79%	Completed protocol
4	EB-ERP	6	2	50%	No longer vomiting
5	EB-ERP	6	2	90%	Dropped out
6	EB-ERP	5	6	83%	Completed protocol

percentages for the food records ranged from 50% for S4 to 90% for S5. No subject turned in self-monitoring records every week and all became less compliant as they improved and approached the final weeks of treatment.

When subjects failed to monitor, they were interviewed extensively in an attempt to determine the number of food intakes and the frequency of vomiting. In general, subjects who completed treatment reported frequencies of target behavior similar to their self-monitoring records. Figure 1 presents data on the frequency of vomiting per day per week. These daily totals for vomiting were obtained from the self-monitoring records and a weekly mean was computed.

Effects of Interventions on Vomiting

Of the subjects who received ERP initially (S1, S2, S3), S1 showed an increase from less than 1 vomit per day per week during baseline to approximately 1.5/day/week. Subsequent reductions in vomiting for S1 occurred in the first two weeks of EB, when she was also able to reduce her food intakes from an average of 5/day/week to 3/day/week.

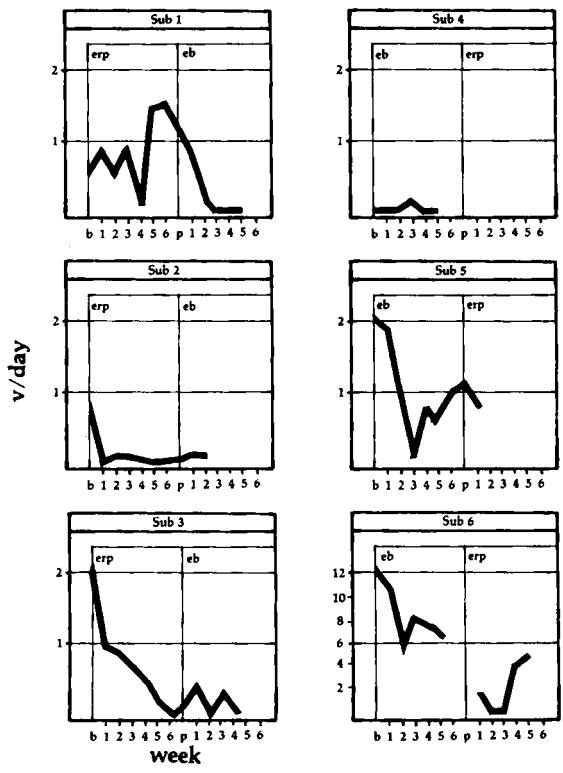

FIGURE 1.
Average number of vomiting episodes per day per week and phase of treatment.

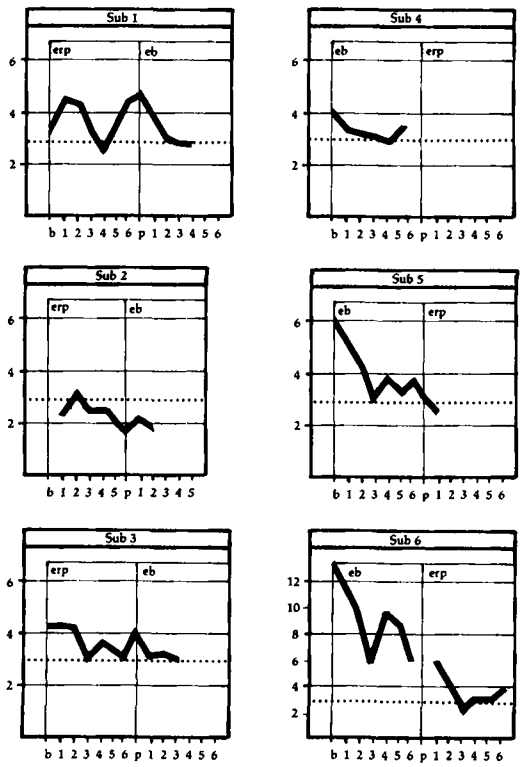

FIGURE 2.
Average number of food intakes per day per week and phase of treament.

S2 reduced her vomiting from slightly less than 1/day/week to zero over the last two weeks of exposure. This subject also displayed a slight increase in vomiting during the first two weeks of EB to approximately 2/week. Because of noncompliance with self-monitoring, the further impact of EB on vomiting cannot be evaulated. However, during weekly interviews, S2 reported a continuation at the level of 2/week.

S3 vomited over 2/day/week, which she dropped to approximately 2-3/week during the fifth and sixth weeks of exposure. Like S2, S3's compliance with self-monitoring during weeks five and six of EB does not allow for a determination of the influence of this latter intervention on her frequency of vomiting. During interviews, S3 also reported vomiting 2-3/week.

For subjects who received EB initially (S4, S5, S6), vomiting occurred only once during treatment for S4. During EB, S5 initially decreased vomiting from the level of 2/day/week to less than 1/day/week in the third week of treatment, but then gradually rose to slightly over 1/day/week. Implementation of

ERP with S5 resulted in a reduction below 1/day/week. S5 withdrew from the study at this point due to the stress of final exams and varsity athletic competition.

Data for S6 reveal a reduction in the rate of vomiting from 12/day/week to approximately 7/day/week at the termination of EB. Implementation of ERP with S6 lead to an initially low rate, which gradually increased to slightly less than 3/day/week. Although S6 did not monitor during week six, she reported vomiting approximately 4-6/day.

With the exception of S4, vomiting was reduced for all subjects with a combination of the two procedures. However, only S1 was free of vomiting at the end of treatment, while S2, S3, and S6 were considerably improved.

Effects of Interventions on Food Intake

Figure 2 presents the mean number of food intakes per day per week for each subject. Since one goal of EB was to average not more than three intakes per day, a horizontal line on each graph marks this goal.

S4, S5, and S6 received this intervention initially, and all showed a reduction in the number of intakes per day. However, only S5 actually approached the goal of 3 intakes/day and remained there throughout the course of this intervention. S4 reached the goal of 3/day/week, then stopped self-monitoring but reported during interviews to be eating three meals per day. S6 showed a substantial reduction in the number of intakes per day, from over 14 to approximately 6/day/week, yet she was still far above the goal of 3/day. However, with the initiation of ERP, S6 reduced her food intake to the goal level during the third week of ERP and kept it there throughout the course of treatment.

Of those subjects who received ERP initially, all three displayed a reduction of intakes to approximately 3/day/week. S1 reached 3/day during the fourth week of exposure, but then rebounded to her baseline level at the termination of that intervention. However, once EB was commenced, S1 quickly reduced her eating to 3/day and remained there until she stopped monitoring at the end of week four. For S2, the number of intakes was not a problem, yet she reduced her eating to approximately 2/day/week by the end of exposure, and remained at the level through several weeks of EB. S3 reduced her number of intakes per day per week from above 4 to approximately 3.5 during exposure, but rebounded to the baseline level in week six.

Covariation of Treatment Influences

ERP was intended to target vomiting, whereas EB focused on the number of food intakes and exercise. As expected, these interventions influenced both the intended and nonintended target behaviors. Of subjects who underwent ERP initially, S1 displayed an increase in vomiting as a result of exposure and even-

tually decreased vomiting when food intakes were controlled during EB. For S2, ERP lead to an effective reduction of vomiting and also a drop in the number of food intakes below 3/day/week. However, S2's food intakes were not far above the goal level of three. S3 displayed a gradual decrease in vomiting as a result of ERP, yet the pattern of food intakes during this period was variable, eventually reaching a goal level of 3/day/week during EB.

For S5 and S6, EB gradually reduced the number of their food intakes. For S5, this intervention led to an initial reduction in vomiting, but it gradually rose. The reduction in food intakes for S6 under EB was also accompanied by an initial drop in vomiting by approximately a third, which then leveled out to roughly 4/day below her baseline level. However, S6 was vomiting all her meals during EB, thus a reduction in intakes must be accompanied by a reduced number of vomits.

DISCUSSION

In this preliminary investigation, the rate of vomiting and the number of food intakes were reduced during treatment consisting of both ERP and EB. While a one-week baseline does not allow for a definitive assessment of change, our interview data indicated that the observed baselines were equal to or lower than the subjects' typical rates of binging and purging. On the basis of data available, neither technique proved superior to the other for either target behavior. ERP reduced both vomiting and the number of food intakes, and EB did likewise. More definitive statements regarding the relative merits of these techniques are difficult to make due to the variable compliance with self-monitoring, small sample size, and design of the study.

While recognizing the limits of these data, it appears that both interventions are helpful in teaching bulimics to control two major aspects of the eating disorder. ERP allows them the opportunity to learn that binge eating or eating "forbidden" foods does not necessarily lead to vomiting. Of course, weight gain is a potential side effect of a decrease in vomiting under ERP without a corresponding change in energy balance. From these present data, it is not whether the effect of ERP was due to extinction of the fear of weight gain or whether the subjects acquired new postmeal coping responses.

For its part, EB teaches bulimics how to control food intake and encourages regular aerobic exercise in order to maintain a satisfactory weight. The emphasis of EB was not only on the number of food intakes per day, but also on establishing control over meal size and amount, thereby decreasing the anxiety of weight gain and urge to vomit.

While ERP and EB may prove to be necessary components in the treatment of bulimia, a more comprehensive approach to treatment is necessitated by our experience in this clinical trial. During the course of treatment, for example, many of our subjects experienced a personal/social problem that lead to one or more binge/purge episodes. Analyses of self-monitoring records by Schlundt, Jarrell, and Johnson (Note 2) support this observation. More specif-

ically, negative moods induced by a failure to cope effectively with personal/social problems are highly predictive of the binge/purge cycle. Thus, in a current study, we have expanded our model for bulimia to address deficits in personal/social problem solving as well as eating behavior, purging, and the fear of obesity.

As noted, compliance with self-monitoring was a problem in the study and we have taken several steps to improve it. Subjects now sign written behavioral contracts regarding self-monitoring and our monitoring form has been streamlined by transforming requested information (social context of eating, activity, mood, and so on) into a multiple-choice format. Moreover, we routinely enter these records into a computer so that patients can receive periodic computer-generated graphical summaries of their bulimic behavior and its relationship to controlling variables. This computerization of the self-monitoring record helps in the evaluation of treatment efficacy as well as in identifying both group and individual environmental and behavioral antecedents to the binge/purge cycle.

Because the rate of food intake and vomiting are not independent, the multiple-baseline design used in the present study does not allow for a determination or comparison of treatment efficacy. Accordingly, studies comparing treatment components on these variables should employ a between-group design.

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