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Anthony F. Rotatori

Harvey Switzky
Northern Illinois University

Robert A. Fox
Marquette University, robert.fox@marquette.edu

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Behavioral Treatment Approaches to Obesity: Successes with the Nonretarded and Retarded

ANTHONY F. ROTATORI, PhD, HARVEY SWITZKY, PhD
and
ROBERT FOX, PhD

ABSTRACT: This article discusses the successful use of behavioral approaches, which have been adopted from research with non-retarded individuals, to the treatment of obese retarded individuals. The first section delineates a variety of approaches with non-retarded obese individuals whereas the second section summarizes the efficacy of these approaches with the obese retarded. The last section discusses practical and future research implications.

Obesity has been treated with a variety of techniques (e.g., medication, psychotherapy).¹ However, most attempts to modify obesity have been unsuccessful.² Additionally, traditional approaches have been plagued by premature termination of treatment and the tendency of successful dieters to regain the lost weight once treatment was over. A bright spot in the treatment of obesity in the past ten years has been the results obtained by various behavioral approaches. This article first summarizes the literature concerned with various approaches in the treatment of obese non-retarded individuals then summarizes the successful application of these approaches with retarded obese individuals.

WEIGHT CONTROL STUDIES WITH NON-RETARDED PERSONS

Results of studies with non-retarded persons are presented in Table 1.

Dr. Rotatori is Assistant Professor and Dr. Switzky is Associate Professor, Department of Learning, Development, and Special Education, Northern Illinois University, DeKalb, IL. Dr. Fox is Assistant Professor, Department of Psychology, Ohio State University, Columbus, OH. Address requests for reprints to Dr. Rotatori, Department of Learning, Development, and Special Education, Northern Illinois University, DeKalb, IL 60115.

Table 1
Summary of Behavioral Management Interventions for Obesity with Non-retarded Persons

Researcher	N	Population	Treatment methods	Treatment periods (wks)	Mean weight change (Pretreatment - end of treatment)	Follow-up period wks from end of treatment period	Mean weight change end of treatment period to follow-up (wks)
Bernard (1968)	1	Psychiatric	Token contract	20	89	6	13
Moore & Crum (1969)	1	Psychiatric	Token contract	28	35	--	--
Dinoff, Richard & Colwick (1972)	1	Psychiatric	Token contract	7	30	--	--
Stuart (1967)	8	Normal	Self control	52	37.5	--	--
Harris (1960)	24	Normal	Self control	10	8.1	4	3.0
Wollersheim	79	Normal	Self control	12	10.33	--	--
Perrick et al (1971)	32	Normal	Self control	12	25.5	--	--
Holpe (1954)	1	Normal	aversive	5 sessions	--	--	--
Meyer & Crisp (1964)	2	Normal	aversive	6	20	64	3.5

asked to visualize the eating of a pleasurable food while at the same time he is given instructions to imagine himself nauseous and finally vomiting after imagining taking a bite of food. Practice is also given in visualizing a favorite food, refusing to eat the favorite food, and how good it feels to resist the temptation. The author noted that when this method is practiced in the clinic and home by the client in conjunction with: (a) keeping a diary of food eaten and; (b) using relaxation methods when the client feels anxious, significant weight loss can result. A control study concerned with assessing the strength of the theoretical basis of covert sensitization was completed by comparing a covert sensitization group of overweight subjects with a placebo control (suggestion) group and a no-treatment control group.⁹ The findings revealed no differential weight change among groups. The investigator concluded that the data implied that the effects of covert sensitization may be the result of attention and suggestion factors.

Covert sensitization has two major advantages over shock conditioning techniques: (1) it is a fairly simple method to learn and administer to a client; and (2) it theoretically has all the advantages of shock conditioning without the elaborate equipment and the difficulties involved in having to administer the electric shock. Unfortunately, the effects of experimenter attention and suggestion may in fact be significant factors for the success of this method rather than the specific technique itself. Another difficulty with the above procedures is the fact that the client's use of the procedures declines significantly as treatment progresses.¹⁰

Contingency Conditioning

Contingency contracting in obesity studies is concerned with training the client to monitor as well as control his eating behavior by making reinforcement contingent upon such control. Usually, a contract is jointly devised and agreed upon by the client and the therapist. Typically, the contract specifies that the client deposits money or other valuables (clothes, favorite jewelry) with the therapist. During the course of treatment the client will earn or forfeit the money or valuables depending on whether the weight is lost or gained. One of the earliest contingency contracting studies used money to reward psychiatric patients for weight loss.¹¹ The authors reported that a significant amount of weight was lost by each of the 21 subjects in the contingency contracting group. Also, the subjects continued to lose weight during the follow-up period while the control group and diet-only group (who had lost weight during treatment) began to regain weight. Mann employed a single subject design to investigate the efficacy of contingency contracting using normal non-institutionalized adults.¹² The results demonstrated that items considered valuable by the subjects could be used to gain experimental control over weight loss. On the negative side, the author noted problems

associated with contracting procedures used with weight control. Informal reports revealed that some of the subjects used extreme measures (e.g., taking laxatives, diuretics, or engaging in vigorous exercise the day of the weigh-in) to lose weight rapidly in order to avoid the aversive consequences. A pilot study attempted to combine the merits of contingency contracting and also promote sound dieting and good eating habits.¹³ The study used a therapist's manual in addition to a contract in which the clients agreed to earn back either money or valuables deposited with the therapist at the beginning of treatment. The manual was composed of suggestions for good dieting and eating habits. During the 22 week treatment period the mean weight loss was 27 pounds. A recent experimental study using contingency contracting involved two client requirements: (1) the depositing of a special possession with the therapist; and (2) daily writing down food eaten and its caloric value.¹⁴ The special item could be earned back weekly or at the end of the treatment. The experimental groups lost significantly more weight than the control group.

Token Programs

The procedure in the contingency contracting studies of reinforcing clients for controlling their eating behavior is also the basis for token programs with obese clients. One such program paid a psychiatric patient ten tokens for each pound lost.¹⁵ The earned tokens could be exchanged for privileges (walks, telephone calls, admission to dances). Gradually, the patient was weaned off the token program and all her privileges restored. The follow-up period indicated that the patients continued to lose weight but at a slower rate in comparison to losses during treatment. Moore and Crum used a similar token approach with a schizophrenic patient in a traditional psychiatric institution, with the result that the patient lost a significant amount of weight.¹⁶ Lastly, Dinoff, Richard, and Colwick reported a significant weight loss with a 10-year-old emotionally disturbed boy by reinforcing the boy with tokens for weight loss which could be exchanged for privileges at the summer camp he was attending.¹⁷

Self-Control of Eating

Ferster et al. reported one of the first articles describing self-control techniques.¹⁸ The author's work centered on developing self-control procedures that resulted from identifying and manipulating the variables that influence eating, (e.g., time of eating, places where food is eaten, manner in which food is eaten). Additionally, he recommended that obese individuals should be made aware of the ultimate aversive consequences of over-eating (e.g., possible heart damage, early death, and high blood pressure) and the positive effects of engaging in such activities as outdoor recreational activities

that would be incompatible with eating. Goldiamond in a case study employed some of the above techniques and expanded treatment to include the training (via readings and individual tutoring) of the client in the functional analysis of behavior so that he could determine what procedures should be applied.¹⁹ A significant weight loss was reported but the author noted that the procedures and training used may be limited to subjects who are "intellectually" capable of knowing conditions and consequences. Further refinement and development of the self-control procedures described by Ferster et al., were used by Stuart in the treatment of eight obese women whose weight loss over a 12-month treatment period ranged from 29 to 47 pounds.²⁰ Additionally, the experimenter used covert sensitization to fattening words.

The rationale for the above self-control studies was to increase the frequency of undesired responses. Implicit in this design was the development of self-management skills. Supportive evidence for the above self-control approaches and methods came in a controlled study.²¹ All subjects in an experimental group achieved a significant stable weight loss in comparison to a control group. The experimental self-control group was divided into two groups: one received covert sensitization to fattening foods and the other did not. The results revealed that there was no significant difference in the experimental groups, which suggested that covert sensitization added little to the outcome.

A more extensive and inclusive experimental study concerned with validating self-control procedures was carried out by Wollersheim.²² The experimenter divided 79 overweight female students into one of four groups, namely: (a) positive expectation-social pressure (similar to Weight Watchers and Take Off Pounds Sensibly); (b) nonspecific therapy (to control for effects of undergoing group treatment resulting from such non specific factors as increased attention); (c) focal therapy (use of self-control methods); and (d) no treatment wait (provided control for such factors as intercurrent life experiences, time of year, effects of testing). The findings indicated that all groups, except for the in treatment wait group, lost weight. However, the focal group lost significantly more weight than the social pressure or the nonspecific therapy group. Further evidence for the effectiveness of self-control procedures came from a study by Penick et al., in a clinical setting.²³ The investigators compared a group which received training in self-control procedures with a group which received traditional group psychotherapy. The self-control group lost significantly more weight than the psychotherapy group.

WEIGHT CONTROL STUDIES WITH RETARDED PERSONS

The following section reviews successful weight reduction studies with retarded persons. Summaries of the studies are presented in Table 2.

Table 2
Summary of Behavioral Management Interventions for Obesity with Retarded Persons

Researcher	N	Population	Treatment methods	Treatment Period (wks)	Mean Weight Change (Pre-treatment-end of treatment: lbs)	Follow-up period wks from end of Treatment Period	Mean Weight Change, end of to follow-up-lbs
Fox (1972)	1	Mildly mentally retarded adolescent	Contingency contracting: social reinforcer	42	-79(-1.88/wk.)	not known	-5
Joachim (1977)	1	Mildly retarded woman	Self-monitoring of food intake	33	-38(-1.15/wk)	46	+31(+ .67)
Foreyt and Parks (1975)	3	Severely retarded women	Self-monitoring of food and weight reinforcement for weight loss	11	- 8.5(-.77/wk)	29	-15.2(-.52/wk)
Buford (1975)	15	Trainable retarded adolescents and young children	Contingency contracting weight loss, increased energy expenditure and meal planning	32	- 8.3(-.26/wk)	--	--
Heiman (1978)	2	Prader-Willi Syndrome young adults	Weight feedback, social and token reinforcements for weight loss, stimulus control, increased energy expenditure and caloric intake restriction	12 for one; unknown for second	-16.6(-1.38/wk)	--	--

Table 2 (continued)

Researcher	N	Population	Treatment Methods	Treatment Period (wks)	Mean Weight Change (Pre-treatment-end of treatment: lbs)	Follow-up Period wks from end of Treatment Period	Mean weight Change-end of treatment period to follow-up--lbs
Altman, Bondy, and Hirsch (1978)	2	Prader-Willi Syndrome adolescent females.	Self-monitoring food intake and weight, weight loss reinforcement, and food-stealing punishment	33	-31(-.94/wk)	--	--
Gumaer and Simon (1979)	11	Trainable mentally retarded adolescents and young adults.	Reinforcement for weight loss self-monitoring of food intake.	14	- 7.90(-.56/wk)	12	-2.75(-.23/wk)
Rotatori, Fox, and Switzky (1978)	10	Mentally retarded adults	External and self-reinforcement for weight loss, self-monitoring of food weight and use of techniques, stimulus control and energy expenditure	7	-3.60(-.51/wk)	10	+ .75(+ .075/wk)

Table 2 (continued)

Researcher	N	Population	Treatment Methods	Treatment Period (wks)	Mean Weight Change (Pre-treatment-end of treatment: lbs)	Follow-up Period wks from end of Treatment Period	Mean Weight Change, end of treatment period to follow-up: lbs
Rotatori, Parrish and Freagon (1979)	6	Moderately/mildly mentally retarded children	same as above	7	-3.70 (-.53/wk)	--	--
Rotatori, Fox and Switzky (1979)	6	Moderately mentally retarded adolescents (with Down's Syndrome)	Same as above	14	-10.37 (-.74/wk)	26* and 52*	-6.5 (-.25/wk) -7.25 (-.14/wk)
Rotatori and Switzky (1979)	6	Moderately mentally retarded adolescents	Same as above	14	-11.00 (-.79/wk)	16*	-2.33 (-.14/wk)
	6	Moderately mentally retarded adolescents	Same as above only instruction by videotape	14	-9.45 (-.68/wk)	16*	-1.63 (-.11/wk)
Rotatori and Fox (1980)	12	Moderately mentally retarded adolescents	Same as above	14	-10.27 (-.73/wk)	16*	-1.94 (-.12/wk)

*Does not include weight lost during maintenance phase

Foxx used social reinforcement of weight reduction with an institutionalized 14-year-old mildly retarded girl.²⁴ The social reinforcement involved a weekly visit to the hospital canteen with the therapist contingent on the girl's weight loss during the previous week. During the 42-week treatment period, the girl lost 33% of her pretreatment weight, or 79 pounds.

Joachim also reported a successful weight reduction program with a 32-year-old mildly retarded institutionalized female. The subject was required to self-monitor her weight and food consumed.²⁵ During the 33-week treatment period, the subject lost 38 pounds. Unfortunately at a 46-week follow-up, the girl had regained 31 pounds of her former weight. The author noted that when the subject recorded accurately and consistently a gradual weight loss resulted. However, when there were variations in the above self-monitoring procedures there was no appreciable weight loss.

The first comprehensive weight reduction program for the severely retarded was reported by Foreyt and Parks.²⁶ The first stage of the treatment program involved providing the parents with a manual which included short chapters on the parameters of weight change (e.g., eating habits, diet, hints to lose weight) and the specifics of implementing the treatment program with their child. In the second stage the authors trained the subjects to self-monitor their food intake. The subjects were provided with colored tokens representing different food groups. The subjects were given a plastic box divided into two separate compartments. A supply of tokens were kept in one compartment. The subjects moved tokens to the second compartment as foods were eaten during the day. The subjects were also weighed daily as part of the monitoring system. All subjects lost weight during the 11-week program. The subjects continued to lose weight during a 29-week follow-up period.

Buford described a multi-component treatment program developed with 15 trainable mentally retarded students ranging in age from 9 to 21 years.²⁷ The program, which was implemented by a public health nurse, included daily meeting with the students to plan school meals, to exercise, and to conduct weigh-ins. Unique individual reinforcement contingencies were established with the cooperation of parents and school staff. The students lost a mean weight of 8.3 pounds, with an individual weight change range of +3 lbs. to 24 lbs. during the eight month treatment phase.

Multi-component treatment programs have also been used with the Prader-Willi population. Heiman reported a weight program for two Prader-Willi adolescents.²⁸ The three components program included: (a) *feedback*—frequent weigh-ins and charting of weight change progress, (b) *reinforcement*—social praise from staff and personalized notes to individual clients from the staff's physician commenting on their respective progress, and tokens and backup reinforcers for weight loss, and (c) *situational management*—implementing low calorie diets, increasing energy expenditure, controlling the stimulus features of the client's eating environment (e.g., allowing the client to eat only with

other clients on weight control measures) and alerting significant people in the client's environment to not reinforce the client's overeating behavior. One 17-year-old mildly retarded male lost 22 pounds during the program which was maintained at a three month follow-up. The second client, a 21-year-old mildly retarded female, lost 13 pounds.

Altman, Bondy & Hirsch also treated two mentally retarded adolescents diagnosed with the Prader-Willi syndrome.²⁹ A multiple baseline design was used to assess the useful components of the program. The program consisted of three components, namely: (a) self-monitoring of caloric intake, daily morning weight, and type and duration of exercise; (b) positive reinforcement for weekly weight loss and reduced caloric intake; and (c) positive reinforcement for weight loss only. An 18-year-old mildly retarded female subject lost 43 pounds during treatment. She lost an additional 22 pounds during a maintenance condition. The second subject, a 13-year-old moderately retarded girl lost 19 pounds during active treatment and an additional 11 pounds during maintenance. The multiple baseline design revealed that the self-monitoring did not produce substantial weight loss for either client. In contrast, the contingency involving reinforcement for decreased caloric intake and weight loss did result in reduced weight and lowered caloric intake for both adolescents. Weight losses continued after removal of reinforcement for reduced caloric intake and giving it only for weight loss.

Gumaer and Simon used a multicomponent weight program with TMR children.³⁰ The multi-component program involved: (1) explanations of the diet by the school nurse; (2) group counseling; (3) schoolwide social and activity reinforcement; (4) weekly weigh-ins; and (5) self-monitoring of food intake with parent assistance. During the 14 week treatment period, the children achieved a mean weight loss of 7.9 pounds. A 12-week follow-up revealed an additional weight loss of 2.75 pounds per child.

Persistent weight loss has been repeatedly demonstrated as the result of a seven-instructional-component, two-reinforcement-component behavioral weight reduction program developed by Rotatori.³¹ Each of the seven instructional units were presented either three or six times during a one or two-week period. Individuals who participated in this program learned how to: (1) self-monitor daily weight and food intake; (2) manipulate their emotional responses to foods in order to discourage the urge to overeat; (3) limit themselves to one helping at a meal; (4) reduce eating rate; (5) perform food-cue elimination techniques; (6) increase energy expenditure; and (7) eliminate (or reduce) snacking. Participants in the weight-control program also learned how to grade themselves on the performance in each of the above tasks on a daily basis. The participants' grades were then exchanged for "activity-cards" and "covert self-reinforcer-cards" of values matching the self-assigned grades (this was the first reinforcement component). Each participant was also weighed on a weekly basis and presented with an

additional highly-prized activity contingent upon completing the recording forms and a one pound weight loss from the weight at the previous week's weigh-in (this was the second reinforcement component).

The treatment phase was followed by a five or six-week maintenance phase, within which the instructional components and recording forms use were reviewed once or twice weekly. This was done to encourage continuation of the skills learned in the initial instructional sessions. The participants were weighed once again 10 to 26 weeks after the end of this maintenance phase.

Rotatori, Fox and Switzky first demonstrated the effectiveness of the weight-reduction program with 18 mildly retarded overweight adults who resided in a semi-independent residential facility. All subjects attended a community vocational workshop for at least part of the day.³² The subjects achieved an average weight loss of 3.60 pounds per subject during the seven-week active treatment phase. During a 6-week maintenance phase the subjects lost an average of .16 pounds per subject. This weight loss was maintained at the time of the 10-week follow-up. In contrast wait-list control group subjects gained weight during all phases, with an average weight gain of 2.60 pounds per subject. A second validation of the program involved six moderately/mildly retarded overweight children.³³ The children lived at home and attended a full day trainable public school program. The treatment training sessions were led by a school nurse over a seven-week program. The children achieved a mean weight loss of 3.7 pounds per child.

The successful experiences of the above studies led to a third study with six moderately retarded, obese adolescents who had a diagnosis of Down's Syndrome.³⁴ All subjects were attending a public high school and lived at home. A special-education teacher with assistance from the first author led the treatment. During a 14-week baseline period all subjects gained weight. However, the subjects achieved weight losses of 10.37 and 3.95 pounds per subject during the 14-week active treatment phase and the five-week maintenance phase, respectively. Twenty-six and fifty-two week follow-up checks revealed that weight loss during the technique training period was maintained.

A fourth study involved 18 moderately retarded obese youth who lived at home.³⁵ All subjects were participating in a public high school mainstreaming program for trainable students. The first author was the diet leader. Subjects were assigned to two behavior therapy groups and a wait-list control group. Behavior Therapy group I subjects were exposed to the techniques live, whereas subjects in a behavior therapy group II were exposed to the techniques via a video type playback of the live sessions. The behavior therapy subjects in groups I and II achieved mean weight losses of 11.00 and 9.45 pounds during the 14-week active treatment training period, respectively. Subjects in the behavior therapy groups continued to lose weight during the

five-week maintenance and 16-week follow-up check phases. However, the wait-list control subjects slowly gained weight during all phases of the study. There was no significant difference in weight loss between the two behavior therapy groups at the end of the various treatment phases. The author stressed that the use of the video tape training session reduced therapist training time without decreasing program effectiveness.

A final validation study investigated the efficacy of behavioral treatment procedures as compared to a social-nutrition weight reduction approach with 30 moderately retarded teenagers.³⁶ All subjects were enrolled in a full day public school program and lived in the community. A special education vocational teacher served as the diet leader for the behavior therapy group ($N = 12$) and a high school nurse served as the diet leader for the social nutrition group ($n = 12$). Six subjects were assigned to a wait-list control group. The social nutrition group training sessions were concerned with the following topics: (a) nutritious foods-to-eat; (b) low-calorie snack substitutes; (c) the advantages of exercising; (d) reasons not to eat when emotionally upset; (e) talking about negative feelings associated with being overweight; (f) being positive about losing weight; and (g) setting weight goals. The behavior therapy subjects lost significantly more weight under all conditions than either the social-nutrition or wait-list control groups. The behavior therapy subjects attained an average weight loss of 10.27 pounds during the 14 week active treatment phase. Positively, the behavior therapy subjects continued to lose weight during the five-week maintenance and 16-week follow-up check phases.

WEIGHT LOSS IN RETARDED AND NON-RETARDED PERSONS

Hall indicated that studies with non-retarded persons which have produced significant weight loss findings have also reported weekly weight loss rates which have ranged from .50 to 1.00 points.³⁷ Results of studies with the mentally retarded compare favorably with the above statement as subjects attained weekly weight losses ranging from .53 to 1.88 pounds per week during the active treatment period.

Studies of obesity have reported the frequent and rapid return of lost weight at the time of a follow-up check.^{36,38,39} Studies of the mentally retarded show somewhat greater success, as follow-up checks after 10 to 52 weeks revealed continued weight losses (see Table 1).

Few research studies of obesity have included a post-treatment maintenance phase. Jeffrey and Christensen incorporated an 18-week maintenance phase which stressed the reduction in subject-therapist contacts as well as the gradual elimination of explicit monetary response cost contingencies for the majority

of subjects.⁴⁰ Their findings indicated that the behavior therapy group maintained their weight loss between post-treatment and the end of the maintenance phase. Weekly weight loss ranging from .17 to .79 pounds per dieter was attained in studies with the mentally retarded that incorporated a maintenance phase.^{29,32,34-36} The inclusion of a maintenance phase appears warranted based upon the above.

Practical Implications

The weight reduction programs reported could be improved in a number of ways. Attrition rate has been reported to be a serious problem in the initial phases of treatment with both the non-retarded and the retarded.^{31,38} The authors stress that it may be necessary to have subjects record baseline data for one month prior to the start of the active treatment period before selecting subjects for participation in a program. Certainly, recording data for a month would be a good indication of the subjects' desire to not only stay with the program but also assess in a gross way the subjects' motivation to lose weight. Additionally, potential dropouts may be identified by looking more closely at the subject's previous history of reinforcement or punishment for past attempts at dieting. Rotatori stated that subjects who dropped out verbalized frequent self-criticism during the initial treatment sessions.³¹ The self-criticism appeared to be based upon their families' past behavior pattern of poking fun at subjects' methods at dieting, as well as being highly critical of their reasons for wanting to lose weight.

Another possible refinement would be the establishment of individual ideal goal weights for each of the subjects at the beginning of the treatment period. It has been the author's experience that retarded subjects continually asked what weight would be best for them to attain or how much farther did they have to go before they could stop restricting food intake. The establishment of an ideal goal weight for the retarded would give the subjects a more concrete reference point to work towards. Preferably, the ideal goal weight might best be attained by establishing a series of smaller criterion goal weights for the subjects to attain during various stages of the training and maintenance phases. The latter would be therapeutically beneficial in that it would increase the likelihood of successful attainment of the short goal weights as well as allow for increased opportunities for self-reinforcement by the subjects for controlling their eating habits. Establishing ideal goal weights would require an additional refinement, namely, the continuation of the treatment sessions until the subjects attained that goal weight.

Studies reviewed have revealed significant differences in weight loss in a short treatment period, however, one has to be sensitive to the fact that a six to seven pound weight loss during treatment for the majority of subjects is probably clinically insignificant when one considers that the majority of subjects were over 20 pounds overweight at the beginning of treatment. By

establishing ideal goal weights the therapist must allow for sufficient time for the subjects to attain the goal weights. This can be approximated by allowing one week for each pound that the subject must lose. Obviously, the therapist would not have to see the subject weekly after he or she has lost a fair amount of weight and demonstrated mastery of the techniques. Instead, short review sessions every three to four weeks could be arranged. For those subjects who do not attain goal weights after a sufficient time period, the therapist may want to consider more intensive behavioral approaches. The use of aversive conditioning to specific foods may be attempted if the subject exhibits cravings for certain high calorie snack foods.

Practitioners working with the obese must provide for the maintenance of techniques taught as well as for continued weight loss once treatment has concluded.⁴¹ A way to increase this likelihood would be to incorporate the systematic involvement of significant others in the dieter's social environment. The significant others (parents, teachers, ancillary care personnel) could be trained to do the following: (a) socially reinforce the dieter for weight loss; (b) provide constructive feedback about dieting and changing eating patterns; (c) eliminate situations in which overeating or excessive snacking may occur; (d) increase the availability of nutritious foods while eliminating junk type foods; and (e) model appropriate eating habits at meals.

Research Implications

Rotatori reported the occurrence of a number of 'psychosomatic' complaints (i.e., headaches, digestive problems) by mentally retarded subjects during a weight treatment program.³¹ Staff members in the subjects' immediate social environment also noticed increased instances of 'acting-out' behaviors (i.e., temper tantrums after being given a request, hitting of peers when teased) by a few of the subjects during the initial training sessions. This anecdotal information raises the issue of the possible development of 'symptom substitution' in behavioral weight programs for the mentally retarded. A number of studies have collected data on the possible occurrence of symptom substitutions in behavioral weight reduction programs with non-retarded persons.^{22,42} These studies did not reveal any evidence of symptom substitution or adverse side effects, however, the subjects in these studies were college students or staff. The question of the possible development of symptom substitution among clinical populations (e.g., mentally retarded, emotionally disturbed) who are exposed to a behavioral weight reduction program has not been empirically investigated. Thus it would be prudent for experimenters working with clinical populations in a behavioral weight reduction program to be cautious.

Rotatori and Fox have noted that much variability exists in the pattern of subjects' weight loss.¹ Some subjects lost weight consistently, whereas others

had peaks, plateaus, or even gained weight. Similar findings have been reported in studies with the non-retarded^{10,23,42,43} and suggests the need for the establishment of useful predictor variables of weight loss. A variable which may account for variability in subjects' weight loss might be the etiology of the obesity.⁴⁴ Some obese individuals are obese due to social cultural causes, while others are obese due to genetic, endocrinologic or central nervous system factors.⁴⁵ Williams et al., has suggested that obese individuals be classified in behavioral terms.⁴⁴ Once classified, an analysis could be performed to determine which obese types reveal a significant marked variability in weight loss during treatment, if at all. If consistent repeated findings are revealed, it would be imperative for behavioral therapists to consider 'tailored' designed treatment programs for those individuals with a specific corpulence. Adjustments in reinforcement requirements may have to be made as well as adjustments in exercise level and/or food intake amounts so that these individuals can lose weight in a more consistent manner.

Another area of research is to investigate whether or not the eating patterns of subjects who were exposed to self-control weight reduction techniques which emphasized the changing of eating patterns actually changed their eating habits significantly during the course of treatment. The data could then be analyzed with regard to actual changes in eating patterns and their relation to weight changes that occurred. Along these lines, future researchers could systematically examine each of the techniques in multicomponent programs over time with a number of obese individuals to assess their effect in promoting weight reduction. Hall has suggested using a research design similar to the above in combination with self-evaluation of the techniques by the subjects at specific times during treatment (e.g., at the beginning, in the middle, and near the end).⁴⁶ The self-evaluations would provide data on the subject's impressions of: (1) difficulty in emitting the technique; (2) the usefulness of the technique; and (3) its effect in promoting weight loss.

The identification of subject characteristics which are associated with adherence to the treatment techniques trained and the subject's tendency to employ the techniques in areas other than the home environment appear worthy of examination. Rotatori reported that when dieters left for a vacation or when they went 'out on the town' they tended not to follow the techniques.³¹ Also, the author's weekly review of the subject's completed homework revealed that certain subjects were lax in filling out their homework forms, whereas other subjects filled out their forms religiously. The development and refinement of subject screening devices could be beneficial to some extent in identifying positive subject characteristics such as thoroughness, persistence, in completing forms, tendencies to adhere to rules or strive for goals. The presence of these characteristics should increase the subjects' chances of being successful in a group weight reduction program.

For dieters that exhibit negative characteristics such as laxity in completing tasks or low tendencies to adhere to set rules or goals, more individualized training sessions should be devised. Lastly, additional motivators should be provided so that the likelihood of these dieters following goals and adhering to the techniques will increase.

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