

COGNITIVE-BEHAVIORAL DIMENSIONS OF WEIGHT CONTROL

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ABSTRACT

One hundred-eleven respondents who had achieved at least a 15 lb (6.80 kg) weight loss in a 20-week cognitive-behavioral treatment program for obesity were asked six to 10 years after treatment to describe their current cognitive and behavioral approaches for weight control. Eleven scales were constructed to measure the frequency with which the cognitive and behavioral efforts were extended for (1) Weight Monitoring, (2) Food Record Monitoring, (3) Calorie Counting, (4) Shopping, (5) Food Storage and Preparation, (6) Meal Times, (7) Snack Times, (8) Social Occasions, (9) Taste and Satisfaction, (10) Physical Activity, and (11) Sports/Exercise. An iterated principal-factor analysis employing an oblique solution was performed on the 11 scales' intercorrelation matrix, and three dimensions of weight control were identified — (1) Control, (2) Activity, and (3) Monitoring. The correlations among the factors, however, indicated that each factor explained at least 25% of the other two's variances, and the conclusion was drawn that the 11 scales were meaningfully related to each other. The employment of cognitive-behavioral techniques in one area of weight control was associated with use of such techniques in other areas too.

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Behavioral techniques for controlling weight have been incorporated into a number of treatment programs for obesity during the past 15 years (Stunkard & Penick, 1979), but the long-term efficacy of such approaches for obesity seem guarded (Foreyt, Goodrick, & Gotto, 1981). Long-term success with cognitive-

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behavioral approaches can be achieved if patients continue to adhere to the cognitive-behavioral principles which they learned while in treatment and incorporate physical activities into their daily schedules (Graham, Taylor, Hovell, & Siegal, 1983). Nevertheless, a substantial number of persons do regain weight rapidly upon leaving behavioral treatment programs for obesity (Hall, 1973; Stunkard & Penick, 1979; Wilson & Brownell, 1980; Wing & Jeffery, 1979).

Although patients are taught a variety of behavioral interventions and methods of cognitive re-structuring for handling their weights (Jordan, Levitz, & Kimbrell, 1978; Mahoney & Mahoney, 1976), there is little research to show which techniques obese patients employ after leaving treatment. Do persons trained in cognitive-behavioral approaches for weight control use just a few of the techniques that they have learned or orchestrate an entire system of controls? Are some cognitive-behavioral techniques perceived as distinct from others for purposes of weight management? In fact, recent efforts in the assessment of the long-term efficacy of cognitive-behavioral approaches for weight management have stressed that obese persons may need protracted follow-up contacts to help them control their weights (Hall, Bass, & Monroe, 1978; Perry, Shapiro, Ludwig, & Twentyman, 1984).

As part of a larger follow-up study which attempted to evaluate the long-term efficacy of cognitive-behavioral approaches for weight management, six-10 years after treatment, the present study attempted to determine what the self reported dimensions of weight control were for persons who had successfully lost at least 15 lb (6.80 kg) in a cognitive-behavioral treatment program.

METHOD

SAMPLE

From a target sample of 154 persons who had responded to a 1978 follow-up study of persons who had achieved at least a 15 lb (6.80 kg) weight loss at the end of their treatment in the behavioral weight control program of the Hospital of the University of Pennsylvania and the Institute for Behavioral Education between 1972 and 1977, (Levitz, Jordan, Lebow, & Coopersmith, 1980), 111 persons again voluntarily and completely answered a 1983 follow-up questionnaire. There were 29 (26.1%) men and 82 (73.9%) women. Over 40% of the respondents had reported educational attainment beyond graduate school, and the mean age was 46.82 ($SD = 10.99$) years. The mean current weight of the 29 men was 222.59 ($SD = 59.81$) lb [$M = 100.97$ ($SD = 27.13$) kg], and the mean current weight of the women was 189.21 ($SD = 41.66$ lb [$M = 85.82$ ($SD = 18.90$) kg]). Importantly, 28 (34.1%) of the 82 women and 9 (31.0%) of the men had current weights below their postprogram levels. Since there was no significant difference between the sexes with respect to having kept their current weights below their postprogram weights ($\chi^2 (1, N = 111) = .01$), the men and women were pooled together for further analysis.

SCALE CONSTRUCTION

The questionnaire contained 11 sets of questions about specific behaviors and attitudes related to times of weight gain, maintenance, and loss. The sets posed

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varying numbers of specific behaviors and attitudes about cognitive-behavioral approaches, and the respondents were asked to describe with a 4-point scale how frequently each of the approaches had been used during times of gain, maintenance, and loss. Since the results of the 1978 survey (Levitz et al. 1980) had indicated that the respondents had been trying to maintain or lose weight during the first five years, it was assumed that the respondents had again been attempting to either maintain or lose weight during the past five years. Therefore, it was decided to calculate total scores based upon just the frequency ratings for the efforts extended during the times of maintenance and loss. Operationally, total scores were calculated by summing the frequency ratings for the scales during times of both weight maintenance and loss and then dividing this total by two. The sets were thus considered to represent summative scales. For example, the Weight Monitoring Scale was composed of five types of reports describing the use of a scale, mirror, clothes, ring, or other persons to gauge weight change. The sum of the 4-point frequency ratings for each of these items during times of both maintenance and loss was calculated and then divided by two to represent the Weight Monitoring Scale total score.

DATA ANALYSIS

Product moment correlations were first calculated among the 11 scales, and a principal-factor solution with iterations to establish communalities was chosen for analysis. The magnitudes of the correlation coefficients shown in Table 1 suggested that a common factor model would be appropriate. Since the treatment program had taught an interrelated system of cognitive-behavioral approaches for the control of obesity, an oblique transformation (Promax) was selected. The computer program used for the factor analysis was the Statistical Analysis System's FACTOR (SAS Institute, 1982). Only factors with eigenvalues ≥ 1.0 were retained for rotation.

Table 1
MEANS, STANDARD DEVIATIONS, AND
INTERCORRELATIONS AMONG COGNITIVE-BEHAVIORAL SCALES

Scale	<i>M</i>	<i>SD</i>	Correlations											
			1	2	3	4	5	6	7	8	9	10	11	
1. Weight Monitoring	11.91	3.61	-											
2. Food Record Monitoring	1.78	.82	.16	-										
3. Calorie Counting	2.26	1.02	.16	.36	-									
4. Shopping	17.77	5.71	.38	.24	.10	-								
5. Food Storage & Preparation	23.01	5.66	.29	.23	.35	.55	-							
6. Meal Times	37.28	7.06	.27	.22	.35	.38	.51	-						
7. Snack Times	31.93	7.42	.16	.33	.42	.36	.52	.52	-					
8. Social Occasions	33.57	7.47	.33	.23	.33	.33	.46	.63	.51	-				
9. Taste and Satisfaction	23.82	5.17	.19	.13	.30	.44	.60	.53	.56	.52	-			
10. Physical Activity	22.17	6.26	.19	.14	.28	.30	.45	.38	.39	.48	.55	-		
11. Sports	26.40	3.41	.08	.17	.07	.02	.27	.14	.34	.38	.37	.56	-	

Note. - *N* = 111

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RESULTS

Table 2 presents the Promax-rotated pattern matrix of standardized regression coefficients of the 11 scales on the three factors which had eigenvalues ≥ 1.0 . The most dominant dimension (Factor I) underlying the behavioral scales was represented by Weight Monitoring, Shopping, Food Storage and Preparation, Meal Times, and Taste and Satisfaction. Since the five scales which had loaded saliently on Factor I represented the use of cognitive and behavioral controls to monitor weight and avoid food temptations, Factor I was considered to represent a Control dimension.

Table 2
PROMAX-ROTATED PRINCIPAL-FACTOR
STANDARDIZED REGRESSION COEFFICIENTS
OF COGNITIVE-BEHAVIORAL SCALES

Scale	Factor			h^2
	I	II	III	
Weight Monitoring	.44			.19
Food Record Monitoring			.44	.20
Calorie Counting			.87	.77
Shopping	.94			.94
Food Storage and Preparation	.59			.39
Meal Times	.44			.30
Snack Times			.44	.29
Social Occasions				.25
Taste and Satisfaction	.44			.34
Physical Activity		.66		.46
Sports		.96		.99
Eigenvalues	2.05	1.70	1.37	5.12
Correlations				
Factor	I	II	III	
I	1.00			
II	.50	1.00		
III	.58	.52	1.00	

Note. - Standardized regression coefficients $\leq .40$ have been suppressed.

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The second most important factor was described by Sports and Physical Activity and was called the Activity dimension. Finally, Factor III's salient scales were Food Record Keeping, Calorie Counting, and Snack Times, this dimension appeared to reflect aspects of Monitoring.

Interestingly, Social Occasions did not have a salient standardized regression coefficient on any of these three factors. Inspection of the intercorrelations among the three factors (Table 2) indicated that each factor explained at least 25% of the other two factors' variances, suggesting that the Control, Activity, and Monitoring dimensions were highly related to one another.

DISCUSSION

The overall pattern of results indicated that the 111 persons who had successfully lost at least 15 lb (6.80 kg) in a cognitive-behavioral treatment program for obesity had described three dimensions underlying their use of cognitive-behavioral techniques six-10 years after treatment. The cognitive-behavioral approaches represented aspects of (1) Control, (2) Activity, and (3) Monitoring. Controlling oneself around food and using physical activity represented two sets of behavior. Monitoring food intake by keeping food records or calorie counting reflected the third aspect of weight control.

Importantly, Control, Activity, and Monitoring were interrelated suggesting that the use of cognitive behavioral techniques for weight management had involved approaches falling across different content domains. In one sense, although the three dimensions represented different types of behaviors and attitudes, the respondents employed all of the cognitive-behavioral interventions which they had been taught for controlling their weights. The respondents drew upon every available strategy ranging from Control to Monitoring. However, "total push" attempts may not be necessary for management because evidence presented by Graham et al. (1983) would suggest that some activities, such as incorporating walking into one's daily schedule, afford more success for controlling weight than others.

The Social Occasions scale did not load saliently on any of the three dimensions of weight control, but the present cognitive-behavioral program had not stressed social reinforcers for weight management. Perhaps, social occasions pose situations where maintaining control and monitoring food intake are especially troublesome; and the concept of increasing physical activity is generally not relevant, except when the social activity involves athletic participation, dancing, etc. Social occasions may generate so many challenges to the applications of cognitive-behavioral techniques that treatment programs may have to address them more thoroughly. Role modeling and behavioral rehearsals for handling food during social occasions may need to be stressed in every cognitive-behavioral treatment program for obesity.

Finally, it should be remembered that the present study represented persons who had been previously contacted in 1978 by Levitz et al. (1980), and these persons may have been re-sensitized by the prior follow-up study to cognitive-behavioral approaches for weight reduction. Furthermore, the present sample was composed of persons who had been successfully capable of losing weight in a

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cognitive-behavioral treatment program, and the sample's perceptions may not be representative of those persons who dropped out of treatment and were unable to lose weight. Further research should endeavor to determine whether or not persons who were unable to benefit from cognitive-behavioral approaches have similar cognitive-behavioral dimensions of weight control as those who were able to benefit from such approaches.

AUTHOR NOTES

1. Requests for reprints should be addressed to the second author at the Institute for Behavioral Education, Suite 511, One Plymouth Meeting, Plymouth Meeting, PA 19462.
2. A copy of the questionnaire may be obtained from the senior author at the address given above by sending a 60¢ self-addressed 9½ x 11 inch envelope.

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