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Rorschach Personality Predictors of Weight Loss
With Behavior Modification in Obesity Treatment
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RORSCHACH AND WEIGHT LOSS

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Weight loss outcome for 49 obese patients after 6 months treatment in
a behavior modification
program was related to Rorschach personality characteristics according
to the Comprehensive

System (Exner, 2003), also including the Rorschach Oral Dependency
Scale (Bornstein, 1996;

Masling & Rabie, 1967). Less weight loss was predicted by signs of
perceptual and cognitive

distortions indicated by the Schizophrenia Index. More weight loss was
predicted by Food

Contents, suggesting a food preoccupation and possibly a benign
dependency orientation. Patients

with a focus on food and dependent needs could benefit above all from
the treatment program

implying learning how to handle food and eating in a supportive
setting, as evidenced by

more weight loss. Distortions in perception and cognition could
constitute more profound difficulties

in weight reduction important to recognize in obesity treatment.

Obesity is a fast growing health problem in the Western world (World
Health Organization, 1998) have been suggested in parental obesity (Whitaker,

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so-called body mass index (BMI) of at least 30 kg/m². The

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well known, as lower socioeconomic (Antipatis & Gill, 2001). In Sweden, the prevalence is 10% to 15% (Lahmann, Lissner, Gullberg, & Berglund, 2000; Sobal & Lissner, Johansson, Qvist, R[^]ssner, & Wolk, 2000), Stunkard, 1989) and educational (Mokdad et al., 1999) levels and in the U.S. population, it has now reached 20% to 25% have been associated with higher degrees of obesity. Weight (Antipatis & Gill, 2001). also increases with age, partly due to lifestyle changes Biological, psychological, social, and cultural factors (R[^]ssner, 2001; Sobal, 2001), although this age-related cause and maintain obesity in a complex interaction. Genetic weight gain has been found to a larger as well as to a more influences (Arner, 2001; Bouchard, P[^]russe, Rice, & Rao, limited extent (Heitmann & Garby, 1999; Lahmann et al.,

ELFHAG, R[^]SSNER, LINDGREN, ANDERSSON, CARLSSON 2000). The primary causes for the increasing levels of body weight are attributed to environmental and behavioral changes, as the obesity epidemic has developed in a too short time span to make it possible to attribute the increasing body weights to genetic changes (World Health Organization, 2000).

Obesity is difficult to treat, and the long-term weight loss outcome is generally modest. Weight loss results remain difficult to predict in spite of a growing amount of research. Some general predictors that have been repeatedly identified and agreed on include pretreatment weights, initial weight loss, and attrition (Wadden et al., 1992). Some factors that seem to have been associated with weight regain after initial weight loss are disinhibited eating and binge eating (Wing & Hill, 2001).

In the research on psychology and treatment outcome in obesity, many factors have been suggested, but to date, there are few consistent and accepted results. Stable psychological correlates of weight loss could, for example, not be identified in reviews of the literature (Vallis & Ross, 1993; Wilson, 1986). The isolated findings provide a somewhat scattered pattern. The lack of a systematic approach including attempts for replication and theoretical frameworks has been noted for this area of research (Vallis & Ross, 1993).

The identification of factors enabling a better match of a person to a particular treatment has been suggested as a cost-effective approach in obesity treatment (Brownell & Wadden, 1992). Furthermore, failure in treatment can obviously have aversive psychological effects (Wooley & Garner, 1991), and the identification of patients with poor prospects for success in a particular treatment program is therefore warranted. It has been suggested these patients should be shifted into other programs (e.g., R[^]ssner, 1992).

Most likely, treatment response varies for different individuals depending on the specific treatment approach used. Predictors for successful weight loss results, taking treatment as well as individual characteristics also involving personality into account, would be valuable if only possible to identify. The aim of this study was to evaluate weight loss in a day care behavior modification program for the treatment of obesity. These patients are included in groups of about 10 participants each. Group sessions focus on behavior modification, including eating and lifestyle habits and physical behavior. Other activities include cooking and eating together, nutritional lectures, and physical activities. The overall treatment length is 2 or 3 years, of which the first 6 months constitute the most active phase. We wanted to identify the patients who benefit most from such a type of active treatment approach and have therefore evaluated the weight loss after the 6 months active phase of the treatment rather than at a later time.

As self-reported readiness and motivation has little relationship to eventual weight loss results (Fontaine, Cheskin, & Allison, 1997), underlying personality variations affecting obesity behaviors difficult to discern by self-reports may give more important information (Elfhag, Carlsson, & R^ssner, 2003). To enable this information on personality, we have as a research tool included the Rorschach method, administered according to the Comprehensive System (CS; Exner, 2003). This is the most widely spread, performance-based personality assessment technique. By using the Rorschach, information about implicit motives and underlying personality characteristics can be attained (Bornstein, 2001; Meyer & Archer, 2001).

We have searched the literature for Rorschach CS research on treatment outcome in obesity and found very few studies. One Rorschach CS study (Yoshida et al., 1995) identified personality functioning to be important for choice of treatment. In the Yoshida et al. study, 43 obese patients were subdivided on the basis of level of personality functioning according to the Rorschach. Dimensions chosen for classification were ability for adjustment, desire for comfort, flexibility, and imagination. The groups resulting from this classification could be divided into 'relatively healthy personality' and 'relatively less healthy personality.' When treatment was adjusted to the prerequisites for each group, the treatment outcome was improved. The precise method used for subdividing the patients was unfortunately not described. In a Rorschach study (Mattlar, Salminen, & Alanen, 1989) using a traditional primarily Klopfer and Davidson (1962) based scoring comprising 30 obese persons, adequacy of Form level seemed to have some relationship to success in weight loss (success defined as >7kg weight loss at 1 year).

This would indicate that accuracy of perception could affect the ability to lose weight. The obese persons were also compared to a random sample control group and were found to have more Rorschach signs of faulty intellectual control, percept formation, and perception of reality.

These results suggest that Rorschach could give information on distortions in ego functioning and psychopathology in relation to weight loss. Looking at research with other psychological

assessment methods, a trend toward psychopathology being associated with poor weight loss and failure in obesity treatments has been discerned (Barrash, Rodriguez, Scott, Mason, & Sines, 1987; Beliard, Kirschenbaum, & Fitzgibbon, 1992; Rowe, Downey, & Faust, 2000; Vallis & Ross, 1993). Such psychopathology includes psychiatric disturbances and disturbed personality profiles according to the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1943) and other questionnaires. Psychopathology, defined as symptoms on the Symptom Checklist-90-Revised (Derogatis, 1977), however, showed no relationship to weight loss results (Cuntz, Leibbrand, Ehrig, Shaw, & Fichter, 2001).

A common experience in obesity treatments is furthermore that some patients have difficulties adhering to the treatment program such as adhering to a schedule, to grasp the information given, and make the changes necessary. This could in part be due to cognitive difficulties. For example, a

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high prevalence of attention-deficit/hyperactivity disorder (ADHD) was reported in an adult obese sample (Altfas, 2002), and these ADHD patients were less successful in losing weight in treatment. Difficulties including distractibility and inefficiency in behavior have been suggested for these patients. Patients with various kinds of cognitive dysfunctions and psychopathology could thus have greater difficulties in losing weight.

The Rorschach has relevance for this area of research, as it provides measures of distortions in ego functioning and degree of psychopathology in the Schizophrenia Index (SCZI; Exner, 1993), suggested to be more correctly labeled as a Psychosis Index (Hilsenroth, Fowler, & Padawer, 1998), and the more recently introduced Perceptual-Thinking Index (PTI; Exner, 2003), both of which measure disturbances in thinking and perception.

The importance of ego functioning for treatment outcome is furthermore well known from psychiatric settings. On the basis of such experience, the Ego Impairment Index (EII) was constructed (Perry & Viglione, 1991). The EII is a Rorschach-derived scale used to assess disturbances in ego functioning

including perception, cognition, reasoning, interpersonal relations, and derepressed primary processes. In research using the EII, it was shown that treatment outcome in depressed patients was poorer for those with more disturbances according to the EII after controlling for self-reported depression (Perry & Viglione, 1991). The EII has, however, foremost been applied to samples with more severe psychopathology such as psychosis (Perry & Braff, 1994; Perry, Minassian, Cadenhead, Sprock, & Braff, 2003). We wanted to evaluate if indications of problems in ego functioning described by the SCZI, PTI, and EII could give information on obstacles in a weight reduction program by being negatively related to weight loss. Such indications on distortions in ego functioning could be assessed by number of conditions fulfilled in these indexes. Number of conditions is the recommended way to adhering the PTI results (Exner, 2003). In earlier research (Hilsenroth et al., 1998), the SCZI was suggested to be useful as a dimensional measure for assessing the extent of impaired reality testing and thought disorder. In a nonpsychotic sample such as the obese, number of conditions would be the reasonable alternative to choose for measuring indications of these kinds of ego distortions.

We also wanted to address personality characteristics of particular interest for obesity and eating. Food Contents on the Rorschach is a measure suggested to give a hint of a dependency needs or a dependency orientation generally associated with an inclination to be overly dependent and in need for support from others (Exner, 2003). Oral activities such as eating may also have a particular importance with such oral traits in the personality. The notion of oral traits has roots in the psychoanalytic theories on libidinal development (Fancher, 1973). Due to fixations at the oral stage of development or regression to oral strivings as a response to a later life situation, a preoccupation with oral activities such as eating may result. Food can also have an important symbolic meaning as a gratifier and comforter. The Rorschach variable Food Contents would also most basically imply a food preoccupation. Elfhag, Barkeling, Carlsson, and R^ssner (2003) found more Rorschach Food Contents in patients who did not slow down their rate of consumption during a meal, which is biologically expected. Such a lack of deceleration can reflect disturbed eating regulation and an inability to feel satiation. We postulated that if eating is motivated by psychological dependency needs rather than a biological regulation, this might result in a nonphysiological eating curve lacking the signs of satiation toward the end of the meal. A problematic relationship to food in patients with a dependency orientation has also been found according to a more extended and validated measure of oral dependency,

the Rorschach Oral Dependency Scale (ROD; Bornstein, 1996; Masling & Rabie, 1967), based on psychoanalytic theory. More signs of oral dependency on the ROD have been linked to eating disorders (Narduzzi & Jackson, 2000) and have further been associated with addiction to alcohol (Sprohge, Handler, Plant, & Wicker, 2002) and to tobacco (Bornstein, 1995).

For patients having dependency needs, there may thus be some implications for eating. When finding Food Contents on the Rorschach to be a positive predictor of weight loss in treatment with a satiety enhancing antiobesity drug, sibutramine, Elfhag, R ssner, Carlsson, and Barkeling (2003) postulated that enhanced satiety could have helped these patients in particular to abstain from food or that enhanced satiety could lessen the importance of food and eating.

An alternative explanation is related to the social implications of a dependency orientation (Masling, O'Neill, & Katkin, 1982; Masling, Price, Goldband, & Katkin, 1981), implying that being enrolled in a treatment program could temporarily have facilitated abstaining from food in persons for whom social support is important. We were interested in assessing oral traits from the Rorschach CS variable Food Contents that have earlier given information on eating behavior and weight loss results in our research as well as with the more extended measure for oral dependency, the ROD scale, in relation to weight loss in this study.

Another crucial variable in eating would be physical demand states suggested by FM. Hunger is included in such demand states, and an increase in this variable has been found after onset of a fluid only phase of a weight reduction program (Exner, 1993). The variable has also been associated with drug dependence (Exner, Wylie, Leura, & Parrill, 1977). Theoretically, the physical demand states suggested to be measured by FM would be included in the biologically based urges described by drive theory (Pine, 1990).

Elfhag, R ssner, et al. (2003) found difficulties with physical demand states, seen in deviating levels of FM, either heightened or lowered, to be related to more weight loss in

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treatment with the satiety enhancing drug, sibutramine. This result was likewise interpreted in light of the satiety enhancing effect of sibutramine. The enhanced satiety could have provided help with appetite control, in particular for persons being ruled by their physical demand states also including hunger, or they could have been more sensitive to alterations in hunger and satiety, resulting in more weight loss.

Patients with a food preoccupation and dependency traits might benefit from a behavior modification treatment focusing on how to handle food and eating and attain appetite control

or from the social implications of being enrolled in treatment. In that case, more weight loss would be expected in active treatment. Patients with difficulties concerning physical demand states also including hunger could also benefit from an improved appetite control. Positive changes in eating behavior implying increase of cognitive control and decrease of hunger and disinhibited eating during behavioral treatment programs in obesity have been well known (Björvell, Aly, Langius, & Nordström, 1994; Clark, Marcus, Pera, & Niaura, 1994). On the other hand, if the patient is ruled by physical demand states and dependency needs, this could alternatively mean difficulty in refraining from food, resulting in less weight lost. These characteristics, of importance for obesity behaviors, should be further explored to gain more understanding of their role for weight loss in behavior modification treatment.

The patients included in this study belong to a larger Rorschach database of obese patients. In previous research on this sample, Rorschach results in association with cross-sectional as well as prospective data has been studied. Our cross-sectional research comprises three studies. In one of these, Elfhag, Carlsson, et al. (2003) identified subgroups based on a priori concepts such as depressive features and coping difficulties based on the Depression Index and Coping Deficit Index being positive and compared the resulting subgroups to sociodemography and interview data. This study was based on 100 of the total 120 obese patients in the data set who had been included at the time the study was undertaken.

Elfhag, Rössner, and Carlsson (2004) also studied degree of obesity in relation to Rorschach characteristics suggesting mental distress, including the total sample of 120 patients. The cross-sectional research further encompassed the study (Elfhag, Barkeling, et al., 2003) on objectively measured eating behavior by means of a computerized eating monitor in relation to Rorschach variables of potential interest for eating and appetite. The Elfhag, Barkeling, et al. (2003) study was conducted on 32 patients for whom the eating measures were complete in a baseline test-meal measure in a clinical trial. In one of the studies (Elfhag, Barkeling, Carlsson, Lindgren, & Rössner, 2004) using prospective data, the results from the clinical trial for this sample, fully including 36 patients, were evaluated. The aim was to test Rorschach variables of interest for eating and appetite as well as psychological moderators in an experimental design in relation to changes in test meal food intake after the satiety enhancing drug sibutramine as compared to placebo.

After the clinical trial (Elfhag, Barkeling, et al., 2003), the patients received sibutramine and monthly dietary advice in a prolonged open program. In the second prospective study,

Elfhag, R[^]ssner, et al. (2003) evaluated Rorschach data possibly related to eating and appetite in relation to the 6 months weight loss results in this antiobesity drug treatment, as the aim was to provide predictors for most weight loss in such a pharmacological treatment. The Elfhag, R[^]ssner, et al. (2003) study included the 30 patients who had completed the treatment phase.

The patients in the clinical trial (Elfhag, Barkeling, et al., 2003) and in the prevailing behavior modification treatment constituted two different subsets of patients, as they were assigned to two different treatments. All patients were, however, included in the prior study (Elfhag, Barkeling, et al., 2004) on degree of body weight, and most of them also in the study (Elfhag, R[^]ssner, et al., 2003) on obese subgrouping.

Two of our Rorschach variables chosen for investigation in this study were also investigated in the previous research (Elfhag, Barkeling, et al., 2004; Elfhag, Barkeling, et al., 2003; Elfhag, R[^]ssner, et al., 2003) on the microstructure of eating and sibutramine treatment. These variables are Food Contents and FM. As these variables could have the most obvious interest when considering hunger, eating behavior, and the need for food, they were chosen in all of the studies directly related to eating behaviors. Affective ratio was earlier related to short-term (Elfhag, Barkeling, et al., 2004; Elfhag, Barkeling, et al., 2003) but not to long-term measurements of eating behavior (Elfhag, R[^]ssner, et al., 2003) and was therefore not given priority in this study. Disturbances in thinking and perception that are of particular interest in the evaluation of weight loss in the behavior modification program were earlier studied (Elfhag, R[^]ssner, et al., 2004) in relation to degree of obesity as measured by the Wsum6 and X ñ %, showing no differences with regard to degree of body weight. Evaluating weight loss results is crucial in obesity research, as the aim in obesity treatment is to reduce body weights, and as the rising body weights in the Western world today is a clearly recognized problem to which better solutions have to be found (Wadden, Brownell, & Foster, 2002).

The uniqueness of this study lies in evaluating weight loss results in a standard behavior modification treatment in relation to Rorschach CS data. Personality predictors for weight loss could suggest more optimal patient selection for this particular type of treatment program.

Summarizing our objectives, our first purpose was to evaluate weight loss results in a behavior modification program in relation to indications of psychopathology generally assumed to indicate poor treatment prognosis (SCZI, PTI, EII).

We anticipated that distortions in functioning would imply greater difficulties managing the treatment demands in a behavior modification program. This means that making changes in weight-related behaviors would be more difficult,

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and less weight loss would be seen. As a second purpose, we also explored the relationships between other personality characteristics that can have relevance for obese eating behavior, such as a need for food, with the weight loss outcome of treatment (FM, Food Contents, ROD).

METHOD

Participants

The participants were 49 patients at the Obesity Unit, Karolinska University Hospital, enrolled in a day care behavior modification program. The patients had been referred to the outpatient unit mostly by a general practitioner or by a specialist. They were assigned to the day care treatment after screening at the unit when this treatment alternative was considered as a suitable choice. In total, 89 patients assigned to the program were invited to Rorschach testing, and 65 of these accepted, giving a response rate of 73%. Of the 65 Rorschach protocols, 64 were complete; one was incomplete (card rejection) and had to be omitted. Of the 64 patients, 15 dropped out of treatment before Month 6, leaving 49 patients in our sample. All or the mere part of these patients have been included in two of earlier Rorschach studies (Elfhag, Carlsson, et al., 2003; Elfhag, R[^]ssner, et al., 2004).

Mean BMI at onset of treatment in this group was 41.7 kg/m² (± SD 5.2), with BMI ranging from 31.7 to 56.7 kg/m². There were 31 women and 18 men, and the age range was 22 to 66 years (M age= 42.3 ± SD 11.3 years). Mean BMI for the men was 40.5 kg/m² (± SD 4.9); mean BMI for the women was 42.7 kg/m² (± SD 5.7). The patients gave their informed consent to participate, and the study received approval by the local Ethics Committee at the Karolinska Institutet.

Assessment Methods

Rorschach CS (Exner, 1991, 1993). The variables chosen were number of fulfilled conditions in the SCZI, the PTI, and the EII, respectively. Suggested characteristics related to eating behavior were FM and Food Contents. Descriptive data for the Rorschach variables used are shown in Table 1. Of the Rorschach variables selected in this study, four have been studied in prior research (Elfhag, R[^]ssner, et al., 2004) on the obese sample: X ñ % and Wsum6 in the research on degree of obesity and FM and Food Contents in the research on eating behavior and weight loss with an antiobesity drug (Elfhag, Barkeling, et al., 2004; Elfhag, Barkeling, et al., 2003; Elfhag, R[^]ssner, et al., 2003).
ROD. The ROD (Bornstein, 1996; Masling & Rabie, 1967) was used as a complementary measure for oral dependency. ROD scores were calculated for the response phase (FA), which is the standard procedure, and also for the total protocol including the inquiry as well (FA + INQ), giving

a more extended ROD measure. More than one ROD score was allowed to one single answer if the critical items belonged to different ROD subcategories. ROD was calculated as the proportion of the number of responses given to the card, R, according to the guidelines for the scale (Bornstein, 1996). Descriptive data for the ROD scores are displayed in Table 1. The frequencies for the 16 ROD subcategories are displayed in Table 2 where the values are presented as proportions, showing the base rate of ROD subcate-

TABLE 1

Descriptive Data for the Rorschach Variables Used in the Correlations and Multiple Regression Analyses

Rorschach Variable M SD Mdn Mode Minimum Maximum Range Skew Kurtosis ICC

SZCI	1.58	1.36	1.00	1.00	0.00	6.00	6.00	0.96	0.66	0.75
PTI	0.58	0.96	0.00	0.00	0.00	5.00	5.00	2.43	8.24	0.73
EII	0.28	1.35	ñ0.01	1.68	ñ1.68	4.67	6.35	1.32	1.82	0.87
Food	0.41	0.57	0.00	0.00	0.00	2.00	2.00	1.05	ñ0.13	0.88
FM	3.31	2.60	3.00	1.00	0.00	11.00	11.00	0.76	0.22	0.94
X + %	0.52	0.13	0.54	0.50	0.21	0.75	0.54	ñ0.05	ñ0.30	0.82
X ñ %	0.16	0.14	0.14	0.00	0.00	0.79	0.79	2.40	9.23	0.67
X A%	0.82	0.14	0.84	0.86	0.21	1.00	0.79	ñ2.10	7.90	0.64
WDA%	0.83	0.14	0.84	1.00	0.25	1.00	0.75	ñ1.76	5.61	0.72
LVL2	0.88	1.29	0.00	0.00	0.00	6.00	6.00	2.02	4.82	0.63
FAB2	0.41	0.93	0.00	0.00	0.00	5.00	5.00	2.24	12.48	0.68
WSum6	13.80	14.39	8.00	0.00	0.00	58.00	58.00	1.51	1.96	0.90
Mñ	0.86	1.21	0.00	0.00	0.00	4.00	4.00	1.32	0.57	0.84
R	21.63	9.92	18.00	14.00	14.00	60.00	46.00	1.90	3.86	1.00
ROD (FA)	0.20	0.15	0.15	0.06	0.00	0.79	0.79	0.01	0.03	0.93
ROD (FA + INQ)	0.34	0.19	0.33	0.14	0.06	1.14	1.08	0.01	0.05	0.92

Note. ROD = Rorschach Oral Dependency Scale; ROD (FA) = ROD scores calculated for the response phase divided by R; ROD (FA + INQ) = ROD scores

calculated for the total protocol divided by R.

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TABLE 2

Frequencies of ROD Subcategories in 49 Obese Patients in Behavior Modification Treatment

ROD (FA) ROD (FA + INQ)

ROD ROD

ROD Subcategory BR of R Frequency BR of R Frequency

Foods and Drinks 2 8 2 6

Food Sources 1 5 2 5

Food Objects 0 2 1 3

Food Providers 0 2 1 2

Passive Food

Receivers 2 9 2 6

Begging and

Praying 0 0 0 0
 Food Organs 4 22 13 38
 Oral Instruments 0 0 0 0
 Nurturers 0 1 0 0
 Gifts and gift
 givers 3 14 3 8
 Good luck objects 0 0 0 0
 Oral activity 4 24 7 19
 Passivity and
 helplessness 1 6 1 4
 Pregnancy and
 reproduction 1 7 2 5
 Baby-talk
 responses 0 1 0 1
 Negations of oral
 percepts 0 2 1 2

Note. All figures are proportions rounded to the nearest whole number.
 ROD = Rorschach Oral Dependency Scale; ROD (FA) = ROD scores
 calculated for the response phase divided by R; ROD (FA + INQ) = ROD
 scores calculated for the total protocol divided by R; BR=base rate of
 a given

subcategory relative to total number of Rorschach responses (R)
 calculated

as ROD subcategory frequency divided by R; ROD frequency = ROD
 subcategory frequency relative to other ROD subcategories calculated
 as

ROD subcategory frequency divided by total number of ROD scores.
 gories in relation to R and total number of ROD scores,
 respectively.

General Descriptives

Items selected from a more extensive structured interview were
 used for describing sociodemographics and eating disorder:

1. "Education" consists of six categories put together
 into two groups for presentation. "Lower education"
 includes nonfinished and finished compulsory school
 and vocational training. "Intermediate and higher education"
 includes college with theoretically oriented
 programs, postcollege educations, and university.
2. "Socioeconomic level" likewise consists of six categories,
 defined according to the Swedish Socioeconomic
 Classification (1995). These were divided into
 two main categories resulting in two approximately
 equal groups for presentation including lower versus
 intermediate/higher socioeconomic level. Lower socioeconomic
 level, "Blue collars," includes manual
 workers, nonskilled, and skilled. Intermediate and
 higher socioeconomic level, "White collars," includes
 assistant nonmanual employees, intermediate
 and higher nonmanual employees, professionals with
 or without subordinates, upper level executives,

self-employed professionals, and entrepreneurs.

3. "Eating disorder" refers to having recurrent food binges. The core features of the diagnostic criteria for binge eating disorder according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; American Psychiatric Association, 1994) were used, implying that large amounts of food are consumed in an addictive way and without a sense of control and with distress about this behavior. Binges with a frequency of at least once a week was used as a criterion for eating disorder. The definition does not have to match the criteria for a full binge eating disorder, implying binges at least twice a week and additional associated symptoms, but rather matches the criteria for binge eating.

Procedure

Kristina Elfhag, specialized in personality assessment with the Rorschach method, administered all Rorschach tests. They were always administered before the start of treatment. Weights and heights were assessed at baseline when the patients entered the behavior modification program. Weights were measured using electronic scales and all weights were measured without shoes but include light clothing. Height was measured using a meter reader attached to the wall according to the routine at the Obesity Unit. Weight loss at 6 months was used as an indication of the active behavior modification phase of the treatment.

Treatment

The treatment was a running day care behavior modification program at the Obesity unit, Karolinska University hospital. The day care treatment has been run for about 20 years, and from time to time, the design of the program treatment has developed due to new scientific data and empirical experience.

The treatment staff includes a physician, dieticians, nurses, a health educator, and a physiotherapist with considerable experience. All the members of the staff had completed an education program on our model for behavior modification (Melin et al., 2003; Melin & Rössner, 2003).

All but one of the staff were women.

The treatment length was 2 or 3 years, of which the first 6 months constitute the most active phase. This first period involved tightly scheduled full days once weekly and after 3 months, biweekly. After 6 months, the treatment program shifted to monthly group sessions of 1.5 hr. The patients were included in groups of about 10 participants each.

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The full days involved preparing and eating breakfast and cooking sessions including preparing and eating a lunch meal as well as a nutritional lecture. The so called Swedish plate

model was emphasized, implying that half of the plate should be filled with vegetables, roots and pulses; a fourth with carbohydrate rich food such as pasta, rice, potatoes, or bread; and a fourth with protein rich food such as fish, meat, eggs, or cheese (National Food Administration [Livsmedelsverket], 1997). The patients were trained in choosing a suitable portion size. A high priority in the program was to make the patient understand the importance of an evenly distributed meal frequency and to include physical activity in everyday life. Physical activity such as gym, water aerobics, and weight lifting was also scheduled during the day.

A manual for behavior modification in weight loss treatment was used as a base for the group discussion sessions (Melin, 1996). Topics included different aspects of eating, lifestyle habits, and physical behavior. Compulsory home-works were given on every occasion, which served as a base for the group discussions. The homework included, for example, registering obesity related behaviors such as food intake, hunger and cravings, and physical activity as well as finding alternative and more healthy food alternatives and habits.

Patients were excluded from the treatment program if they failed to attend the treatment sessions regularly. This means that all the patients for whom weight loss was evaluated at Month 6 had regularly attended to the treatment program and that the dropouts were not considered in our analyses.

After a 2-year period, weight reduction in the range of 5% to 10% for half of the patients was earlier demonstrated (Melin et al., 2003) in treatment programs based on this type of model for behavior modification. Such a weight reduction has been suggested as a realistic goal for treatment of obese patients (e.g., Goldstein, 1992). The weight loss reached nadir after a 6-month period (Melin et al., 2003). In previous behavior modification treatment conducted at the Obesity Unit and based on 1-hr weekly group sessions (Andersson, Lennerns, & R^ssner, 2000; Andersson & R^ssner, 1997), the significant weight loss results have been documented.

Rorschach Interrater Reliability

The Rorschach protocols of the 49 patients in the day care program belong to a larger data pool of 120 protocols of patients from the Obesity Unit. From these, 25% (30 protocols) were randomly selected and rescored independently by one of two other psychologists who were blind to the scoring of Kristina Elfhag. The interrater agreement for the main segments according to Cohen's Kappa (.) was earlier reported for this sample (Elfhag, Barkeling, et al., 2003). For the particular variables investigated in this study, the protocol level of agreement of summary of scores calculated as ICC is shown in Table 1. According to established criteria on cutoff

levels (Chicetti & Sparrow, 1981; Janson & Olsson, 2001; Shrout & Fleiss, 1979), ICC was excellent (ICC = .75 to 1) for FM, Fd, SCZI and EII, Mñ,X+%,and Wsum6. Good agreement (ICC = .60 to .74) was reached for PTI, X ñ %, FAB2, LV2, WDA% and XA%. For the ROD scale, excellent agreement was reached for the FA as well as the FA + INQ conditions.

Statistical Analyses

Weight loss was measured as percent weight lost from onset of the treatment to Month 6. General weight loss results were evaluated with paired t tests.

To measure deviating levels of the Rorschach variable physical demand states (FM), either relatively heightened or lowered on one scale, a transformation described earlier was performed (Elfhag, R`ssner, et al., 2003). The variable was in a first step transformed to standardized Z scores, implying a mean of 0, and in a second step returned to absolute, positive values, implying that negative z values indicated a value below the mean, were changed to the corresponding positive value. Higher levels of the variable thus implied more deviating scores.

Percent weight loss was related to the descriptive data and Rorschach variables using Pearson's r and t tests. Post hoc analyses were also made on weight loss results in relation to the separate variables included in the SCZI and the PTI. In additional post hoc analyses, the two measures of dependency, Food Contents and ROD scores, were compared to the remaining Rorschach variables. The chosen level of statistical significance was two-tailed $p < .05$. The significant correlates from the univariate analyses of Rorschach variables and weight loss results were in the next step tested in a stepwise linear regression model set on p in .15 and p out .20. Effect sizes were provided in r and were also calculated to estimate effect sizes for the t tests following established guidelines for transforming data (Rosnow, Rosenthal, & Rubin, 2000). The effect size magnitudes were interpreted according to established guidelines in which small = .10, medium = .30, and large = .50 (Cohen, 1988). For all analyses, the Statistical Package for Social Sciences for Windows (Version 11.0) was used.

RESULTS

Weight Loss Results and General Descriptives

Weight loss for the whole sample of 49 patients ranged from ñ4.2% to 20.0 %, with a mean weight loss of 7.5 % (\pm SD 5.6). There was a clearly significant difference in body weight at baseline and at Month 6 for the whole sample (M weight = 123.2 \pm SD 19.6 kg vs. 113.9 \pm SD 19.3 kg; $t = 8.87$, $p < .001$, $r = .79$). Initial body weight was not significantly related to weight loss results in our sample ($r = \grave{n}.06$, $p = .671$), nor was age ($r = \grave{n}.14$, $p = .351$). Mean weight loss for the

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 men and women did not differ significantly as seen in Table 3. No significant differences in the remaining pretreatment characteristicsóeducation, socioeconomic level, and eating disorderówere found.

Rorschach Correlates of Weight Loss

One of the Rorschach indexes, the SCZI, reached the level of statistical significance as seen in Table 4. Disturbances in ego functioning indicated by number of fulfilled conditions in the SCZI were negatively associated with weight loss. With such disturbances in thinking and perception, less weight was lost.

From the suggested eating related features, Food Contents suggesting dependency needs was the strongest positive correlate of weight loss. For patients giving Food Contents, greater weight loss was achieved. The more extended measure of oral dependency, the ROD, was, however, not related to weight loss. For the ROD measure FA + INQ, including the inquiry as well as the response phase, the results even suggested a negative relationship between ROD scores and weight loss, giving a trend toward significance. However, when a statistical outlier on the extended ROD scores was removed, this trend did not persist: ROD (FA + INQ) $r = \tilde{n}.20$, $p = .184$, $n = 48$.

Physical demand states indicated by FM and also including hunger were not related to weight loss.

Post Hoc Analyses of SCZI and PTI

As the SCZI that was significantly related to weight loss has been replaced by the PTI, we did post hoc analyses on the component variables included in the SCZI as well as the PTI to enable an extended generalization of our results. The post

TABLE 3

Descriptive Data and Weight Loss in a Behavior Modification Treatment

Weight Loss

(%)

Sociodemography n M SD t r p

Gender

Men 18 9.0 5.7 $\tilde{n}1.44$.21 .154

Women 31 6.6 5.5

Education

Intermediate/higher 22 9.0 5.5 1.67 .24 .101

Lower 27 6.4 5.5

Socioeconomic level

White collar 23 7.0 4.7 0.61 .09 .542

Blue collar 26 8.0 6.4

Eating disorder

Yes 6 7.6 5.8 0.24 .04 .815

No 35 6.9 6.7

Note. N = 49. Effect sizes are displayed as r.

TABLE 4

Rorschach Correlates of Weight Loss
in Behavior Modification Treatment

Rorschach Variables r p

Indexes (no. of conditions fulfilled)

Schizophrenia Index $\bar{n}.33$.021

Perceptual-Thinking Index $\bar{n}.26$.070

Ego Impairment Index $\bar{n}.22$.123

Suggested eating related features

FM: Physical demand states .24 .092

FM Z scores: Physical demand states, .10 .481

deviations from the mean

Food contents: Dependency orientation .49 < .001

ROD (FA): Oral dependency $\bar{n}.20$.173

ROD (FA + INQ): Oral dependency $\bar{n}.27$.057

Note. N = 49. ROD = Rorschach Oral Dependency Scale; ROD (FA) =

ROD scores calculated for the response phase divided by R; ROD (FA +

INQ) = ROD scores calculated for the total protocol divided by R.

TABLE 5

Rorschach SCZI and PTI Variables
in Relation to Weight Loss in Behavior
Modification Treatment

Rorschach SCZI and PTI Variables r p

X + % (good Form Quality): Accurate perception .17 .253

X \bar{n} % (poor Form Quality): Perceptual distortions $\bar{n}.30$.036

XA% (Form Appropriate Extended) .27 .057

WDA% (Form Appropriate extended for answers with .24 .093
a common location)

LVL2 (Special Scores Level 2): Signs of severe $\bar{n}.27$.063
thought disorder

FAB2 (Fabulized Combinations Level 2): signs of $\bar{n}.26$.068
severe problems in thinking and conceptualization

WSum6 (Weighted Sum of 6 Special Scores): $\bar{n}.27$.161

Problems in thinking

M \bar{n} (poor Form Quality for Human Movemet): $\bar{n}.27$.066

Ideational disarray

Note. N = 49. SCZI = Schizophrenia Index; PTI = Perceptual-Thinking
Index.

hoc analyses of weight loss in relation to the separate variables
in the SCZI and the PTI are displayed in Table 5. One
variable that is crucial for the SCZI and PTI, X \bar{n} % measuring
distortions in perception, was significantly related to less
weight loss as a separate variable, $r = \bar{n}.30$, $p = .036$. Trends
toward significance were found for XA% being positively associated
with weight loss and for LVL2, FAB2, and M \bar{n}
showing more severe signs of thought disorder and flawed
judgment that were negatively associated with weight loss.
One extreme statistical outlier was identified on the XA%
and WDA%. When removing this outlier, the Form Appropriate

Extended, XA%, was significantly positively related to weight loss, $r = .33$, $p = .021$, $n = 48$. Form Appropriate Extended deals with the extent to which the mediational activities have yielded behaviors and responses appropriate for the situation.

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Post Hoc Analyses of Dependency Measures

As the Rorschach CS variable Food Contents and the ROD scores yielded very different results in relation to weight loss, post hoc analyses of these oral measures suggesting dependence were performed. The CS variable Food Contents and the ROD were correlated to the other main Rorschach variables used in our analyses, the indexes SCZI, PTI, and EII and also the FM variables, to explore the intracorrelations. These results are shown in Table 6. Striking positive associations were found between the ROD scores and the indexes measuring distortions in thinking and perception as well as with the EII for this obese sample. The effect sizes for these correlations were large, ranging from $r = .56$ to $r = .70$. The CS variable Food Contents was not related to the CS variables implying distortions in ego functioning. CS Food Contents were instead significantly positively related to the other variables of interest for eating behavior: the FM measuring physical demand states as well as the transformed Z score of FM showing deviating levels of the variable indication difficulties handling or holding physical demand states. ROD scores had no such relationship to physical demand states. Furthermore, the ROD scores adjusted to the number of Rorschach responses were not related to the CS score Food Contents in spite of the Food Contents being included as a subcategory in the ROD: ROD (FA) $r = .08$, $p = .594$; ROD (FA + INQ) $r = \tilde{n}.01$, $p = .942$. The raw ROD scores were also correlated to the Rorschach CS variable Food Contents. This did reveal a positive correlation with Food Contents for the response phase scores but not for the total ROD scores: ROD (FA) Raw scores $r = .30$, $p = .040$; ROD (FA + INQ) raw scores $r = \tilde{n}.20$, $p = .166$.

TABLE 6

Intercorrelations Between the Two Alternative Rorschach Measures of Dependence (Food Contents and ROD Scores) to the Other Rorschach Variables Investigated for 49 Patients in Behavior Modification Treatment

CS Variable:
 Food ROD (FA + Rorschach Variables Contents ROD (FA) INQ)
 Schizophrenia Index $\tilde{n}.06$ $.64***$ $.56***$
 Perceptual-Thinking

Index $\tilde{n}.05$.68*** .62***
Ego Impairment Index $\tilde{n}.001$.70*** .65***

FM: Physical demand
states .37** .11 .03

FM Z scores: Physical
demand states,
deviations from the
mean .37* .11 $\tilde{n}.02$

Note. ROD Rorschach Oral Dependency Scale; CS = Comprehensive System.

* $p < .050$. ** $p < .010$. *** $p < .001$.

Scatterplots were analyzed to check for outliers that could have influenced these results unduly. One extreme outlier, with elevated scores on the ROD (FA and FA + INQ) was identified. The correlations were repeated with this outlier removed. The correlations between ROD (FA and FA + INQ) and the indexes SCZI, PTI, and EII showed lower effect sizes ranging from .40 to .60 ($N = 48$) rather than the range of .56 to .70 shown in Table 6. These correlations were still significant at $p < .05$ and for one correlation, ROD (FA + INQ) and the SCZI, at $p = .05$.

Linear Regression Analysis of Weight Loss

In the next set of analyses, the significant relationships found in the univariate analysis of weight loss results and the Rorschach variables were tested in multiple linear regression analysis on 6 months weight loss. Two models were derived using a stepwise procedure, and these are displayed in Table 7. The first model includes only Food Contents as a positive predictor and has a high effect size, $R = .49$, explaining 24% of the variation in weight loss. The second includes Food Contents as well as number of fulfilled conditions in the SCZI, the latter as a negative predictor raising the effect size to .58, explaining 33% of the variation in weight loss. The oral measure Food Contents was thus an important feature predicting more weight loss in treatment. Number of fulfilled conditions in the SCZI indicating signs of disturbances in thinking and perception meant less weight loss in the treatment. Both linear regression models as well as the separate variables included in the models were statistically significant at at least $< .05$.

DISCUSSION

In these analyses, we have studied 6 months weight loss in a behavior modification treatment in relation to personality characteristics according to the Rorschach. These results add to our prior Rorschach research on obesity and eating behavior by providing prospective outcome data on weight reduction in a behavior modification program. This approach more specifically supplements research on weight reduction, which has earlier encompassed weight loss in an antiobesity drug treatment (Elfhag, R[^]ssner, et al., 2003).

The overall weight loss results in the behavior modification program were significant and resemble the magnitude of weight loss that has earlier been demonstrated at the Obesity Unit (Andersson et al., 2000; Andersson & R ssner, 1997). Considering the association between Rorschach data and degree of weight loss for these patients, a model including a measure of dependency and signs of distortions in perception and thinking could predict a third of the variance in the weight loss outcome in the treatment. Presence of a food preoccupation and dependency needs according to Food Contents at baseline meant that more weight was lost. With signs of disturbances in

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TABLE 7

Rorschach Predictors of Weight Loss
in Behavior Modification Treatment
As Derived From Stepwise Multiple
Linear Regression Analyzes

Rorschach Predictors B SE fl t

Model 1a

Food contents: Dependency
orientation 5.78 1.50 .49 3.84**
Intercept 5.44 0.89 6.09**

Model 2b

Food content: Dependency
orientation 5.56 1.43 .48 3.89**

SCZI no. of conditions:

Distortions in perception
and thinking \bar{m} 1.20 0.49 \bar{m} .30 \bar{m} 2.45*

Intercept 7.49 1.19 6.28**

Note. N = 49. Dependent variable is percentage weight loss in behavior modification treatment.

aR = .49, R2 = .24**. bR = .58, R2 = .33**.

*p < .050. **p < .001.

thinking and perceptions according to number of conditions in the SCZI, less weight loss was attained.

Distortions in ego functioning involving cognitive and perceptual dysfunctions measured by the SCZI were a negative predictor of weight loss in the behavior modification treatment in line with our hypothesis. Patients with such distortions in thinking and inaccurate perception of reality lost less weight in the treatment.

Psychopathology being associated with poor treatment outcome in obesity has also been found in earlier research. For example, a psychiatric history means a more pessimistic treatment prognosis (Valley & Grace, 1987). The Rorschach provides information on ego functioning that does not have to imply severe psychopathological problems but that expands the understanding for mild dysfunctions in obesity.

The Rorschach measure of number of fulfilled conditions in

the SCZI was the most sensitive measure of impairments in ego functioning and reality testing.

Distortions in perceptions and thinking could disrupt the ability to adhere to the treatment, to incorporate information, and to gain from the educative approach. In obesity, slight cognitive dysfunction could perhaps even imply a disability to accurately perceive and register food intake and adjust food intake to energy expenditure.

In our sample, X² as a single variable was significantly related to less weight loss. Rorschach indications of distortions in perception and cognition such as X² and Wsum6 has earlier been useful for predicting poorer performance in military training (Hartmann, Sunde, Kristiensen, & Martinussen, 2003). This suggests that accuracy of perception and coherent ways of thinking are important for behavioral achievements in various areas of life. These results on perceptual distortions could be further compared to research findings for obese samples that have described considerable underreporting of actual food intake and overreporting of physical activity (e.g., Lichtman et al., 1992). This gives even more reasons to consider difficulties in accurate perception of reality in obesity behaviors.

In a large prospective population study (Elias, Elias, Sullivan, Wolf, & DiAgostino, 2003), significant adverse effects of obesity (and hypertension) on neuropsychological tests of learning and memory were found for men. A conclusion on the causal relationship drawn in the Elias et al. study is that obesity had an adverse effect on cognitive performance, although the authors did not elaborate on the possible pathways for this. It was, actually, recently suggested elsewhere (Almeida et al., 2002) that it is not only lack of but also excess of nutrient intake that can affect brain function and behavior adversely. Shared biological pathways for eating behavior and cognitive functions were also suggested when studying Neuropeptide Y (Magni, 2003). Whereas some research has elaborated the possibility for cognitive effects being caused by obesity, the results on weight loss rather have suggested weight development is affected by the cognitive distortions at baseline.

The issue of cognitive distortions in weight loss could be summarized in that cognitive functioning seems to be an upcoming topic of interest in obesity. The cause and effect relationship probably provides no simple answer, and the biological and psychological pathways are likely manifold. Some psychopathological characteristics and cognitive functions could be well described on a personality basis. The link between obesity and cognitive dysfunction could give more information on obesity behaviors.

The PTI and the EII were not significantly related to weight loss. The PTI was constructed to replace the SCZI,

which seems to have captured many false positive cases (Exner, 2003), although the SCZI has shown diagnostic efficiency (Hilsenroth et al., 1998). We suggest that in obesity, there is less psychopathology to be identified with the PTI. The cognitive difficulties that do prevail and can be important in treatment could be more sensitively assessed with the SCZI conditions. This index therefore seems to have a value when the aim is to capture slight dysfunctions, enhancing the understanding for ego functioning.

The Rorschach variable Food Contents predicted more weight loss in treatment. Based on prior findings (Elfhag, R ssner, et al., 2003) of Food Contents in the Rorschach as a positive predictor of weight loss in sibutramine treatment, we postulated that the enhanced satiety provided help for the patients with an addictive, dependent need for food in particular that resulted in more weight loss. The prevailing finding of a positive relationship between Food Contents and weight loss in a behavior modification could be interpreted in a related manner. The treatment provided a lot of training and help directly related to eating and food habits also leading to an enhanced appetite control and enhanced satiety because of more regular eating habits and healthier food choices. This could have helped patients with a preoccupation and need to

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eat to better handle their relationship to food, resulting in greater weight loss.

Although Food Contents did predict more weight loss, the more extended and validated measure for oral dependency, the ROD scale, did not reveal such a relationship. Also, the ROD and Food Contents were not related to each other when ROD was calculated as the proportion of number of Rorschach responses as recommended (Bornstein, 1996). In the post hoc analyses, it was furthermore shown that ROD was related to the indexes used to capture distortions in thinking and perception and ego impairment, the SCZI, PTI, and EII. This suggests that the oral dependence as measured by the ROD was related to tendencies toward distortions in thinking, perception, and to ego dysfunctions, whereas the dimension captured by Food Contents was not. It should be noted, however, that the obese patients did not have elevated levels of the SCZI, PTI, and EII and that these indexes rather captured slight dysfunctions. The ROD scale is a validated measure of social dependent behaviors (Masling et al., 1982, 1981). In patient samples, the ROD scale has also been associated with more psychopathology such as depression (O'Neill & Bornstein, 1991), personality disturbances (Bornstein, 1998; Bornstein, Hilsenroth, Padawer, & Fowler, 2000), and higher suicidality scores (Bornstein & O'Neill, 2000). This suggests ROD could tap more malign features of oral dependency.

How could the results on the dependency measures be understood methodologically? The CS variable Food Contents is a straightforward measure of food and drinks. The ROD scale includes several other categories that may capture more maladaptive and regressive contents, for example, food organs, passivity and helplessness, and pregnancy and reproductive organs. The most common subcategories in the ROD scale across different samples are Food organs (such as mouth, teeth, lips, stomach) and Oral activity (such as eating, talking, singing, kissing; Bornstein et al., 2000), which also coincided with the ROD subcategory results for our obese sample. This would mean the ROD captures more features related to the process of incorporating something as displayed by a focus on mouth, stomach, and so forth and being oral in relation to the world seen in the oral activities, whereas Food Contents more exclusively captures the food stimuli. This suggests that Food Contents may foremost capture a preoccupation with food.

That Food Contents may in particular be related to eating behavior such as a need for food was strengthened by the significant relationship with both FM variables measuring physical demand states also including hunger. Elfhag, Barkeling, et al. (2003) further previously showed a relationship between Food Contents and a characteristic eating pattern in single test meals for obese patients, which was interpreted as a psychological need for food.

Food Contents are, however, obviously an Oral Content, and it was postulated that this gives a hint of dependency needs (Exner, 2003). Oral features are linked to dependency according to original psychoanalytic theory (Freud, 1953-1974). The Rorschach CS variable Food Contents may perhaps express more benign features of oral dependency and oral fixation that have a particular relevance for eating behaviors rather than being a sign of a more problematic personality disposition.

We suggest that the Rorschach CS variable Food Contents could show features being critical for eating and weight loss in obesity. We have primarily assumed that Food Contents have captured a preoccupation with food and a dependent need for food, which was targeted in the treatment. Second, if implications of a dependency orientation are also regarded, patients with some dependency traits could benefit in particular from being enrolled in the supportive setting of a treatment program and also be more prone to please and comply with demands (Bornstein, 1992). This may promote weight loss as long as active treatment persists.

We have found that a food preoccupation and maybe a more benign tendency toward dependency as suggested by Rorschach Food Contents can indicate a more treatable condition, according to the prevailing results and also prior results

(Elfhag, R ssner, et al., 2003) on weight loss in obesity. According to prior research (Elfhag, R ssner, et al., 2003), difficulties with demand states seen in deviating levels of FM were in addition related to weight loss with the satiety-enhancing drug. These characteristics implying psychological needs and biological drives could be suggested as relatively more neurotic, more  classici  reasons for overeating. Eating due to needs and drives may thus constitute more benign problems in obesity.

Patients losing less weight had indications of distortions in perception and thinking that seemed critical for weight loss. From a personality perspective, it should be noted that some obese patients likely have problems related to ego functioning to be considered rather than inner psychological motives for eating. Ego dysfunctions may constitute more profound problems in obesity behaviors than the characteristics related to needs and drives. Aspects of ego functioning could be regarded in assessment in obesity clinics. Failure in treatment can have additional aversive psychological effects (Wooley & Garner, 1991), and patients with poor prospects for success in a particular treatment program should be considered for other programs (R ssner, 1992). In treatment with the satiety enhancing, antiobesity drug, distortions in perception and thinking did not imply less weight loss (Elfhag, 2004). Such a pharmacological treatment is less contingent on the patients behavioral abilities, as it is foremost the biological alterations in satiety that will lead to reduced food intake.

We have made an attempt to place the psychological findings on weight loss results in a larger framework to enable a more comprehensive understanding of obesity behaviors. As earlier research on psychological findings in relation to weight loss has not provided consistent models, these findings should be further explored and replicated in new samples also taking type of treatment into account.

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