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The Development of an Instrument for the Assessment of Obesity-Related Cognitions

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THE DEVELOPMENT OF AN INSTRUMENT FOR THE ASSESSMENT OF OBESITY-RELATED COGNITIONS

by

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David E. Christian

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ABSTRACT

The Development of an Instrument for the Assessment of Obesity-Related Cognitions

by

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This dissertation involved the design and validation of the Obesity Cognitions Inventory (OCI) which was intended to quantify cognitions associated with obesity. An initial pool of 117 items was refined through expert ratings, a pilot test involving 59 subjects, and a major test and validation using 217 subjects.

The resulting 56-item instrument contains scales measuring five types of cognitions: Personal Control, Dietary Restraint, Cost-Benefit Beliefs, Health Knowledge, and Self-Concept. Test-retest reliabilities for these scales range from .69 to .83 and Cronbach alphas range from .57 to .82. Concurrent criterion validity of the OCI was assessed through two methods (a) correlations with percent fat and percent overweight and (b) MANCOVA analyses. These procedures revealed that all scales of the OCI except the Dietary Restraint scale were capable of distinguishing

cognitive differences among subjects of varying obesity levels.

For males, Personal Control and Self-Concept showed significant differences across obesity levels. For females, Personal Control, Cost-Benefit Beliefs, Health Knowledge, and Self-Concept showed significant differences across obesity levels. For males, subjects of low obesity level were cognitively distinct from those of moderate and high levels of obesity. For females, just the opposite was true, with those of high obesity level differing most from those of moderate and low obesity levels. The only exception to this for females was the Health Knowledge scale where only those of low and moderate obesity levels showed significant cognitive differences.

In general, it was concluded that the OCI shows promise as an instrument capable of quantifying the relationship between certain key cognitions and obesity level. The implications this has for cognitive-behavioral treatment of obesity are considered.

(107 pages)

CHAPTER I

INTRODUCTION

Obesity is currently recognized as a prevalent, serious, and refractory disorder. According to the National Center for Health Statistics (1985) 28% of Americans, ages 25 to 74 are overweight. There is also evidence that the prevalence of obesity is increasing, especially among the young. Gortmaker, Dietz, Sobol, and Wehler (1987) analyzed the skinfold measurements of 7,851 youth between the years of 1963 to 1980. They found that there was a 54% increase in the number of children qualifying as obese, and a 98% increase in the number qualifying as "superobese" during this period.

A wide variety of health hazards have now been linked to obesity. These include psychological difficulties, hypertension, digestive and neurological disorders, musculoskeletal problems, cardiovascular disease, and diabetes (Dietz, 1981; Gortmaker et al., 1987; Mossberg, 1989).

Unfortunately, obesity has shown itself to be very resistant to treatment. Although Americans spend an estimated $30 billion per year in various weight reduction programs, on average, they regain 105% of the weight they lose (Stuart, 1967; Jeffrey & Katz, 1977).

In a recent meta-analysis of the obesity treatment literature (Christian, 1989), it was demonstrated that the two most effective psychological treatments for obesity were behavioral interventions and cognitive interventions. Analysis of 85 treatment trials, involving over 1900 subjects showed that the mean weight loss produced by behavioral treatments was 10.4 pounds. For cognitive treatments the mean improvement was 11.5 pounds. In spite of their apparent efficacy, cognitive treatments for obesity have received relatively little attention. In the treatment literature, behavioral treatments outnumber them 5 to 1. This may be the result of the more recent emergence of cognitive treatments.

According to the cognitive perspective of psychotherapy, dysfunctional behaviors and affect are the result of dysfunctional cognitions. In brief, cognitive therapy typically involves (a) identifying the key cognitions which underlie dysfunctional behaviors or affect, (b) identifying functional cognitions, and (c) training the person to replace dysfunctional with functional cognitions.

It is quite possible that the application of cognitive therapy to obesity treatment has been stifled due to the lack of adequate measurement and assessment of cognitive characteristics of the obese. Although numerous psychometric instruments have been used with the obese population, few have been designed specifically for the

assessment of the cognitive concommitants of the disorder. At present, there is no single instrument that provides a cognitive profile for obese subjects. An instrument designed specifically to measure a broad range of obesity-related cognitions would make it possible to answer a number of key questions regarding obesity treatment. These questions include: (a) Do obese people cognitively differ from nonobese people? (b) Are cognitive differences among the obese associated with age or sex differences? (c) Which cognitive constructs are most related to obesity? (d) Are there cognitive subcategories within the obese population, suggesting a need for specialized cognitive interventions? A reliable and valid measure of obesity-related cognitions is essential to answering these questions.

This dissertation consisted of the design, pilot testing, refinement and validation of a measure of obesity-related cognitions, hereafter referred to as the "Obesity Cognitions Inventory" (OCI). The OCI was constructed so as to tap each of five major cognitive domains that have been considered salient to obesity, as indicated in the relevant literature.

CHAPTER II

REVIEW OF THE LITERATURE

Methods Used to Locate Previous Works

A variety of methods were used to locate reports of primary and secondary research relating to the cognitive correlates of obesity and their measurement. First, computer searches of several data bases were conducted. Data bases searched were: (a) Psych Abstracts, (b) ERIC, (c) Medline, (d) Sportfile, and (e) a recently developed online data base called The Health Instrument File.

The pool of articles generated by computer searches was used to begin an extensive network bibliographic search which greatly increased the article pool. As the article pool increased in size, those periodicals which most frequently published relevant studies were identified. These journals were searched issue by issue for relevant studies. Journals included in these searches were: Addictive Behaviors, Behavior Therapy, Journal of Behavioral Medicine, Cognitive Therapy and Research, Health Psychology, International Journal of Eating Disorders, and International Journal of Obesity.

Focus of this Review

The search methods outlined above resulted in the acquisition of over 250 articles. For the purposes of this review, three subtypes of the literature will be analyzed: (a) previous reviews examining the cognitive correlates of obesity, (b) primary research focusing on cognitive correlates of obesity and/or its behavioral concommitants (dietary and/or exercise behaviors), and (c) articles addressing methodological issues regarding the psychometric assessment of cognitions.

Previous Reviews

Three reviews examining the role of cognitions in obesity were located. The cognitive constructs examined are locus of control and dietary restraint. The reviews of these constructs will be discussed in chronological order.

Garner, Garfinkel, and Moldofsky (1978) reviewed four studies which examined locus of control as it relates to obesity. This cognitive construct, originally developed by Rotter (1966), refers to one's beliefs concerning the contingencies of one's behavior. A belief that one's circumstances are due to one's own effort or skill is exemplary of internal locus of control. Beliefs that one's circumstances are the product of luck, fate, others' influences, etc., would be exemplary of an external locus of control. They concluded that locus of control may be useful in the prediction of weight loss and body image distortions.

Unfortunately, the very small sample of studies employed makes this conclusion very tentative.

Ruderman (1986) reviewed 12 studies focusing specifically on the role of dietary restraint in obesity. Dietary restraint refers to a set of cognitions, typically used by chronic dieters, to combat the urge to eat. Restraint may be disrupted by disinhibitors; cognitive, emotional, or pharmacological events. Cognitive disinhibitors would include thoughts of the sort, "I've blown my diet, I just as well eat all I want." Disinhibitors typically result in overeating. Ruderman concluded that the disinhibition hypothesis (i.e., that dieters overeat after disruption of self-control) has been established. However, she also concluded that obese people, who scored higher on restraint scales than the nonobese, did not show the disinhibition common among the restrained nonobese. Ruderman asserted that the cognitive concept of restraint is more useful in understanding the dynamics of binge eating and bulimia, than obesity.

Heatherton, Herman, Polivy, King, and McGree (1988) reviewed 15 studies regarding dietary restraint as it relates to obesity. These authors focused on the psychometric problems associated with measurement of the construct. They concluded that restraint is often confounded with disinhibition. Though they acknowledged that restraint measures may tap different factors for obese

than nonobese individuals, Heatherton and colleagues maintained that restraint still reflects dieting/nondieting differences for obese as well as the nonobese, and that restraint is associated with the counterregulation phenomenon for both groups as well.

The three reviews considered above are apparently the only published attempts to synthesize the findings regarding the cognitive correlates of obesity. This is surprising given the relatively large number of studies which this author has been able to locate regarding the topic.

Cognitive Correlates of Obesity

In the following sections, studies regarding each of five different categories of cognitive correlates of obesity are reviewed. To more efficiently synthesize the findings in each of these areas a summary table is provided for each. (See Appendix A for summary tables.) As indicated above, studies were included if they examined the relationship of a clearly cognitive variable to obesity-related factors (e.g., weight, weight loss, dietary behaviors, and/or exercise behaviors). The cognitive variables involved were related to these obesity-related factors in any of several possible ways: as a simple correlates, as predictors (e.g., of treatment outcome), or as manipulated independent variables in experimental studies. The first two subsections in this literature review involve those constructs considered in previous reviews: locus of control (under the heading of

Personal Control) and dietary restraint. The three remaining subsections will then be considered in the following order: (a) Cost-Benefit Beliefs (b) Health Knowledge and (c) Self-Concept.

Personal Control

Several constructs relating to personal control have been shown to be related to obesity. These constructs are all measures of the degree to which a person believes himself to be in control of a given outcome. In this section, three related measures of personal control will be reviewed as they relate to obesity (Zuroff & Rotter, 1985). These measures are locus of control (LOC), self-efficacy, and causal attribution.

In 1966 Rotter published his first paper on the concept of internal versus external LOC. This signalled the birth of a construct that has been associated with a wide variety of behaviors in a diversity of contexts (Rotter, 1990). As indicated earlier, LOC is a cognitive construct which refers to the expectancy one has that the outcomes of one's behavior are the results of personal behaviors or characteristics (internal LOC) versus fate, luck, chance, powerful others, or unpredictable factors (external locus of control). Ten years after Rotter's first description of the construct (1966), the first studies appeared which explored its role in obesity-related factors. Table 3 outlines the

results of these studies. (Tables 1 and 2 provide keys to the abbreviations used in review tables.)

LOC seems to play a complex role in obesity. Of the 20 studies appearing in the literature, 14 report that LOC is not clearly linked to obesity-related factors. For example, Bennett (1986) reports that LOC was not predictive of outcome in a series of obesity treatment trials. Another study, Chelune, Ortega, Linton, and Boustany (1986), reports a counter-theoretical relationship. The grossly obese subjects in this study were found to endorse more internal loci of control than others. Six studies find relationships in the direction predicted by the theory. For example, Kincey (1980) found that subjects who lost the most weight in treatment were more internal in their LOC than those who lost less weight. Though the studies in this area are quite uniform in their selection of independent and dependent variables, the diversity of contexts, subject characteristics, and instrumentation may account for some of the variability of findings in this area.

In addition to LOC, self-efficacy and causal attribution have also been used as indices of one's concept of personal control. In 1977 Bandura described self-efficacy as a construct referring to one's expectancies regarding whether or not one can successfully perform a given task.

Table 1

Key to Table Abbreviations

Abbreviation	Meaning
Author	First Author of Study
Yr	Year of Publication
Obcrit	Criteria for Obesity Level
Age	Average Age of Subjects Ad = Adults ? = Unknown
%M	Percent of Subjects Who Were Male
#Ss	Number of Subjects in Study
Indep Var	Independent Variable Att = Attributions Bels = Beliefs Cal = Calorie Cog = Cognitive Conf = Confrontation Cov Rnf = Covert Reinforcement Kn = Knowledge Restr = Restructuring S-E = Self-Efficacy Tx = Treatment Wt = Weight WtLoss = Weight Loss
Depend Var	Dependent Variable Adh = Adherence Cogs = Cognitions Comp = Compulsive Ex = Exercise Forb = Forbidden H = Health WtGain = Weight Gain WtLoss = Weight Loss
Fn	Findings Relative to Theory: + = findings support theory o = findings equivocal - = findings contrary to theory m = mixed findings, ? = unclear theoretical bearing
Des	Design of the Study: E = Experimental C = Correlational P = Prediction

Table 2

Key for Obesity Criteria Abbreviations

Abbreviation	Meaning
p	Pounds
%ow	Percent overweight
bmi	Body mass index
Diag	Clinically diagnosed as obese
Norm	Normal weight subjects
CarPts	Cardiac patients
pbf	Percent body fat
mm	Millimeters of skinfold
diet	Dieters
ow	Described as overweight
pow	Pounds overweight
Sknfld	Skinfolds

It is evident that there is considerable similarity between self-efficacy and LOC. In fact, Kirsch (1985, p. 826) asserts that "... self efficacy has been operationalized in ways that are virtually identical to Rotter's expectancy construct, and both theories generate identical predictions." Causal attributions represent a third way of measuring the nature of one's sense of personal control. Attribution theory (Weiner, 1985), as it has come

Table 3

Locus of Control

Author	Yr	ObCrit	Age	%M	#Ss	Indep Var	Depend Var	Fn	Des
Balch	75	179p	Ad	0	34	LOC	WtLoss, Adh	+	C
Bennett	86	48%ow 33BMI	40	0	48	LOC	WtLoss	o	P
Chavez	80	30mm	22	0	22	Health LOC	WtLoss, Adh	m	C
Chelune	86	>100%ow ? >100pow		17	42	LOC		-	C
Dishman	80	Norm	Ad	?	130	LOC	Ex Adh	+	P
Dunn	81	Norm	19	0	47	LOC	Comp Eating	+	C
Geller	81	31%ow	9	50	48	LOC	Weight	o	C
Goldney	81	25%ow	43	0	46	LOC	WtLoss, Adh	+	C
Gorman.	75	>15%ow	23	41	216	LOC	Weight	o	C
Harris	80	>20%ow	18	0	36	LOC	WtLoss, Adh	o	C
Kincey	80	28%ow 175p	41	0	58	LOC	WtLoss	+	C
King	89	Dieters	?	0	20	LOC	Weight	o	C
Lauer	79	264p	38	88	90	LOC	Weight	o	C
McCready	85	Norm	27	0	61	LOC	Ex Adh	o	P
Rodin	77	>17%ow	Ad	7	204	LOC	WtLoss	o	P
Saltzer	82	34%ow	34	0	79	LOC	WtLoss	+	P
Schifter	85	OW	20	0	76	LOC	WtLoss	o	P
Speaker	83	39pbf 177p	13	100	18	LOC	WtLoss	o	P
Tobias	77	162p 33%ow	20	0	100	LOC	WtLoss	o	E
Wallston	76	32pow	21	0	34	LOC	WtLoss	m	C

Note: For key to abbreviations see Tables 1 and 2.

to be known, suggests that through experience, humans accumulate beliefs regarding the causality of events. These beliefs are categorized along three dimensions: internality-externality (equivalent to LOC), stability-instability, and controllability-uncontrollability.

All sixteen of the studies examining the role of self-efficacy and attributions have found them to be related to obesity (see Table 4). For example, Bernier and Avard (1986) found that post-treatment efficacy expectations were predictive of subsequent weight loss. Flannery and Kirschenbaum (1986) reported that treated subjects who had adaptive attributional styles (i.e., internal, global, and stable) lost more weight than subjects who had less adaptive attributional styles. Results of the 15 studies focusing on self-efficacy and attributional style confirm the importance of the roles of these constructs in obesity conceptualization and management.

In summary, measures of personal control, namely LOC, self-efficacy and attributions have been found to be related to obesity and its related behaviors.

Dietary Restraint

Although Ruderman's review (1986) of the dietary restraint literature concluded that the construct of restraint is not particularly applicable to the obese, the studies garnered in the present review would suggest that

Table 4

Self-Efficacy and Attributions

Author	Yr	ObCrit	Age	%M	#Ss	Indep Var	Depend Var	Fn	Des
Bernier	86	>15%ow 175p	44	0	62	Self-efficacy	WtLoss	+	PC
Biddle	85	Norm	44	42	41	Attributions	Exercise	+	C
Brubaker	88	Norm	41	50	260	Attributions	Wt Status	+	C
Desharn.	86	Norm	20	29	98	Self-efficacy	Ex Adh	+	P
Edell	87	>50pow	43	35	147	Self-efficacy	WtLoss Adh	+	P
Flannery	86	55%ow	10	33	39	WtLoss Att	WtLoss	+	C
Forster	86	46%ow	47	49	113	Efficacy	WtLoss	+	C
Fowler	85	27%ow	Ad	5	129	Expectations	Adherence	+	C
Gillet	88	166p 43pbf	42	0	38	Efficacy		+	C
Glynn-a	86	>20%ow	20	0	484	Eating S-E	% Overweight	+	C
Glynn-b	86	223p	33	6	32	Eating S-E	WtLoss	+	C
Gormally	82	195p 40%ow	40	13	112	Self-efficacy	Eating	+	C
Hartigan	82	36%ow	37	30	27	Wt Attribs	WtLoss	+	C
Leon	84	180p	41	91	47	Self-efficacy	WtLoss	+	P
Straw	84	>20%ow	41	20	216	Attributions	WtLoss	+	P
Tirell	80	CarPts	59	87	30	Self-efficacy	Ex Adh	+	C

Note: For key to abbreviations see Tables 1 and 2.

Ruderman's conclusion is controversial. Sixteen of the 20 studies in this area indicate that restraint is related to obesity or its related behaviors (especially eating). For example, Bjorvell, Rossner, and Stunkard (1986) found that obese subjects scored higher on disinhibition than normals. Marcus, Wing, and Lamparski (1985) found two aspects of restraint (disinhibition and perceived hunger) to be significantly associated with bingeing severity. And Weber, Klesges, and Klesges (1988) found that highly restrained obese subjects failed to regulate for a high calorie preload of food. Only two studies yield clearly contrary evidence; Ruderman and Christensen (1983), and Ruderman and Wilson (1979) found that obese subjects did not demonstrate the disinhibition phenomenon (overeating). Given the balance of evidence (see Table 5), it appears that restraint is related to obesity and its related behaviors.

Cost-Benefit Beliefs

Cost-benefit beliefs have been found to be closely related to obesity itself and its associated factors (e.g., diet and exercise behavior). For the purposes of this review, cost-benefit beliefs are those beliefs regarding the risks, costs, and/or benefits associated with obesity and its treatment (e.g., dieting and exercising).

Table 5

Dietary Restraint

Author	Yr	ObCrit	Age	%M	#Ss	Indep Var	Depend Var	Fn	Des
Bjorvell	86	41bmi 260p	40	25	162	Weight	Restraint	+	C
Herman	75	?	20	0	45	Restraint	Eating Beh	+	C
Jansen	88	23bmi	23	0	40	Restraint	Eating, Cogs	+	CE
Johnson	83	>20%ow	35	44	136	Restraint	Dieting	+	C
Klesges	89	Norm	20	48	65	Restraint	WtGain	?	C
Knight-a	89	Norm	22	?	84	Restraint	Forb Food	+	C
Knight-b	89	Norm	20	0	93	Restraint	Consumption	+	C
Lowe	82	Norm	20	0	120	Restraint	Consumption	+	C
Marcus	85	192p	39	0	66	Restraint	Weight	+	C
O'Neil	81	>15%ow	37	0	30	Restraint	Weight	o	C
Pecsok	88	Norm	20	0	62	Restraint	Consumption	+	C
Ruderman	83	35%ow	20	0	89	Restraint	Consumption	-	C
Ruderman	79	>10%ow	20	0	55	Restraint	Consumption	-	C
Ruderman	83	32%ow	20	0	392	Restraint	Weight	+	C
Stunkard	85	Diag	44	44	220	Restraint	Weight	+	C
VanStr.	86	Norm	Ad	0	110	Restraint	Consumption	+	C
Weber	88	>15%ow	20	0	102	Restraint	Consumption	+	C
Westert.	88	25bmi	Ad	0	136	Restraint	Cum Intake	+	C
Woody	81	Norm	20	0	100	Restraint	Consumption	+	C
Wooley	72	33%ow	21	50	32	Cal Beliefs	Consumption	+	C

Note: For key to abbreviations see Tables 1 and 2.

Studies examining obesity-related beliefs have produced relatively consistent findings (see Table 6). For example, Valois, Desharnais, and Godin (1988) demonstrated that beliefs about exercise are related to actual exercise behavior. Tirrell and Hart (1980) found that beliefs about barriers to regimen adherence and susceptibility to health risks were strongly associated with exercise adherence. Becker, Maiman, Kirscht, Haefner, and Drachman (1977) have demonstrated that manipulation of cost-benefit beliefs leads to behavioral change. They found that altering beliefs about obesity health risks led to greater weight loss in obese children and better regimen adherence in their mothers.

Only two of the 14 studies of cost-benefit beliefs have not found relationships of the sort described above. For example, Laffrey (1986) failed to find differences in the expected direction. In this study, obese subjects did not differ from normal weight subjects in terms of their beliefs about: their own health status, their health conceptions, or their choice of health behaviors. However, given the preponderance of evidence in this area, it appears that obesity-related beliefs are definitely related to obesity itself as well as the factors that affect it.

Table 6

Obesity-Related Beliefs

Author	Yr	ObCrit	Age	%M	#Ss	Indep Var	Depend Var	Fn	Des
Becker	77	Diag	12	30	182	Health Bels	WtLoss, Adh	+	EC
Harris	80	>20%ow	18	0	36	Obesity Bels	WtLoss, Adh	+	C
Jansen	88	23bmi	23	0	40	Food Bels	Eating	o	CE
Krietler	88	>15%ow 161p	31	0	128	Obesity Bels	Weight	+	C
Laffrey	86	>10%ow	41	42	59	Health Bels	Weight	o	C
Mahoney	75	Norm	20	50	46	Eating Bels	Consumption	+	E
Morelli	79	?	Ad	?	12	Eating Bels	Adherence	+	C
O'Connel	88	ow	20	50	264	WtLoss Bels	WtLoss	+	C
O'Conner	87	30%ow	Ad	10	155	Obesity Bels	Weight	+	C
Tirell	80	CarPts	59	87	30	Health Bels	Ex Adherence	+	C
Valois	88	Norm	40	40	16	Exerc Bels	Exercise	+	P
Woody	81	Norm	20	0	100	Caloric Bels	Consumption	+	C
Wooley	72	33%ow	21	50	32	Caloric Bels	Consumption	+	C
Worsely	84	Sknfld	10	50	60	Exerc Bels	Exercise	+	CE

Note: For key to abbreviations see Tables 1 and 2.

Health Knowledge

It would be easy to assume that the more knowledge a person has regarding physical health (e.g., the roles of diet and exercise) the more likely it will be that the person will be able to maintain appropriate weight. Such an assumption, however, is not clearly born out by the literature.

The findings of seven studies examining this assumption are found in Table 7. One study (Burns, Richman, & Caterson, 1987) found, contrary to expectations, that obese subjects scored higher on a measure of nutrition and health knowledge than did normal weight subjects. Two studies found no clinically significant differences in the nutrition knowledge of obese and normal weight subjects. Four studies found relationships between diet or exercise knowledge and obesity in the expected direction (with the obese showing less knowledge than normal weight subjects).

One possible reason for the variability of findings in this area could be an erroneous assumption concerning causality; that is, that a lack of appropriate knowledge impedes appropriate behavior. It could easily be that the more obese one becomes, the more one attends to diet and exercise information, thereby confounding the relationship between these variables. At present, the exact role health knowledge plays in the development of obesity is unclear.

Table 7

Health Knowledge

Author	Yr	ObCrit	Age	%M	#Ss	Indep Var	Depend Var	Fn	Des
Burns	87	30bmi	40	20	362	Weight	Nut & H Kn	-	C
Douglas	81	220p	37	0	132	Kn of WtLoss	WtLoss	+	C
Drewnow.	85	220p 36bmi	38	21	73	Weight	Nutrition Kn	o	C
Hall	82	>60%ow	35	6	100	Obesity	Nutrition Kn	o	C
Jordan	86	200p	47	26	11	Kn of Regimen	Weight	+	C
Straw	84	>20%ow	41	20	216	Energy Kn	WtLoss	+	P
Tirell	80	CarPts	59	87	30	Regimen Kn	Ex Adherence	+	C

Note: For key to abbreviations see Tables 1 and 2.

Self-Concept

The evidence available suggests that self-concept is moderately associated with obesity-related factors. Self-concept has typically been defined as those beliefs one holds about oneself (Hamachek, 1987). In other words, my self-concept consists of my view of what I am. A very closely related construct, self-esteem, consists of the value-oriented beliefs one holds regarding one's self-concept. In other words, my self-esteem consists of my assessments and evaluations of my self-concept. Given that

most examples of self-concept are value-laden (e.g., I am; competent, lazy, caring), many theorists use the term self-concept to include self-esteem as well. That convention is adopted in this review.

In spite of the widespread appeal of the construct of self-concept in both psychology and education, its role in obesity has received scant attention. Only 7 studies examining the role of self-concept are available. The results of these studies are found in Table 8.

Table 8

Self-Concept

Author	Yr	ObCrit	Age	%M	#Ss	Indep Var	Depend Var	Fn	Des
Forster	86	46%ow	47	49	113	Self-Esteem	WtLoss	+	C
Fox	83	177p	30	43	84	Self-Concept		o	C
Kendzie.	88	Norm	21	31	53	Self-Concept	Exercise	+	C
Laffrey	86	>10%ow	41	42	59	Self-Concept	Weight	o	C
Lauer	79	264p	38	88	90	Self-Concept	Weight	+	C
Rodin	77	>17%ow	Ad	7	204	Self-Esteem	WtLoss	o	P
Stuart	77	162p	43	0	721	Self-Concept	Wt Maint.	+	C

Note: For key to abbreviations see Tables 1 and 2.

Three studies have found nonsignificant differences between self-concept and obesity-related factors. For example, Fox, Burkhart, and Rotatori (1984) found that neither of two measures self-concept distinguished obese subjects from normals. Rodin et al. (1977) found that neither self-esteem nor self-concept measures were predictive of weight loss.

The narrow majority of studies in this area have found relationships in the expected direction. Examples include Kendzierski (1988) who found that individuals who believed themselves to be "the exercising sort of person" reported exercising more per week than those who did not have such self-concepts. Lauer, Wampler, Lantz, and Romine (1979) reported that obese individuals showed lower scores on personal self-concept, family self-concept, and physical self-concept than normal weight individuals.

A stronger relationship between self-concept and obesity-related factors might be discovered if measures that were more obesity-relevant could be developed. This could shed additional light on the popular hypothesis that the obese (a) suffer from poor self-concept, and (b) that this condition is central to the intractability of their disorder.

Cognitive Treatments For Obesity

As indicated earlier, Christian (1989) conducted a meta-analysis of the obesity treatment literature which indicated that cognitive interventions were equal to or better than other methods for achieving long-term weight loss. Table 9 lists the results of an additional 7 studies of cognitive treatments for obesity. These studies provide additional confirmation of the efficacy of such interventions in obesity treatment. The fact that modification of cognitive variables results in reduced obesity (or related behaviors) lends support to the assertion of this paper, that the adequate measurement of cognitive variables is highly relevant to addressing the problem of obesity.

Problems with Existing Instrumentation

A number of instruments have been developed that measure to some degree, the constructs discussed above. For each article coded for this review, a record was made of the instruments employed. In Table 10 is found a listing of the 30 instruments identified, grouped according to the construct they measure.

Although each of the instruments listed in Table 10 offers some insight into the cognitive correlates of obesity, a number of problems exist with these measures. These are itemized below.

Table 9

Cognitive Obesity Treatments

Author	Yr	ObCrit	Age	%M	#Ss	Indep Var	Depend Var	Fn	Des
Becker	77	Diag	12	30	182	Motivation	WtLoss, Adh	+	EC
Bennett	86	48%ow 33BMI	40	0	48	Cog Rehearsal	WtLoss	+	E
Collins	86	>10%ow	38	0	60	Cog Tx	WtLoss	+	E
Manno	72	?	Ad	12	41	Cov Rnf	WtLoss	+	E
Pecsok	88	Norm	20	0	62	Cog Restr	Consumption	+	E
Schwartz	88	OW	Ad	60	87	Value Conf	WtLoss	+	E
Tobias	77	162p 33%ow	20	0	100	Cog Tx Match	WtLoss	o	E

Note: For key to abbreviations see Tables 1 and 2.

1. Many of these instruments are not designed for use with obese populations. Their content focuses on issues that are often tangential or weakly related to obesity (e.g., Tennessee Self-Concept Scale, Nowicki-Strickland LOC Inventory).

2. Norms on these measures for obese populations are often unavailable or nonexistent (e.g., Irrational Beliefs Test, Self-Talk Questionnaire).

Table 10

Instrument Breakdown by Construct

Construct	Instrument Name
Personal Control	Eating Self-Efficacy Scale
	Exercise Objectives Locus of Control
	Health Locus of Control Scale
	Locus of Control of Behavior Questionnaire
	Master Questionnaire
	Multidimensional Health LOC Scale
	Nowicki-Strickland LOC Inventory
	Personal Control Scale
	Rotter's I-E LOC Scale
	Self-Efficacy Form
	Self-Motivation Inventory
	Weight Locus of Control Scale
Restraint	Binge Scale
	Dutch Restrained Eating Scale
	Eating Inventory
	Restrained Eating Questionnaire
	Restraint Scale
	Revised Restraint Scale
	Three Factor Eating Questionnaire
Obesity-Related Beliefs	Cognitive Orientations of Obesity
	Common Belief Survey
	Decision Balance Measure
	Irrational Beliefs Test
	Attitude Toward Physical Activity Inventory
	Obesity Cognitions Scale
	Rational Behavior Inventory
	Self-Talk Questionnaire
Diet and Exercise Knowledge	HEW Food Questionnaire
	Institute for Behavioral Education Survey
Self-Concept	Tennessee Self-Concept Scale

3. In some cases the psychometric properties (reliability and validity data) are unclear or poorly established (e.g., HEW Food Questionnaire, Institute for Behavioral Education Survey).

4. The data produced by these instruments are scaled in a variety of ways. This makes it difficult to compare one's score on one construct with one's score on another (e.g., Multidimensional Health LOC Scale, Self-Motivation Inventory).

5. Using the instruments currently available, developing a comprehensive cognitive profile of an individual would be cost-ineffective given the large amount of time required to complete the varied administration, scoring, and interpretation procedures.

6. Many of these instruments confound cognitive data with demographics, self-report of overt behaviors, and personal history (e.g., Eating Inventory, Revised Restraint Scale).

The development of the Obesity Cognitions Inventory (OCI) is designed to address the inadequacies outlined above. It includes subscales tailored to measure each of the five constructs previously reviewed. All items in the instrument are designed to be directly relevant to obesity and its management. The item-analysis process is clearly outlined and psychometric indices of reliability and validity are provided.

CHAPTER III

METHOD

This study progressed through four major phases. The general objectives for these phases were as follows. Phase 1: To develop an initial pool of items (roughly 20 per scale) with good content validity according to clinical evaluators; Phase 2: To create a revised instrument with good internal consistency (construct validity) through item analysis (using a 50-subject pilot test); Phase 3: To refine the revised instrument through a second item analysis (using 200 subjects); and Phase 4: To assess the concurrent criterion validity of the instrument using an objective obesity criterion (percent body fat).

Hypotheses

The methods employed in this study were designed to permit the testing of several hypotheses. These hypotheses relate to the cognitive constructs measured by each of the five OCI scales. The hypotheses were formulated in harmony with the literature reviewed previously. The hypotheses are as follows:

1. Given that the preponderance of evidence suggests that obesity is associated with lower scores on measures of personal control, it is hypothesized that scores on Scale 1

(measuring degree of personal control) will be negatively correlated with obesity level.

2. Given that the foregoing review shows dietary restraint to be positively correlated with obesity, it is hypothesized that scores on Scale 2 (measuring degree of dietary restraint) will be positively correlated with obesity level.

3. Given that obesity-related cost-benefit beliefs have been found to negatively correlate with obesity and its behavioral concommitants, it is hypothesized that scores on Scale 3 (measuring cost benefit beliefs as defined previously) will be negatively correlated with obesity level.

4. Given the moderate evidence for a negative relationship between health knowledge and obesity level, it is hypothesized that scores on Scale 4 (measuring knowledge of dietary and exercise facts) will be (moderately) negatively correlated with obesity level.

5. Given that the positiveness self-concept has generally been found to be negatively correlated with obesity level, it is hypothesized that scores on Scale 5 (measuring positiveness of self-concept) will be negatively correlated with obesity level.

The development of the OCI is intended to meet the guidelines set forth in the Standards for Educational and Psychological Testing, published by the American

Psychological Association (1985). Therefore the procedures that follow are designed with these guidelines in mind.

Initial Design and Expert Rating

Thirty instruments which directly or indirectly measured obesity-related cognitions were located (see Table 10). Using this pool of items as a model, a large group of items representing each of the OCI's five target areas (Personal Control, Dietary Restraint, Cost-Benefit Beliefs, and Self-Concept) was created. Items from this pool which showed good face validity, readability, and suitability for Likert format were arranged into questionnaire format (n=117).

An "expert" review was designed to identify items which demonstrated obvious content validity. Definitions of the five constructs were drafted and refined. A panel of expert raters was selected from the USU Department of Psychology and included three faculty members and three advanced (final year) doctoral students from the combined Professional-Scientific Psychology program. These six raters were given a packet which included the 117 items arranged in random order, an instruction sheet, and the operational definitions of the five constructs. Raters fully familiarized themselves with the operational definitions of the constructs and then rated each of the 117 items. Rating items consisted of giving a score from 0 to 4 (0= Not Measured to 4= Measured a Lot) to each item for each of the

five constructs. In other words, each item was rated as to how well it measured each of the five constructs. By averaging ratings across raters it was possible to determine which items were seen as measuring one construct relatively well and independently of the other (related) constructs.

A two-stage process was used to eliminate poor items based on the expert raters' data. First, items were eliminated where no mean rating was greater than or equal to 2.5 (range 0-4). This eliminated items which failed to measure any construct to a sufficient degree. Second, the penultimate mean rating for each item was divided by the highest mean rating, resulting in a ratio constant which will be referred to as "pencon." All items which had pencons higher than .66 were eliminated from the pool. This eliminated items where more than one construct was being measured to a considerable degree. Together, these methods allowed identification of items which were clinically judged as measuring one construct relatively well, while not measuring other constructs to any great degree. These methods might be seen as a "preliminary intuitive factor analysis" in that they allow the instrument developer to determine which items "load high" on one scale (construct) while simultaneously loading relatively low on all other scales.

Using the methods outlined above, the initial pool of 117 items was reduced to a pool of 84 items. These items

were organized in questionnaire format with reverse scaling on about half of the items (to avoid response bias). Instructions directed subjects to respond to each item using a Likert scale (1= Strongly Disagree to 5= Strongly Agree). Instructions also indicated the importance of honest responses and that confidentiality would be assured.

Though not a formal part of the OCI, a supplementary questionnaire was constructed. This questionnaire, hereafter referred to as the Personal Information Questionnaire (PIQ), included items regarding weight history, diet and exercise behaviors, and other demographic information.

Pilot Test and First Revision

In this phase, the OCI was pilot tested using a sample of 59 subjects. The pilot test was designed to permit refinement of the instrument through item analysis, thereby resulting in improved internal consistency (construct validity). The majority of subjects were recruited from a large introductory psychology course in the USU Department of Psychology. These participants were offered course extra credit for their participation. The investigator discussed the project in brief with the class before recruiting subjects. In this discussion, potential participants were informed that they could NOT: (a) drink alcohol for 24 hours prior to participation, (b) be seriously ill during the week prior to participation, (c) exercise excessively

during the 24 hours prior to participation, or (d) be pregnant. These requirements were designed to increase the likelihood that subjects would be normally hydrated at the time of participation. (Normal hydration improves the accuracy of the percent fat measurement which was used as the primary outcome measure for this study.) Ten of the 59 subjects met clinical obesity standards (greater than 20% overweight according to Metropolitan height and weight charts).

Subjects came to the USU Department of Psychology Community Clinic where they were met by a research assistant who greeted them. The research assistant presented each subject with a copy of the Obesity Cognitions Inventory (OCI) and the Personal Information Questionnaire (PIQ) along with a response sheet and a consent form. Subjects were seated in a separate testing room where they were allowed to complete the questionnaires and consent form. This took between 20 and 30 minutes per subject. Upon completing these materials, subjects were directed to an adjacent lab where the following data were collected: height and weight (without shoes), elbow width (measured with slide calipers according to Metropolitan guidelines), and body resistance and impedance (used for calculation of percent body fat). The latter two measurements were made with a Body Impedance Analyzer, Model 101A produced by RJL Systems, Inc., Detroit, Michigan. (For an extensive review of literature regarding

the reliability and validity of this method of percent fat measurement as well as mechanical specifications, see the Bioelectric Impedance User's Manual: A Review of Body Composition Techniques, by Twyman and Liedtke, 1987.) These measurements involved having the subject fully recline in a reclining chair. Adhesive pre-gelled electrode patches were attached at two sites on the top of the foot and at two sites on the back of the hand/wrist. To insure consistent and adequate contact, electrode attachment sites were swabbed lightly with rubbing alcohol to remove any skin oils or other material that might have interfered with electrical conductivity. While in the lab, each subject was questioned regarding their adherence to the participation requirements of the study (i.e., regarding alcohol consumption, exercise level, illness and pregnancy). After completing all measurements, subjects were thanked for their participation and informed that after August 1, they could obtain a complete report of the study's findings in the USU library, or a brief summary of findings in the USU Psychology Department main office. Percent body fat calculations were made using a standard computer program designed for use with the BIA measurement system. Percent body fat for each subject was recorded on a feedback sheet. The feedback sheet included interpretive information and suggested referrals for those desiring to improve their fitness

levels. Feedback sheets were provided to all participants in the study.

The pilot-test data were subjected to item analysis. To eliminate ceiling and floor effects, items with mean scores greater than 4.5 or less than 1.5 were eliminated. To improve variability within items, those with standard deviations less than .25 were eliminated. And to improve internal consistency, items with item-total correlations less than .3 were eliminated. These procedures resulted in the elimination of 14 items. Thus, the second version of the OCI contained a total of 70 items.

Second Revision

The second revision of the OCI involved recruiting a sample of 217 subjects. The majority of these subjects were drawn from an introductory psychology course at Utah State University using the same procedures outlined above. In order to guarantee that at least 40 subjects in the sample would be greater than 20% over ideal weight (clinically obese according to Metropolitan standards) additional subjects were drawn from several other sources as well. These included local branches of Weight Watchers, Slim for Life, Nutri/Systems, and Optifast weight loss programs. Of the 217 subjects employed in this sample, 20 came from the latter sources.

Seventy of the subjects in the main test returned to the Community Clinic to complete all questionnaires and

measures a second time. This allowed calculation of test-retest reliabilities for all measures used in the study.

Items in the main test of the OCI were subjected to item analysis procedures again. Items with test-retest reliability coefficients (Pearson correlations) lower than .4 were eliminated. Cronbach alphas were calculated for each of the five scales on the OCI. Since alphas for the five scales were all above .5, all scales were maintained. Items whose item-total correlations were low enough to increase alpha if they were removed, were removed. The procedures outlined above resulted in the elimination of 14 more items from the OCI, resulting in a final version containing 56 items.

Concurrent Criterion Validation

Two general procedures were used to assess the concurrent criterion validity of the OCI. First, scores on each of the five twice-revised subscales of the OCI were correlated with obesity measures (percent body fat and percent overweight). The resulting correlation coefficients were checked for significance using the r to t transformation (Loftus & Loftus, 1982).

To further assess the concurrent criterion validity of the OCI, a multivariate analysis of covariance (MANCOVA) was employed (Norusis & SPSS Inc., 1988; Kleinbaum & Kupper, 1978). MANCOVA was used to test whether or not there was a difference between means on the five subtests of the OCI for

subjects of low, moderate, and high obesity levels. The use of MANCOVA reduces the possibility of Type I error when multiple dependent measures are employed. At the same time, this procedure controlled for the effects of variables believed to be correlated with the dependent measures; In this case, age was the covariate. Separate MANCOVAs were conducted for males and females, due to the marked disparity between the distributions of obesity measures for the two groups. Subjects were categorized as low, medium, or high in obesity level by dividing the overall distribution for each sex into thirds.

In summary, statistical analyses of the OCI resulted in the following information regarding each subscale: Item-total correlations, test-retest reliability coefficients for items and subscales, coefficient alphas, two indices of concurrent criterion validity; scale-criterion correlations, and *F* statistics for the five scale scores.

CHAPTER IV

RESULTS

Item Elimination by Expert Ratings

Using the expert rating procedures outlined in the previous section, each of the 117 initial OCI items was rated as to how well it measured each of the five constructs of interest. The mean ratings (range 0-4) for all five constructs for all 117 items are found in Table 11. Also listed for each item in Table 11 is the constant "pencon", calculated by dividing the penultimate scale rating for each item by the highest scale rating for each item. Items where the largest rating was less than 2.5 were eliminated, as were items where pencon was greater than .66. Thus, items that remained had to measure one construct relatively well, without measuring other constructs to any great degree. The 33 items eliminated by these criteria have asterisks adjacent to their item numbers in Table 11.

Table 11

Average Expert Ratings and Pencon

ITEM	PC	DR	CB	HK	SC	PENCON
1	3.83	1.17	.00	1.50	.50	.39
2*	.00	.00	2.67	3.33	.17	.80
3	.00	.00	.50	.00	4.00	.13
4*	1.50	1.67	.33	.00	1.17	.90
5	3.67	1.67	.00	.33	1.00	.45
6	.67	1.17	1.33	4.00	.00	.33
7	.00	.00	.50	.00	4.00	.13
8	4.00	.67	.17	.33	.83	.21
9	.00	.00	2.17	4.00	.00	.54
10*	3.00	1.00	.00	.00	3.83	.78
11	.83	3.00	.00	.00	.83	.28
12*	.00	.00	2.17	3.17	.00	.68
13	2.83	.33	.00	.00	2.83	.12
14*	2.33	1.33	.50	.00	1.50	.64
15	3.00	.83	.33	.17	.83	.28
16	3.83	.67	.00	.00	2.50	.65
17*	1.83	1.83	1.50	.00	1.67	.91
18*	1.33	.50	1.00	.67	2.17	.62
19	.50	.17	.33	4.00	.00	.13
20	.17	.00	1.67	4.00	.00	.42
21*	2.33	.33	1.00	3.33	.17	.70
22	.50	.00	.00	.67	2.83	.24
23	.50	.33	2.83	1.33	.83	.47
24	1.17	2.50	.00	.50	.17	.47
25	2.17	.83	1.33	3.50	.17	.62
26	.33	.17	.00	.17	2.83	.12
27	.33	.50	3.33	1.17	.67	.35
28	.83	1.00	.17	3.33	.00	.30
29	2.00	.50	.33	4.00	.17	.50
30	.50	.00	.17	.00	3.50	.14
31	1.50	3.00	.00	.00	.33	.50
32	.50	.00	.00	.00	3.67	.14
33	.67	.83	.67	3.67	.00	.23
34	1.67	.17	.00	.00	3.33	.50
35	.50	.50	1.33	2.50	.33	.53
36	1.00	3.00	.00	1.50	.00	.50
37*	2.17	.00	.00	2.83	.50	.76
38	.50	.00	2.00	4.00	.00	.50
39	.17	.83	.33	3.67	.00	.23
40*	3.33	.33	.00	.00	2.33	.70

table continues

ITEM	PC	DR	CB	HK	SC	PENCON
41*	.17	.00	2.50	3.17	.00	.79
42	3.50	.83	.50	.33	1.33	.38
43	.83	.83	.67	.00	2.67	.31
44	1.50	.00	.00	.00	4.00	.38
45	.17	.00	2.00	3.00	.00	.67
46	.00	.00	.00	3.67	.00	.00
47	1.50	2.67	.00	.50	.50	.56
48	.00	.00	.00	.00	4.00	.00
49	.67	1.00	.33	.83	2.67	.38
50	3.33	.00	.00	1.33	.50	.40
51	.00	.00	.00	.00	3.83	.00
52*	1.33	2.00	.33	.17	.33	.67
53	.67	.17	2.83	.00	1.17	.41
54	.00	.00	.00	4.00	.00	.00
55*	1.67	.33	.00	1.33	.00	.80
56	.50	.00	.00	.00	3.00	.17
57	.33	.00	.00	.00	3.17	.11
58	.17	.50	.00	3.67	.00	.14
59	.00	.00	.00	.00	4.00	.00
60	1.00	.00	4.00	.33	.17	.25
61*	1.67	2.17	.17	.00	.17	.77
62*	1.83	.17	.00	1.50	.00	.82
63	1.00	.00	.17	.00	3.83	.26
64	.33	.33	3.33	.50	.00	.15
65*	2.33	1.67	.33	1.83	.00	.79
66	2.50	.00	.00	.50	.50	.20
67	.17	.00	.00	.00	2.83	.06
68	.50	.00	3.33	1.67	.00	.50
69	3.67	.83	.00	.83	1.50	.41
70	.33	.00	3.00	1.83	1.00	.61
71*	1.83	.00	.00	.00	2.67	.69
72	.00	.17	.00	4.00	.00	.04
73	1.83	3.33	.00	.33	.00	.55
74*	.50	.50	.00	.00	1.50	.33
75	4.00	1.50	.00	.83	.67	.38
76*	1.83	1.83	.00	2.33	.00	.79
77	.33	.00	3.83	.17	.00	.09
78	.67	.67	.67	3.67	.33	.18
79	.17	.00	.00	.00	3.17	.05
80	3.50	.33	.00	1.00	.83	.29
81*	2.17	.17	.00	.00	2.83	.76
82	3.33	2.00	.00	.00	.33	.60
83*	.33	.00	2.67	2.00	.00	.75
84*	2.00	.00	.33	.00	2.83	.71

table continues

ITEM	PC	DR	CB	HK	SC	PENCON
85	3.33	1.33	.50	1.83	.00	.55
86	1.50	.17	2.83	.50	.00	.53
87	.17	.00	.00	.00	3.50	.05
88	.33	.17	.67	3.67	.00	.18
89*	3.83	.50	.00	.00	3.67	.96
90*	2.00	2.17	.50	1.17	.00	.92
91*	.83	1.50	1.00	1.50	.00	.67
92	3.67	.50	.00	1.00	.83	.27
93	1.50	.17	.17	.00	3.00	.50
94	.00	.00	.00	4.00	.00	.00
95*	1.50	1.83	.83	.50	.00	.82
96*	.50	1.00	2.33	.33	.50	.43
97*	1.83	1.33	2.50	1.00	.00	.73
98*	.17	.00	2.83	3.00	.00	.94
99	3.83	1.00	.00	.50	.67	.26
100	.17	.00	.00	.00	3.17	.05
101	1.00	.00	.83	3.83	.00	.26
102	.17	.00	3.67	1.67	.00	.45
103*	2.00	.33	2.00	2.83	.17	.71
104*	2.50	.00	.00	.00	2.33	.93
105*	2.17	2.50	.33	.83	.00	.87
106	3.83	1.17	.00	.17	.00	.30
107	.17	.00	.33	3.50	.00	.10
108*	2.67	.17	.00	.00	3.17	.84
109	.17	.33	3.33	1.50	.17	.45
110	.17	.33	.50	3.83	.00	.13
111	.17	.00	3.83	1.67	.00	.43
112	.17	.17	.00	3.83	.00	.04
113	.17	.33	3.83	.50	.00	.13
114	.17	1.17	.50	2.83	.00	.41
115	.33	.50	.00	3.67	.00	.14
116	.00	.83	3.67	.17	.00	.23
117	.17	.17	.50	4.00	.00	.13

Pilot Test and First Revision

The 84-item version of the OCI resulting from the expert rating phase was pilot tested using a sample of 59 subjects. Table 12 shows the means and standard deviations

for each item as well as the minimum and maximum values (all items have been scaled in the positive direction). Items with means above 4.5 were eliminated as well as items with standard deviations below .5. Using these criteria, only one item, number 79, was eliminated.

Item-total correlations. A second criterion for item elimination was the item-total correlation for each item. Table 13 shows the item-total correlations for each item, broken down by scale. The correlations in Table 3 are those for items which remained after items with item-total correlations less than .3 were eliminated. First, items with correlations below .25 were eliminated, resulting in higher correlations for remaining items. After this procedure, only 2 more items had correlations below .3. Eliminating these resulted in the correlations found in Table 13. The use of means, standard deviations and item-total correlations resulted in 14 items being deleted from the OCI.

Table 12

Pilot Test: Item Means and Standard Deviations

Item	Mean	Std Dev	Minimum	Maximum
1	4.42	.83	1	5
2	3.39	1.02	1	5
3	2.05	1.02	1	5
4	1.98	.78	1	4
5	3.37	.89	1	5
6	4.32	.75	1	5
7	4.47	.70	1	5
8	2.54	.95	1	4
9	4.02	.80	1	5
10	3.93	.89	2	5
11	2.61	1.05	1	5
12	2.29	1.05	1	5
13	3.86	.82	2	5
14	3.92	.88	1	5
15	4.36	.61	3	5
16	2.75	1.14	1	5
17	3.73	.96	1	5
18	3.49	1.02	1	5
19	2.71	1.07	1	5
20	2.12	.97	1	5
21	3.93	.83	1	5
22	4.02	.78	2	5
23	2.68	1.07	1	5
24	3.90	.84	2	5
25	3.39	1.02	2	5
26	3.20	.91	2	5
27	2.80	1.01	1	5
28	2.31	1.15	1	5
29	2.34	.66	1	4
30	3.97	1.03	1	5
31	2.80	1.00	1	5
32	3.47	1.37	1	5
33	2.53	1.13	1	5
34	1.75	.71	1	4
35	2.39	.97	1	5
36	3.53	.95	1	5
37	2.22	1.07	1	5
38	2.19	1.24	1	5
39	3.14	1.02	1	5
40	4.03	.76	2	5
41	1.85	.98	1	5

table continues

Item	Mean	Std Dev	Minimum	Maximum
42	3.29	.89	1	5
43	4.41	.72	1	5
44	3.92	.86	2	5
45	1.75	.78	1	3
46	4.27	.58	2	5
47	2.53	1.02	1	5
48	4.12	.81	2	5
49	2.44	1.04	1	5
50	2.53	1.06	1	5
51	3.31	1.21	1	5
52	1.88	.85	1	5
53	3.78	.91	1	5
54	4.31	.73	1	5
55	4.15	.74	2	5
56	2.86	1.09	1	5
57	3.71	.91	1	5
58	3.49	.75	1	5
59	2.31	.93	1	5
60	4.02	1.04	2	9
61	2.34	.82	1	5
62	2.95	1.09	1	5
63	4.12	.70	2	5
64	3.51	.97	2	5
65	4.14	.73	1	5
66	4.14	.80	2	5
67	4.31	.50	3	5
68	2.73	1.10	1	5
69	3.61	.79	2	5
70	4.02	.78	1	5
71	3.86	.80	2	5
72	3.78	.81	1	5
73	1.86	.78	1	5
74	3.73	.98	1	5
75	2.58	.97	1	5
76	1.95	.88	1	5
77	2.25	.94	1	4
78	2.64	1.23	1	5
79*	4.71	.49	3	5
80	2.09	.94	1	5
81	3.86	.94	2	5
82	2.34	.88	1	5
83	2.71	1.10	1	5
84	2.41	1.07	1	5

Table 13

Item-Total Correlations for Version 1

PERSONAL CONTROL					
1	3	6	10	11	31
.5044**	.5133**	.3156*	.3206*	.4064**	.3795**
50	53	57	61	62	63
.3899**	.6727**	.7236**	.3015*	.5727**	.4868**
67	70	74			
.3166*	.4310**	.4204**			
DIETARY RESTRAINT					
8	16	23	28	36	56
.6357**	.7193**	.7020**	.6963**	.5508**	.4841**
COSTS/BENEFITS					
19	41	47	49	52	54
.3464**	.5534**	.6276**	.4239**	.4790**	.5171**
58	64	73	76	78	80
.6461**	.5385**	.7341**	.6914**	.6640**	.8035**
83					
.7353**					
HEALTH KNOWLEDGE					
4	17	20	21	30	35
.4616**	.4105**	.5874**	.4464**	.6018**	.4267**
45	55	66	69	72	77
.4769**	.6828**	.5098**	.3735**	.4325**	.4324**
79	81	82	84		
.4126**	.5408**	.3484**	.4969**		

table continues

SELF-CONCEPT

2	5	14	18	22	24
.6352**	.5552**	.6396**	.5752**	.8112**	.4200**
26	32	33	37	38	40
.4493**	.4949**	.7264**	.7922**	.5305**	.5532**
44	46	48	51	60	65
.3095*	.4359**	.7373**	.4077**	.5291**	.3773**
68	71				
.6068**	.6555**				

* - Signif. LE .05 ** - Signif. LE .01

Scale inter-correlations. Table 14 provides scale inter-correlations for the five subscales of the revised (70-item) OCI. As can be seen from this table, the only scales correlated with each other at a level of .5 or greater are PC and CB, and PC and SC.

Table 14

Scale Inter-Correlations

	PC	DR	CB	HK	SC
PC	1.0000				
DR	-.0519	1.0000			
CB	.7064**	-.0314	1.0000		
HK	.3207*	.2859*	.4172**	1.0000	
SC	.5628**	-.1758	.4649**	.1350	1.0000

* - Signif. LE .05 ** - Signif. LE .01

Second (Final) Revision

Test-retest reliability. A total of 217 subjects participated in the second revision of the OCI. The first item analysis procedure for the second revision consisted of an examination of test-retest reliability. Seventy of the 217 subjects returned to take the OCI a second time. The delay between the first and second instrument administrations averaged 9.6 days (SD= 4.9, range= 6-21). Test-retest reliabilities (Pearson correlations) for the 70 items of the OCI (version 2) are found in Table 15.

Table 15

Test-Retest Reliability: Version 2

Item	r	Item	r	Item	r	Item	r
1	.57	19	.49	37	.49	55	.48
2	.80	20	.63	38	.41	56	.47
3	.60	21	.69	39	.82	57	.59
4	.45	22	.40	40	.29	58	.61
5	.71	23	.38	41	.59	59	.45
6	.32	24	.93	42	.45	60	.56
7	.64	25	.69	43	.55	61	.69
8	.43	26	.63	44	.70	62	.52
9	.68	27	.70	45	.48	63	.56
10	.54	28	.58	46	.67	64	.71
11	.64	29	.64	47	.48	65	.45
12	.51	30	.42	48	.46	66	.52
13	.72	31	.17	49	.57	67	.50
14	.66	32	.45	50	.12	68	.63
15	.67	33	.54	51	.43	69	.47
16	.77	34	.33	52	.64	70	.70
17	.44	35	.67	53	.47		
18	.56	36	.54	54	.46		

As can be seen from Table 15, six items had test-retest reliabilities less than .4. These items (6, 22, 23, 31, 34, 40, and 50) were eliminated. In Table 16 is found the test-retest reliability coefficients for the total scale scores.

Table 16

Scale Score Reliabilities: Version 2

Scale:	PC	DR	CB	HK	SC
	.82***	.83***	.71***	.76***	.78***

***= P less than .001

Item-total correlations. Item-total correlations for Version 2 of the OCI were also calculated. These figures are found in Table 17, along with "alpha adjusted" for each item and Cronbach's alpha for each scale. Alpha Adjusted is the scale alpha which results if the item is deleted from the scale. Any item whose deletion from its scale resulted in a higher scale alpha, was removed. This resulted in the deletion of 8 items, including item 31, which was also removed because of poor test-retest reliability.

Table 17

Item-Total Correlations: Version 2

Item	Item-Total r	Alpha Adjusted*
Scale: PC (Alpha= .7625)		
1	.4773	.7460
3	.5149	.7377
6	.3328	.7555
8	.0191	.7809
9	.4822	.7407
23	.4325	.7461
38	.3454	.7551
41	.5634	.7343
45	.5456	.7363
48	.2429	.7623
49	.2404	.7702
50	.3653	.7533
54	.2713	.7601
57	.4452	.7493
61	.3632	.7533
Scale: DR (Alpha= .5651)		
7	.3504	.5000
11	.2744	.5356
18	.2870	.5275
21	.3999	.4748
27	.1791	.5720
44	.3455	.5009
Scale: CB (Alpha= .7130)		
14	.0299	.7367
31	.1610	.7169
35	.5614	.6609
37	.4538	.6801
40	.2745	.7037
42	.1367	.7169
46	.3472	.6951
51	.2648	.7056
60	.3727	.6929
62	.3473	.6951
64	.3801	.6900
66	.5882	.6609
69	.4380	.6814

table continues

Item	Item-Total r	Alpha Adjusted*
Scale: HK (Alpha= .6714)		
4	.2311	.6623
12	.3515	.6457
15	.2211	.6635
16	.3272	.6495
22	.2279	.6641
26	.3647	.6457
33	.4123	.6393
43	.4283	.6420
53	.2032	.6650
56	.2303	.6620
59	.1854	.6679
63	.1672	.6695
65	.3161	.6565
67	.2559	.6591
68	.2372	.6619
70	.2959	.6540
Scale: SC (Alpha= .8075)		
2	.5377	.7894
5	.6104	.7867
10	.3423	.8011
13	.4814	.7937
17	.4617	.7967
19	.4115	.7973
20	.2727	.8047
24	.3618	.8063
25	.5338	.7892
28	.5464	.7890
29	.5291	.7896
30	.2525	.8051
32	.1653	.8115
34	.3337	.8021
36	.3855	.7993
39	.1680	.8128
47	.3805	.7994
52	.1193	.8116
55	.3771	.7993
58	.3801	.7992

*Alpha Adjusted= Scale alpha if item is removed.

Final Instrument Characteristics

Given that no items had means that exceeded 4.5 and standard deviations that dropped below .5, no items were eliminated based on these criteria. In all, item analyses for version 2 of the OCI resulted in the elimination of 14 additional items, leaving 56 items in the final version of the OCI. The number of items remaining in each scale was as follows: PC- 10, DR- 6, CB- 9, HK- 15, and SC- 16.

Test-retest reliability coefficients and Cronbach's alphas for each of the five scales of Version 3 are found in Table 18. Figures for the total sample as well as individual breakdowns for males and females are listed.

Table 18

Scale Reliabilities and Alphas: Version 3

Statistic	PC	DR	CB	HK	SC
Reliability					
Total	.83	.83	.69	.77	.83
Males	.71	.72	.71	.73	.76
Females	.92	.85	.70	.69	.89
Cronbach Alpha					
Total	.74	.57	.75	.66	.82
Males	.67	.30	.73	.66	.82
Females	.79	.60	.76	.62	.81

Scale inter-correlations. Correlations among the scale scores are provided in Table 19. A correlation matrix for the group as a whole is presented first with similar matrices for males and females following.

Table 19

Final Scale Inter-Correlations

Group	Scales				
All Subjects					
	PC	DR	CB	HK	SC
PC	1.0000				
DR	-.0599	1.0000			
CB	.5141**	.1140	1.0000		
HK	.3298**	.4900**	.3082**	1.0000	
SC	.5501**	-.1427*	.2980**	.0127	1.0000
Males					
	PC	DR	CB	HK	SC
PC	1.0000				
DR	.2028*	1.0000			
CB	.5460**	.3136**	1.0000		
HK	.5538**	.3376**	.4707**	1.0000	
SC	.5700**	.1037	.3214**	.1602	1.0000

table continues

Group	Scales				
Females					
	PC	DR	CB	HK	SC
PC	1.0000				
DR	-.1178	1.0000			
CB	.4991**	.0220	1.0000		
HK	.2782**	.4903**	.2174*	1.0000	
SC	.5263**	-.1106	.3014**	.0629	1.0000

* - Signif. LE .05 ** - Signif. LE .01

Outcome variable statistics. Statistics for the outcome variables are provided in Table 20. Both test-retest reliability and intercorrelations between percent fat (PF) and percent overweight (PO) are listed.

Concurrent Criterion Validation

Scale-criterion correlations. The first method used to assess concurrent criterion validation of the OCI was to correlate each subject's scale scores with that individual's criterion measures of obesity (percent fat and percent overweight). These correlations are found in Table 21.

Table 20

Outcome Variable Statistics

Variable	Total	Males	Females
Reliability			
Percent Fat	.94**	.91**	.79**
Percent Overweight	.93**	.95**	.87**
Intercorrelations			
PF with PO	.51**	.70**	.83**

**= significant at the .01 level.

MANCOVA analyses. A second assessment of concurrent criterion validity was made using MANCOVA. This procedure allowed testing whether or not subjects of low, moderate, and high obesity levels scored differently on the 5 cognitive subscales of the OCI. Since the distribution for obesity level is highly dependent upon sex, separate MANCOVAs were run for males and females. Low, moderate, and high obesity levels were defined as the respective thirds of the distribution for percent fat (percent fat being the most valid measure of obesity available). Age, which correlated .35 with percent fat, was used as the covariate. Table 22 provides the results of multivariate tests of significance for males. As can be seen, when taken as a group, the discriminatory power of the five scales is statistically

Table 21

Scale Score Correlations with Obesity Measures

Obesity Measure	Scale Scores PC	DR	CB	HK	SC
Percent Fat					
Total	-.3640**	.3398**	-.1809**	.2063**	-.4919**
Male	-.3439**	.0335	-.1706	-.0380	-.3645**
Female	-.3966**	.1408	-.2770**	.0635	-.4580**
Percent Overweight					
Total	-.2602**	.1224	-.1484*	.0632	-.3699**
Male	-.1652	.1245	-.0036	.1045	-.3182**
Female	-.3499**	.2078*	-.2535**	.0837	-.5015**

* - Signif. LE .05 ** - Signif. LE .01

Table 22

Multivariate Tests of Significance: Males

Test	Value	F	Hyp. DF	Error DF	Sig.
Pillais	.18637	1.84975	10.00	180.00	.055
Hotellings	.22306	1.96289	10.00	176.00	.040
Wilks	.81583	1.90704	10.00	178.00	.047
Roys	.17371				

(S = 2, M = 1 , N = 43 1/2)

significant according to two of the tests and closely approaches significance according to the third. As indicated in Table 13, univariate F tests clearly show that there are differences across obesity levels for PC and SC with CB closely approaching significance.

Table 23

Univariate F Tests: Males

Scale	Hyp. SS	Error SS	Hyp. MS	Error MS	F	Sig.
PC	213.5	1518.9	106.7	16.3	6.5	.002
DR	13.9	837.2	6.9	9.0	.7	.465
CB	109.3	1792.1	54.6	19.2	2.8	.064
HK	10.2	2918.5	5.1	31.3	.2	.849
SC	520.5	4393.9	260.2	47.2	5.5	.005

(2,93) D. F.

In the following two tables (24 and 25), the multivariate and univariate test results for females are presented. Multivariate analyses (Table 24) indicate that as a whole, the OCI subscales clearly differentiate among female subjects of low, moderate and high obesity levels. An examination of the univariate analyses shows that PC, CB, HK, and SC all easily discriminate among females of the various obesity levels.

Table 24

Multivariate Tests of Significance: Females

Test	Value	F	Hyp. DF	Error DF	Sig.
Pillais	.31195	4.06551	10.00	220.00	.000
Hotellings	.39417	4.25706	10.00	216.00	.000
Wilks	.70507	4.16217	10.00	218.00	.000
Roys	.24149				

(S = 2, M = 1 , N = 53 1/2)

Table 25

Univariate F Tests: Females

Scale	Hyp. SS	Error SS	Hyp. MS	Error MS	F	Sig.
PC	235.7	2494.8	117.8	22.0	5.3	.006
DR	54.2	1523.0	27.1	13.4	2.0	.138
CB	283.1	2805.4	141.5	24.8	5.7	.004
HK	240.3	2974.7	120.1	26.3	4.5	.012
SC	865.0	4866.5	432.5	43.0	10.0	.000

(2,113) D. F.

Pairwise comparisons: Scheffe tests. Multiple pairwise comparisons of means were made using the Scheffe test. This test indicates which group means differed from one another at the .05 level of significance. Tables 26 and 27 provide the results of these comparisons for males and females respectively. Groups are listed in order lowest mean to highest mean.

Table 26

Pairwise Comparisons (Scheffe Tests): Males

Scale	Mean	Group	Group
PC			3 2 1
	38.7647	Grp 3	
	39.3667	Grp 2	
	42.0909	Grp 1	* *
SC			3 2 1
	60.4118	Grp 3	
	61.2333	Grp 2	
	65.9091	Grp 1	* *

* Pairs of groups significantly different at the .05 level.

Table 27

Pairwise Comparisons (Scheffe Tests): Females

Scale	Mean	Group	Group
PC			3 2 1
	36.1750	Grp 3	
	39.6410	Grp 2	*
	40.6750	Grp 1	*
CB			3 1 2
	32.1026	Grp 3	
	35.5250	Grp 1	*
	35.5385	Grp 2	*
HK			1 3 2
	58.1250	Grp 1	
	60.2500	Grp 3	
	61.6410	Grp 2	*
SC			3 2 1
	54.1795	Grp 3	
	58.5128	Grp 2	*
	61.5750	Grp 1	*

Factor Analysis

Finally, to determine what salient constellations of variables might be revealed by factor analysis, this procedure was run for both males and females. A principal components extraction with varimax rotation required 17 factors for males and 18 factors for females in order to reach eigen values less than 1.0. This poor result was due to the fact that the correlation matrix of all variables (items) was ill-conditioned. That is, SPSSX indicated that intercorrelations among items were too weak for factor analysis to be an appropriate method for grouping items.

CHAPTER V

CONCLUSIONS

In general, the OCI shows promise as an instrument for the assessment of obesity-related cognitions. As a result of the pyschometric procedures employed, the final 56-item version of the OCI has emerged with reliability and validity characteristics which suggest that it is capable of quantifying the relationships between five cognitive constructs and objective measures of obesity level. The constructs measured by the OCI consist of thoughts, beliefs, and attitudes that are related to obesity. Such cognitions might be contrasted with cognitive processes, such as planning, reasoning, and calculating.

Of the cognitive constructs considered in this study, Personal Control and Self-Concept show the strongest relationships to obesity. These constructs also appear to be strongly related to one another as well. Surprisingly, Dietary restraint, which has received considerable attention in previous literature, shows the weakest relationship to obesity.

A number of clear sex differences were discovered. Not only do males and females differ considerably in terms of the statistical distributions of percent fat and percent overweight, but they also show interesting differences with

respect to the relationship between their cognitive patterns and their obesity levels. We will now turn to a more detailed discussion of these and related issues.

Psychometric Characteristics of the OCI

Construct validity. The original item pool was subjected to a clinical rating process which resulted in a beginning pool of items which clinical raters consensually agreed had good content validity relative to carefully drafted operational definitions. The expert rating process resulted in the removal of items which raters saw as measuring more than one construct to a relatively high degree. Overall, the clinical rating process produced a starting pool of items for each construct which were seen as clinically significant. As a result, the clinical rating process yielded final scales which clinicians can recognize as meaningful.

Test-retest reliability. The test-retest reliability of the OCI appears to be reasonably good, with coefficients ranging from .69 to .83. These figures might be higher still for clinical populations. Given that the sample used for reliability measurement may have been more interested in hurriedly performing its task so as to collect extra credit with as little effort as possible, it is conceivable that clinical populations might take the task more seriously, and therefore, perform more consistently. Also, the reliabilities could reflect the fact that the constructs

measured by some scales may entail a fair amount of natural variability. For example, the lowest reliability, .69 for Cost-Benefit cognitions, may indicate that such cognitions are fairly susceptible to transient influences (e.g., media advertising, peer influences, etc.). It is also interesting to note that in general, scale scores for females are more reliable than for males.

Internal reliability. Cronbach alphas for the scales also appear to be adequately high for this level of the OCI's development. Cronbach's alpha may be interpreted as the correlation between a given scale and all other such scales that could be constructed from items measuring the same construct. Again, it appears that the alphas for females tend to run slightly higher than those for males.

Sex differences. Reliabilities and intercorrelations for the outcome measures (percent fat and percent overweight) present some interesting interpretation challenges. For all subjects combined, the test-retest reliabilities of .94 and .93 suggest good temporal stability. However, a breakdown by sex shows that both measures are considerably less reliable for females. This may be due to more dieting among females or perhaps fluctuations due to menstruation. Intercorrelations of percent fat and percent overweight are also puzzling. While the overall correlation (for all subjects) is .51, the correlations for both males and females individually are

considerably higher (.70 and .83, respectively). This suggests that the regression lines for the two sexes probably have different slopes and/or intercepts.

Scale intercorrelations. Scale intercorrelations for the OCI range in magnitude from near zero to .57 with most around .30. This suggests that the scales are relatively independent of one another. The highest scale intercorrelations are for Personal Control and Self-Concept. For males, females, and the group as a whole, these correlations all run above .50. These relatively strong correlations are explainable from a common sense standpoint. Those who believe that the outcomes of situations are largely controllable are likely to have strong self-concepts as well. A sex difference relative to the scale intercorrelations is also worthy of note. For males, the intercorrelations between PC and DR, DR and CB, and CB and HK, are all considerably higher than those for females or the group as a whole. Given the number of correlations produced across these three groups, it is likely that some of the differences between correlations that appear significant are the result of chance (increased Type I error). Further research will be necessary to determine if these sex differences are reliable.

Concurrent Criterion Validity of the OCI

Scale-criterion correlations. Correlations between the criterion measures and the scale scores provide an initial index of the OCI's concurrent criterion validity. These figures also address the hypotheses outlined previously. Personal Control (PC) and Self-Concept (SC) show the highest overall correlations with the outcome measures (r= -.36 and -.49 with percent fat). These findings are directly in line with the study's hypotheses. In other words, a strong sense of personal control over the outcome of one's actions, as well as a positive self-concept/self-esteem, appear to be associated with lower levels of obesity.

Dietary Restraint presents a bit of a puzzle since its overall correlation with percent fat is .34. However, the correlations drop to .03 and .14, respectively, when males and females are examined independently. This points to the importance of checking for sex differences when dealing with obesity-related variables. This finding is also at variance with this study's hypothesis that dietary restraint would be positively associated with obesity. Given the results of breakdowns by sex, it may be that previous research that generally found positive correlations may have done so by failing to examine males and females separately. This bears further examination.

Health knowledge cognitions appear to be somewhat positively correlated with obesity (r= .21) when the group

as a whole is considered (a finding contrary to the study hypothesis). However, this effect disappears when the relationship is examined for males and females separately (r= -.04 and .06). In other words, it appears that the more accurate one's knowledge of diet, exercise, and other health-related factors, the greater is one's likelihood of being obese (when both sexes are considered simultaneously). Though seemingly paradoxical, similar findings have been made by Burns et al. (1987), suggesting that the obese may be more attentive to health-related information as a result of their condition. However, as this study has shown, such findings may be the result of not considering obesity-knowledge relationships separately for each sex.

The correlation between cost-benefit cognitions and percent fat (-.18) is the lowest of all five scale correlations, suggesting that the more one acknowledges the benefits of diet, exercise, and other fitness-producing activities, while minimizing the costs, the less likely it is that the person will be obese. Though this correlation is in the hypothesized direction, its magnitude implies that this particular set of cognitions may not play a major role in obesity or its maintenance, contrary to the considerable number of studies which have suggested otherwise.

Multivariate analyses of covariance. The results of MANCOVA analyses shed additional light on the relationships above. Pairwise comparisons between scale means for each of

the three obesity levels provide particularly interesting information. For males, personal control and self-concept were the only scales achieving significant differences across groups. In both cases, the only pairwise comparisons achieving significance were between group 1 and groups 2 and 3, suggesting that there is little difference between those of moderate and high obesity levels relative to these variables.

The picture is somewhat different for females. MANCOVA indicates that all scales except dietary restraint show significant differences between groups. For both personal control and self-concept the "odd group out" is the high obesity group, shown to be significantly different than both the low and moderate obesity groups (just the opposite pattern as found in males). Cost-benefit cognitions show a pattern similar to self-concept and personal control with the high obesity group significantly differing from the other two groups.

Only the Health Knowledge scale shows a different pattern. The only significant difference between means occurred between subjects of low and moderate obesity level. This explains the low correlation. There appears to be a distinct curvilinear relationship between health knowledge and obesity level, with health knowledge being highest for those in the moderate obesity group.

Findings from the pairwise comparisons raise several interesting possibilities with respect to the relationships between these cognitive constructs and obesity. For males, those of low obesity level seem to cognitively differ most from their more obese peers (i.e., relative to personal control and self-concept). However, among females, just the opposite tends to be true. That is, those of high obesity level are cognitively distinct from their less obese peers (relative to personal control, cost-benefit, and self-concept). The only exception is health knowledge, where females of low obesity level significantly differ only from those of moderate obesity level. Though the foregoing findings are not easily explainable, they suggest that the moderate to weak correlations found for all scales are due to curvilinear relationships between many of these variables and the obesity measures.

Final Considerations

A word about correlation and causation is warranted. The OCI offers evidence that certain cognitive variables are correlated with obesity level. The evidence provided in this study, however, does not support the idea that certain cognitions or patterns thereof, cause obesity. The OCI would, however, lend itself nicely to a number of research designs which could address the issue of whether or not cognitions are causal agents in the obesity equation. For example, obese subjects could be treated with interventions

aimed at changing personal control and/or self-concept cognitions. If such treatments resulted in cognitive as well as obesity level changes, the causality assertion would be strengthened.

It should also be noted that even factors such as cost-benefit cognitions, which show the lowest correlation with obesity level, should not be overlooked when exploring causal links. There are numerous examples of variables which in an unmanipulated state are uncorrelated, yet can be shown to be causally linked when one variable is manipulated.

The present study has shown that the OCI demonstrates promise as an instrument for the assessment of obesity-related cognitions. This study, however, simply constitutes the first major step in the instrument's development. In addition to the studies suggested above, the OCI itself might be further refined by developing norms for the following groups: males versus females, obesity treatment seekers versus non-treatment seekers, and white versus minority groups.

In summary, the OCI shows promise as an instrument which can further elucidate the role of cognitions relative to obesity.

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APPENDICES

Appendix A

Operational Definitions of the Five Constructs

Personal Control (PC)

Personal Control refers to the degree that one feels one is in control of a given outcome. In the context of this instrument, PC refers to the degree that one feels one is able to control one's weight. This would include feeling that one can make the diet, exercise, and psychological changes necessary to maintain appropriate weight. As defined here, PC is a measure of one's expectancy for success (or failure) relative to performing the behaviors that will result in achieving proper weight.

Dietary Restraint (DR)

It has been hypothesized that eating behavior is the result of an interplay between physiological urges to eat and cognitive efforts to resist those urges. DR relates to the cognitive efforts (e.g., self-statements, thoughts, and beliefs) which indicate that one is attempting to monitor and/or reduce food intake.

Cost-Benefit Beliefs (CB)

Achieving and maintaining appropriate body weight is associated with certain costs and benefits. CB refers to how one perceives the relative costs (disadvantages, drawbacks, etc.) and benefits (advantages, rewards, etc.) for achieving and/or maintaining appropriate weight. This includes beliefs about the costs and benefits associated with dieting and exercising.

Health Knowledge (HK)

This category is intended to measure the amount of factual information one has regarding weight-reduction and weight-maintenance behaviors (diet and exercise). Hence, HK items assess one's knowledge about the types and amounts of diet and exercise necessary to achieve appropriate weight and fitness.

Self-Concept (SC)

Self-Concept refers to what one believes on is and how one feels about these beliefs. In other words, self-concept items assess what I believe I am and how I feel about this.

Appendix B

Item Elimination Record

Key to Codes

First Elimination (117-84)

1- Expert Rating

Second Elimination (84-70)

2a- Mean/SD

2b- Item-Total Correlation

Third Elimination (70-56)

3a- Test-Retest Reliability

3b- Alpha-Adjusted (ITC)

1.		You can learn to control your weight.
2.	1	Overweight people tend to get sick more often.
3.		My looks are acceptable to me.
4.	1	When I occasionally overeat it does not bother me.
5.		My eating habits are out of my control.
6.		You have to eat less than 1000 calories per day to maintain appropriate weight.
7.		I am physically attractive.
8.	3a	I can control how much physical activity I get.
9.	2b	Being overweight can lead to a heart attack.
10.	1	I see myself as weak-willed.
11.		I spend a lot of time thinking about food.
12.	1	Obese people tend to fatigue easily.
13.	2b	I am self-motivated.
14.	1	A gain of 5 pounds would upset me very much.
15.	3b	My attitudes toward diet and exercise can be changed.
16.		I lack self-control.
17.	1	After eating too much I feel guilty.
18.	1	Being overweight is a problem for me.
19.	2b	Liquid diets are one good way to reduce weight.
20.	2b	In general, obese people die younger than non-obese people.

21.	1	My weight level is affected by my activity choices.
22.		My health is good.
23.	2b	Staying in shape makes you look good.
24.		I don't pay much attention to what I eat.
25.		My weight level is affected by how much I choose to eat.
26.		I see myself as an active person.
27.	3b	People who are fit have more friends.
28.		Skipping meals is a good way to loose weight.
29.		My weight level is affected by the kinds of foods I choose to eat.
30.		I am generally happy.
31.		I think a lot about food and eating.
32.		Intelligence is one of my characteristics.
33.	2b	Eating sweets should be avoided to maintain appropriate weight.
34.		I am more hard-working than others.
35.	2b	Being overweight has little to do with sexual satisfaction.
36.		I am very aware of the calorie content of what I eat.
37.	1	Fitness level is the result of genetic factors.
38.	2b	Injuries are common among those who exercise.
39.	3a	Fasting is a poor method for reducing weight.
40.	1	I have a hard time sticking to difficult tasks.
41.		Exercise increases your risk of premature death.
42.	3a	My eating habits are influenced strongly by other people.
43.		I would like very much to be thinner.
44.		Confidence is a virtue I lack.
45.	2b	Exercise often causes health problems.
46.		Processed foods are usually better for reducing weight than unprocessed foods.
47.		My weight level is affected by how I think.
48.		I am dissatisfied with who I am.
49.		I have a serious weight problem.
50.	2b	My body chemistry controls my weight.
51.		I think that I am a likeable person.
52.	1	After gaining weight I want to get rid of it immediately.
53.	3ab	People make fun of you if you exercise.
54.	2b	Dried fruits contain more calories per ounce than fresh fruits.
55.	1	The causes of my weight level tend to fluctuate.
56.	2b	Being honest with others is important to me.
57.	3b	I see myself as an obedient person.
58.		Whole milk is better for reducing weight than skim milk.
59.	3a	I am a good person.
60.		Getting enough exercise takes too much time.

61.	1	I rarely make a conscious effort to reduce my eating.
62.	1	The things that influence my weight vary across time.
63.		I am proud of my accomplishments.
64.		Exercising is boring.
65.	1	I deliberately choose foods that will help me reduce.
66.		My weight level is unpredictable.
67.	3b	Creativity comes naturally for me.
68.	3a	Getting regular exercise is expensive.
69.		I can control my weight.
70.	3b	Physical activity produces a feeling of wellbeing.
71.	1	My problem-solving skills are poor.
72.		Reducing the amount of fat in the diet helps maintain appropriate weight.
73.		I think of ways to avoid snacking.
74.	1	Commitment to a cause is not important to me.
75.		I can control the factors which influence my weight.
76.	1	I believe that skipping meals helps me control my weight.
77.		Exercising leads to meeting interesting people.
78.	2b	It is OK to eat sugary foods while reducing as long as you reduce your consumption of other foods to compensate.
79.		I am generally enthusiastic about things.
80.		If you are fat its not your fault.
81.	1	Indecisiveness is a problem for me.
82.	3b	Once I start eating it is often hard to stop when I should.
83.	1	You have to sweat a lot for exercise to do any good.
84.	1	I enjoy challenges.
85.	3a	Appropriate weight can be maintained through personal effort.
86.		Getting adequate exercise is not too hard.
87.	3b	Dependability is one of my characteristics.
88.		In order to maintain appropriate weight, one should exercise for at least 30 minutes, 3 times per week.
89.	1	I can do almost anything if I put my mind to it.
90.	1	I purposely take small helpings to stay thinner.
91.	1	Paying attention to everything you eat is stupid.
92.		I can change my exercise habits.
93.		Lack of assertiveness is a problem for me.
94.		In order to get a good effect from exercise, your heart rate should be between 60%-80% of its maximum possible level.
95.	1	I believe that you should "eat, drink and be merry".
96.	1	People respect you if you exercise.

97.	1	Trying to control what you eat is not worth the effort.
98.	1	Regular exercise lengthens your life.
99.		I can change my eating habits.
100.		I am generally optimistic.
101.		Simply increasing normal daily activities can make a big difference in maintaining appropriate weight.
102.		Eating a healthy diet makes you irritable.
103.	1	Through regular effort, you can become quite fit.
104.	1	Being organized is important to me.
105.	1	I keep a close eye on what I eat.
106.		Anyone can control their weight if they put their mind to it.
107.	2b	Frequent strenuous exercise is probably the best way to maintain appropriate weight.
108.	1	I am self-disciplined.
109.		Sticking to a healthy diet makes you depressed.
110.		Exercise is less important than diet in maintaining appropriate weight.
111.		Eating a healthy diet is expensive.
112.	2a	A combination of appropriate diet and exercise is the best method for achieving appropriate weight.
113.		Eating a healthy diet takes too much time.
114.		Eating slowly allows you to appropriately satisfy your appetite.
115.		The total number of calories eaten is the most important factor in controlling weight.
116.		Eating appropriately isn't much fun.
117.		Natural foods such as nuts and raisins are low in calories.

Appendix C

Personal Information Questionnaire

Please answer the following questions as accurately as possible. This information will be kept confidential. Mark your answers ON YOUR RESPONSE SHEET. Make sure to answer all questions.

1. How often do you go on a diet to lose weight?
    1. Less than once every five years.
    2. Once every 2-5 years.
    3. Once every 1-2 years.
    4. Once every 6 months- 1 year.
    5. Once every 2-6 months.
    6. Once every 2-8 weeks.
    7. At least every two weeks.

2. How would you rate your knowledge of nutrition?
    1. Very Good.
    2. Good.
    3. Fair.
    4. A little below average
    5. Poor.

3. About how many times per month do you eat at "fast food" places?
    1. More than 20.
    2. 10-20
    3. 5-10.
    4. 1-5.
    5. Almost never.

4. What percent of your food do you buy for yourself (including groceries and dining out)?
    1. 90-100%
    2. 70-90%
    3. 50-70%
    4. 30-50%
    5. 10-30%
    6. 0-10%

5. When you do go shopping, what percent of the time do you use a shopping list?
   1. 90-100%
   2. 70-90%
   3. 50-70%
   4. 30-50%
   5. 10-30%
   6. 0-10%

6. What percent of your food do you cook for yourself?
   1. 90-100%
   2. 70-90%
   3. 50-70%
   4. 30-50%
   5. 10-30%
   6. 0-10%

7. What percent of your meals do you eat by yourself?
   1. 0-10%
   2. 20-40%
   3. 40-60%
   4. 60-80%
   5. 80-100%

8. On average, how many meals do you eat per day?
   1. 1
   2. 2
   3. 3
   4. 4
   5. more than 4

9. On average, how many times per day do you eat a snack?
   1. 1
   2. 2
   3. 3
   4. 4
   5. more than 4

10. On average, how long do your meals last?
   1. 0-5 minutes
   2. 5-10 minutes
   3. 10-20 minutes
   4. 20-30 minutes
   5. 30 minutes or more

11. How many months (total) have you spent in commercial and/or medical weight-loss programs?
    1. 0 months
    2. 1 month
    3. 2-3 months
    4. 3-5 months
    5. 5-7 months
    6. 7-12 months
    7. 12-24 months
    8. 24 or more months.

12. About how often do you binge eat?
    1. once or more per day.
    2. twice per week.
    3. once per week.
    4. once a month.
    5. less than once per month
    6. never.

13. Estimate how much you eat when you binge.
    1. 10,000 calories or more.
    2. 5,000-10,000 calories.
    3. 3,000-5,000 calories.
    4. 1,000-3,000 calories.
    5. less than 1,000 calories.
    6. I don't have any idea.
    7. I never binge eat.

14. How many times have you been in treatment for binge eating?
    1. more than 10 times.
    2. 5-10 times.
    3. 3-5 times.
    4. 2 times.
    5. 1 time.
    6. never.

15. How many times have your purged after binge eating (e.g., used vomiting, laxatives, etc.)?
    1. more than 50 times.
    2. 20-50 times.
    3. 10-20 times.
    4. 5-10 times.
    5. 1-5 times.
    6. never.

16. How often do you exercise per month?
    1. not at all.
    2. 1-2 times.
    3. 3-4 times.
    4. 5-8 times.
    5. 9-15 times.
    6. 16-25 times.
    7. every day.

17. How would you rate your knowledge about exercise?
    1. Very Good
    2. Good
    3. Average
    4. Fair
    5. Poor

18. In general, how much do you like exercise/physical activity?
    1. Very much
    2. Quite a Bit
    3. Average
    4. Not much
    5. Not at all.

19. How did you like Physical Education courses during your elementary school years (grades K-6)?
    1. Very much
    2. Quite a Bit
    3. Average
    4. Not much
    5. Not at all.

20. How did you like Physical Education courses during your secondary school years (grades 7-12)?
    1. Very much
    2. Quite a Bit
    3. Average
    4. Not much
    5. Not at all.

21. On average, how much time did you spend participating in COMPETITIVE athletics in high school (including training time)?
    1. more than 50 hours per week.
    2. 30-50 hours per week.
    3. 10-30 hours per week.
    4. 1-10 hours per week.
    5. Not at all.

22. How often do you use physical activity to "burn off" calories after overeating?

1. Never.
2. once per month.
3. 2-4 times per month.
4. 4-8 times per month.
5. more than 8 times per month.

23. Of your five closest friends, how many would you say are at least 15 pounds overweight?

1. 1
2. 2
3. 3
4. 4
5. 5
6. None.

24. Estimate your MOTHER'S weight level (if deceased, estimate weight level one year prior to her death).

1. more than 5 pounds underweight.
2. weight was appropriate.
3. 5-10 pounds overweight.
4. 10-20 pounds overweight.
5. 20-30 pounds overweight.
6. 30-50 pounds overweight.
7. More than 50 pounds overweight.

25. Estimate your FATHER'S weight level (if deceased, estimate weight level one year prior to his death).

1. more than 5 pounds underweight.
2. weight was appropriate.
3. 5-10 pounds overweight.
4. 10-20 pounds overweight.
5. 20-30 pounds overweight.
6. 30-50 pounds overweight.
7. More than 50 pounds overweight.

26. If you wished to lose weight, which do you think would be most effective?

1. Individual treatment.
2. Treatment in a group.
3. Group and individual treatment combined.
4. Doing it on my own.

27. In your opinion, if a WOMAN is 20% over her ideal weight, how serious of a problem is it?
    1. not serious.
    2. somewhat serious.
    3. very serious.

28. In your opinion, if a MAN is 20% over his ideal weight, how serious of a problem is it?
    1. not serious.
    2. somewhat serious.
    3. very serious.

Note: For the following items: write your response in the numbered blanks provided on the Response Sheet. If an item does not apply to you, indicate this by writing "NA" in the blank.

29. How many years total have you been overweight (including childhood and adolescence).

30. On average, how many times PER MONTH do you weigh yourself?

31. Currently, how many pounds are you below your all-time highest weight?

32. Estimate your percent body fat.

33. Estimate your weight in pounds.

34. What is your nationality?
    1. North American
    2. Mexican/Central-South American
    3. Asian
    4. African
    5. European
    6. Middle-Eastern
    7. Other

35. What is your race?
    1. White/Caucasian
    2. American Indian
    3. Black
    4. Hispanic
    5. Asian
    6. Mixed
    7. Other

36. What is your age?

37. What is your sex?

38. Have you been in a weight treatment program at any time during the last 3 months?

Note: **Check your Response Sheet. Make sure you have answered all of the items in the appropriate blanks. Feel free to ask us if you have questions.**

Thanks for your participation!

Appendix D

Consent Form

The purpose of this study is to examine the relationship between thinking patterns and body weight. A participant in this study will be able to learn his or her percent body fat- a measurement of what percent of the body is composed of fat tissue. Participants will also be told where they stand relative to established weight standards. Some individuals may also earn course credit for their participation (according to instructor's agreements).

Participation in this study requires the following: 1) filling out a questionnaire regarding some of your beliefs, attitudes and views, 2) filling out a demographic questionnaire (relative to your age, sex, marital status, eating and exercise habits), 3) having your height and weight measured, and 4) having your percent body fat measured while reclining (using a painless, simple procedure). Total time required for these activities is about 45-60 minutes. This study does NOT involve deception, nor risk of any kind. However, the questionnaires and other measures require self-disclosure of personal information. Some people may find it disturbing to disclose such information.

Participation is voluntary and participants may discontinue at any time during their participation without penalty. However, course extra credit can only be given to those who complete their participation.

All information is confidential and will be viewed only by a research team and the principal investigator. Participant names or other personal identifiers (e.g., social security numbers) are NOT used in this study. A list of names will be used only to notify instructors of those who have earned extra-credit.

This project has been approved by the Institutional Review Board at Utah State University. Any questions or concerns should be directed to Dr. J. R. Skidmore, Assistant Professor of Psychology and Principal Investigator (801-750-1451).

If you wish to participate in this research study, sign below.

I HEREBY AGREE TO VOLUNTARILY PARTICIPATE
IN THE RESEARCH PROJECT DESCRIBED ABOVE,
AND UNDER THE CONDITIONS DESCRIBED ABOVE.

_____ _____ _____

Print Name Here Your Signature Date

Appendix E

Participant Feedback Sheet

Date: _____

OCI Participant:

Thank you for your participation in the OCI Project. According to our measurements, your percent body fat is _____. This represents the percent of your total body weight which is composed of fatty tissue. Keep in mind that there is error variation in any measure of percent fat. Hence, subsequent measurements would be necessary to be more conclusive. Though standards vary, for adult females, 22-26% would be considered typical as would 18-22% for adult males. An "optimal" range for females would be 16-20% and an optimal range for males would be 11-13%. Whether or not weight reduction is advisable depends on your personal lifestyle and circumstances. Hence, if your percent body fat lies above or below the ranges listed, consultation with health professionals is strongly advised before you attempt to alter your weight.

If you would like to obtain help in improving your fitness level (or reducing weight) there are a number of facilities to choose from. These include Logan Regional Hospital's Nutrition and Weight Management Services at 750-5608 or the USU Department of HPER's Wellness Center at 750-3322. If you would like counseling for compulsive overeating, binge eating, anorexia, bulimia or related problems, the USU Community Clinic (750-3401) is available to students and the public and the USU Counseling Center (750-1012) is available to students only. If you have further questions, you may contact the OCI Project Director: David Christian, at 752-1620.

Thanks again for your participation. We hope this information is useful to you.

David Christian
OCI Project Director
USU Department of Psychology
Logan, Utah 84322
Phone: 801-752-1620

VITA

DAVID E. CHRISTIAN

Candidate for the Degree of

Doctor of Philosopy

PERSONAL DATA

Name: David E. Christian

Date of Birth: August 8, 1959

Place of Birth: St. George, UT

Married: June, 1987

EDUCATION

Ph.D. Candidate Professional & Scientific Psychology (APA Approved-Clinical)		Utah State University Department of Psychology Logan, UT 84322-2810
	Emphasis:	Clinical Psychology
Master of Science (1989)		Utah State University Department of Psychology Logan, UT 84322-2810
	Major:	Counseling Psychology (Pre-Clinical Track)
Bachelor of Science (1983)		University of Utah Salt Lake City, UT
	Major:	Psychology
Associate (1981)		Dixie Jr. College St. George, UT
	Major:	Science (Pre-Med Track)

PROFESSIONAL AFFILIATIONS

American Psychological Association

Association for Advancement of Behavior Therapy

Society of Behavioral Medicine

FELLOWSHIPS AND SCHOLARSHIPS

President's Fellowship (1987-1988)
Dean, College of Education, USU

Academic Scholarship
University of Utah (1979-1981)

Academic Scholarship
Dixie College (1977, 1980)

HONORS

Valedictorian- Dixie College
Selected by College President to Represent the Graduating Class of 1981

Graduate Senator: Selected by department head to represent all students in graduate psychology programs at USU during the 1988-89 school year.

"Rebel Creative Writing Award"- Dixie College, 1981. (Awarded for the most significant creative writing contribution of the year.)

Elected Member Phi Theta Kappa Honor Society
Dixie College (1981)

Member of Academic Honor Society
University of Utah (1983)

THESIS AND DISSERTATION

Master's Thesis- Obesity Management: A Meta-Analysis of Key Factors.

Doctoral Dissertation- The Development of an Instrument for the Assessment of Obesity-Related Cognitions.

PROFESSIONAL EXPERIENCE

Instructor- Taught 11 quarters of Educational Psychology, General Psychology, and related courses at Utah State University.

Teaching Assistant- for courses in Educational Psychology, and General Psychology (9 quarters)

Research Assistant- Learning Strategy Studies, and Hyperactivity Treatment Meta-Analysis at Utah State University (7 quarters).

JOURNAL PUBLICATIONS

Kiewra, K. A., DuBois, N. F., Christian, D., & McShane, A. (1988). Providing study notes: A comparison of three types of notes for review. Journal of Educational Psychology, 80, 595-597.

Kiewra, K. A., DuBois, N. F., Christian, D., McShane, A. Meyerhoffer, M., & Roskelley, D. (in press). Notetaking functions and techniques. Journal of Educational Psychology.

COMMISSIONED (PAID) PUBLICATIONS

Christian, D. E. (1989). Psychology for Teaching. Course text for Educational Psychology Course #366. Published by ICLIS/COM-NET for Distance Instructional Programs. Funded by a grant from the Kellogg Foundation.

Christian, D. E. (1990). Stress Management Package for Telecommunications Delivery. Published by ICLIS/COM-NET. Funded by a grant from the Kellogg Foundation.