



“Can One Predict Weight Gain Before It Occurs?”

Psychological Predictors of Weight Gain

Pedro J Teixeira, Ph.D.



Introduction

Why study predictors of obesity?

To understand the conditions that help develop and/or perpetuate obesity (“natural history”)

→ Knowledge-base, education, prevention, policy

To improve obesity management

→ Identify responders and non-responders

(e.g. delay treatment, seek alternative treatments)

→ Match intervention to individuals (tailoring)

→ ***Select effective (psychological) intervention targets***

Use of Predictors (example)

Obesity Facts
The European Journal of Obesity

Clinical Information

Obesity Facts 2008;1:000-000
DOI: 10.1159/000126822

Published online: April 18, 2008

Management of Obesity in Adults: European Clinical Practice Guidelines

Weight loss objectives should be:

- realistic,
- individualised,
- aimed at the long term.

Practical weight loss objectives are:

- A 5-15% weight loss over a period of 6 months is realistic

→ **Are unrealistic goals predictive of poorer outcomes?**

Use of Predictors (example)

Financial Incentive-Based Approaches for Weight Loss

A Randomized Trial

JAMA. 2008;300(22):2631-2637

→ **Extrinsic rewards and reinforcements diminish perceived autonomy ("ownership") and intrinsic motivation...**

A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation.

By Deci, Edward L.; Koestner, Richard; Ryan, Richard M.
Psychological Bulletin. Vol 125(6), Nov 1999, 627-668.

→ **Is autonomy predictive of greater weight control...?**



Introduction

“Psychological Predictor”...?

Psychological / psychosocial

“... **study of mental processes and behaviors...**”

(e.g., cognitions, emotional life, motivations, traits, etc...)

NOT INCLUDED:

- . Behavioral variables (e.g. dietary intake, PA, self-monitoring)
- . Early weight loss, weight cycling, diet/weight history
- . Treatment type

PREDICTOR: Factor “associated” with weight change, presumably **causally involved**... (prospective quality)

Summary – Most Consistent Predictors

T – treatment P – population

Exercise-related

- exercise self-efficacy (T/P)
- exercise intrinsic motivation (T)

Eating-related

- flexible cognitive restraint (T/P)
- low disinhibition / emotional eating (T/P)
- less hunger? (T, VLCD)

Psychological well-being

- obesity-specific quality of life (T)
- high self-esteem and positive body image? (T)

Other

- autonomous self-regulation (T)
- low weight preoccupation / concern (P)
- internal locus of control (T)
- low dichotomous thinking (T)
- moderate weight loss outcome evaluations (T)
- conscientiousness / low impulsiveness traits? (P)





Outline

Introduction

Predictors of population (“natural”) weight change

Pre-treatment predictors of weight loss / gain

Post-treatment predictors of maintenance / regain

Summary and Conclusions



Methodological challenges

Introduction

Reverse causality

(cross-sectional, retrospective, **prospective, experimental data**)

Moderating / interactive effects

(e.g. **treatment type**, gender, genetic/metabolic factors)

Self-selected / less representative samples

(NWCR, clinical samples, University settings)

Natural enviromental / societal changes

(e.g. economy, official guidelines, diet trends)

Study design heterogeneity

(e.g. instruments, follow-up periods, outcomes, definitions of success...)



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Prospective studies

I. Introduction

*II. “Natural”
weight change*

Québec Family Study (n=75 M/F, 6-year FU, ▲ weight)

BASELINE PREDICTORS – LOWER WEIGHT GAIN:


→ Low disinhibition


→ Low cognitive restraint

→ Low perception of hunger

Drapeau (2003) Int J Obes 27:808

Chaput (2009) Obesity 17:1964

 <p>I. Introduction</p> <p>II. "Natural" weight change</p>	<h2 style="text-align: center;">Prospective studies</h2> <p>Australian Longitudinal Study on Women's Health (n=790 young F, <u>2-year</u> FU, ▲ weight)</p> <p style="text-align: right;"><i>Ball (2006) Int J Obes 30:1240</i></p> <p><u>BASELINE PREDICTORS:</u></p> <p>→ Low importance of avoiding weight gain</p> <p>→ Self-efficacy: weight control, eating healthy (N.S. in adjusted analysis)</p>
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 <p>I. Introduction</p> <p>II. "Natural" weight change</p>	<h2 style="text-align: center;">Prospective studies</h2> <p>New England women (n=535 F, <u>20-year</u> FU, wt ▲)</p> <p style="text-align: right;"><i>Hays (2008) Obesity 16:52</i></p> <p>→ Low disinhibition (habitual and emotional)</p> <p>→ High <u>flexible</u> cognitive restraint</p>
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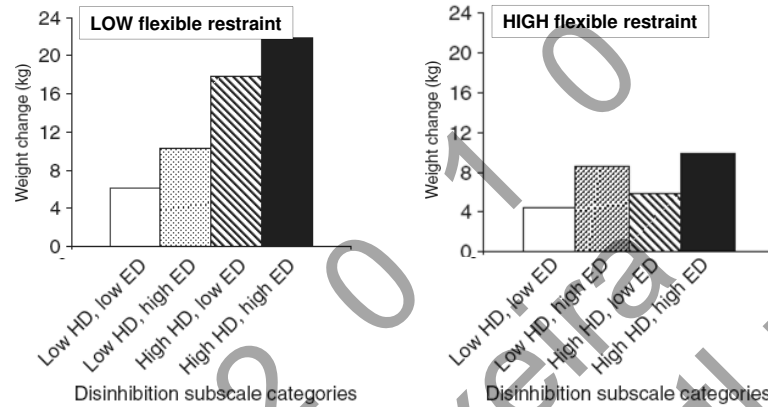


Prospective studies

New England women (n=535 older F, 20-year FU, wt▲)

I. Introduction

II. "Natural" weight change



Hays (2008) Obesity 16:52



Prospective studies

Pennsylvania women (n=176, 4-year FU, wt loss profile)

Savage (2010) Obesity 18:513

I. Introduction

II. "Natural" weight change

BASELINE PREDICTORS:

→ **Low level of weight concerns**

(fear of weight gain, worry over weight / shape, importance of weight)

→ **Low cognitive restraint**



“Obese Personality”...?

I. Introduction

II. “Natural”
weight change

Stereotypical Belief About Overweight Applicants and/or Employees

Studies Providing Empirical Evidence of the Stereotypical Belief

Lazy, don’t try as hard, less
conscientious, poorer
work habits, sloppy

Bellizzi and Norvell (1991); Cossrow, Jeffrey,
and McGuire (2001); Klassen, Jasper, and
Harris (1993); Kleges et al. (1990); Larkin
and Pines (1979); Larwood (1995); Polinko
and Popovich (2001)

More likely to have emotional
or personal problems

Bellizzi and Norvell (1991); Klassen et al.
(1993); Kleges et al. (1990)

Less likely to get along with
or be accepted by others

Bordieri, Drehermer, and Taylor (1997);
Kleges et al. (1990)

Less outgoing, less energetic,
inactive, less suitable for
active positions, less social

Larkin and Pines (1979); Lennon (1992);
Popovich et al. (1997);
Rothblum, Miller, and Garbutt (1988)

Roheling (2008) Group Organiz Manag 33:392



Summary - Personality

I. Introduction

II. “Natural”
weight change

Most CONSISTENT Predictors

→ **High Conscientiousness**

→ **Low Impulsiveness**

→ **High Extraversion** (especially in women?)


Faith (2001) Obes Res 9:647


Rydén (2003) Int J Obes 27:1534

Brummett (2006) J Res Personality 40:222

Roheling (2008) Group Organiz Manag 33:392

Terracciano (2009) Psychos Med 71:683

 <p>I. Introduction</p> <p>II. "Natural" weight change</p>	<h2 style="text-align: center;">Personality (cross-sectional)</h2> <p>SOS study, Sweden (n=4405 severe obese vs. non-obese, M/F) Rydén (2003) <i>Int J Obes</i> 27:1534</p> <p>"... somewhat elevated levels of <u>Impulsiveness</u>, particularly among male obese patients"</p> <p>"<u>No evidence</u> of a general obese personality profile... <u>only small differences</u> were noted compared to a reference population..."</p> <p>"... <u>considerable heterogeneity</u> in personality traits..."</p>
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 <p>I. Introduction</p> <p>II. "Natural" weight change</p>	<h2 style="text-align: center;">Personality (<u>cross-sectional</u>)</h2> <p>MIDUS US survey (n=3,176 <u>national sample</u>, M/F, BMI) Roheling (2008) <i>Group Organiz Manag</i> 33:392</p> <p>"Results <u>fail to provide evidence</u> that, in a national sample of working-age U.S. adults, there is a <u>practically significant relationship</u> between weight and the personality variables."</p>
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Summary

I. Introduction

II. "Natural"
weight change

Predictors of "natural" weight control

- **Low total restraint (flexible restraint is protective)**
- **Low disinhibition**
- **Low preoccupation / concerns with weight**
- **High Conscientiousness, low Impulsiveness (?)**



Outline

Introduction

Predictors of population ("natural") weight change



Pre-treatment predictors of weight loss / gain

Post-treatment predictors of maintenance / regain

Summary and Conclusions

A review of psychosocial pre-treatment predictors of weight control

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Summary

Prompted by the large heterogeneity of individual results in obesity treatment, many studies have attempted to predict weight outcomes from information collected from participants before they start the programme. Identifying significant predictors of weight loss outcomes is central to improving treatments for obesity, as it could help professionals focus efforts on those most likely to benefit, suggest supplementary or alternative treatments for those less likely to succeed, and help in matching individuals to different treatments. To date, however, research efforts have resulted in weak predictive models with limited practical usefulness. The two primary goals of this article are to review the best individual-level psychosocial pre-treatment predictors of short- and long-term (1 year or more) weight loss and to identify research needs and propose directions for further work in this area. Results from original studies published since 1995 show that few previous weight loss attempts and an autonomous, self-motivated cognitive style are the best prospective predictors of successful weight management. In the more obese samples, higher initial body mass index (BMI) may also be correlated with larger absolute weight losses. Several variables, including binge eating, eating disinhibition and restraint, and depression/mood clearly do not predict treatment outcomes, when assessed before treatment. Importantly, for a considerable number of psychosocial constructs (e.g. eating self-efficacy, body image, self-esteem, outcome expectancies, weight-specific quality of life and several variables related to exercise), evidence is suggestive but inconsistent or too weak for an informed conclusion to be drawn. Results are discussed in the context of past and present conceptual and methodological limitations, and several future research directions are described.

Keywords: Correlates, moderators, obesity, treatment.

obesity reviews (2005) 6, 43–65

Teixeira et al. *Obes Rev* 6:43 (2005)

Table 1 Prediction models from studies using behaviour modification and (a) hypocaloric or low-calorie diets or (b) very-low-calorie diets as a means to weight loss

Model (reference)	Sample			Treatment/weight loss phase			Follow-up/maintenance phase			Outcome (dependent variable) predicted from baseline variables
	Size	Gender	BMI	Type	Duration	Wt. loss	Attrition	Duration	Wt. change ^a	Attrition ^b
(a)										
Poston_BM (2005)	102	M + F	39	BM + LCD	8 weeks	-12 kg	NR	52 weeks	-8.0 kg	21%
Bryan_BM (197)	42	F	34	BM + HBD	8 weeks	-7.9 kg	9%	52 weeks	-7.9 kg	36%
Fontaine_BM (2006)	177	M + F	-42	BM + LCD	13 weeks*	-13.0 kg	11%	52 weeks	-11%*	30%
Fontaine_BM (2006)	109	M + F	42	BM + LCD	15 weeks*	-13.0 kg	-11%*	52 weeks	-11%*	30%
Smith_BM (2007)	54	F	32	BM + HBD	15 weeks	-4.5 kg	24%	52 weeks	-4.5 kg	24%
Teixeira_BM (17)	112	F	31	BM + HBD	16 weeks	-6.4 kg	21%	52 weeks	-6.4 kg	21%
Wing_BM (81)	166	M + F	31	BM + HBD	17 weeks	-8.8 kg	10%	52 weeks	-8.8 kg	10%
Teixeira_BM (2005)	100	M + F	39	BM + LCD	17 weeks	-10.7 kg	NR	52 weeks	-10.7 kg	NR
(b)										
Leibbrandt_BLM (126)	136	M + F	45	BM + HBD	10 weeks	-7 kg	NR	76 weeks**	-8.0 kg	21%
Gladis_BLM (50)	118	F	36	BM + LCD	48 weeks	-15 kg	17%	52 weeks	-17 kg	36%
Jefferys_BLM (93)	130	M + F	31	BM + HBD	78 weeks	NR	NR	52 weeks	-2 kg	20%
Ni_BLM (123)	66	F	30	BM + HBD	10 weeks	6.6 kg	NR	74–204 weeks	+3.1 kg	30%
Poston_BM (2005)	102	M + F	39	BM + LCD	8 weeks	-12 kg	NR	52 weeks	-43 kg	NR
Gladis_BM (50)	118	F	36	BM + LCD	48 weeks	-15 kg	17%	52 weeks	-17 kg	36%
Cuntz_BM (131)	138	M + F	-46	BM + HBD	10 weeks	6.9 kg	NR	76 weeks	-1.5 kg	13%
(b)										
Fogelholm_VL (18)	85	F	34	BM + VLCD	12 weeks	13.5 kg	4%	40 weeks**	+0.4 kg	6%
Raymond_VL (206)	174	F	-36	BM + VLCD	24 weeks	-17 kg	12%	52 weeks	-17 kg	12%
Smith_VL (219)	289	F	35	BM + VLCD*	-26 weeks	-11 kg	45%	52 weeks	-11 kg	45%
Foster_VL (75)	223	F	37	BM + VLCD	26 weeks	-16.7 kg	NR	52 weeks	-16.7 kg	NR

NR, Not reported.

*BMI < 35 kg/m².

**BMI < 30 kg/m².

***BMI < 25 kg/m².

****BMI < 20 kg/m².

*****BMI < 15 kg/m².

*****BMI < 10 kg/m².

*****BMI < 5 kg/m².

*****BMI < 0 kg/m².

*****BMI < -5 kg/m².

*****BMI < -10 kg/m².

*****BMI < -15 kg/m².

*****BMI < -20 kg/m².

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*****BMI < -75 kg/m².

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*****BMI < -85 kg/m².

*****BMI < -90 kg/m².

*****BMI < -95 kg/m².

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*****BMI < -120 kg/m².

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*****BMI < -735 kg/m².

*****BMI < -740 kg/m².

*****BMI < -745 kg/m².

*****BMI < -750 kg/m².

*****BMI < -755 kg/m².

*****BMI < -760 kg/m².

*****BMI < -765 kg/m².

*****BMI < -770 kg/m².

*****BMI < -775 kg/m².

*****BMI < -780 kg/m².

*****BMI < -785 kg/m².

A review of psychosocial pre-treatment predictors of weight control

	Predictors	Non-predictors
Consistent evidence	Less previous dieting, fewer weight loss attempts Self-motivation , general efficacy, autonomy	Binge/emotional eating Depression, psychopathology, mood Eating disinhibition, external eating Cognitive (eating) restraint, chronic dieting Perceived hunger
Mixed evidence	Initial BMI/weight Body image, body size satisfaction Self-esteem Eating self-efficacy Realistic weight loss goals/expectations Internal locus of control	Personality, general cognitive style Perceived social support
Suggestive evidence	Exercise self-efficacy Few exercise perceived barriers Quality of life (obesity-specific) Perceived autonomy (social) support Absence of bulimic behaviour Cognitive style regarding diet lapses	Low perceived stress, anxiety Exercise social support Cognitive performance Quality of life (general, SF-36)

Teixeira et al. *Obes Rev* 6:43 (2005)

Pre-treatment **self-motivation** and weight loss

US women ($n=112-158$ overw/ob F, **4-m behavioral treatment**)

Baseline to 4-month, **$r = -0.28^{**}$**

Teixeira et al. (2002) *J Behav Med* 25: 449

Baseline to 16-month FU, **$r = -0.15^*$**

Teixeira et al. (2004) *Int J Obes* 28:1124

Portuguese women ($n=140$ overw/ob F, **4-m behav. treatment**)

Baseline to 4-month, **$r = -0.19^{**}$**

Teixeira et al. (2004) *Int J Behav Nut Phys Activity* 1: 12

The PESO study

(n=239 overweight/obese women, 1-year behavioral program + 2-year FU)

Silva et al. (2008) BMC Public Health 8:234



No association between pre-treatment self-motivation and 12m, 24m, 36m weight loss...

(unpublished observations)

obesity reviews (2005) 6, 43–65

A review of psychosocial pre-treatment predictors of weight control

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Teixeira et al. Obes Rev 6:43 (2005)

The PESO study: pre-treatment predictors of 3-year % weight change

All sample (completers)

- **Obesity-specific QOL** ($r = -.21^{**}$)
- **Body image satisfaction** ($r = .17^*$)
- **Low disinhibition** ($r = .15^\#$)
- **Low external eating** ($r = .15^\#$)
- **Self-esteem** ($r = -.14^\#$)

(unpublished observations)

The PESO study: pre-treatment predictors of 3-year % weight change

All sample (n=164 completers)

- **Obesity-specific QOL** ($r = -.21^{**}$)
- **Body image dissatisfaction** ($r = .17^*$)
- **Disinhibition** ($r = .15^\#$)
- **External eating** ($r = .15^\#$)
- **Self-esteem** ($r = -.14^\#$)

Intervention group

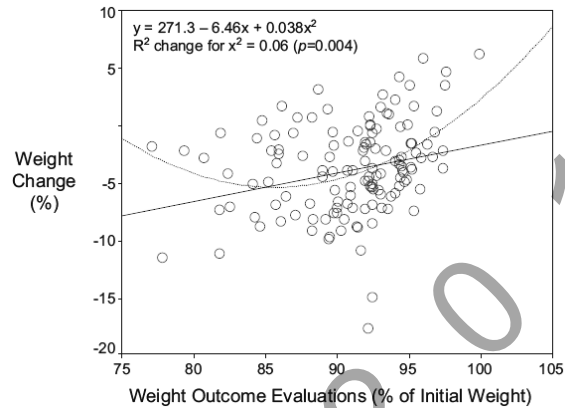
- **Obesity-specific QOL** ($r = -.29^{**}$)
- **Self-esteem** ($r = -.27^{**}$)
- **Low disinhibition** ($r = .25^*$)
- **Low external eating** ($r = .21^*$)
- **Moderate outcome evaluations** (lower "acceptable/happy") ($r = . -19^\#$)

(unpublished observations)

International Journal of Behavioral Nutrition and Physical Activity



Who will lose weight? A reexamination of predictors of weight loss in women



Curvilinear Relationship

Teixeira et al. (2004) Int J Behav Nut Phys Activity 1: 12



“Happy” Weight Loss

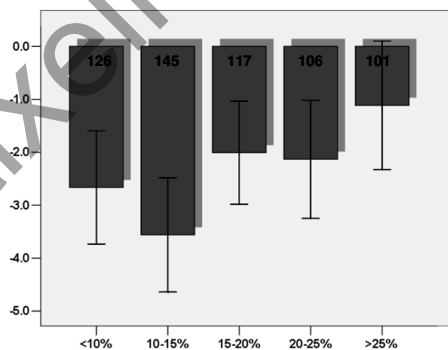
Intent-to-Treat Analysis (n=596)

I. Introduction

II. “Natural” weight change

III. Pretreatment predictors

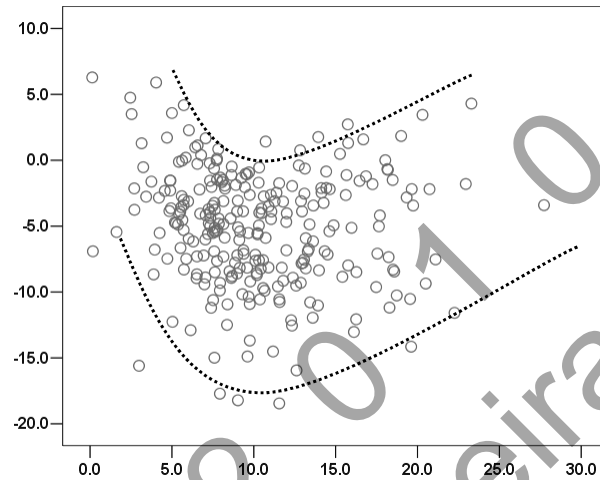
16-18 month wt change



Quadratic term: $F=2.74$ ($p=0.028$)

Teixeira, ISBNPA 2005 (unpublished)

**Positive but moderate (“realistic”)
outcome evaluations...**



Average “Happy” + “Acceptable” weight loss (%)



**“I would be OK with a
10-15% weight loss”**

No detrimental effect of
“unrealistic” goals on weight loss

Jeffery et al. (1998) *J Clin Cons Psych* 66:641
Finch et al. (2005) *Health Psych* 24:608
Linde et al.. (2004) *Obes Res* 12:569
Linde et al.. (2005) *Int J Obes* 29:1002

The PESO study: pre-treatment predictors of 3-year % weight change

All sample (n=164 completers)

(unpublished observations)

- **Obesity-specific QOL** ($r = -.21^{**}$)
- **Body image dissatisfaction** ($r = .17^*$)
- **Disinhibition** ($r = .15^\#$)
- **External eating** ($r = .15^\#$)
- **Self-esteem** ($r = -.14^\#$)

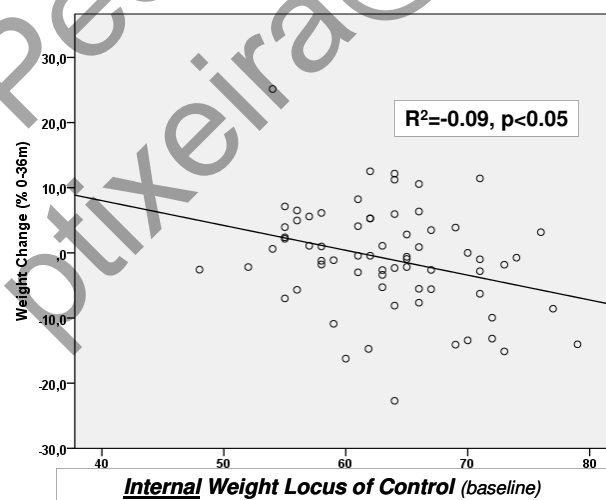
Intervention group

- **Obesity-specific QOL** ($r = -.29^{**}$)
- **Self-esteem** ($r = -.27^{**}$)
- **Disinhibition** ($r = .25^*$)
- **External eating** ($r = .21^*$)
- **Expected weight loss** ($r = -.19^\#$) (the more realistic expectations, the better)

Control group (health behavior education)

- **Weight internal locus of control** ($r = .31^*$)
- **Exercise self-efficacy** ($r = -.24^*$)
- **Self-determination / perceived autonomy** ($r = -.22^\#$)

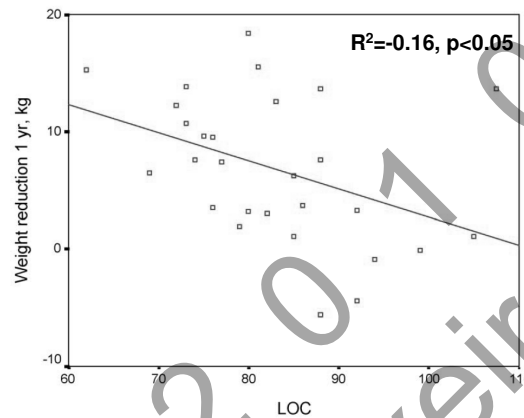
The PESO study (predicting 3-year weight change)



Locus of control and weight reduction

Birgitta Adolfsson^{a,*}, Ingalena Andersson^a, Stig Elofsson^b,
Stephan Rössner^a, Anna-Lena Undén^c

Patient Education and Counseling 56 (2005) 55–61



Behavior modification, 1-year program



Pretreatment predictors

TRIM study (n=286 overw/ob M/F, 18-m behavioral treatments)

Niemeyer (2007) Obesity 15:2485

I. Introduction

II. "Natural" weight change

III. Pretreatment predictors

BASELINE PREDICTORS:

→ **Low internal disinhibition**

6-month weight loss ($p=.03$)

18-month weight change ($p=.06$)

Summary of pre-treatment predictors

	Predictors	Non-predictors
Consistent evidence	Less previous dieting, fewer weight loss attempts Self-motivation, general efficacy, <u>autonomy</u>	Binge/emotional eating Depression, psychopathology, mood Eating disinhibition, external eating Cognitive (eating) restraint, chronic dieting
Mixed evidence	Initial BMI/weight Body image, body size satisfaction Self-esteem Eating self-efficacy Realistic weight loss goals/expectations Internal locus of control	Perceived hunger Personality, general cognitive style Perceived social support
Suggestive evidence	Exercise self-efficacy Few exercise perceived barriers Quality of life (obesity-specific) Perceived autonomy (social) support Absence of bulimic behaviour Cognitive style regarding diet lapses	Low perceived stress, anxiety Exercise social support Cognitive performance Quality of life (general, SF-36)

Teixeira et al. *Obes Rev* 6:43 (2005)



A review of psychosocial pre-treatment predictors of weight control

Teixeira et al. *Obes Rev* 6:43 (2005)

I. Introduction

II. "Natural" weight change

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Two recommendations:

. **Success group / profile analyses**

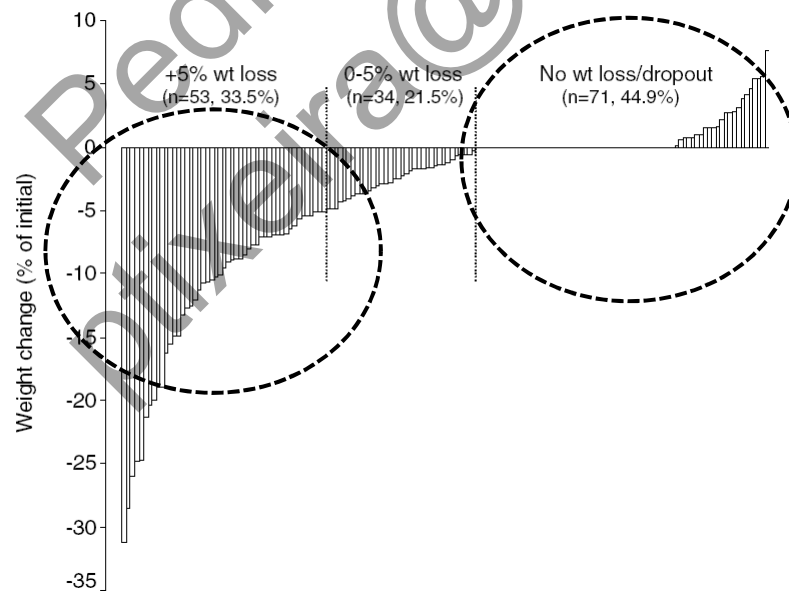
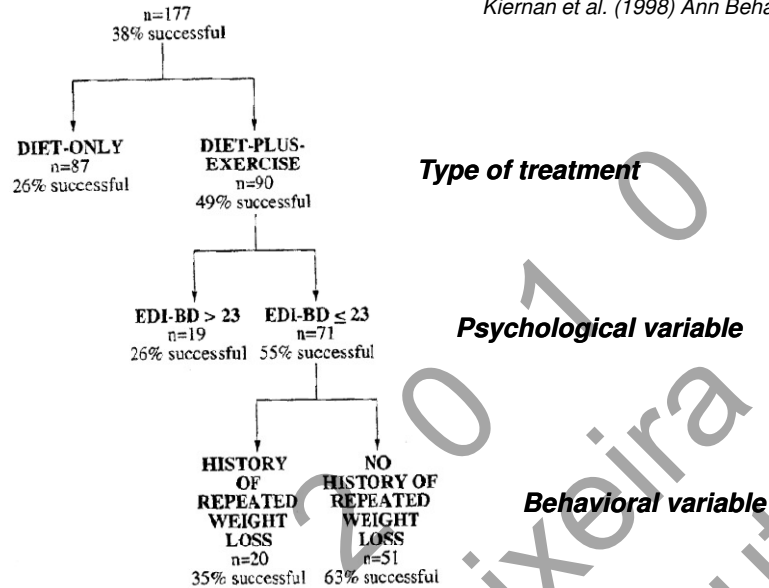
. **More complex predicting models**

. More powerful statistical tools

. Inclusion of other variables (behavioral, treatment type)

CHARACTERISTICS OF SUCCESSFUL AND UNSUCCESSFUL DIETERS: AN APPLICATION OF SIGNAL DETECTION METHODOLOGY^{1,2}

Kiernan et al. (1998) *Ann Behav Med* 20:1

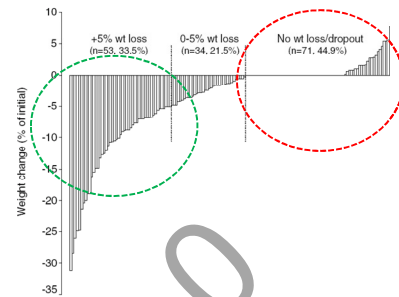


Predictors of SUCCESS CATEGORY

(<-5% weight loss at 16m
vs.
dropout / no wt loss)

BASELINE

- Low WHR
 - Less previous dieting
 - Realistic weight loss outcome evaluations
 - High exercise self-efficacy
- (Logistic regression
 $\text{Chi}^2 = 33.6, p < 0.001$)



**74% of subjects correctly classified into success category
(84% correctly classified when predicting DROPOUT)**

Teixeira et al. (2004) *Int J Obes* 28:1124



Outline

Introduction

Predictors of population (“natural”) weight change

Pre-treatment predictors of weight loss / gain



Post-treatment predictors of maintenance / regain

Summary and Conclusions

Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain

obesity reviews

Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain

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Summary

Weight loss is difficult to achieve and maintaining the weight loss is an even greater challenge. The identification of factors associated with weight loss maintenance can identify and guide strategies for the improvement and prevention that are crucial to maintaining a lowered body weight. In this paper we have reviewed the literature on factors associated with weight loss maintenance and weight regain. We have used a definition of weight maintenance implying sustained weight loss that has subsequently been maintained for at least 12 months. According to our review, successful weight maintenance is associated with more initial weight loss, reaching a self-reported goal weight, having a physically active lifestyle, a regular meal of three including breakfast and healthier eating, control of overeating and self-monitoring of behaviour. Weight maintenance is further associated with increased satisfaction with weight, social support, better coping strategies and ability to handle life stress, self-efficacy, autonomy, assuming responsibility in life, and overall more psychological strength and stability. Factors that may pose a risk for weight regain include a history of weight cycling, disordered eating, binge eating, more hunger, eating in response to negative emotion and stress, and more passive reactions to problems.

Keywords: eating behaviour, overweight, psychology, weight loss, retention.

Obesity reviews (2005) 6, 67–80

Introduction

Overweight and obesity are today recognized to be amongst the major public health problems of our society. The long-term weight loss results in weight loss programmes are usually modest (1–3). Most patients who lose weight will regain the weight.

Thus, clearly, we need to have understood why weight maintenance is so difficult and how it can be prevented. The identification of factors associated with weight loss maintenance can enhance our understanding of the behaviour and strategies that are crucial to maintaining a lowered body weight. Such knowledge has implications for what strategies should be initiated and encouraged to increase the ability given of the weight maintenance phase as well as the objective of persons with a sustainable program to a long-term retention of desired treatment. The review is a necessary for effective use of the limited resources available to reach the increasing number of obese people today. It also enables a professional assessment of the risk of relapse in patients with different individual psychological and behavioural responses to treatment (1).

We were interested in describing research findings on factors of potential importance for weight maintenance, and further aim was to attempt to reach a coherent picture of factors affecting weight maintenance, as the weight maintenance is often characterized by scattered findings and contradictory statements.

© 2005 The International Association for the Study of Obesity, obesity reviews 6, 67–80

Weight maintenance

An achieved weight loss goal
More initial weight loss
Physically active lifestyle
Regular meal rhythm
Breakfast eating
Less dietary fat, more healthy foods
Reduced frequency of snacks
Flexible control over eating
Self-monitoring
Coping capacity
Capacity to handle cravings
Self-efficacy
Autonomy
'Healthy narcissism'
Motivation for weight loss: more confidence
Stability in life
Capacity for close relating

Weight regain

Attribution of obesity to medical factors
Perceiving barriers for weight loss behaviours
History of weight cycling
Sedentary lifestyle
Disinhibited eating
More hunger
Binge eating
Eating in response to negative emotions and stress
Psychosocial stressors
Lack of social support
More passive reactions to problems
Poor coping strategies
Lack of self-confidence
Psychopathology
Motivation for weight loss: medical reasons, other persons
Dichotomous thinking

Elphag and Rossner, *Obes Rev* 6:67 (2005)



Weight regain (after weight loss)

STOP Regain study (n=261 M/F, 18-month intervention)

Wing (2008) *J Cons Clin Psych* 76:1015

I. Introduction

II. "Natural" weight change


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IV. Weight loss maintenance

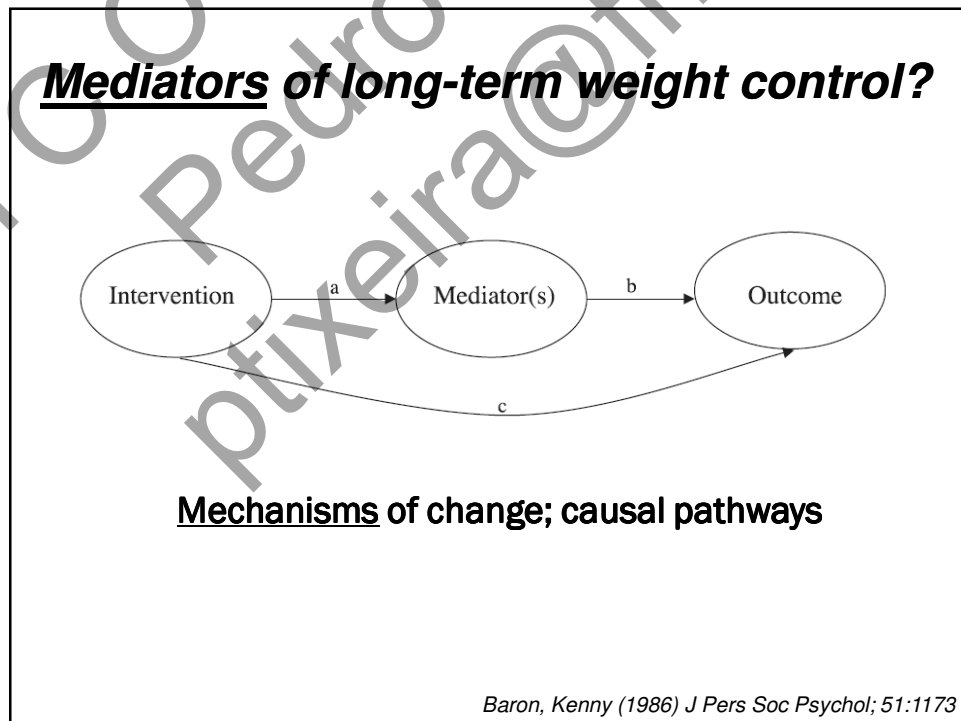
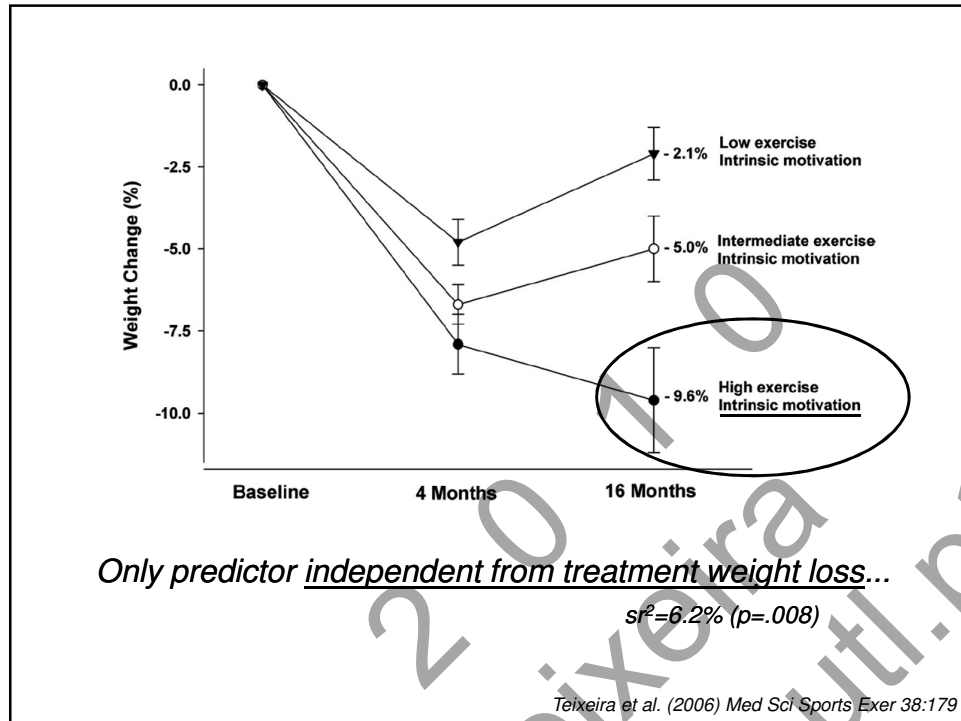
PREDICTORS **BEFORE** MAINTENANCE INTERVENTION:

→ **None**

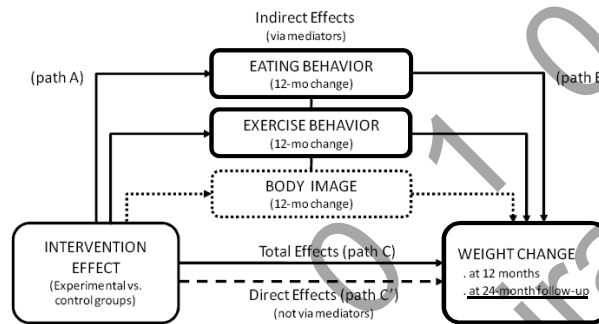
(Beck depression and TFEQ: restraint, disinhibition, hunger)

 <p>I. Introduction</p> <p>II. "Natural" weight change</p> <p>III. Pretreatment predictors</p> <p>IV. Weight loss maintenance</p>	<h2 style="text-align: center;">Weight regain (after weight loss)</h2> <h3 style="text-align: center;">NWCR study (successful weight loss maintainers)</h3> <p><u>PREDICTORS (before 1-year follow-up):</u></p> <p>→ Lower (internal) disinhibition and low binge eating</p> <p>→ Lower depression</p> <p style="text-align: right;">McGuire (1999) <i>J Consult Clin Psych</i> 67:177</p> <p style="text-align: right;">Niemeier (2007) <i>Obesity</i> 15:2485</p>
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 <p>I. Introduction</p> <p>II. "Natural" weight change</p> <p>III. Pretreatment predictors</p> <p>IV. Weight loss maintenance</p>	<h2 style="text-align: center;">Weight regain (after weight loss)</h2> <p><u>Slimming club UK F (n=53), had lost 10% body weight interviewed before 2-y FU</u></p> <p style="text-align: right;">Byrne (2004) <i>Behav Res Ther</i> 42:1341</p> <p><u>PROSPECTIVE PREDITOR:</u></p> <p>→ Low dichotomous thinking ($p < .004$)</p> <p style="text-align: center;">(total score + food and weight-related + general cognitive style)</p>
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Mediators of Weight Loss and Weight Loss Maintenance in Middle-aged Women



Teixeira et al. (2010) Obesity 18:726

Mediators of Weight Loss and Weight Loss Maintenance in Middle-aged Women

	12-Month weight change	24-Month weight change
	<i>r</i>	<i>r</i>
Cognitive restraint	-0.41***	-0.24**
Flexible restraint	-0.40***	-0.24**
Rigid restraint	-0.29***	-0.12

Teixeira et al. (2010) Obesity 18:726

Table 3 Multiple mediation models

	Coefficient	Normal theory P
<i>Weight loss and maintenance models (24-month weight change)</i>		
Model A		
Total effect (C path)	-0.213	0.001
Direct effect (C' path)	-0.088	0.274
Indirect effect (via mediators)	-0.125	0.001
Flexible restraint	-0.044	0.086
Exercise self-efficacy	-0.081	0.009
Model R ² (P)		0.13 (<0.001)
Effect ratio		0.59

→ **Full mediation effects** through **flexible restraint** and **exercise self-efficacy**

→ When treatment weight change is included, **only exercise variables** remained as mediators

Teixeira et al. (2010) Obesity 18:726



Weight regain (after weight loss)

US severe obese M/F (n=128, VLCD 6-mo, **2-year** FU)

Williams (1996) J Pers Soc Psych 70:115

I. Introduction

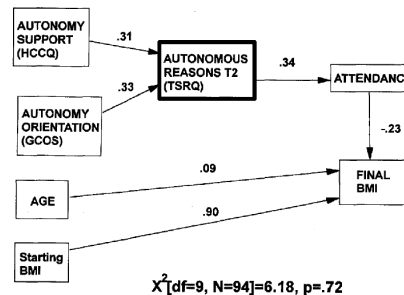
II. "Natural" weight change

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IV. Weight loss maintenance

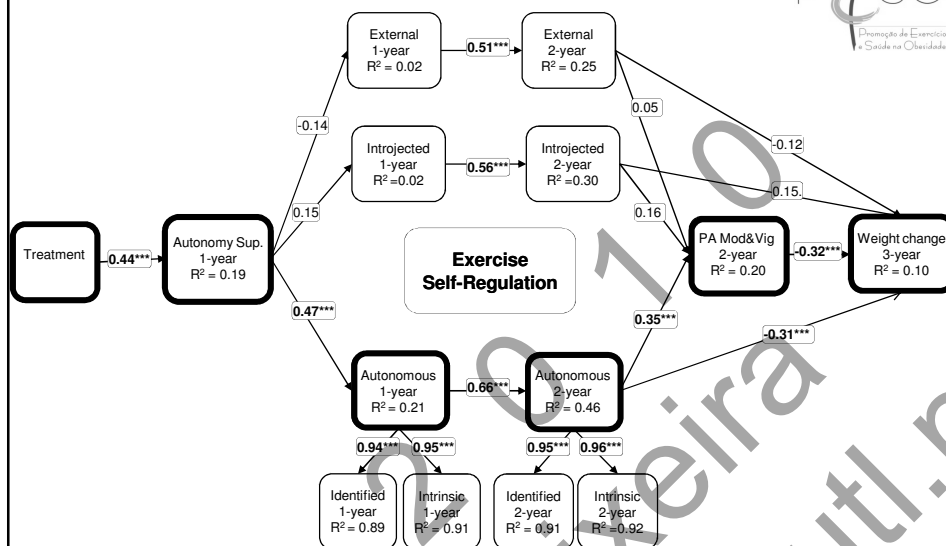
PREDICTOR (MEDIATION ANALYSIS):

→ **Increase in autonomous self-regulation**



Autonomous Self-Regulation Mediates 3-Year Weight Control

PLS (Partial Least Squares) Modeling



Silva et al. (submitted)

Summary - Predictors of weight loss maintenance

Weight maintenance

An achieved weight loss goal
 More initial weight loss
 Physically active lifestyle
 Regular meal rhythm
 Breakfast eating
 Less dietary fat, more healthy foods
 Reduced frequency of snacks
 Flexible control over eating
 Self-monitoring
 Coping capacity
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Elphag and Rossner, *Obes Rev* 6:67 (2005)

Predictors of Long-Term Weight Control

Weight maintenance	Weight regain
<div></div> <p><u>Flexible control over eating</u></p> <div></div> <p>Coping capacity Capacity to handle cravings <u>Self-efficacy</u> <u>Autonomy</u> 'Healthy narcissism' Motivation for weight loss: more confidence Stability in life Capacity for close relating</p>	<p>Attribution of obesity to medical factors Perceiving barriers for weight loss behaviours</p> <div></div> <p><u>Disinhibited eating</u> More hunger Binge eating <u>Eating in response to negative emotions and stress</u> Psychosocial stressors Lack of social support More passive reactions to problems Poor coping strategies Lack of self-confidence Psychopathology Motivation for weight loss: medical reasons, other persons Dichotomous thinking</p>

Elphag and Rossner, *Obes Rev* 6:67 (2005)



Outline

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Summary and Conclusions

Summary – Most Consistent Predictors

T – treatment P – population

Exercise-related

- exercise self-efficacy (T/P)
- exercise intrinsic motivation (T)

Eating-related

- flexible cognitive restraint (T/P)
- low disinhibition / emotional eating (T/P)
- less hunger? (T, VLCD)

Psychological well-being

- obesity-specific quality of life (T)
- high self-esteem and positive body image? (T)

Cognitive and other psychological variables

- autonomous self-regulation / motivation (T)
- low weight preoccupation / concern (P)
- internal locus of control (T)
- dichotomous thinking (T)
- positive but realistic weight loss expectations (T)
- conscientiousness / low impulsiveness traits? (P)



Summary – Most Consistent Predictors

T – treatment P – population

Exercise-related

- exercise self-efficacy
- exercise intrinsic motivation

Eating-related

- flexible cognitive restraint
- low disinhibition / emotional eating
- less hunger? (T, VLCD)

Psychological well-being

- obesity-specific quality of life (T)
- high self-esteem and positive body image? (T)

Cognitive and other psychological variables

- autonomous self-regulation / motivation
- low weight preoccupation / body shape concerns
- internal locus of control
- dichotomous thinking
- positive but realistic weight loss expectations (T)
- conscientiousness / low impulsiveness traits? (P)





“Can one predict weight gain (or loss) before it occurs...?” (*psychological variables*)

Actual individual weight change (e.g., Δ kg, Δ %)

→ **Not very well**

Best predictive models explain 20-40% variance

Success level / category (e.g., achieve <5%; dropout)

→ **Can expect better results**

Success at predicting endpoint category... 75-85%



Alternatively, predictors research useful to...

→ **Improve interventions, identify targets / mediators**

(e.g., exercise intrinsic motivation, self-efficacy, flexible restraint)

→ **Understand why and how obesity develops / persists**

(e.g., poor body image, weight concerns, obesity-specific QOL)



Research Recommendations...

→ **Conduct moderation and mediation analyses**

. Many statistical solutions for different study designs

→ **Include valid psychological measures in trials**

. **Based on theory and / or previous work** (e.g. reviews)

. **Be specific, detailed, and clear...**

. Cognitive restraint ≠ flexible restraint ≠ rigid restraint

. Self-regulation ≠ self-control ≠ autonomous regulation

. Motivation ≠ intrinsic ≠ extrinsic ≠ "readiness" ≠ intention

Where do we stand on behavioral self-regulation?

→ **Clear picture of VOLITIONAL BEHAVIORS most useful ("HOW Tos")**

(physical activity, regular breakfast, self-monitoring, little TV time)

nature publishing group

ARTICLES

INTERVENTION AND PREVENTION

One-year Weight Losses in the Look AHEAD Study: Factors Associated With Success

Thomas A. Wadden¹, Delia S. West², Rebecca H. Neiberg³, Rena R. Wing^{4,5}, Donna H. Ryan⁶, Karen C. Johnson⁷, John P. Foreyt⁸, James O. Hill⁹, Dace L. Trencé^{10,11} and Mara Z. Vitolins¹²; Look AHEAD Research Group

Obesity (2009) **17**, 713–722

Where do we stand on behavioral self-regulation?

→ Little insight on motivational and self-regulatory (psychological) processes underlying these volitional behaviors? (WHYs)

Maintaining Large Weight Losses: The Role of Behavioral and Psychological Factors

STOP Regain trial

Wing (2008) J Clin Cons Psych 76:1015

“Future programs... should include stronger components to modify psychological parameters.”

Traditional view

NWCR, TRIM, STOP Regain trials

McGuire et al. (1999) J Consult Clin Psych 67:177

Niemeier et al. (2007) Obesity 15:2485

Wing et al. (2008) J Consult Clin Psych 76:1015

Alternative view

Elphag and Rossner (2005) Obes Rev 6:67

Teixeira et al. (2005) Obes Rev 6:43

(present review)

“Successful weight loss maintainer”

***High level of vigilance to weight
(e.g. self-monitoring)***

***Strong, executive self-control
(“will power”)***

***Need to “work harder”, adopt
“extreme” behaviors, aim high
(e.g. NWCR)***

***Healthy weight preoccupation,
long-lasting commitment and
interest (self-monitoring)***

***Flexible control (restraint); sense
of competency (efficacy), and
challenge/fun (ex. intrins. motiv.)***

***Moderate outcome expectancy,
aim for moderate/sustainable
changes (not perceived as “hard work”)***

(CONT.)

Traditional view

McGuire et al. (1999) *J Consult Clin Psych* 67:177
 Niemeier et al. (2007) *Obesity* 15:2485
 Wing et al. (2008) *J Consult Clin Psych* 76:1015

Alternative view

Elphag and Rossner (2005) *Obes Rev* 6:67
 Teixeira et al. (2005) *Obes Rev* 6:43
 (present review)

(CONTINUED)

Highly disciplined, goal-oriented, able to deliberately delay gratification

Motivated by external reinforcements, incentives
 (e.g. scale, gifts, praise, continuous care model)

No sense of deprivation
 (low hunger, disinhibition),
flexible thinking (non-dichotomous cognitive style)

Motivated by internalized
 (autonomous), **meaningful motives and goals** (e.g. health, family-related, mood and well-being)

Internal frame of reference
 (internal locus of control)



Famous quote...

“Despite strong physiological pressure to regain weight after weight loss... it is remarkable that scores in a few questionnaires can prospectively predict long-term weight loss maintenance.”

“It shows that behavior is indeed energized by different motivational drives, thoughts, and emotions in coherent, predictable ways... And that humans can in fact self-regulate, even in adverse environments.”

“... the best part about this is that we can in fact change our clinical practices and interventions, and to some degree change our social environments, to maximize the influence on these predictors... That is our challenge.”

Teixeira (last night)