




E5: Self-Determination Theory

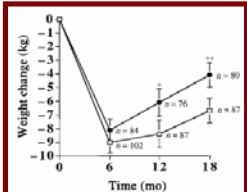
Exercise Intrinsic Motivation, Autonomous Self-Regulation, and Psychological Motives as Mediators of Physical Activity During Weight Management

Silva MN, Teixeira PJ, Vieira PN, Castro MM, Minderico CS, Coutinho CS, Santos TC, Palmeira AL, Markland D, Sardinha LB

ISBNPA 2008 MEETING
 May 21st to 24th, 2008
 Rimrock Resort Hotel - Banff, Alberta Canada

The Reality of Weight Control...

- **Relative success in short-term (~5-15% wt loss)**
- **Small average long-term weight loss (3-4%)**
- **High rates of weight regain (poor maintenance)**



Long-term weight loss maintenance
Rena R Wing and Suzanne Phelan

ABSTRACT
 There is a general perception that almost no one succeeds in long-term maintenance of weight loss. However, research has shown that ~20% of overweight individuals are successful at long-term weight loss, defined as losing at least 10% of initial body weight and maintaining the loss for at least 1 y. The National Weight Control...
Am J Clin Nutr 2005;82(suppl):222S-5S.

Jeffery, AJCN 2003; 78:684

Long-term weight loss maintenance

Rena R Wing and Suzanne Phelan

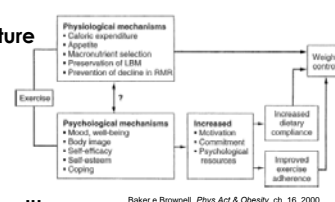
ABSTRACT

There is a general perception that almost no one succeeds in long-term maintenance of weight loss. However, research has shown that ~20% of overweight individuals are successful at long-term weight loss, defined as losing at least 10% of initial body weight and maintaining the loss for at least 1 y. The National Weight Control...
Am J Clin Nutr 2005;82(suppl):222S-5S.

Successful Weight Control

Critical Role of Physical Activity

- **Activity Energy Expenditure**
(calories!)
- **Quality of Weight Loss**
(body composition, RMR)
- **Improved Self-Efficacy**
(confidence, autonomy)
- **Improved Well-being/Health**
(affect, mood, physical self-esteem, quality of life / metabolic risk)



Baker e Brownell, Phys Act & Obesity, ch. 16, 2000

How to promote and sustain?...

Toward a Better Understanding of the Influences on Physical Activity

The Role of Determinants, Correlates, Causal Variables, Mediators, Moderators, and Confounders

Adrian E. Bauman, PhD, James F. Sallis, PhD, David A. Dziewaltowski, PhD, Neville Owen, PhD

Little is known about these influences in obese populations...

*“Experimental Testing of Specific Theory Based Interventions... **how does it work?** Requiring an understanding of the **causal processes and mechanisms, that is, the underlying psychological changes that account for observed behaviour change”***

Mitchie & Abraham, *Psy Health*, 2004;19(1): p.29-49

Self-Determination Model for Health

Autonomous Self-Regulation can be promoted *(Deci & Ryan, 1985,2000)*

Health Care Climate
Autonomy Support vs. Control

Individual Differences
Autonomous Orientation

Intrinsic vs. Extrinsic Values

Essential Human Needs

Autonomy

Competence

Relatedness

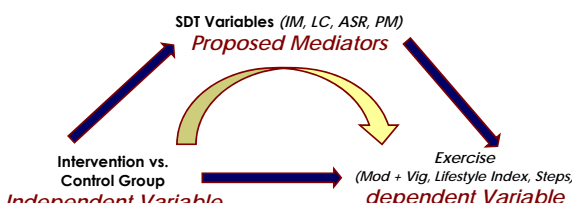
Mental Health
Depression
Anxiety
Quality of life

Physical Health
*Diabetes
*Med. Adherence
*Healthy Diet
*Physical Activity
*Weight Loss

Geoffrey Williams (personal communication)
3rd SDT Conference, Toronto, May 2007


Purpose

- **To analyze the role of exercise intrinsic motivation (IM), locus of causality (LC), autonomous self-regulation (ASR), and psychological motives (PM) as mediators of physical activity (PA)**



Intervention vs. Control Group → **dependent Variable**
Independent Variable

"Promotion of Exercise and Health in Obesity" (PESO) Trial



RCT to test Self-Determination Theory for weight management in women

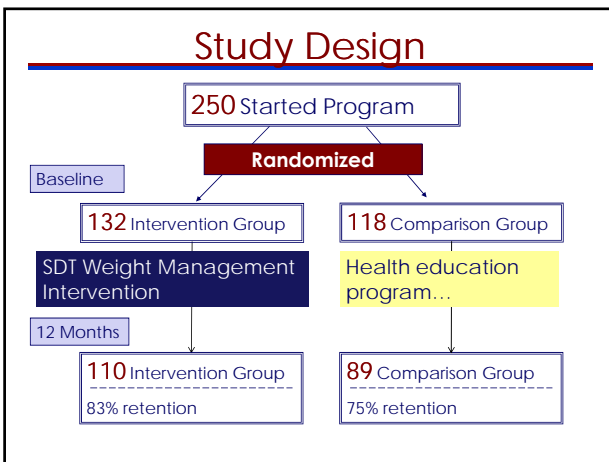
Programa PESO

Baseline Data (n=250)

Women, Pre-menopausal

Age (yr)	37.6 ± 7.1
Weight (kg)	82.3 ± 12.1
Height (m)	1.61 ± 0.1
BMI (kg/m²)	31.6 ± 4.1

- 34% Overweight, 63% Obese (class I, II)
- Mostly Sedentary
- 55% Married
- 66% with Some College Education




Intervention

30 weekly or bi-monthly group sessions for ~1 year, lasting ~120 minutes



Intervention


- Covering physical activity, eating/nutrition, body image, and other cognitive and behavioral contents
- Tutorial, interactive, discussion, and small group activities



SDT Based Intervention

Promote Intrinsic Motivation, Autonomy

- No exercise prescription!
- Giving options, active experimentation
- Include challenging PA opportunities
- Promote personally-meaningful activities
- Ask for autonomy in organizing
- Three-month dance curriculum
- Safety, skills, Monitoring (walking/pedometers)...



Measurements (0-12 Months)

Exercise Psychosocial Proposed Mediators

- **Exercise Intrinsic Motivation (IMI)** Alphas Between .82 & .94
- **Locus of Causality for Exercise (LCE)** Alpha .80
- **Self-Reg Quest Exercise (SRQ-E)** Alphas Between .67 & .88
- **Exercise Motives Questionnaire (EM)** Alphas Between .78 & .90

Measurements (12 Months)

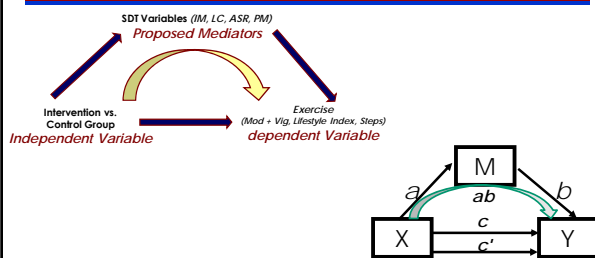
Exercise Measures - Outcomes

- **Moderate + Vigorous PA (min/ Wk):**
Seven-Day Physical Activity Recall (7-Day PAR)
- **Lifestyle PA Index ***
Obesity Physical Activity Recall (OB-PAR)
- **Walking: Steps/day**
Pedometer Yamax Digi-Walker SW-200

* Lifestyle PA Index - mean value of 4 out of 7 OB-PAR scores (scale from 1 - 'Never' to 5 - 'Always'):

- Using Stairs or Escalators;
- Walking instead of using transportation;
- Park away from destiny
- Work breaks to be active

Statistical Analysis



Total Effect (c)- the total effect of X on Y
Direct effect (c')- Direct effect of X on Y, controlling for the mediator
Indirect effect (ab)- Product of a and b (in most cases $ab = c - c'$)

Preacher & Hayes, *BRMIC*, 2004; 36(4): p:717-731

Intervention Impact (I vs. C)

Outcomes Physical Activity

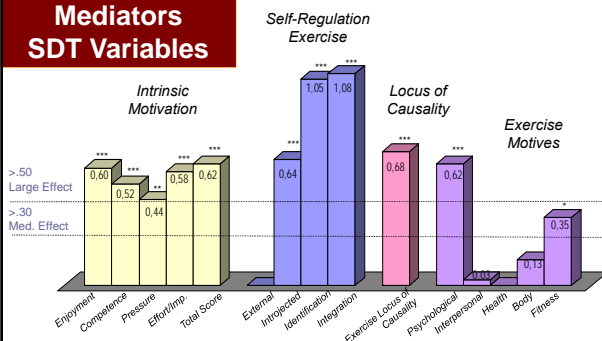


	Intervention n=[84,107]	Control n=[56,78]	
	M ± SD	M ± SD	p
Lifestyle PA Index	3.9 ± 0.7	3.2 ± 0.9	<0.001
Steps/day	9838 ± 3306	7852 ± 3469	0.001
Moderate + Vig. PA (min/wk)	301 ± 180	154 ± 166	<0.001

p for independent samples t-test comparing Intervention and Control groups at 12 months.

Intervention Impact (I vs. C) - Effect Size

Mediators SDT Variables



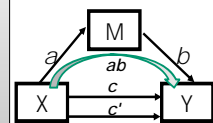
*ps 0.05, **ps0.01, ***ps0.001 for t-test comparing Intervention (n=110) and control (n=89) groups at 12 months

Moderate + Vigorous PA

Partial Mediation:

- Exercise Intrinsic Motivation (Enjoyment, competence, interest, absence of pressure)
- Exercise Autonomous Self-Regulation (Identification, Integration)
- Exercise Internal Locus of Causality
- Exercise Psychological Motives (Challenge, fun, energy)

TREATMENT AFFECTED MOD+VIG PA IN PART BY THE CHANGES IT INDUCED IN THE PROPOSED SDT MEDIATORS

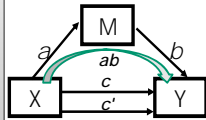


Lifestyle PA Index

Partial Mediation:

- Exercise Intrinsic Motivation (*Enjoyment, interest*)
- Exercise Autonomous Self-Regulation (*Identification, Integration*)
- Exercise Internal Locus of Causality
- Exercise Psychological Motives (*Challenge, fun, energy*)

TREATMENT AFFECTED THE LIFESTYLE PA IN PART BY THE CHANGES IT INDUCED IN THE PROPOSED SDT MEDIATORS



Walking: Steps/Day

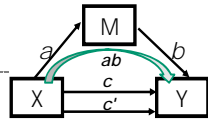
Total Mediation:

- Exercise Psychological Motives (*Challenge, fun, energy*)

Partial Mediation:

- Exercise Internal Locus of Causality

Z SCORES	Total Effect	Direct Effect	Indirect Effects
	C	c'	ab
IMI Total	***	0.22 **	0.02
IMI Enjoyment	***	0.22 **	0.02
IMI Perc Competence	***	0.23 **	0.01
IMI Importance	***	0.20 **	0.04
IMI absence pressure	***	0.24 ***	0.00
SRO-E External	0.24	0.23 ***	0.00
SRO-E Introjection	***	0.23 ***	0.00
SRO-E Identification	***	0.19 *	0.05
SRO-E Integration	***	0.20 *	0.04
Locus of Causality	***	0.19 **	0.05 *
EM2- Psychological	***	0.18	0.06 *



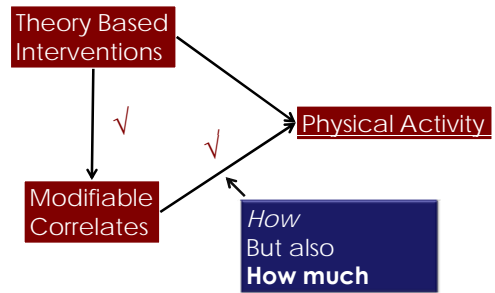
Summary: Intervention Effects

✓ Significantly changed all proposed SDT mediators ($p < 0.001$) and significantly increased PA ($p < 0.001$)

✓ Total effects on Moderate+Vigorous PA and Lifestyle PA were reduced by the proposed SDT mediators, suggesting partial mediation.

✓ For number of Steps, few mediators were identified (Exercise Internal Locus of Causality; Psychological Motives)

Discussion



Biddle, personal communication, ISBNPA, 2008

Results consistent with autonomous self-regulation and intrinsic motivation resting within the causal path of exercise adherence during weight control.

SDT: promising theoretical framework to promote health behavior change!