Self-Determination Theory

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


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)

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)

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)
**Baseline Data (n=250)**

- **Women, Pre-menopausal**
  - Age (yr): $37.6 \pm 7.1$
  - Weight (kg): $82.3 \pm 12.1$
  - Height (m): $1.61 \pm 0.1$
  - BMI (kg/m²): $31.6 \pm 4.1$

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

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**Study Design**

- **Randomized**
  - 250 Started Program
  - 132 Intervention Group
  - 118 Comparison Group
  - 12 Months
  - 110 Intervention Group (83% retention)
  - 89 Comparison Group (75% retention)

**Intervention**

- 30 weekly or bi-monthly group sessions for ~1 year, lasting ~120 minutes
- **SDT Weight Management Intervention**
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  - Health education program...

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

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**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

Statistical Analysis

- SDT Variables (IM, LC, ASR, PM)
- Proposed Mediators
- Intervention vs. Control Group
- Independent Variable
  Exercise (Mod + Vig, Lifestyle Index, Steps)
  dependent Variable
  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, JBMIC, 2004; 36(4); p:717-731

Intervention Impact (I vs. C)

Outcomes Physical Activity

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=84,107</td>
<td>n=56,78</td>
</tr>
<tr>
<td>M ± SD</td>
<td>M ± SD</td>
</tr>
<tr>
<td>Lifestyle PA Index</td>
<td>3.9 ± 0.7</td>
</tr>
<tr>
<td>Steps/day</td>
<td>9838 ± 3036</td>
</tr>
<tr>
<td>Moderate + Vig. PA (mean)</td>
<td>301 ± 180</td>
</tr>
</tbody>
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*p for independent samples t-test comparing Intervention and Control 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
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

- 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!

Biddle, personal communication, ISBNPA, 2008