Prevailing Trends in Behavior Therapy, Weight Loss, and Weight Maintenance

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Outline for Today’s Presentation

**Brief theoretical rationale** for behavior change interventions in obesity (why)

**Fundamental intervention components** (what)

**Evidence base** for lifestyle interventions to reduce obesity and type 2 diabetes in adults

New developments

Why Bother With Lifestyle Behavior?

- Behavior remains integral to the energy balance process (even in context of complex physiologic and psychosocial individual differences)
- The food/activity environment is potent in shaping habits in animals and people
- Lifestyle interventions influence broad spectrum physical outcomes (even in context of other effective interventions)
Theoretical foundations of major lifestyle intervention approaches

Behavioral Learning Theory
• Classical or respondent conditioning (Ivan Pavlov)
• Operant or instrumental conditioning (B.F. Skinner)

Social Learning and Social Cognitive Theory
• Modeling and Self-Efficacy (Albert Bandura)
• Cognitive restructuring (Aaron Beck/Post-Psychoanalytic Psychiatry)

Behavior Theory 101: Classical Conditioning

• New behaviors develop in response to previously neutral stimuli (Pavlov)

• Eating is a drive state but eating habits are largely a product of “stimulus control” (eg, craving mega-tub of popcorn at the movies)

Behavior 102: Operant Conditioning

The A-B-C’s of learning
• ANTECEDENT (Stimulus)
• BEHAVIOR (Response)
• CONSEQUENCE (Reinforcement)

Personal schedule (history) of reward and punishment is reliably associated with the strength of a behavior
What is self-control? What is motivation for healthy lifestyle change?

I did not direct my life. I didn't design it. I never made decisions. Things always came up and made them for me. That's what life is.

B. F. Skinner

Skinnerian View of Motivation

- Cognition and other psychological constructs ("self") are not necessary to explain behavior
- People and animals behave well when the environment is set up to cue and reinforce desirable behaviors
- Undesirable behavior results from problematic cues, schedules of reinforcement and misuse of punishment
- Many have criticized strict functional behavior analysis as too simple or reductionistic
- Educators, trainers, and social economic theorists and practitioners still utilize this approach

Nanny State or Building Healthy Social Reform?
Beyond the Black Box:
Social Learning Theory and Self Control
(Walter Mischel/Albert Bandura-1960’s and 70’s)

• Pre-schoolers asked to defer one marshmallow now for two marshmallows later
• 1/3 eat right away, 1/3 delay for variable intervals then eat, 1/3 wait for adult to return
• “Delayers” found ways to distract their thoughts and attention
• Further studies demonstrated children could be taught self-control strategies to increase delay time


Conclusion: Lifestyle Self-Management is Good Medicine

• Person, environment and cognition interact to shape healthy behavior and counter unhealthy behavior
• Focus on helping people build capacity to self-regulate
• Put emphasis on building healthy social norms, social support and social ecology


Natural Social Support Increases Weight Loss

What is behavioral technology for weight loss?

If lifestyle intervention is good medicine, what is the dose?

- **1-8:** Self-management of diet/nutrition, physical activity, weight, environment (weight, activity, calorie/fat goals for induction of weight loss, core behavioral skills)
- **9-16 and beyond:** Psychological and behavioral skills; trial and error problem solving and application to personal barriers

Diabetes Prevention Program (DPP) lifestyle coaches used problem solving with most participants

<table>
<thead>
<tr>
<th>Top Approaches Used to Improve Weight</th>
<th>Q1</th>
<th>Q2</th>
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<tbody>
<tr>
<td>Problem-Solving (review behavior chains/action plans)</td>
<td>77%</td>
<td>96%</td>
</tr>
<tr>
<td>Review Self-Monitoring Skills</td>
<td>49%</td>
<td>76%</td>
</tr>
<tr>
<td>Recommend Increased Activity</td>
<td>35%</td>
<td>76%</td>
</tr>
<tr>
<td>Recommend Lower Fat/Cal Goal</td>
<td>24%</td>
<td>25%</td>
</tr>
<tr>
<td>Schedule Extra Phone Call or Visit</td>
<td>18%</td>
<td>75%</td>
</tr>
<tr>
<td>New Self-Monitoring Strategy</td>
<td>10%</td>
<td>47%</td>
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<tr>
<td>Provide Healthy Recipes</td>
<td>14%</td>
<td>37%</td>
</tr>
<tr>
<td>Motivational Strategy (No Cost)</td>
<td>13%</td>
<td>25%</td>
</tr>
<tr>
<td>Motivational Strategy (Added Cost)</td>
<td>11%</td>
<td>52%</td>
</tr>
<tr>
<td>Recommended Meal Plans</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>Mailings: Recommend or Provide Slim Fast; Refer to Specialists; Involve Family; Provide lower Fat/Cal Frozen Entrees, Taste Testings, Cookbooks/Utensils</td>
<td>&lt;10%</td>
<td>0-30%</td>
</tr>
</tbody>
</table>

Venditti et al, ADA Abstract, 2011
Clinically meaningful weight loss of 5-10% is feasible and effective—what do we know?
Behavioral weight loss studies (1974-present)
- 10% loss at 6 months (~10 kg)
- Longer duration = greater weight loss
- Regain is the norm
  - Maintenance contacts suppress regain
Large trials (DPP, Finnish DPS, Look AHEAD)
- 7-8% average weight loss at 1-4 years (~5 kg)
Translation and dissemination
- Closer to 5% on average

The Diabetes Prevention Program Outcomes Study
Long-term Follow-up to
A Randomized Clinical Trial
to Prevent Type 2 Diabetes
in Persons at High Risk

The DPP Research Group
Study Timeline

DPP Incidence of Diabetes
- Placebo (n=1082)
- Metformin (n=1073, p<0.001 vs. Placebo)
- Lifestyle (n=1079, p<0.001 vs. Metformin,
  p<0.001 vs. Placebo)

Risk reduction
- 31% by metformin
- 58% by lifestyle

DPP Trial Mean Weight Change

DPP Research Group, 2002, NEJM, 346: 393-403
What Were the Keys to DPP Lifestyle Success?

- Weight loss was the key to diabetes prevention
- Reduction of total calories, especially fat calories
- Achieving 150 minutes of activity each week
- Activity increasingly important over time

Pound for pound how does the weight loss happen?

- Mean kilocalories
  Decreased 450/day
  (from 2137 to 1687)
- Mean percent calories from fat
  Decreased 6.6%
  (from 34.1% to 27.5%)

Hamman et al, Diab Care 29: 2102-2107, 2006
Reduced diabetes risk with DPP lifestyle intervention is related to effects on adiposity (metformin treatment effect independent of body fat)

▲ = lifestyle  ■ = metformin  ● = placebo
Fujimoto WJ et al, Diabetes, 2007; 56:1680-1685


10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study

Fujimoto WJ et al, Diabetes, 2007; 56:1680-1685

DPP Research Group. Lancet. 2009; 374:1677-1686 (Figure 2)

Weight Change Over Time – Overall

DPP Research Group. Lancet. 2009; 374:1677-1686 (Figure 2)
Older age associated with weight loss (and behavior change)

- Older age strong predictor of success in meeting 7% weight loss goal at 24 weeks
- By final visit, 63% of participants ≥ 60 yrs were at weight goal compared to 43% of those age 45 to 59 yrs
- Older participants turned in more self-monitoring booklets and reported lower percent calories from fat

Incidence of Diabetes – 60+ yrs old
DPP Summary (1)

• Successful long-term weight loss was experienced over the 10-year follow-up in the lifestyle group
• Incidence of diabetes in original placebo and metformin groups was reduced to a similar rate as in the original lifestyle group
• Cumulative incidence of diabetes continues to be lower in the lifestyle group than in the other two groups

DPP Summary (2)

• Lifestyle and metformin treatment resulted in improved blood pressure measurements
• All groups had decreased cholesterol and triglycerides
• Lifestyle presented the same or lower blood pressure and lipid levels over time as other groups despite lower use of medication

Summary of Diabetes Prevention Program (DPP) Adapted Lifestyle Interventions (2008-2012)

(refer to translation handout)

It's springtime for dissemination studies
Internet-Delivered Intervention for Weight Management (the Bottom Line)

- Range of weight loss variable (1-8 kg)
- Few studies show 5% wt loss or greater
- Optimal programs include:
  - Structure (scheduled contacts, lesson materials/plans, home-assignments similar to in-person)
  - All behavior therapy elements (self-monitoring, skills training, reinforcement and feedback)
- Factors associated with better weight loss:
  - Synchronous group meetings ("real time" chat) for social support from group leader and members
  - Log in frequency ("showing up" still matters)
  - Meal replacement/structured meals plans as adjunct


What's new in weight loss and weight maintenance?
Under Construction
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We are what repeatedly do. Excellence, then, is not an act but a habit.
Aristotle
Thank you.
Questions?