Expectancy & Design Issues in Obesity Research
Me

Counseling Psychology

Crisis Counseling (suicide) connection & altering perceptions/expectations

Personality & Appraisal Psychology

Family Therapist

Clinical Obesity Post-doc (Hopkins)

Hopkins faculty ~15 years (GI & Rheumatology)

Fibromyalgia, CFS

Trained Science Writer

Windsurfing and Working Out
1. What do we want to learn in clinical obesity research? **Effect of diet intervention**

2. What do we really learn in clinical obesity research? **Effect of diet intervention PLUS**

3. What can we do to learn what we really want to learn in clinical obesity research? **Try to design studies to disentangle the PLUS from the effect of the diet intervention**
Map

Power of Expectations

Placebos as Expectancy Primers

Manipulating “Mind Set”

“Mechanisms” of Expectancy Effects

Designing weight loss trials to investigate role of expectancies
Expectations

Hidden application

Medication is administered by a machine (unbeknown to the patient)

Open application

Medication is administered by a physician

Pain relief

Expectancy-related (placebo) effect

Pharmacological effect

Hidden

Open
Open and Hidden Administration of Analgesics

Amanzio et al., 2001
Expectations Can Modify Drug Effects

Possible interaction between drug and expectation effect (open)

Eliminating expectation effect (hidden)

Benedetti et al., 2011
An effective drug will have a significantly greater effect during hidden administration compared to placebo.
What are Expectancies in RCTs?

Confidence in the occurrence of some future event

<table>
<thead>
<tr>
<th>Participant Expectancies/Beliefs</th>
<th>Experimenter Expectancies/Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment will be effective</td>
<td>Treatment will be effective</td>
</tr>
<tr>
<td>I am or am not getting the treatment</td>
<td>Results will confirm this</td>
</tr>
<tr>
<td>Operates Through (e.g.)</td>
<td>Operates Through (e.g.)</td>
</tr>
<tr>
<td>Demand characteristics</td>
<td>Different messages conveyed</td>
</tr>
<tr>
<td>Motivation</td>
<td>Interpretation of outcomes</td>
</tr>
<tr>
<td>Emotions</td>
<td>Vested interest</td>
</tr>
</tbody>
</table>

Theoretically, blinding distributes expectancies evenly between study groups to minimize bias.
Placebos as an Expectancy Primer
A merry heart doeth good [like] a medicine: but a broken spirit drieth the bones.

-Proverbs 17:22
A CONTROLLED TRIAL OF ARTHROSCOPIC SURGERY FOR OSTEARTHritis OF THE KNEE

J. Bruce Moseley, M.D., Kimberly O'Malley, Ph.D., Nancy J. Petersen, Ph.D., Terri J. Menke, Ph.D., Baruch A. Brody, Ph.D., David H. Kuykendall, Ph.D., John C. Hollingsworth, Dr.P.H., Carol M. Ashton, M.D., M.P.H., and Nelda P. Wray, M.D., M.P.H.
Some Placebo Terms

**Placebo Effect** = effect following administration of an inert “treatment” (pill, procedure) [“nothing = something”]

**Placebo-Related Effect** = effect of reassurance, kindness, spending time, empathy etc. [to real or inert treatments]

**Placebo Responses** = psychobiological phenomenon in response to inert treatments or the placebo-related effects of real treatments [hard to disentangle]
Beyond Our Expectations

Do placebo effects require deception?
Placebos without Deception: A Randomized Controlled Trial in Irritable Bowel Syndrome

Kaptchuk TJ et al. (2010)

“Placebo pills, something like sugar pills, have been shown in rigorous clinical testing to produce significant mind-body self-healing processes.”

Took 2 placebo pills twice a day

21-Day Endpoints


Kaptchuk TJ et al. (2010)
Effect size larger than is typically seen in anti-depressant drug trials
### The Placebo Orientation Meeting

**Placebo Effect/Expectancy Building:** Explain power of the placebo effect and how placebo treatment can lead to substantial relief whether placebo is concealed or unconcealed.

Rationale = build expectancies.

**Conditioning:** Explain how the body can respond automatically to placebo pills like Pavlov’s dogs that salivated when they heard a bell. Can produce physiological response independent of conscious belief. Examples of conditioning placebo responses and in pain conditions.

Rationale = reassure that response to placebo can produce changes in physiology.

**Realistic Attitude Toward Belief/Disbelief:** Explain that positive expectations can be helpful but are not necessary. Beliefs may wax and wane during the trial.

Rationale = belief and disbelief are both compatible with placebo response and comfort with either is important.

**Emphasize Importance of Adherence:** Explain that studies show that people who take placebo pills faithfully do much better. Commitment to performing the ritual of treatment may be more important than anything else.

Rationale = adherence is vital and supports the conditioning aspect of placebo.
“Impure” Placebos
Intermission
I am available for personal training
Double-Blind, Placebo-Controlled Clinical Trials as Gold Standard

Isolate and estimate the direct effects of a drug on blood pressure

- “Tight” inclusion/exclusion criteria
- Drug vs. Placebo (indistinguishable)
- Randomize to drug or placebo
- Blind to allocation
- Present identical information (e.g., effects, side effects)
- Identical quantity and quality of staff contact
- Careful monitoring of adherence
- Precise and standardized BP measurements
- Assess belief about treatment allocation

Try to control, not eliminate, expectancies/bias
Applications to Weight and Eating
Research Article

Mind-Set Matters
Exercise and the Placebo Effect

Alia J. Crum and Ellen J. Langer

Harvard University

ABSTRACT—In a study testing whether the relationship between exercise and health is moderated by one’s mind-set, 84 female room attendants working in seven different hotels were measured on physiological health variables affected by exercise. Those in the informed condition were told that the work they do (cleaning hotel rooms) is good exercise and satisfies the Surgeon General’s recommendations for an active lifestyle. Examples of how their work was exercise were provided. Subjects in the control group were not given this information. Although actual behavior did not change, 4 weeks after the intervention, the informed group perceived themselves to be getting significantly more exercise than before. As a result, compared with the control group, they showed a decrease in weight, blood pressure, body fat, waist-to-hip ratio, and body mass index. These results support the hypothesis that exercise affects health in part or in whole via the placebo effect.
Believing that you have a physically active job produces improvement on hard outcomes.
Consume a 380-calorie shake but are told that it is either: (1) a 620-calorie "indulgent" shake or (2) a 140-calorie "sensible" shake.
**Figure 1.** Indulgent shake label.
Figure 2. Sensible shake label.
Effects independent of dietary restraint

Figure 3. Differences in perceived healthiness as a function of shake label. Error bars reflect standard errors of the mean.

Ghrelin

Effects independent of dietary restraint
Taking weight-loss supplements may elicit liberation from dietary control. A laboratory experiment

Yewon Yi-Chi Chang, Wen-Bin Chiu

Department of Hospitality Management, Tunghai University, 1727, Sec. 4, Taiwan Boulevard, Taichung 40704, Taiwan, ROC
Institute of Education, National Sun Yat-sen University, 70 Lien-Hai Rd., Kaohsiung 80424, Taiwan, ROC

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ABSTRACT

Given that changes in diet and exercise habits are difficult to initiate and maintain, the use of weight-loss supplements has become an appealing alternative approach to weight management for many individuals. The current research examined whether the use of weight-loss supplements induced overly optimistic assessments of progress toward weight reduction, leading to psychological abdication of dietary regulation. Participants were randomly assigned to take either an identified placebo or a purported weight-loss supplement (actually the same placebo). Each participant reported perceived progress toward weight reduction following the manipulation. Consumption of snacks in a taste test and choice of sugary drinks were recorded. The results showed that participants receiving a purported supplement ate more in a taste task and preferred larger quantities of sugar in their reward drinks than did controls. Mediation analysis supported the perception of progress toward weight reduction contributed to the liberating effect. Using weight-loss supplements may increase perceived progress toward weight reduction but decrease dietary self-regulation. These thought-provoking findings can serve as a basis for educating the public about the myth that they are free to feel liberated from the need to regulate their eating when using weight-loss supplements.

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Those who were told that they were taking a weight loss supplement reported greater progress toward their weight loss goals YET ate more in a taste task and consumed more sugary drinks compared to those told they were taking a placebo.

Table 1
Participant demographics and descriptive statistics for the measures.

<table>
<thead>
<tr>
<th>Community sample</th>
<th>Weight-loss supplement</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
<td>50.0</td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>50.0</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–24</td>
<td>5</td>
<td>13.5</td>
</tr>
<tr>
<td>25–40</td>
<td>24</td>
<td>64.9</td>
</tr>
<tr>
<td>41+</td>
<td>8</td>
<td>21.6</td>
</tr>
<tr>
<td><strong>Dietary supplement users</strong></td>
<td>18</td>
<td>51.3</td>
</tr>
<tr>
<td>Overweight (BMI &gt; 25)</td>
<td>13</td>
<td>35.1</td>
</tr>
<tr>
<td><strong>M (SD)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time since last meal (h)</td>
<td>1.60 (0.51)</td>
<td></td>
</tr>
<tr>
<td>Number of daily supplements taken</td>
<td>0.62 (0.67)</td>
<td>0.65 (0.68)</td>
</tr>
<tr>
<td>BMI</td>
<td>23.84 (3.93)</td>
<td>23.81 (3.73)</td>
</tr>
<tr>
<td>Perceived goal progress (1–7)</td>
<td>4.65 (1.99)</td>
<td>3.48 (1.04)</td>
</tr>
<tr>
<td>Amount of nougat consumed (g)</td>
<td>47.30 (13.67)</td>
<td>36.62 (11.06)</td>
</tr>
<tr>
<td>Proportion of sugar-free beverages chosen</td>
<td>0.11 (0.31)</td>
<td>0.38 (0.49)</td>
</tr>
<tr>
<td>Amount of sugar chosen for the drink (0–4)</td>
<td>2.30 (1.31)</td>
<td>1.23 (1.27)</td>
</tr>
</tbody>
</table>

Note: Total sample size for both groups was n = 37. Units of the dependent measure are presented in parentheses.
Clinical Obesity Research

Clinical obesity researchers, to the extent possible, try to use strict RCT methodology

- Randomization to diet interventions
- Precise outcomes measurement

Blinding is typically not possible because participants are given instructions and are prescribed a specific set of behaviors that reveal the particular diet condition that they have been randomized to (no placebo-control diet condition)
Study participants are typically not given identical information because the diets require different information, prescriptions, and required actions. This creates a set of uncontrolled confounds, such as:

- Information & Beliefs
- Competence, credibility, authority
- Expectancies
- Differential contact time
- Different levels of required action (e.g., self-monitoring)

that MAY make it difficult to isolate and estimate diet effects.
Opaque Feeding Tube

Diet

Expectancy/Non-specific effects

Weight loss

Diet effect

Diet prescription administered by dietitian
Interventionists: Differential enthusiasm, reassurance, encouragement, interpersonal skills

Some people are natural born healers!
Potential Mechanisms for Participant Expectancies

**Research Context**
- Patient & Staff Factors
- Information & Diet Prescription
- Attention/Therapeutic Relationship

**Psychosocial Factors**
- Expectation for improvement
- Persuasive rationale for diet
- Adherence/monitoring
- Desire to lose weight
- Clinical environment
- “Skill” of interventionist

**Therapeutic Response**
- Subjective Outcomes [e.g., energy, quality of life, wellness]
- Objective Outcomes [e.g., weight, cholesterol]

Effects are not only the result of an intervention but also the effects embedded within the research context.
Diet effect is inflated by expectancy/non-specific effects such that expectancies play a differential role in one of the diets tested.
“Package of Care” Argument

Real interest is in the effects of the whole treatment experience (including expectancies and other non-specific effects) and NOT in the individual components.

Prevalent in CAM world

Camouflages ineffective procedures or components

[never fly in a drug trial!]
Trying to Estimate the Effects of Expectancies in Diet Comparison Study
300 Overweight/Obese People

Randomized to Message Set

Pro-Vegan Message
- Randomized to Diet
  - Vegan Diet
  - Paleo Diet

Pro-Paleo Message
- Randomized to Diet
  - Paleo Diet
  - Vegan Diet

Outcomes: Change in Weight and Body Composition

**Table 1: 2 x 2 Factorial Design Combining Two Types of Messages and Two Diets**

<table>
<thead>
<tr>
<th>Message Set</th>
<th>Assignment</th>
<th>Diet Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro-Vegan Message (PV)</td>
<td>PV-VD</td>
<td>Vegan (VD)</td>
</tr>
<tr>
<td></td>
<td>PV-PD</td>
<td>Paleo (PD)</td>
</tr>
<tr>
<td>Pro-Paleo Message (PP)</td>
<td>PP-VD</td>
<td>Vegan (VD)</td>
</tr>
<tr>
<td></td>
<td>PP-PD</td>
<td>Paleo (PD)</td>
</tr>
</tbody>
</table>
“Message Sets”

- **Pro-Vegan Message (PV):** told that the purpose of the study is to compare the effects of the vegan diet (VD) to a comparator diet, and that it is expected that the VD will produce greater weight loss compared to the other diet, but the study needs to be conducted to confirm that the VD is, in fact, the superior diet.

- **Pro-Paleo Message (PP):** told that the purpose of the study is to compare the effects of the paleo diet (PD) to a comparator diet, and that it is expected that the PD will produce greater weight loss compared to the other diet, but research needs to be conducted to confirm that the PD is superior.
Diets

Vegan Food Guide
Daily Plan For Healthy Eating

Other Essentials - Sources of Omega-3 Fatty Acids, Vitamin B12, Vitamin D

Fortified Soymilk & Alternates
8 oz SERVING

Beans & Bean Alternates
8 oz SERVING

Vegetables
1 or more SERVING

Grains
1/2 SERVING

Fruit
1 or more SERVING

Eat a variety of foods from each of the food groups. Drink 6-8 glasses of water and other fluids each day. Limit intake of concentrated fats, oils, and added sugars, if used.

Paleo Approved Food Pyramid

Nuts & Berries

Fruits

Vegetables

Meats
What about Staff Expectancies?

A LONGITUDINAL STUDY OF THE EFFECTS OF EXPERIMENTER BIAS ON THE OPERANT LEARNING OF LABORATORY RATS

ROBERT ROSENTHAL and REED LAWSON
Dept. of Social Relations, Harvard University, Cambridge, Ma
and
Dept. of Psychology, Ohio State University, Columbus, Ohi

(Received 20 August 1963)
(Revised 4 December 1963)

<table>
<thead>
<tr>
<th>I. Satisfaction with Experiment</th>
<th>Bright</th>
<th>Dull</th>
<th>t</th>
<th>p &lt; 0.10 (two-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9.1</td>
<td>6.6</td>
<td>4.40</td>
<td>0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. Ratings of Ss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aggressive (new scale)</td>
</tr>
<tr>
<td>2. Healthy (new scale)</td>
</tr>
<tr>
<td>3. Friendly (new scale)</td>
</tr>
<tr>
<td>4. Bright</td>
</tr>
<tr>
<td>5. Clean</td>
</tr>
<tr>
<td>6. Tame</td>
</tr>
<tr>
<td>7. Pleasant</td>
</tr>
<tr>
<td>8. Like</td>
</tr>
</tbody>
</table>

On the basis of questionnaire data obtained in this and in an earlier study, it appeared that Es believing their Ss to have been bred for brightness were more satisfied with their participation in the experiments, liked their Ss more, watched them more intently and found them to be more pleasant. They tended also to be more enthusiastic, friendly, encouraging, pleasant and interested in their rat's performance, but were less talkative and less loud when working with their S. But perhaps the crucial difference was that these Es may have handled their Ss more; a difference which could, on the basis of other research, account for their superior learning.
Evaluating Expectancy Effects in Weight Loss Measurement

Confederates reveal study condition (Treatment vs. control) to outcomes assessor.

Does it influence/bias recording of weight?
What we know

Favorable responses arise directly from treatment as well as from the social processes (e.g., words, beliefs, expectations etc) embedded within the delivery of the treatment

Interventionists can differentially activate non-specific effects through reassurance, encouragement, and talent as a healer
So, in Clinical Obesity Research...

Expectancy and non-specific effects may be potential confounds.

The absence of blinding increases susceptibility to these confounds.

If these confounds make more than a trivial difference, then the results of may not offer valid estimates of the effects of diet interventions.

To be continued....