Behavior, Energy, and Climate Change

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The Behavioral Sciences can reduce energy demand by promoting widespread individual behavior change.
- How can we ensure people use it correctly?
- How can we get it to diffuse quickly?
Programmable Thermostat Interfaces

- Only 20% Americans own one
- 70% of those don’t program it
- Designed from engineer’s perspective of what’s easiest to implement
- Should be designed from user’s perspective of what’s easiest to use
How the User Thinks

Numerous possible places to get stuck each leading to poor performance!

Amount of Time Doing Task ("Practice")

Based on Newell & Rosenbloom (1981)

Quantification & Feedback

- 10-14% reductions in use
- More successful studies used more frequent feedback
- Home electricity feedback in cell phone
- Feedback in non-hybrid cars
- Note: Measurement is also important for evaluating the efficacy of programs, which in turn is important for justifying their support.

<table>
<thead>
<tr>
<th>Savings</th>
<th>Studies 1975-2000 (n=38)</th>
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</thead>
<tbody>
<tr>
<td>20%</td>
<td>3</td>
</tr>
<tr>
<td>20% of peak</td>
<td>1</td>
</tr>
<tr>
<td>15-19%</td>
<td>3</td>
</tr>
<tr>
<td>10-14%</td>
<td>13</td>
</tr>
<tr>
<td>5-9%</td>
<td>9</td>
</tr>
<tr>
<td>0-4%</td>
<td>6</td>
</tr>
<tr>
<td>unknown</td>
<td>3</td>
</tr>
</tbody>
</table>

Sarah Darby. Making it obvious: designing feedback into energy consumption.
- How can we ensure people use it correctly?
- How can we get it to diffuse quickly?
Characteristics of People

Adopter Groups Through Time

“Mavens” - Knowledge
“Salesmen” - Persuasive
“Connectors” - Know people

Characteristics of Network Structures

Hub and Spoke

Fully Connected

Random

Small World
Characteristics of the Technology

Characteristics of Innovations (Technology or Practices) (Everett Rogers, 2003)

- Simplicity - Is it easy to understand and use?
- Observability - Are the results of using it visible?
- Trialability - Can it be experimented with?
- Compatibility - Is it consistent with existing values and needs?
- Relative Advantage - Is it better than the prior thing?

Characteristics of Ideas (Chip & Dan Heath, 2007)

S implicity (& gets to the core)
U nexpectedness
C oncreteness
C redibility
E motions
S tories

Aesthetics & Identity Signaling
Increase Conservation

Increase Technology Use & Diffusion

Technology Economics

Identify Future Directions

Toolbox

- Which techniques are problematic?
- Which have been successful?
Ideas for Target Behaviors

Criteria: Size of Footprint + Ease of Modifying It

• Reduce driving – ~20% ? residential CO2
  (not likely to be easy without extensive infrastructure changes)

• Home improvements (e.g., insulation) – Lots! ?

• Eat less meat – ~6% ?

• Clothes drying – ~6% ?

• Lower set-back house temperatures – ~6% ? (= total heating)
  (current average is 5.5 degrees)

• “Vampires” – 5-10% ?
  (note a large proportion are clustered in groups)
Fields

- Public Health
- Social Marketing
- Education Entertainment
- Communications
- Social Psychology
- Anthropology, Sociology, & City Planning
“Taken as a whole, these studies suggest that it is considerably more likely that attitudes will be unrelated or only slightly related to overt behaviors than that attitudes will be closely related to actions. …correlation coefficients…are rarely above .30 and often are near zero.” (Wicker, 1969, p. 65).

Awareness of Problem
“Climate change is occurring & it’s human caused.”

Information
“Driving less will help.”

Attitude
“This is bad. Something should be done.”

Attitude
“Biking is good for env.”

Behavior
E.g., biking
Awareness of Problem
“Climate change is occurring & it’s human caused.”

Information
“Driving less will help.”

Monetary (Dis)Incentives

Attitude
“This is bad. Something should be done.”

Attitude
“Biking is good for env.”

Behavior
E.g., biking

Problems:
- Other barriers are not addressed
- Not cost-effective
- Taxes or fees are unpopular
- Behavior is not long-lasting
- Overjustification effect
Typical Approaches

**Awareness of Problem**
“Climate change is occurring & it’s human caused.”

**Information**
“Driving less will help.”

**Monetary (Dis)Incentives**

**Standard Marketing**

**Attitude**
“This is bad. Something should be done.”

**Attitude**
“Biking is good for env.”

**Behavior**
E.g., biking

- Small changes in market share are sufficient.
- Target easy behaviors: switch to a new brand or indulge.
- Messages based primarily on creative inspiration.

→ Product, price, placement, & promotion + overcome barriers & social psych.
Typical Approaches

**Awareness of Problem**
“Climate change is occurring & it’s human caused.”

**Information**
“Driving less will help.”

**Monetary (Dis)Incentives**

**Standard Marketing**

**Attitude**
“This is bad. Something should be done.”

**Attitude**
“Biking is good for env.”

**Behavior**
E.g., biking

**Other:**
- Overcoming barriers
- Social Psychology
- Stories in media
- Feedback
Increase Technology Use & Diffusion

Increase Conservation

Technology Economics

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- Which techniques are problematic?
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PIEE Precourt Institute for Energy Efficiency
Barriers & Benefits

- People gravitate to actions with high benefits and few barriers.
- Change behavior by altering the balance of benefits and barriers.

**External barriers**
- Infrastructure, technology
- Time, safety, unpleasantness

**Internal barriers**
- Cultural habits & myths
- *Perceived* time, safety, unpleasantness

<table>
<thead>
<tr>
<th></th>
<th>New Behavior: Bike to work</th>
<th>Competing Behavior: Drive to work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benefits</strong></td>
<td></td>
<td>Time (add speed bumps)</td>
</tr>
<tr>
<td><strong>Barriers</strong></td>
<td>Safety (add lights to bike paths)</td>
<td></td>
</tr>
</tbody>
</table>
Munster, Germany: 400,000 bikers/day
35% of daily transportation

Infrastructure

Safety, etc.

Promotion

Education & Tests

Bike Police
Habits & Myths

Studies of nearly identical units have reported large (e.g., 200-300%) variations in energy use. (for a review, see Lutzenhiser 2003)

• Cultural habits
  – 1996 study on energy related behaviors in Norway and Japan

• Myths
  – Turning things off and back on again uses more energy than leaving them on
  – When devices are turned off they’re not drawing power
  – Seen devices use more energy than hidden ones

• Personal habits
  – People are surprised by the frequency of habits like peering into the refrigerator or running hot water that the self-monitoring causes them to “catch”.
Education Entertainment

• Serial dramas are extremely effective for prosocial change
• Few environmental shows
• Story lines + modeling

Social Cognitive Theory - Albert Bandura
• Instruct
• Create norms
• Build self-confidence
• Demonstrate expected outcomes
Social Psychology

   - Opt-in ~20% participation
   - Opt-out 80-90% participation
   → Change renewable energy to Opt-Out
Social Psychology

2. Personal contact
   – Face-to-face contact, from friends, block leaders, representatives of organizations
   – Australia’s EnergyMark program
   – Gore’s 1000 soldiers
   – Interfaith Power & Light
Social Psychology

2. Personal contact
3. Norms
   - Individuals’ beliefs about the common and accepted behavior in a specific situation
Summary of Behavioral Tools

1. Target specific behaviors (versus raising general awareness)
2. Design technology, infrastructure, or programs for the user
3. Overcome barriers:
   - Infrastructure, cultural habits or myths
4. Use feedback
5. Apply cognitive, social psychological, & other principles to enhance success
6. Employ the media and diffusion principles

→ Let’s move forward in implementing what is known, measuring it’s efficacy, and developing best practices based on results
Increase Conservation

Increase Technology Use & Diffusion

Technology Economics

Identify Future Directions

Toolbox

PIEE Precourt Institute for Energy Efficiency
Behavior, Energy, and Climate Change (BECC) Projects

Website (PIEE supported)

• Professional Profiles
  – With researchers, policy makers, business and NGO representatives
• Research
  – Foundational Readings
  – Literature Database
• Top Questions to be Answered, Case Studies

BECC Conference Nov 8-9 (CIEE supported)

White Papers
Behavior, Energy, and Climate Change (BECC) Content Areas

- Behavioral Economics
- Anthropology/Ethnographic Research
- Risk Evaluation
- Energy Program Evaluation especially Process Evaluation
- Public Opinion Polling
- Advertising/Communication Research
- Social Marketing
- Consumer Behavior Research
- Technology Commercialization
- Diffusion of Innovation
- Psychology (Social, Cognitive, etc.)
- Education
- Public Health
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