THE ADOLESCENT YEARS OF BEHAVIORAL PROGRAMS

Optimizing Behavioral Program Design through Energy Savings Persistence

December 8, 2014
Program design is a moving target

- In some jurisdictions, behavioral program participants have reached their adolescent years
- ‘Adolescent’ behavioral programs require different approaches to optimize results
- One of the main questions that program administrators ask is:
  - How long do we need to treat participants?
  - How often do participants need feedback?
  - How should we continue to treat participants?
We know what to expect on an annual basis, but we are still learning about what to expect over the long-term

- Programs are moving from infancy (measured in months), to adolescence (measured in years)
- Program designers and evaluators need to shift focus from an annual perspective to a multi-year perspective

Presentation focuses on:
- Stages of Development – What do we know from persistence studies?
- Optimizing Program Design – What can we take from this knowledge to optimize program design?
- Setting the Course – What can we do moving forward?
Stages of Development

What do we know from persistence studies?
Savings grow after the first year in multi-year programs, but may plateau

- For Home Energy Reports, we know how much energy they save in the first 1-2 years, generally see savings plateau after Year 2

Annual Savings with Continued Treatment

<table>
<thead>
<tr>
<th>Percent Savings</th>
<th>Electric</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>SMUD</td>
<td>Ameren Illinois Gas</td>
</tr>
<tr>
<td>Year 2</td>
<td>Wave 1</td>
<td>Wave 2</td>
</tr>
<tr>
<td>Year 3</td>
<td>National Grid Electric</td>
<td>National Grid Gas</td>
</tr>
<tr>
<td>Year 4</td>
<td>Wave 1</td>
<td>Wave 2</td>
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</tbody>
</table>

- Opinion Dynamics
Participation in DSM programs are accelerated compared to control group customers, but converge over time

- Participants tend to participate in DSM programs:
  - More than the control group, but over time this difference gets smaller
  - In the **first year**, and tend to participate in summer for electric cohorts and winter for gas only cohort
  - At a **faster pace** than control

![Difference in Participation Lift Over Years](image_url)
Savings persist with decay after treatment stops

- A few multi-year programs suspended treatment for some customers, and found persistence with decay after reports are suspended at year 2.

Nearly 67-80% of treatment effect may remain 12 months after suspended treatment*.

*Allcott & Rogers, 2014
Savings persist with decay after treatment is reduced

- A Northeast utility program reduced treatment for some customers, and found persistence with decay
  - 33% reduction in savings for electric, 64% reduction in savings for gas when compared to continued group

**Electric Reduced Treatment Group Results**

<table>
<thead>
<tr>
<th>Period</th>
<th>Percent Savings (Continued)</th>
<th>Percent Savings (Reduced)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>N/A</td>
<td>1.86%</td>
</tr>
<tr>
<td>Period 1</td>
<td>2.51%</td>
<td>1.86%</td>
</tr>
<tr>
<td>Period 2</td>
<td>2.70%</td>
<td>2.39%</td>
</tr>
<tr>
<td>Period 3</td>
<td>2.39%</td>
<td>1.80%</td>
</tr>
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</table>

**Effect of Reduction** (Difference in Differences vs. Period 1)
- No reduction in savings
- Represents 33% of continued group savings in Period 3

**Gas Reduced Treatment Group Results**

<table>
<thead>
<tr>
<th>Period</th>
<th>Percent Savings (Reduced)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>N/A</td>
</tr>
<tr>
<td>Period 1</td>
<td>0.64%</td>
</tr>
<tr>
<td>Period 2</td>
<td>0.40%</td>
</tr>
<tr>
<td>Period 3</td>
<td>0.44%</td>
</tr>
</tbody>
</table>

**Effect of Reduction** (Difference in Differences vs. Period 1)
- Represents 29% of continued group savings in Period 2
- Represents 64% of continued group savings in Period 3
Recent results suggest savings are derived primarily from behaviors

- Recent studies indicate:
  - Spike in response after receiving reports (days)*
  - Behavior is not habituated in first year of reports (months)**
  - It takes time to habituate EE behaviors, but appears to occur after first two years (years)***
  - Savings from DSM programs are fraction of overall savings

*Allcott & Rogers, 2014, **NMR Group, 2014, *** Allcott & Rogers, 2013
Optimizing Behavioral Programs for Adolescents

The Adolescent: Strategies, Timing and the Individual
Things to think about when understanding an adolescent

- **Changing Strategies**
  - What are the right ways to engage?
  - Are there new strategies we need to try given the stage of development?
  - What sort of services are administrators in a position to provide that might increase savings?

- **Picking your Moments**
  - When is the right time?
    - For messaging? For intervention?
    - Will they remember the earlier messages we taught them at those critical moments?

- **Nature versus Nurture**
  - Every child (or household) may be unique
  - Speaking to the individual
  - Picking your audience, knowing your audience
Changing Strategy – Variation in Interventions

### DSM Programs

#### Behavioral Programs
- Marketing (Mass, CB, Social)
- Education
- Energy Information Display
- Competition & Games
- Home Energy Report Programs

### Program Types and Electric Savings Per Participant

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Electric Savings Per Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Energy Reports</td>
<td>1.4% to 2.8% annual kWh reduction per household</td>
</tr>
<tr>
<td>Energy Information Display /HAN/IHD</td>
<td>2.3% to 9.3% annual kWh reduction per household*</td>
</tr>
<tr>
<td>Education &amp; Training</td>
<td>2.5% - 4.4% annual kWh reduction per household; 300–515 kWh per participant</td>
</tr>
<tr>
<td>Competition &amp; Games</td>
<td>1.9% annual kWh reduction per household; ~200 kWh per participant</td>
</tr>
<tr>
<td>Marketing (Community Based, Social Media, Mass Marketing)</td>
<td>Not typically estimated</td>
</tr>
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</table>

*Higher range typically also includes control devices
Pick Your Moments

- Findings from persistence studies also highlight how varied responses can be to reports and what they convey over time
  - **Duration of Exposure**: Don’t Stop Providing Treatment Too Soon, or else you may not have sufficient habituation
  - **Seasonality & Fuel Type**: Reduced treatment study found 33% reduction in savings for electric, and 64% reduction in savings for gas when compared to continued group
  - **Timing**: Provide direct feedback to move off peak or at other key moments (POS) when it matters most
Nature vs. Nurture – Design Customer-Centric Interventions

- Optimization depends on the customer profile (i.e., who, what and when customers take action)

Participants are **more engaged** with their home’s energy use than control

Participants have **higher levels of knowledge** on ways to save than control

Treatment and control have **similar attitudes** regarding energy usage, ways to save, and changing actions to reduce energy
Setting the Course

What can we do moving forward?
Re-Orient Program Design to Customer Perspective

- Customers are not monolithic, and should be viewed both across each other and over time
- Over the next few years, need to re-orient program design to take a customer perspective to effectively reach and engage them in a customized way
- Design should consider:
  - Alternative intervention strategies
  - When changes occur
  - Customer-centric interventions

How do you optimize?

“To find out what happens when you change something, it is necessary to change it.” George Box
## There are many options for future research

<table>
<thead>
<tr>
<th>Research Area</th>
<th>What it may tell us</th>
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<tbody>
<tr>
<td>“Stop treatment” experiments</td>
<td>• Long-run persistence under different program designs &amp; different audiences</td>
</tr>
<tr>
<td>Frequency &amp; duration experiments</td>
<td>• Help estimate decay rate</td>
</tr>
<tr>
<td></td>
<td>• Indication that habituated behaviors and/or measures have accumulated to a point where persistence effects could kick in</td>
</tr>
<tr>
<td>Assess actions taken</td>
<td>• End-uses driving savings, and demand shift</td>
</tr>
<tr>
<td></td>
<td>• Potential for measure savings</td>
</tr>
<tr>
<td></td>
<td>• Bottom-up estimate (or adjustment) to persistence</td>
</tr>
<tr>
<td>Profile Customers</td>
<td>• Understand which customers drive high savings, low savings</td>
</tr>
<tr>
<td></td>
<td>• Couple with survey research/AMI/disaggregation to understand what actions are driving these results, and how messaging can be tailored to engage customers over time</td>
</tr>
<tr>
<td></td>
<td>• Understand customer motivation and action (test messaging)</td>
</tr>
</tbody>
</table>
Thank you!

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Visit us at www.opiniondynamics.com
Persistence References