

Environmental Behavior Change Backsliding Literature Review

Introduction

Once a program has successfully motivated behavior change, the question becomes, will the new behavior stick? If not, how long will it last before the program should reach out again? This is a challenging question to answer, as few programs do long-term evaluations, and ultimately, it is dependent on the behavior, the program, and the audience. However, a literature review of behavior change research can shed some light on these questions. This review speaks to the goals of The Recycling Partnership; specifically, how long after The Recycling Partnership implements their successful outreach strategies in a community will residents continue to recycle a commodity or keep a contaminating commodity out of the recycling? Despite the desired focus on recycling, considering the limited long-term evaluation literature available, the review will touch on programs targeting a range of social good behaviors.

Literature Review

Few programs complete and publish long-term evaluation, and those that do often speak to how successful their program was in the long-term, as opposed to a focus on at what point behavior returns to baseline, or “backslides.” In this review, we summarize the available research and evaluations focused on the durability of outreach programs that change social good behaviors.

First, in the *Specific Program Evaluations* section, we summarize each program in a brief paragraph and then present a table with the durability of a program and the approximate number of touches starting with the most durable research, . Then, in the *Meta-Analysis of Behavior Change Programs* section, we summarize the findings of two meta-analyses that looked specifically at durability of behavior change programs. Finally, we give overall results and considerations for The Recycling Partnership.

Specific Program Evaluations

Harrigan and Gregory (1994) examined the persistence of energy savings among households who received an in-home education program and a setback thermostat compared to a group of households that received a weatherization program. Persistence was evaluated by looking at each group's energy data for the first year after treatment and the third year after treatment. In the first year, the Education group saved 24% of the normalized annual consumption, while the Weatherization Group saved 14%. In the third year, these savings had been nearly maintained across both groups, with 85% of the Education group's first year savings and 90% of the Weatherization Group's first year savings still evident in the third year. These results provide evidence that behavior change can be sustained over the long term.

One of the most well-known reports on long-term behavior change is the work of **Staats, Harland, and Wilke (2004)**, which evaluated the EcoTeam Program. The EcoTeam Program combined education, feedback, and social diffusion/social norms in a group setting (social support), and targeted behaviors focused on six themes: garbage, gas, electricity, water, transport, and consumer behavior. EcoTeams consisted of six to ten people who already knew each other and met once a month to cover one theme from the EcoTeam Workbook. The household then spent the rest of the month working on that theme at home. In their evaluation, Staats, Harland, and Wilke (2004) studied 38 behaviors using a longitudinal study design. Across the behaviors, 19 changed in a pro-environmental direction directly at the end of the program, and these changes were retained or increased further during the subsequent two years as compared to non-participants who behaved equally pro-environmentally at the start of the program.

Wilhite, Hoivik, and Olsen (1999) reported on a Norwegian energy utility program that provided customized feedback on households' previous year's energy usage compared to their usage during the current year (weather-corrected). The reports were included on the customers' bill which was sent every 60 days. The enhanced bill group saved between 5 to 10% more energy than a control group that did not receive the billing reports. The effect was maintained a year after the project concluded.

Action Research (2017), under contract with the New York State Energy Research Development Authority (NYSERDA), implemented a normative feedback intervention aimed at reducing energy use among low- to moderate-income people living in a Downstate NY housing development where the landlord pays for utilities. The intervention consisted of a customized flyer delivered monthly over a two month period in the summer. The flyer provided normative energy feedback comparing the household's energy use to that of their neighbors. The energy use of households who received the feedback flyer was compared to a control group of households who did not receive the flyers (no-contact control). In the short term, those who received the feedback flyer demonstrated an average energy savings of 5.6% and some energy savings persisted over the next 12-months, decreasing to an average of 3.6%. By the next summer, the level of energy savings began to return to baseline.

Staats, van Leeuwen, and Wit (2000) provided information and weekly feedback on two heating-related behaviors in offices. The program was delivered across two 4-week intervention sessions, over two different winters, occurring a year apart. In the short term, the interventions were

successful on a group level, showing a 6% reduction in natural gas use. In the follow-up study occurring one year later, observations of individuals showed that relapses (returns to original behaviors) had occurred in 50% of the cases. While these findings show some maintenance of behavior change, they also suggest that periodic application of the program is necessary to maintain change.

One of the classic programs that employs normative feedback to change homeowner energy behavior are home energy reports sent by OPower (**Schultz, Nolan, Cialdini, Goldstein, & Griskevics, 2018**). The reports use individualized normative feedback, comparing households to their neighbors with ratings on whether the household is doing a good job or needs to improve. Since its launch in 2008, the average savings per household has ranged from 2% to 5%. When reports were discontinued after a large-scale trial, the amount of savings reduced by 50% over a one-year period, though even after a year, the participants in the program were still saving significantly more energy than a randomized control group.

Winett, Neale, & Grier (1979) compared the effects of interventions using daily individualized feedback or self-monitoring on electricity use. All households were first given information about how to conserve and were instructed to choose an energy conservation goal. The daily feedback group was provided with electricity feedback sheets each day for 28 days. The feedback sheets were color coded and included normative ratings (happy or sad faces) based on a comparison of the household to their neighbors. Households in the self-monitoring group were taught to read their own meters and received weekly sheets to complete for four consecutive weeks. The households were checked up on after their first read. Households who received daily feedback used 13% less electricity, and households who were self-monitoring used 7% less electricity compared to a control group. This effect persisted at a follow-up measurement occurring 10 weeks after the initial intervention was concluded.

Schultz (1999) conducted research on curbside recycling participation. Households received either individualized or group normative feedback describing the amount recycled by an average neighborhood family. The feedback was delivered via a door hanger once a week, for four weeks. Both types of feedback significantly increased the amount and frequency of the household's subsequent curbside recycling behaviors as compared to a no-contact control group. The effect was maintained for eight weeks after implementation.

Van Houwelingen and Van Raay (1989) used a goal setting intervention combined with either daily or monthly feedback about households' natural gas usage for a year. Both groups significantly decreased natural gas usage, with the daily feedback group reducing usage by 12.3% and the monthly group reducing usage by 7.7%. After conclusion of the initial experiment, the treatment and control households were monitored for an additional year. The initial effects disappeared when the data were evaluated a year after implementation.

Program	Number and Type of Touches	Long term effect
Harrigan and Gregory (1994)	In-home energy efficiency education and thermometer (one tailored touch, with infrastructure) compared to weatherization	Effects maintained for three years
Staats, Harland, and Wilke (2004)	Over eight months, EcoTeam monthly meetings, household completes workbook (eight meetings, monthly homework)	Two years, near full maintenance of behaviors
Wilhite, Hoivik, and Olsen (1999)	Over one year, provided monthly feedback with energy bill (12 touches)	One year after program, energy savings were maintained
Action Research (2017)	Two monthly normative energy feedback sheets, delivered under the door of apartments (2 touches)	Effect partially maintained for one year
Staats, van Leeuwen, and Wit (2000)	Over two years, 4 weeks in winter with weekly feedback (4 touches per year)	50% relapse one year after outreach
Schultz, et al., (2018)	Monthly OPOWER feedback reports with energy bills (12 touches)	Effect decreased by 50% in one year
Winett, Neale, and Grier (1979)	Over one month, all attended a workshop (one touch), then comparing a month of daily feedback (28 touches) to self-monitoring (1 blank report drop-off per week, ~4 touches)	Maintenance of savings for both groups after ten weeks
Schultz (1995)	Over four weeks, once a week feedback (4 touches)	Maintenance of behaviors for eight weeks
Van Houwelingen and Van Raay (1989)	Over one year, daily feedback (365 touches) or monthly feedback (12 touches)	One year later, all energy savings were back to baseline

Meta-Analysis of Behavior Change Programs

Darby (2006) examined the persistence of energy savings using a meta-analysis of programs that have employed feedback to change energy conservation behaviors. Key elements of persistence that emerged from the meta-analysis were feedback supporting intrinsic motivation or encouragement to invest in energy-efficiency upgrades. In addition, programs that provided well-thought-out energy advice that addresses barriers households may face to taking action have had more success. However, where feedback was being used along with financial incentives to save energy, behavior changes are likely to fade away when the incentive is taken away. Based on her review, Darby (2006) suggests that a new behaviour formed over a three-month period or longer

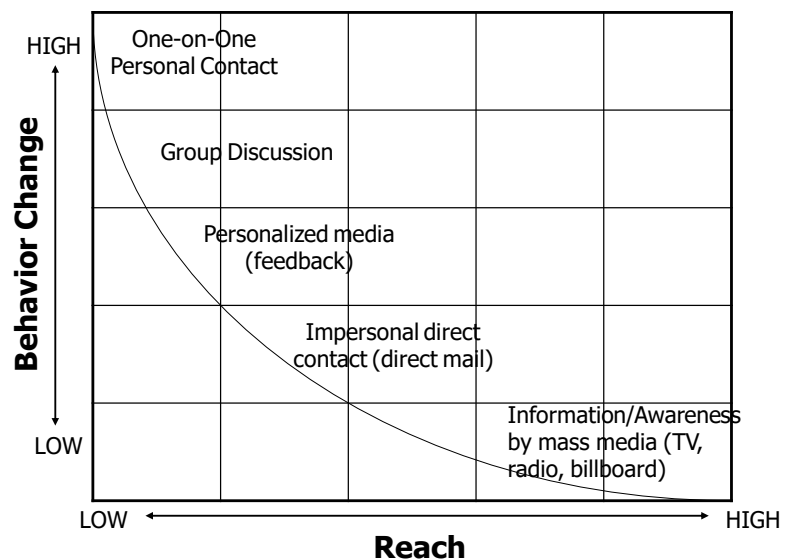
seems likely to persist. However, continued feedback is needed to help maintain the change and encourage other changes.

Abrahamse, Steg, Vlek, and Rothengatter (2005) conducted a review of 38 peer-reviewed field experiments, run from 1977 to 2004, that used experimental design to change household energy behaviors. For the majority of interventions, there was no reduction in energy use or a reduction of less than 5%. Of the 13 studies that considered long term effects (reductions were maintained after two or more months post-intervention), only five reported that reductions were maintained. Overall, the authors concluded that programs led to more durable results when they used a mix of behavioral strategies (e.g., tailored feedback, rewards, information, goal setting), and when barriers to actions were completely addressed. In addition, they recommended that more research is needed to follow programs after short-term success to demonstrate whether the behavior change is sustained.

Results

Overall, it appears possible to maintain behavior change over time when participants are provided education and feedback, particularly when it is personalized. However, most programs show a decline in behavior and/or resource savings over time, and those that continued to maintain behavior change often consisted of a more intensive program (e.g., EcoTeam or in-home education). This potential durability is in line with the best practices of social science research which suggests that more individualized and personalized contact is associated with greater impact. Messages delivered through more personal contact tend to be more impactful. However, increasing personal contact significantly limits reach (See Figure 1 for a visual representation), requiring program designers the necessity to engage their target audience.

Figure 1: Personal Contact: Reach Vs. Impact¹



Overall, the findings from the studies included in this review suggest that if a program has a robust design, is based in behavioral science, and adequately addresses the barriers participants face to acting, it is possible for behavior changes to be durable for a year, three years, or perhaps longer. Additionally, a refresher program delivered between 6 months to a year later would likely be beneficial for maintaining the behavior, as several programs found that behavior had begun to return to baseline a year later.

Considerations for Recycling Durability

The majority of the research summarized in this review is from the energy field, but the findings can be applied more broadly to programs that seek to change behaviors for social good. While there is not one set answer as to how long a new social good behavior will stick, there are several factors The Recycling Partnership might consider after implementing their program to estimate the potential long-term impact and the need to provide additional outreach.

Factors Affecting a Recycling Program

1. Personalization of the program (e.g., was the outreach more personal or broad?).
 - a. Programs that are less personalized may require more frequent contact, while more intensive programs may not need much follow up.
2. Difficulty of the behavioral ask (e.g., does the program asking participants to change several actions? Only one action?).
 - a. Programs that ask the audience to change a behavior that has many barriers, or to change several behaviors, may need more follow up to reduce backsliding.
3. Level of transience of residents (e.g., how frequently will there be new residents who have not received the program? Is the area a college town with a highly mobile population, or a suburban area with residents who stay in their homes for most of their lives?).
 - a. Programs that target fairly stable audiences may not need much follow up.
4. Level of initial success (e.g., how successful was your program? Was it an effective design?).
 - a. Programs that struggle to change behavior initially may require more follow up with citizens to achieve impact
5. Resources of implementer (e.g., what is a realistic ask for repeating outreach? Is outreach part of an annual budget?).
 - a. Programs must be sustainable in funding, staffing and management support and feasible for the implementer otherwise the behavior will not be durable.

Potential Future Research

Overall, these results indicate that The Recycling Partnership's programs have the potential to be durable. However, as indicated by the amount of studies found, there are still significant research gaps, particularly for behaviors outside of energy efficiency. If desired, Action Research could partner with The Recycling Partnership to design methodology to determine the amount of backsliding that happens after recycling programs, comparing different behaviors, audiences, or program variations.

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