Initiating Sustainable Behavior: Feel Good for Doing Good

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Abstract

This study investigated if alteration of cues and rewards of people at a university workout center could impact water bottle disposal behaviors. Using a Social Cognitive Theory model, two 8-week interventions were conducted. After a baseline was determined, educational signs were posted and then environmental changes were made to affect on awareness and cognition. Results recorded changes from a baseline proportion 73.2% of recyclable plastic and glass bottles disposed of in garbage cans to 26.8% in the recycling bins to 26.1% of the bottles in the garbage cans and 73.9% in the recycling bins after the interventions. Surveys also suggested supportive cognitive changes. The simple interventions used to nurture, support and reinforce pro-environmental behaviors would not only lower garbage costs, research indicates these actions also improve morale, well-being, and public image. This study documents destructive waste habits can be changed toward positive recycling behaviors with proper support and design.

"Simplicity is the ultimate sophistication." - Leonardo Da Vinci

Recycling behaviors offer a hope for sustainable growth by alleviating some of the waste issues generated by economic activities (Kuhn, 2003). Additionally, recycling helps the economy by creating jobs and helps maintain the environment for the future. Overall, recycling reduces the amount of waste sent to landfills and incinerators, conserves natural resources, and prevents pollution and greenhouse emissions caused by the manufacturing of new goods from virgin materials. Manufacturing recycled materials uses only two-thirds of the energy required to make goods from new material. Although there are many programs in the U.S. designed to encourage and facilitate recycling behavior, a gap still exists between implementation of these initiatives and optimal amounts of recycling behaviors (United States Environmental Protection Agency, 2012).

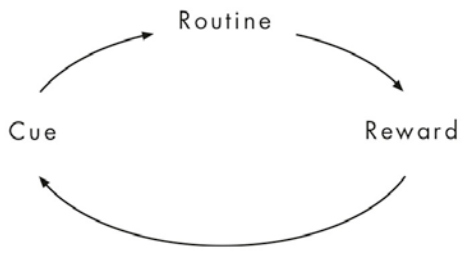
Research estimates that there are 165 million tons of plastic in our oceans with another 250,000 more plastic bottles added each hour (Knight, 2012). In 2010, the United States

generated almost 14 million tons of plastic containers and packaging, almost 11 million tons as durable goods, such as appliances, and almost 7 million tons as nondurable goods such as plates and cups. Of that total, only eight percent (2.4 million tons) of this waste was recovered for recycling (United States Environmental Protection Agency, 2012). At the state level, North Carolinians collectively throw away almost 24 billion (23,731,658,000) pounds or over 2400 pounds of trash per person per year (including recyclables). The amount North Carolinians throw away could circle the earth twice. Of that amount, 2,693,270,000 pounds or 276 pounds of material per person is recycled each year. With a trash disposal rate nine times greater than the recycling rate, there are opportunities for improvement. Even though North Carolina law forbids the trashing of plastic bottles in landfills, over 200 million (207,058,000) pounds or over 21 (21.23) pounds per person of plastic bottles still end up in landfills each year. In 2013, recycling plastic bottles were worth $0.20 per pound to recyclers that means increased garbage costs were incurred instead of earning a potential revenue stream of $41,411,600 (North Carolina Division of Environmental Outreach).

With the inevitability of growth, society must find sustainable ways to meet current needs that do not compromise the ability of future generations to meet their needs (Brundtland, 1987). Behavior change is therefore desired and it has been found that sustainable human behavior is most successful when efforts simultaneously provide social, economic and environmental benefits (United Nations Educational, Scientific and Cultural Organization, 2012). While it was believed that changing people's attitudes and values was enough to alter unsustainable behavior, studies have demonstrated more is needed to help people develop and continue to engage in sustainable behaviors (Webb & Sheeran, 2006).

Behavior change efforts attempt to help people develop sustainable behaviors to replace existing actions. Behaviors are initiated in response to a cue or signal, often from the environment. The cue sets in motion a routine, the behavior, from which a real or perceived consequential reward is realized. The consequence, if perceived as a reward, functions to reinforce and encourages future repetition of that behavior. In the beginning, the routine of new behaviors in response to a cue takes more energy because of effort and thought required. Later, however, as the new behavior is repeatedly performed, habits form and these behaviors become automatic and these actions require less energy. The formation of automatic behaviors, or habits, can be characterized with the habit loop (see Figure 1) (Duhigg, 2012).

Figure 1. The Habit Loop



Existing behaviors are often passive habits that do not require active cognitive processing. To start a new behavior therefore, the existing behaviors or routines must be interrupted. Additionally, new behaviors must be easy to adopt. Findings indicate that convenience is important (Arbuthnott, 2009) and new behaviors are unlikely to be attempted or later adopted if they require too much energy (activation energy) to begin (Achor, 2011). Moreover, individual habits are difficult to overcome and are often more powerful than intentions. Therefore institutional regulation, incentives and supports are important because they encourage and reinforce behavior change by altering the value and intention of the behavior (Arbuthnott, 2009; Webb & Sheeran, 2006). The power of existing behaviors can explain why many New Year's resolutions do not result in new behaviors. Education remains the key institutional support in promoting new actions such as sustainable behaviors, however, although education is necessary it has been shown to be insufficient and it must be supplemented (Prochaska, 2013).

Arbuthnott (2009) identified three factors: attitudes, context and individual attributes, which are influential in the translation of intention into behavior. With regard to recycling, non-recyclers tend to have limited knowledge about recycling benefits (Schultz, 2002). Increased understanding of associated benefits yields more participation in pro-environmental behavior (Gamba & Oskamp, 1994; Vicente & Reis, 2008). Like Arbuthnott's factors, the Social Cognitive Theory (SCT) explains how individual behaviors are formed. SCT shows behaviors are affected by environmental, behaviors and personal factors. Personal factors are described as the sum of all cognitive attributes (Crosby, Salazar, & DiClemente, 2013). The habit loop with cue, routine, and reward therefore describes and predicts behavior as can be explained by SCT. The environment provides the cue that initiates a cognition that leads to a routine or behavior from which an actual or perceived reward is received to encourage behavior repetition.

Various cues have been studied to promote sustainable behaviors such as recycling (Khoroshikh, Ivanova, & Kulikov, 2012). Pro-environmental education is thought be more effective than informing the general public about the dire situation of our environment (Arbuthnott, 2009). To change behaviors, "choice architects" are those who design environments to "nudge" people toward a new behavior by interrupting a routine with new environmental cues while they also design the environment to reward a new behavior to help people build new habits (Thaler & Sunstein, 2008). Throwing waste in a garbage can is an example of a stubborn automatic passive habit that would have to be interrupted to initiate a new recycling behavior.

To support national programs, many states now mandate recycling (Viscusi, Huber, Bell, & Cecot, 2013). For example, North Carolina has created legislation regarding disposal bans on a wide range of materials and has required local government and state agencies to develop 10-year solid waste management plans that mandates the establishment of recycling programs (Division of Environmental Assistance and Outreach, 2013); (Purdue, Freeman, Matthews, & McKinney, 2011). To encourage recycling behaviors, states are running programs to raise awareness to increase

participation. For example, NC devotes resources toward the development of programs for school children, young adults in college or elsewhere, and other programs for 35-year olds and older (N.C. Division of Environmental Outreach and Assistance).

In recognition of the need and in coordination with these campaigns, several Universities in North Carolina have implemented innovative programs to improve recycling on their campus. Despite these efforts, recycling rates are still below 50% in closed communities such as universities (UNC Division of Finance and Administration, 2013) and even lower in the general public. This study was an effort to determine if alteration of cues and rewards could impact behaviors or routines. Specifically, this study investigated if the water bottle disposal habits of people at a major university workout center could be altered toward a new recycling habit through the use of educational signs and associated environmental modifications.

Methods

Participants

A 27,000 student Southeast Division I university completed this study at the campus Student Recreation Center (SRC). The student population included 21,298 undergraduate, 5330 graduate, and 319 medical students. Of that total, 2876 undergraduate and 2951 graduate students were Distance Education (DE) only. The population includes 41% male and 59% female. With regard to ethnicity, 72% of the population was Caucasian, 15% African-American, 2.4% Asian, 2.9% Hispanic, 2.4% were two or more races, and other ethnicity groups represented less than 1% of the population. Participants in this study were a convenient sample of self-selected people in the university population who choose to use the SRC during the study. Students, faculty, and staff all have access to the SRC. On campus students are given membership with tuition while faculty, staff and DE students must purchase memberships. With regard to membership, over 80% were students and the remaining 20% included approximate equal representation of faculty, staff, student spouses, DE students, retiree's, and alumni.

Study Setup

Two weeks of set-up and trial runs were followed by two more formal eight-week studies over eighteen weeks. Before the start of the study, initial project meetings were held with the research team, SRC administration and the SRC custodial staff to organize collaborative efforts. To facilitate the plan, a facility blueprint was created to identify the location of all trashcans and recycling bins in the facility. Following identification of all disposal containers, collection time and procedures were developed to allow researchers to collect bottles without interfering with the custodial staff. The same bottle collection procedure was used throughout the study.

Data Collection Procedure

During the fall semester, pre- and post- intervention quantitative data and qualitative data were collected during the first eight weeks. Sustainable “paperless” practices were developed to collect both the qualitative and quantitative data in this study. Quantitative data included the numbers of cans and bottles disposed of in garbage cans and recycling bins. Qualitative data included participant responses to surveys. Surveys were designed using Qualtrics online survey software. The online survey was then administered to participants with iPads. Administration of the survey using iPads allowed respondents to both read and respond to the survey with the device instead of responding on paper. After recruiting volunteers, researchers handed participants iPads with the survey opened. Participants then completed the survey by providing responses on the iPad that were then captured by Qualtrics software for analysis. These paperless procedures were used to distribute or complete surveys and to record bottles and cans deposited in trashcans or recycling bins. Additionally, all communication and drafts were worked on, shared and compared using online software. These methods allowed minimal paper and ink to be used in the completion of this study and preparation of this manuscript.

The following can and bottle collection procedures were applied in both studies. Collection occurred daily, Sunday through Thursday at 9pm and on Friday and Saturday at 7:30pm. In weeks 1 through 8, there were 5 recycling bins and 22 trashcans. During weeks 9-16 after the environmental changes were implemented, there were 16 recycling bins and 17 trashcans in the facility. After collection each night, the researchers recorded the date; number of recyclables in the trash cans and recycle bins, and daily person count into an online data collection system. Procedures dictated the cans and bottles disposed of in recycling bins were collected and recorded weekly at the same times. The number of can’s and bottles collected in each container type were totaled weekly.

Pre-Intervention Data Collection

During the first four weeks, prior to any intervention, the number of all cans and bottles disposed of in the garbage cans and recycling bins were collected, counted and recorded to determine a baseline.

Analysis

Total number of bottles and cans collected were used for quantitative comparisons to determine the impact of the interventions. Comparisons were determined by calculating the percentage of cans and bottles disposed of in the garbage cans and or recycling bins weekly during each period of the study, pretest, post study 1, post study 2. Odds ratios and confidence intervals were also calculated for each study.

Study I: The Cue

Description

Study I, completed during the fall semester (October-December), attempted to alter the routine by providing a new cue. The routine (habit) was defined as individuals trashing bottles rather than recycling them. Research suggested that cueing positive behaviors with recycling signs, “Feel Good for Doing Good” would interrupt the bottle trashing habit and replace it with a new recycling routine (Duhigg, 2012). The hypothesis was that the new signs on the trashcans would cue individuals to start a new routine recycle and the “Thank You” signs on recycling bins would reward those who recycled.

Study I Methods

Prior to week five, the researchers developed a “Feel Good for Doing Good” sign that was affixed to garbage cans to serve as a positive cue to remind individuals to recycle. A rewarding sign, “Thank You”, was also attached to all the recycling bins to reward individuals.

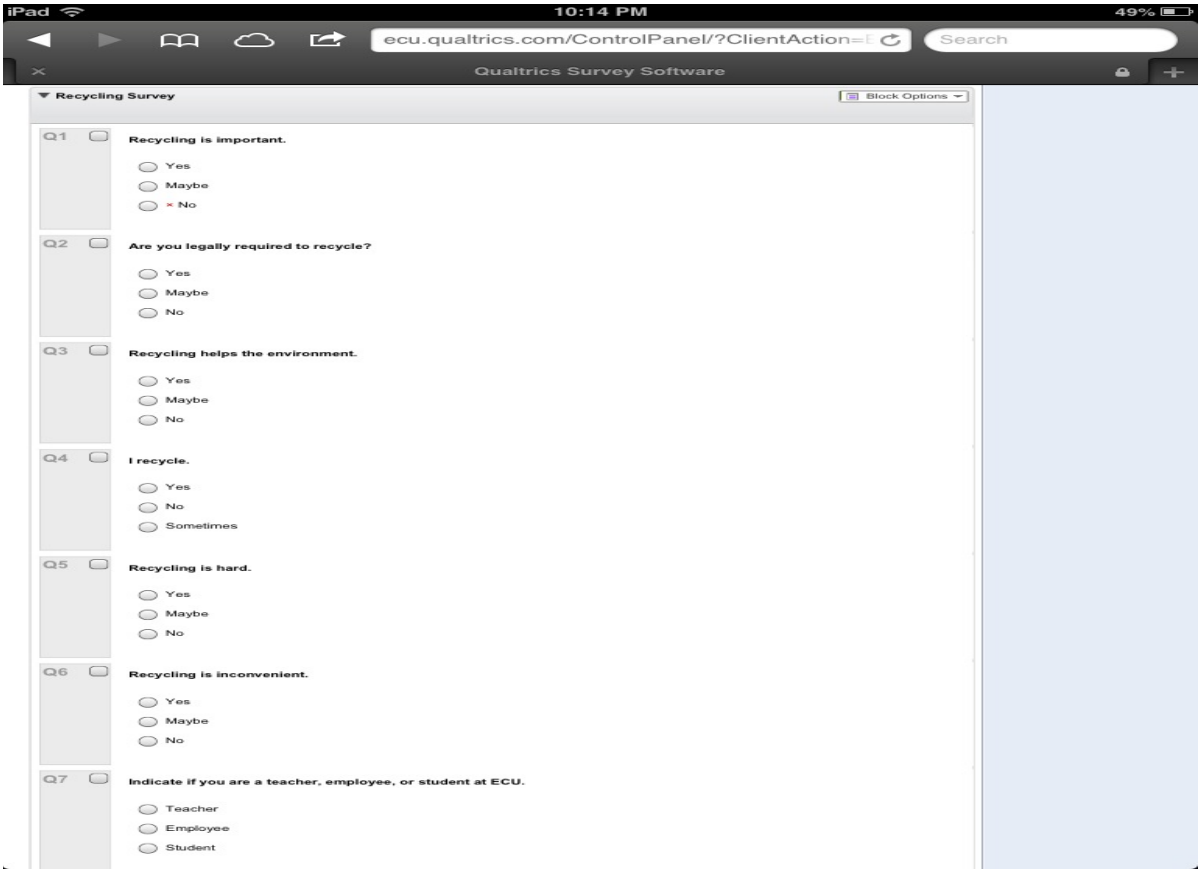
Study I Data Collection

All cans and bottles disposed of in the garbage cans and recycling bins were collected, counted and recorded.

Perceptions

Pre-cue and Post-cue intervention qualitative surveys were conducted on a convenience sample of students at the university’s recreation center to determine’ attitudes about recycling. Questions gathered demographics and inquired if participants felt recycling was important, if they are legally required to recycle, if it helps the environment, if recycling is hard or convenient, and if they recycle. In the post survey participants were asked the same questions and also if they saw the news signs and if the signs made them feel inspired, good or guilty (see Figure 2).

Figure 2: iPad Survey Screen



Study II: The Environment

The results of Study I suggested perceptions could be altered but since still less than 40% of the recyclable bottles were trashed instead of recycled; more was needed to change behaviors. Existing research has suggested that lowering activation energy to recycle by increasing the number of recycling bins at the point of consumption would be more convenient and might increase recycling rates (Ludwig, Gray, & Rowell, 1998; O'Connor, Lerman, Fritz, & Hodde, 2010).

Study II Methods

The environment was changed for study II by putting more recycling bins in the SRC and removing some garbage cans. Study II was completed in the spring semester (January-March). These changes resulted in the addition of 11 recycling bins and the removal of 6 trashcans. Based on study 1, recycling bins were placed in high traffic areas. Also, based on feedback from study I, all signs were removed from garbage cans. “Feel Good for Doing Good” signs on garbage cans were moved to recycling bins.

Following the environmental change, bottles and cans were collected, counted and recorded as previously done.

Results

Study I Results

In the Pretest over the first four weeks, garbage and recycling collection was conducted to establish a baseline. Initial recycled bottle rates were 26.8% compared to the trash rate of 73.2%. Changing the cue did improve the recycling rate to 35.1% (see Table 1).

Table 1: Bottles & Cans Trashed or Recycled by Percentage (total numbers in parenthesis)

Week	% in Trash	% in Recycling
PRE-INTERVENTION		
Week 1	57.1% (96)	42.9% (72)
Week 2	68.7% (281)	31.3% (128)
Week 3	86.5% (320)	13.5% (50)
Week 4	71.7% (165)	28.3% (65)
Total: Pre Intervention	73.2% (862)	26.8% (315)
POST-INTERVENTION		
Week 5	63.5% (87)	36.5% (50)
Week 6	67.5% (332)	32.5% (160)
Week 7	71.0% (193)	29% (79)
Week 8	57.9% (228)	42.1% (166)
Total: Post Intervention	64.9% (840)	35.1% (455)

Perceptions

Although results suggested that post education sign intervention behavior change was minimal, only 35% of recyclable bottles recycled, the 50 post-cue survey respondents indicated that 43% of survey respondents said that the signs helped remind them to recycle, 23% said the signs made them feel good, and 18% said the signs inspired them to recycle. Even so, 25% of respondents said they did not notice any signs. The pre-cue

survey indicated that the population was aware of the benefits of recycling and felt that it was important. Out of the 40 pre-cue survey respondents, 45% of the survey respondents said that they did recycle, 45% said they sometimes recycle, and only 10% said they did not recycle.

Study II Results

At the end of the second study, the percentage of recyclable plastic, aluminum, and glass bottles and cans in the trash had decreased from 73.2% to 26.1% and the percentage in the recycling bin increased from 26.8% to 73.9%. (Table II)

Table II: Bottles & Cans Trashed or Recycled

Week	% in Trash	% in Recycling
Week 1	20.4% (65)	79.6% (254)
Week 2	21.8% (133)	78.2% (478)
Week 3	31.7% (176)	68.3% (380)
Week 4	26.2% (144)	73.8% (406)
Week 5	26.7% (142)	73.3% (390)
Week 6	29.8% (171)	70.2% (402)
Week 7	19.5% (95)	80.5% (392)
Week 8	29.7% (179)	70.3% (423)
Total: Post Intervention	26.1% (1105)	73.9% (3125)

Odds Ratios and Confidence Intervals

To describe the proportions, odds ratios and confidence intervals were calculated. Following the first posting of signs, there was an odds ratio of 1.482 and a confidence interval (CI) of 1.248-1.761. This indicates that bottles and cans were 1.482 times more likely to be recycled when signs were present compared to no signs. After more recycling bins were made available and signs were moved from the trash cans, bottles and cans were 7.739 times (CI 6.687-8.957) more likely to be recycled than before signs or bins were added. Bottles and cans were also 5.221 (CI 4.570-5.964) times more likely to be recycled when bins were present compared to signs only.

Discussion

Logic would suggest we could just put out more recycling bins and more people would recycle. However, previous research, as cited, this study, and Social Cognitive Theory (SCT) suggest more than environmental manipulation is needed (Crosby, Salazar, & DiClemente, 2013). Results from this study suggest it is effective to increase awareness through signs and messages over an extended period and to follow the awareness campaign with an environmental change. As suggested by Achor (2008), to encourage behavior changes, activation energy needed to engage in the new desired behavior should be lowered so a new habit can be created. It can be inferred from this study that raising awareness of a concern and associated benefits, feeling good, not just lowering activation energy, may help participants initiate new behaviors. These types of interventions appear to help people develop sustainable living habits.

Conclusions

Results of this study suggest that recycling behaviors might be changed with simple, low cost methods such as encouraging signs. However, in the beginning of this study we made it too complicated by putting messages on the garbage cans that required cognitive effort and were not a direct message of what to do to “Feel Good for Doing Good”. Participants indicated that these signs caused some to think the garbage cans were recycling bins and not cues to recycle. This study, therefore, helped to clarify the need for simple messages and programs. If the study were repeated locally or at other locations, which we encourage, it would be in the best interest to develop a clear and simple message to direct people how to do the desired action. This study suggests it is best to facilitate and encourage the desired behavior by altering cognition and environment. Putting messages on the garbage may stop an undesired behavior but this led to confusion because many believed the garbage cans were recycling bins. In other words, DaVinci’s words are profound, “Simplicity is the ultimate sophistication.” Keep the message simple and be clear about what should be done and make it easier to engage in the desired behavior. Overall, efforts to change behaviors should support, nurture, encourage and reinforce desired actions.

While the findings in this study are convincing, several limitations must be noted. Many events occurred at the university that brought in people from outside the university population on campus and this study did not account for these events. Although pickups of cans and bottles were to occur by researchers, sometimes other events interfered with this process. The SRC was open to the entire population so the researchers do not know if it was the same people that continued to use the SRC throughout the entire study. Overall the study suggests that with simple, inexpensive changes to the environment and awareness, habits can be changed to ones that exhibit pro-environmental behaviors. While these results were dramatic, a change from about 73% of the bottles being thrown in the trash and only 27% being recycled to almost 74% of the bottles being recycled and only 26% being thrown in the trash, the specific mechanisms as well as the generalizability of these results must be better understood. To understand more, the authors encourage other researchers and practitioners to replicate this study at other locations to better understand the generalizability of

mechanisms to improve the effectiveness of efforts that encourage recycling and other beneficial behaviors.

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