

ESSAY 2

Going Green - With Envy or Education?

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INTRODUCTION

What if a neighbor told you:

1. *An average american throws more than 7 lb of trash a day*
2. *Americans toss nearly 700 plastic bottles a day*
3. *It takes over 400 years for plastic to decompose*

Every Thursday, put out your Blue Recycle bin with items that are recyclable - water bottles, milk jugs, other plastics, cardboard boxes, newspaper - it's easy to recycle.

Will that make you want to recycle more?

OR

What if a neighbor told you:

Nearly 60% of the residents on our street recycle every week. That ranks our street #10 out of 25 in the community - can you help us move up to #5? Every Thursday, put out your Blue Recycle bin with items that are recyclable - water bottles, milk jugs, other plastics, cardboard boxes, newspaper - it's easy to recycle.

Will that make you recycle more?

According to a [recent report](#) Germany ranks #1 on the list of countries with the highest recycling rate with 65% of its waste being recycled; The United States of America ranks #25 on that list with an overall recycling rate of 35%.

How can we do better?

This is an experiment designed to test communication tactics to increase recycling rates at individual household level with the objective of identifying tactics that perform well.

Causal Question

The overall low recycling rate in the US can be partially attributed to the availability of recycling facilities. A [recent study by the sustainable packaging coalition](#) found that while nearly 94% of Americans (especially those living in urban locations) have access to recycling (either curbside pickup or dropoff locations) only around 50% have access to automatic curbside recycle program (similar to other municipal services).

However, the recycling rate even in communities where recycling is universally available like the county where I live (Montgomery County, MD) is only at [60%](#). We believe that the low recycling rates observed are due to two factors

- a) Lack of knowledge - benefits of recycling, what can and cannot be recycled
- b) Lack of motivation - just too much work

The key causal question we are trying to find an answer to is:

Can communication tactics help drive higher participation in recycling? Will educating people on the consequences (and benefits) of recycling work better or would social comparison work better?

Experiment - Outline

The field experiment in this study uses two types of communications to examine which one does better. The experiment has one control group and two treatment groups. The first treatment group focuses on communication tailored to educating consumers about the benefits of recycling to the environment, and also includes what can be recycled and how to do it. The second treatment group focuses on motivating consumers to recycle more through social comparison - how their recycling habits compare to their neighbors - and also includes what can be recycled, and how to do it. The control group receives no additional information.

Experiment Details

1. How will we find subjects for the experiment?

Select households in specific neighborhoods for this experiment. Some of these households will be part of one of the two “Treatments” (described below) and some of these households will be our “Control” group.

2. Outcome measures

We will focus on these key outcome measures

- a) Amount of recycling materials (by weight) available for collection on each scheduled recycle pick up day for each household.
- b) Total volume of recycled materials from a neighborhood (measured by weight or volume)
- c) Proportion of materials put out for recycling that are actually recyclable.
- d) Participation: 1/0 indicator for whether a household made materials available for recycle pick-up on the day of collection each week.

With these measures, we will be able to get a sense for whether the communication strategy is bringing new participants into the recycle movement and/or if it is increasing quantity recycled/frequency of recycling among existing participants.

Some of these measures may be difficult to assess given the resources available for the experiment (and cost associated with the measurements). It is likely that we will go with measure (d) above as it is relatively easy to obtain.

3. Covariates

There are several extraneous factors that might impact recycling rates any given week for e.g. holidays (long weekends), collection day of week, weather (snow, rain, high winds) - however given that our treatment and control groups are in the same geography, proper randomization will ensure that these factors will have the same level of impact across those groups.

4. Experiment Duration & Analysis

We will collect data for 4 weeks prior to the launch of the experiment, send out communication in the 4th week and measure 4 weeks after the communication was delivered. We will compare recycling metrics described above for the before vs. after periods for each unit in the Treatment and Control groups.

Treatment Details

Treatment A - Education

Send out a flyer communicating the “*benefits of recycling to the environment, consequences of not recycling. You can help - here’s how*”. Flyer would also provide a simplified way to determine what can or cannot be recycled.

Treatment B - Motivation

Send out a flyer communicating the performance of the residents on the street relative to other nearby communities. E.g. *Your street recycles “more/less/same” than similar homes next street over. Or provide more specific information: 40% of the homes on this street participated in the recycling program compared to 60% on average on nearby streets. That ranks you #10 out of 25. You can help move up the rank by recycling more.* Flyer would also provide a simplified way to determine what can or cannot be recycled

Blocking and Clustering

Since neighbors may talk to each other (and observe each others’ actions) - it is possible that there might be some cross-contamination if we assign houses in a neighborhood to different treatment conditions - so it is probably best to cluster the treatment, so an entire street gets the same treatment condition.

While there are no intuitive reasons to employ blocking, we may want analyze the measures during the pre-experiment period to account for any inherent differences in the outcome measures across the neighborhoods selected for our experiment.

Statistical Analysis

We have two Null Hypothesis.

Null- 1: Communicating about recycling has no impact on the participation rates for recycling.

Alternate - 1: Communicating about recycling increases participation.

Null -2: The two different communication tactics (education vs. social comparison) have the same impact on recycling participation

Alternate - 2: There is a difference in participation rates based on communication tactics used.

We will conduct a randomized inference analysis (using clustering) to assess the impact of the treatment on the measures. For e.g. we will look at the treatment effect i.e. change in household participation rate (number of weeks that a household participated in the recycle program before vs. after) and compare the actual average treatment effect to treatment effects computed through random assignments of treatment condition under the sharp null hypothesis.

Pilot and Preparation

We should do a small pilot study that involves taking measurements of the metrics listed for a small sample. This will ensure that the measurements can be reliably made and highlight any problems with the approach.

Before we launch the experiment, we should also get a sense for how many households need to be in the treatment groups to reliably estimate the treatment effect. A pilot would give us a sense for the variability in the measures which would help with sizing the experiment.

Risks

1. If measurement is not done discreetly, it might draw attention to the study (Hawthorne effect) for the treatment group.

2. Timing of when measurements are taken could impact the measure (e.g. measuring an hour before scheduled pick-up vs. measuring the night prior - would result in different values).
3. The 'dosage' (ie. one communication) may not be strong enough to cause an impact that might be detected through our measurement approach. For e.g. in order to get enough people to read the flyer, we may have to send it to them multiple times - just sending one communication may not be enough to have a measurable impact.
4. The neighborhoods we pick may already be at "peak recycling" participation - a saturation level beyond which it is difficult to increase participation.
