



Social Comparison Nudges Without Monetary Incentives: Evidence from Home Energy Reports

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Energy costs in a campus dormitory setting are often not well understood or salient for students. They do not see billing or consumption information, making it difficult to translate use of particular energy services into costs. As a result, energy consumption is often “out of sight, out of mind” as students go through their busy days. Our research aims to enhance the understanding of how to better address these issues of saliency and incentives for energy conservation. Through randomized controlled trials (RCTs) on campus, we implement 2 types of energy conservation behavioral nudges: social comparisons, and moral suasion. By focusing on an undergraduate residence hall, we can test the effectiveness of those nudges in a context where consumers do not directly pay for energy. We provide further details about the nudges and their results in the following sections.

Home Energy Reports (Social Comparisons)

Our study focuses on understanding the mechanisms driving an especially policy relevant behavioral intervention: Home Energy Reports (HERs). HERs provide information about a household’s own energy usage, how that compares with neighbors’ usage, and estimated monetary savings from several suggested conservation actions. In standard residential contexts, the reports have been shown to be remarkably cost-effective: a simple additional section to consumers’ monthly bills produces energy savings that range from 2 to 6% [1, 2, 3, 4, 5, 6].

We introduce HERs into a campus dormitory, where tenants do not directly pay for energy. We conducted an RCT in a university residence hall, which houses over 400 undergraduate students. Two-thirds of those students (treatment group) were assigned to receive weekly reports, designed to be very similar to HERs typically provided by utilities [1, 7].

A sample of our emails is presented in Figure 1. Energy usage graphs were created based on thermostat readings from each bedroom in the building. Note that the emailed reports included graphs of a given student’s own energy usage, average neighbors’ (same bedroom type) usage, and the 15th percentile of neighbors’ usage. The reports also included information on students’ “efficiency standing,” which indicated if they were “GREAT,” “GOOD,” or “BELOW AVERAGE” based on their energy usage percentile for a given week. This information appeared both in the subject line of the email, and in an “efficiency standing box,” in the body of the email. Recommendations on how to adjust thermostats to save energy were added at the bottom of the email.

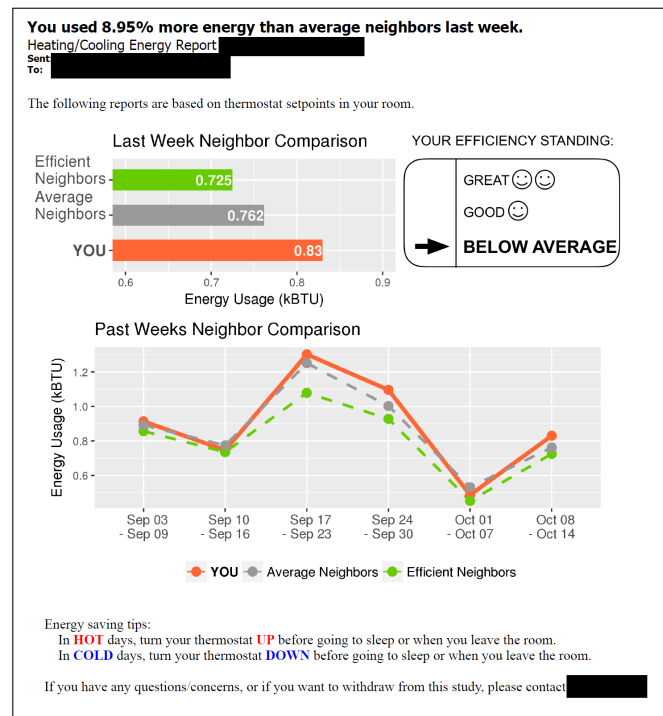


Figure 1: Emails Sent to Students During Fall 2017

In theory, by having students compare their own energy usage to their neighbors', we are appealing to their desires to "belong" to the group or to adhere to "social norms." Above average consumers would, therefore, be expected to lower their energy usage, trying to approach the average. That has worked in contexts where consumers are paying for energy bills. However, we show that in our setting, where there are no monetary incentives, consumers do not respond to these types of nudges.

Figure 2 presents average setpoints from students who received the energy reports (treated), compared to those who did not (control). It is clear that, as outside temperatures rise, students in both groups also increase their thermostat settings. Even though the treated students seem to prefer slightly higher temperatures, that difference is not statistically significant (given the overlapping 95% confidence intervals shown in Figure 2). Further, there is a noticeable drop in temperature settings from both groups during Thanksgiving week, when some students might have left town for a short break.

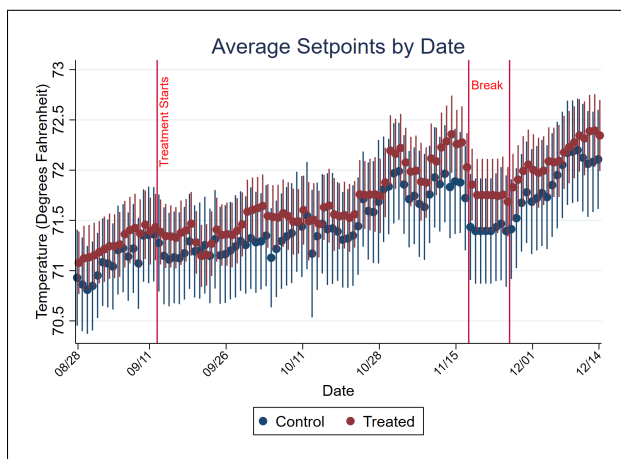


Figure 2: Average Setpoints by Date, Fall 2017

Simple Nudges Prior to Winter Break (Moral Suasion)

Prior to winter break, we sent simple emails to subjects, asking them to lower their thermostats down to 68 degrees. For this secondary trial, subjects were re-randomized and again split into two groups: 159 rooms were assigned to control, and 161 were assigned to treatment. The exact wording and image included in the emails can be found in the Figure 3.

Note that the energy-saving action ("lower your thermostat to 68 degrees") is clearly stated and highlighted. Also, the image and the last sentence of the emails include the word "save," to reinforce the positive/beneficial nature of the requested action. These emails were de-

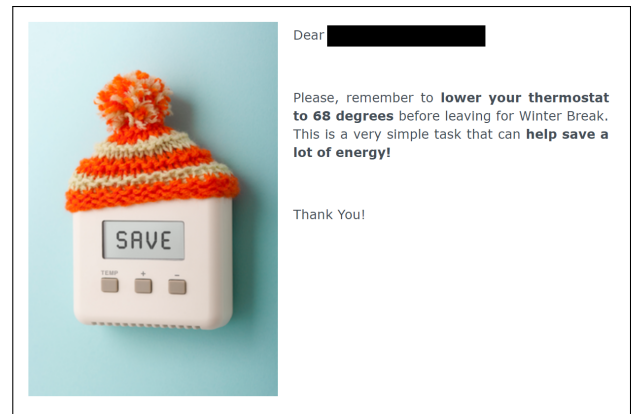


Figure 3: Email Sent Prior to Winter Break

signed to act primarily as moral suasion, and differ greatly from the Fall HERs, since students are not compared to each other, neither is own usage revealed. The same set of emails was sent out three times: 12/15 (Friday), 12/18 (Monday), and 12/20 (Wednesday). The final day of exams was 12/21, and most students were expected to have left the building by that weekend.

We can check if the simple nudges were effective by looking at Figure 4, which again compares thermostat means between treated and control groups. It can be noted that after the second round of nudging emails, average thermostats decreased steadily for the treatment group. By then, most students had probably completed their academic activities for the semester, and thus could leave for winter vacation. Shortly after the end of finals week, the setpoints stabilize, with the treated group averages remaining significantly lower than control. Once the Spring semester started, the setpoints for both groups quickly converge back to their pre-treatment levels, indicating that the effects of our nudges persisted only through the break period, while students were away.

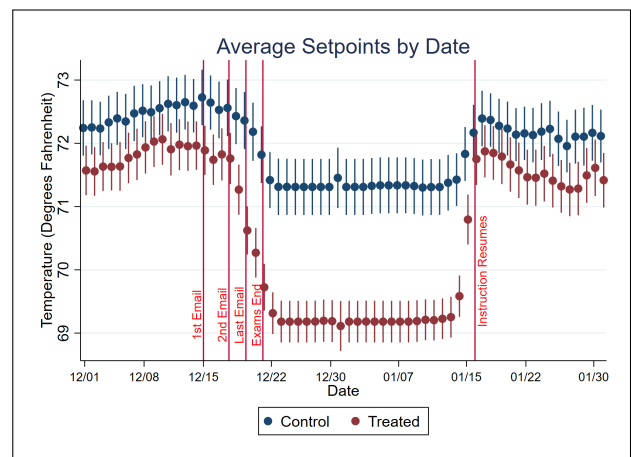


Figure 4: Average Setpoints by Date, Around Winter Break Period

Given the success of the nudges prior to break, we decided to test if they were also effective during the regular semester. For that purpose, we ran a third randomized trial, during Spring 2018, for which treated students received weekly moral suasion emails, similar to that from Figure 3. We found that those nudges were not effective during Spring, suggesting that the timing of treatment is crucial in this context. Students were probably more willing to lower thermostats prior to leaving for break, since that would not cause them any thermal discomfort. During a regular semester, however, the students may wish to use their heating more intensively.

Conclusions

This research explores the mechanisms driving the effectiveness of Home Energy Reports (HERs) in reducing energy consumption. Results from our randomized control trials suggest that HERs have no effect on behavior in the context of university housing, where students do not directly pay for energy. On the other hand, with simple moral suasion emails we successfully nudged students to lower their thermostats prior to leaving for winter break. Statistical analysis suggests that those nudges promoted close to 2% reductions of steam usage for the treated rooms during the break period. Those savings could potentially be larger if the same nudges were implemented for buildings with less efficient heating systems. During a regular semester, however, we find that, without monetary incentives, students may not be willing to sacrifice thermal comfort in favor of energy conservation.

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Published by the Institute for Sustainability, Energy, and the Environment (iSEE), University of Illinois at Urbana-Champaign. The authors are grateful for the support from the Levenick iSEE Fellowship. Souza is also grateful for the financial support from CAPES (Coordination for the Improvement of Higher Education Personnel - Brazil). We thank Bruce Mikos, Bryan Johnson, Morgan White and all University of Illinois staff who were helpful with data provisioning and overall feedback. We are also thankful for excellent research assistance from Eli Yu, and for helpful comments from Hunt Allcott, Severin Borenstein, Peter Christensen, Tatyana Deryugina, Don Fullerton, Madhu Khanna, Julian Reif, Catherine Wolfram, and seminar participants at the University of Illinois, 2018 Midwest Energy Fest, 2018 Mannheim Energy Conference, and 2018 AAEA Meetings. This research has been pre-registered at the American Economic Association’s registry for randomized controlled trials, with ID number AEARCTR-0002398. An academic working paper about this research is available at <http://e2e.haas.berkeley.edu/abstractWP041.html>. Other iSEE publications can be found at <https://sustainability.illinois.edu/>.
