

**Turning Off the Lights:  
Consumers' Environmental Efforts Depend on Visible Efforts of Firms**

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*Abstract*

Firms can save considerable money if consumers conserve resources (e.g., if hotel patrons turn off the lights when leaving the room, restaurants patrons use fewer paper napkins, or airline passengers clean up after themselves). In two studies conducted in real-world hotels, the authors show that consumers' conservation behavior is affected by the extent to which consumers perceive the firm as being green. Furthermore, consumer perceptions of firms' greenness and consumer conservation behavior depend on (a) whether the firm requests them to conserve resources, (b) the firm's own commitment to the environment, and (c) the firm's price image. Additionally, firm requests to consumers to save resources can create consumer reactance and can backfire when firms themselves do not engage in visible costly environmental efforts. Such reactance is more likely for firms with a high price image. Finally, the authors show that by spending a little money to signal environmental commitment, firms can save even more money through consumers' conservation of resources, resulting in wins for the firm, the consumer, and the environment.

*Keywords:* sustainability, green marketing, corporate social responsibility, price image, reactance

In the current environment featuring climate change, frequent natural disasters, and a growing population, firms and consumers both have a keener focus on sustainability. For firms, it is increasingly important to be perceived as being environmentally friendly. Salient environmental efforts, eco-friendly products, and a green brand image can all be handsomely rewarded (Leonidou, Katsikeas, and Morgan 2013; Olsen, Slotegraaf, and Chandukala 2013; Pelozo, White, and Shang 2013), and may result in higher stock returns for the firm (Sum 2012). Accordingly, firms are adopting a wide variety of greener practices. In this research, we examine how firms' environmentally friendly programs can affect consumer perceptions of how green the firm is, and how this perception drives consumers' actual green behavior.

Many environmental efforts on the part of firms do not entail any cost to the consumer. For example, when the firm uses less water, energy, or paper in manufacturing products, it limits the quantity of *inputs* in a product's creation, and there is no direct cost to consumers. On the other hand, when the firm encourages consumers to use less water, energy or paper in the *consumption* of services (e.g., using fewer napkins at a fast food restaurant), it entails a direct cost to the consumer in terms of necessitating a change in behavior.

Our contribution centers on an in-depth examination of the latter case: firm-encouraged green behavior where consumers bear some personal cost. When consumers in a hotel forego housekeeping, turn off the shower when soaping, switch off the lights when not in the room, or bring their own bags to the supermarket, the environmental benefit comes at a "cost" to the consumer. Further, in many such cases, there is little or no cost to the firm. To the extent that consumers comply with the firm's request to conserve resources, the firm saves money and also helps the environment. For instance, Marriott hotels estimates that it saves between 11 and 17 percent on water and sewer costs through its hotel towel reuse program (Pellettieri 2009).

Even firm programs that offer the consumer something in return for compliant behavior can still generate a profit. Delta Hotels' GreenSTAY program asks consumers to forego housekeeping services during their entire stay in return for planting a tree in their name, a \$5 hotel restaurant voucher, or 250 flyer miles; Westin and Sheraton offer a \$5 hotel voucher or 500 hotel points for the same (Hetter 2013). Both offers are financially much smaller than the savings to the hotel if the consumer complies with the request -- a room is cleaned in about 30 minutes of housekeeping labor per day (Touryali 2013), the vouchers drive incremental sales to the hotel restaurants, and many loyalty programs are worth 1-2 cents per mile (Groenewege 2003).

Thus, we start with the presumption that such "green" programs are designed with two firm goals in mind: to foster the perception that the firm is committed to sustainability and to increase consumer conservation behavior. Succeeding at the first goal can make the hotel more attractive to consumers and also increase consumer conservation behavior (as we show). And, as discussed above, achieving the second goal can decrease costs for the hotel. The question we explore in this research is how consumers perceive and respond to programs that ask the consumer to save resources, but where the firm also benefits if they do so.

Knowing that firms are highly motivated by the bottom line, some consumers may have an especially keen cynicism towards firms when they profess to "do good" or "be environmentally friendly". The very fact that the term "greenwashing" has been coined indicates such cynicism is not without merit (Motavalli 2011)<sup>1</sup>. Furthermore, this skepticism has likely been reinforced in consumers' mind through the media, as commentators have criticized various

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<sup>1</sup> Greenwashing refers broadly to deceptively promoting the perception that an organization is environmentally friendly (Kahle and Gurel-Atay 2014). Interestingly, hotel towel reuse cards were the context for the coining of the term, where author Jay Westervelt argued that the firm's true objective all along was cost savings (Motavalli 2011).

social efforts as merely thinly veiled efforts to make more money -- e.g., cause marketing efforts (see Frieswick 2009; Krishna and Rajan 2009). As such, it can be expected that when consumers observe a firm introduce a new green program that also saves the firm money, consumers may be skeptical and question the extent to which the program is truly for the benefit of the environment, versus for increasing the firm's profits.

We address three main questions in this research: First, can implementing an environmentally friendly ("green") program lead companies to be perceived in a negative light? If so, it is important to know when green programs can have negative reputational consequences for firms. Second, if a new green program can lead to detrimental reputational problems, how can this issue be addressed? Finally, how can green programs be implemented to ensure that they will actually increase (rather than potentially decrease) consumers' actual green behavior?

We answer these questions in two studies in real hotels. We show that green programs can sometimes lead a company to appear *less* concerned about the environment, an effect more likely to occur for high price image firms. Next, we show that a way to overcome this problem is by demonstrating to consumers that the company has voluntarily invested its own (financial) resources in its efforts to be more pro-environmental. Importantly, we show that, executed effectively, green programs can increase consumer conservation efforts and liking for the firm, and also reduce the firm's costs – thus resulting in a win for the firm, the consumer, and the environment. However, when executed ineffectively, green programs can backfire and actually reduce conservation, increase firm costs, as well as produce negative reputational effects. Finally, we demonstrate the psychological process underlying consumers' response to firm requests. Specially, we show that under some conditions, a request by the firm to conserve resources can create consumer reactance to such messaging, which negatively impacts both

consumers' beliefs about how green the firm is and consumer conservation behavior. We also document a relationship between consumers' perceptions of the firm's greenness and their conservation behavior. Our research contributes to both theory and practice, and we believe it can help marketers execute better green programs that benefit the environment, improve their reputation, and help their bottom line.

The next section presents our theoretical background and conceptual development. We then report two studies in real hotels that test our theorizing. We conclude with a discussion of the findings and highlight implications for practice and directions for future research.

## ***LITERATURE REVIEW AND CONCEPTUAL BACKGROUND***

### ***Sustainable Consumption***

Marketing researchers have called for more research into sustainability (e.g., Mick 2006), and research focusing on towel reuse at hotels (Goldstein, Cialdini, and Griskevicius 2008), environmentally friendly products (Griskevicius, Tybur, and Van den Bergh 2010), and recycling (Trudel and Argo 2013) has garnered attention. Research has found that consumer reactions to green offerings can be highly varied. While some consumer segments are willing to pay more for sustainable offerings, others are not (e.g., Haws, Winterich, and Naylor 2014; Menon and Menon 1997). In one example, Trudel and Cotte (2009) show that people are sometimes willing to pay more for ethically produced goods, but consumers can also punish firms (by demanding lower prices) for goods seen as unethical.

However, negative consequences of sustainable offerings have also been found. For example, Luchs and colleagues (2010) show that consumers associate sustainable (vs.

conventional) products with greater gentleness and lower strength. As such, consumers have a lower desire to purchase sustainable products when strength is a preferred attribute. In a similar vein, Luo and Bhattacharya (2006) find that for firms low in innovativeness, social initiatives (or CSR) can harm customer satisfaction and hurt firm market value. Finally, Newman, Gorlin, and Dhar (2014) show that consumers perceive a tradeoff facing firms in their product improvements, whereby “greening” a product takes away from its perceived product quality. But, interestingly, consumers view new products with green enhancements as being lower in quality only when the firm “proactively” created a green product, and not if it was an “unintended” side effect.

In general, while consumers report caring about the environment, there exists a wide gap between their attitudes and actual behavior (e.g., Auger and Devinney 2007; Carrington et al. 2010). As White and Simpson (2013, p. 78) state quite succinctly, “An issue that arises in contexts of sustainable consumption behaviors is that consumers often tend to resist engaging in activities that involve some cost to the individual-level self (e.g., additional time, increased effort, behavioral change), despite their goal of promoting a more societal, other-focused good (e.g., more sustainable practices and outcomes).” In other words, consumers often resist changing their behavior to promote sustainable efforts when it entails effort on their part.

### ***Motivating Conservation Behavior***

Some prior research has focused on nudges and well-constructed pleas to increase consumer conservation behavior (e.g., Cornelliissen et al. 2008; Griskevicius, Tybur, and Van den Bergh 2010; Thøgersen 2005). For instance, Baca-Motes and colleagues (2013) show that

guests who are asked to pledge their commitment to the environment and wear a pin symbolizing this commitment are much more likely to re-use their towels in a hotel.

Kronrod, Grinstein, and Wathieu (2012) find consumers respond better to assertive messages (e.g., “everyone must use more public transportation!”) than non-assertive messages (e.g., “everyone could use more public transportation.”), but only if they believe the environmental issue to be important. In hotels specifically, Goldstein and colleagues (2008) demonstrate that the extent to which a firm’s message matches consumers’ current situational circumstances predicts the latter’s actual conservation behavior. In other words, being told that others in the same room reused their towels is more effective than being told a larger group or more meaningful group (e.g, other hotel guests, others of their same gender) did so.

***Backfire effects of conservation pleas.*** Some research suggests that pleas to increase consumer conservation behavior can “backfire” and increase consumption. For example, Schultz and colleagues (2007) document that messages informing consumers that they are using less power than their neighbors caused some households to increase their power usage (rather than decrease it further). Similarly, Catlin and Wang (2013) found that when consumers were provided convenient recycling options (vs. none), they increased their resource usage -- paper in one study, and paper hand towels in another. In a fair trade context, White, MacDonnell, and Ellard (2012) show that communicating high need when requesting consumer prosocial actions can backfire. For instance, in one study, when there was a high need (producers’ conditions were unjust) but the item had low potential for justice restoration (only a small portion of the proceeds went to the producers), participants showed less desire for such products compared to when the need was more modest.



The explanations for these results are diverse, ranging from social norms (Schultz et al. 2007), licensing (Catlin and Wang 2013), and justice sensitivity (White et al. 2012). We add to the literature on such backfire effects by showing another source of potential backfire to consumer pleas by firms, namely consumer reactance. Further, we document when such reactance is more likely to manifest in response to conservation appeals.

### *Reactance*

*What is reactance?* Reactance is a resistance to persuasion (Brehm 1966, 1972; Hong 1992) – specifically, a resistance in changing one’s beliefs or behavior. Per Brehm’s theory, messages that are perceived by consumers as reducing their personal freedoms (for example, choosing to drink or smoke) arouse the motivational state of reactance, which directs individuals toward changing their beliefs about the messenger and re-establishing the lost freedom. In the context of consumer-firm interactions, reactance is grounded in a desire to reassert freedom that is allegedly restricted when a firm sends a message to consumers and “tells” them to think or behave in a certain fashion (Brehm 1966, 1972; Clee and Wicklund 1980; Kivetz 2005; Fitzsimons and Lehmann 2004). In terms of beliefs, it can mean, for example, a resistance to changing one’s perception about how “good” a firm is. Thus, consumers may not let firm CSR messaging change their beliefs about how good the firm is. Behaviorally, reactance can mean engaging in activities that are in direct contrast to what is being asked by the firm.

Reactance has been illustrated very clearly by Bensley and Wu (1991) in a study of alcohol prevention ads. In their study, they showed participants either high threat ads (with terms such as “conclusive evidence”, “any reasonable person must acknowledge these conclusions”) or low threat ads (with terms such as “good evidence” and “you may wish to consider these

conclusions carefully”); consistent with reactance theory, participants evaluated the high threat messages more negatively. Further, these messages also had a boomerang effect in that they led the participants to have greater intentions to drink (compared to low threat messages). In a follow up study on downstream effects, participants who saw the high (versus low threat ads) drank more beer in a taste test. Thus, certain kinds of alcohol prevention ads increased alcohol consumption (instead of decreasing it), an effect attributed to reactance.

As reactance works on both beliefs and behaviors, in our context, a consumer could react to both the notion that a hotel touts its environmental commitment and to the firm’s request that consumers conserve resources. A firm request may lead consumers to focus on the profit-perspective of the firm and perhaps infer more sinister (“greed”) motives for the request rather than conservation motives.

Accordingly, in a hotel context, notes with requests to consumers (e.g., “please help save the environment”) could result in such a tension -- on one hand, the note could have a positive effect on perceptions of the hotel’s greenness, and consumers may comply with the request by increasing their conservation behavior (*a direct response to the plea*). However, the note could also have a negative effect with perceptions of the hotel’s greenness being reduced, and consumers reducing their conservation behavior (*an indirect response to the plea, via reactance*).

***Reactance and firm commitment and price.*** For our specific hypothesis relating reactance to consumer response to firm requests, we draw on three streams of literature which make a similar prediction: that consumers are more likely to respond to the firm’s request if the firm is also perceived as putting in green effort.

First, the literature on dual entitlement indicates that when consumers decide on how much effort to put in, they also look at how much effort the firm is putting in (e.g., Kivetz and

Simonson 2002, 2003; Reczek, Haws, and Summers 2014). Consumers believe that both themselves and the firm are entitled to fair processes and outcomes (Haws and Bearden 2006). As consumers and firms are engaged in a series of exchanges, consumers look to the efforts of firms, and reward them accordingly (Morales 2005).

Second, work on social norms and reciprocity (e.g., Cialdini 2009) suggests that consumers view the firm as being effortful in being green, they will be more motivated to do their part. This is because effort on the part of the firm triggers a sense of obligation on the part of the consumer.

Third, the CSR literature suggests that CSR efforts are interpreted in light of various characteristics of the firm (e.g., Bhattacharya and Sen 2004; Luo and Bhattacharya 2006). For example, consumer beliefs about a firm's value system and its products can affect consumer perceptions of the firm's CSR initiatives, with incongruities having the potential to hurt the firm's sales (e.g., Newman, Gorlin, and Dhar 2014; Sen and Bhattacharya 2001).

All three literatures streams above point to firms' "actions" being more motivating to consumers rather than firms just "talking about" being green. In our hotel context, there are several possible cues a firm can use to signal its environmental values. These may include sustainability targets, sustainability reports, visible pledges, or visible conservation efforts. Perhaps the most obvious from a consumer's standpoint is visible conservation efforts on the part of the firm. However, not all conservation programs are equal: the consumer can readily infer some as being cost saving (e.g., asking consumers to conserve towels), and others as costing money (e.g., offering electric car charging stations). In other words, some programs "tell" consumers to help save, while others "show" a firm's commitment to sustainability. Clearly, behaviors that are costly are stronger evidence of commitment.

As such, we expect consumers will engage in more actual green behavior when they perceive a firm to be more “green”, and that these perceptions will be influenced by cues of the firm’s environmental efforts. When a firm makes a request to consumers to conserve, the presence of other cues suggesting that the firm is also doing so should increase consumers’ perceptions of the firm’s greenness and influence consumer conservation behavior. However, the same request is likely to invoke reactance – decreasing perceptions of the firm’s greenness and reducing conservation behavior – when there are no signs that the firm is also conserving resources and putting money behind the conservation effort. The aforementioned firm behavior may be interpreted as hypocrisy, and can be damaging to the brand (Wagner, Lutz, and Weitz 2009). Such “empty” requests are also likely to be interpreted by consumers as persuasion attempts, activating their skepticism and persuasion knowledge, and generating counter-arguing (Friestad and Wright 1994; Campbell and Kirmani 2000), thus backfiring.

Besides lack of visible conservation effort by the firm, when else is reactance more likely? Reactance should be particularly likely when *firms have a high price image* (i.e., how cheap or expensive customers perceive the firm to be; Zielke 2006), since consumers may feel that they have paid for the right to behave as they see fit. Specifically, as a consumer pays more, the more freedom she should (perceive) she has to do as she wants. When her “freedom” to make these decisions is threatened, via firm requests to conserve, she may be more likely to feel reactance (i.e., feel the firm is less green and behave contrary to the request). Even if she is not paying personally, a high price sets an expectation (Zeithaml 1988). Since the high price firm is charging more, a consumer may also expect the firm to take care of conservation without expecting help from them (“when they are charging so much, don’t they have the money to be green?”), and may perceive requests for the consumer to do so as petty (“why should I do the

work, if it's just saving them money?"). This incongruence should cause resistance to the idea that the firm is environmentally friendly and decrease consumers compliance with the firm's request. Thus, once consumers start questioning the firm's environmental efforts (i.e., once skepticism and metacognition are aroused), it will be more detrimental for the high price firm in terms of reactance, green perception and conservation behavior.

A second reason why firm price should be associated with reactance relies on the legitimacy of the firm request. Reactance is a feeling of having one's beliefs or behaviors externally manipulated or induced (Brehm 1966). Brehm suggests that one entity's interference in another's freedom creates less reactance if the interference is justifiable and legitimate. When might firm requests be more legitimate? We contend that when the firm engages in costly green efforts itself, this justification is more legitimate. The justification is also legitimate when the firm does not have the resources to engage in its own costly green efforts (i.e., the low price firm) and does not do so. However, if the hotel has capabilities (i.e., if the hotel has a high price), but does not engage in its own green efforts, such requests are *unjustified*, and the likelihood of reactance is high.

Note, however, that green products frequently have higher prices (Dale 2008), which may also result in the reverse inference being made by consumers, namely that high price products are more green (e.g., Lee and Schwarz 2012). Consumers readily make inferences about product attributes in the absence of incomplete information (Chernev and Carpenter 2001; Deval et al 2013) and the more expensive a firm is, the more resources consumers should infer it has to invest in the environment. Thus, all else being equal, however, we expect that high price firms will be perceived as being greener than low price firms; and, in the absence of other cues, consumers should a firm's price as a cue of its greenness.

For ease of explication, we refer to “costly visible effort by the firm to help the environment” as *visible-firm-effort*, a request by the firm to the consumer to engage in resource conservation as *firm-request*, price image of the firm as *firm-price-image*; consumer perception of the firm’s greenness as *green-perception*, and actual resource conservation by the consumer (in the context of interacting with the firm) as *consumer-conservation-behavior*. We propose:

**H1:** Consumer conservation-behavior will be positively related to perceptions of a firm’s greenness.

**H2:** When there is no visible-firm-effort, a firm-request is likely to create reactance, especially when firm-price-image is high; when there is visible-firm-effort, a firm-request will not result in such reactance, irrespective of firm-price-image [i.e., there is a 3-way interaction between visible-firm-effort, firm-request and firm-price-image on reactance].

As discussed above, we expect consumer reactance to impact both perceptions of greenness and consumer conservation behavior, and H1 suggests that perceptions of greenness impact conservation behavior. Thus:

**H3:** When there is a firm-request to the consumer to conserve resources, reactance to this request mediates the interactive effect of firm-price-image and visible-firm-effort on green-perception; green-perception then affects consumer conservation-behavior [i.e., there is a serial mediation process].

As discussed earlier, when firms request consumers to make conservation efforts and there is no reactance by consumers, then the request can increase consumer conservation behavior (*direct effect of a firm-request*); however, when there is reactance, then the request can decrease such conservation behavior (*indirect effect of a firm-request*).

H2, H3, and the direct and indirect effects of a firm-request together imply that:

**H4:** When there is no visible-firm-effort, a firm-request is likely to decrease green perception and decrease conservation, especially when firm-price-image is high. However, when there is visible-firm-effort, a firm-request will increase green-perception and conservation-behavior, irrespective of firm-price-image [i.e., there is a 3-way interaction between visible-firm-effort, firm-request and firm-price-image on (a) consumer perceptions of the firm's greenness, and (b) actual resource conservation by the consumer].

Our conceptual framework is given in figure 1. Studies 1 and 2 together test this framework. Both studies focus on the context of hotels. In study 1, we examine electricity savings. If hotels are able to convince patrons to turn off the lights, the hotel's expenses decline and profits increase. While the interests of the firm and the environment are aligned in such cases, the burden falls on the consumer to conserve resources. As hotels across the world use billions of dollars of electricity (much of which still comes from coal), a reduction in usage is clearly good for society. The study is done in the field (in real hotels) and tests H1 and H4, where consumers' actual green behavior (electricity usage) is measured non-intrusively. Study 2 tests H1 and H4 with a real hotel serving as a laboratory. Additionally, in this study, we test the process underlying consumer response to the hotels' request to conserve resources – we examine the role of consumer reactance (H2 and H3).

### ***STUDY 1: FIELD STUDY -- HOTEL ROOM ELECTRICITY***

#### ***Participants and Design***

The study utilized a 2 (firm-price-image: high price vs. low price)  $\times$  2 (firm-request for consumer effort: note vs. no-note)  $\times$  2 (visible-firm-effort: effort-absent vs. effort-present) between-subjects design, and took place in partnership with a hotel chain and a large corporation. Participants ( $N = 281$ ) were employees of a large Chinese E-Commerce corporation who were participating in the company's quarterly training workshop. Participants were assigned to one of two hotels according to workshop themes, which are not relevant to the study. Importantly for our study, the two hotels, while under the same parent brand name, differ substantially in price. The high price hotel charges about 768RMB (about USD \$125) per night, while the low price hotel charges approximately 228RMB (about USD \$37) per night for a standard room. Web Appendix A provides photos of the bathroom and bedroom of the two hotels<sup>2</sup>.

Within each hotel, firm-request and visible-firm-effort were randomly assigned. Thus, our study has elements of both a quasi experiment (the hotel price was not randomly assigned) and a conventional field experiment (firm-request and visible-firm-effort were randomly assigned). To manipulate firm-request for consumer effort, we had a *note* and a *no-note* condition. In the note condition, at the main power buttons we placed small notes (one near the door of bedroom, one near the bed). These notes read: "To save the environment, we encourage you to save electricity. Please turn off air-conditioning, kettle, lights, TV, etc. when not in use". This request had a footnote saying "Please set the thermostat above 25°C when cooling" and "Please set the thermostat below 20°C when heating" (see Web Appendix B for the note used).<sup>3</sup>

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<sup>2</sup> 360-degree videos of the hotel rooms are available at <https://www.youtube.com/channel/UCjvcHEjG66cGVpf8ZnpA0bg/videos>. Additional photos and videos of the hotel rooms are available upon request.

<sup>3</sup> We focus on individual benefit appeals (such as "you can help"; e.g., White and Simpson 2013) and not on injunctive ("you should do this") or descriptive appeals ("most people do this") (e.g., Cialdini, Reno, and Kalgren 1990; Fisher and Ackerman 1998; Schultz et al. 2007, Nolan et al. 2008; Goldstein et al. 2008). However, our theory tests the interaction between price, firm request appeals, and efforts on the part of the firm, and the role of reactance. Theoretically, our model should apply to other appeal types as well. The fact that reactance can be activated by



The thermostat settings of 25°C (77°F) and 20°C (68°F) are common benchmarks suggested by numerous hotels in China. When this study was carried out, the outside temperature was 24-34°C (75-93°F). We expected participants to use air conditioning in their room when the temperature was as warm as it was, and this was necessary to observe variance in the degree of electricity usage across participants. Signage in most Chinese hotels is bilingual (Chinese and English), as was this note. In the *no-note* condition, the note was absent.

To operationalize presence and absence of visible-firm-effort, we used a costly, environmentally friendly item (*bamboo* toothbrush for effort-present), and less costly, environmentally unfriendly item (*plastic* toothbrush for effort-absent). The toothbrush made of bamboo was placed in a recycled paper box package; the regular plastic toothbrush was in a plastic sleeve package (as is the standard practice in local hotels; see Web Appendix C for photos). The bamboo toothbrush signaled that the hotel was committed to environmentalism and was willing to spend for it; it cost approximately four times more than a regular plastic toothbrush.<sup>4</sup> We refer to the effort-present and effort-absent conditions as *bamboo* and *plastic*, respectively.

All participants stayed in individual rooms. To minimize participants in the *note* and *no-note* conditions from visiting each others' rooms, we placed them on different floors.

### ***Materials and Procedure***

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perceived firm hypocrisy should also be true if instead of an individual appeal, a different type of messaging was used, but the request is incongruent with the asker's behavior.

<sup>4</sup> A between-subjects laboratory pre-test with 58 participants from a Hong Kong university confirmed that the bamboo toothbrush was perceived to be both more costly ( $M_{\text{bamboo}} = 4.59$  (SD = 1.02) vs.  $M_{\text{plastic}} = 2.10$  (SD = 1.05),  $F(1, 56) = 83.81$ ,  $p < .01$ ) and more environmentally friendly ( $M_{\text{bamboo}} = 4.97$  (SD = 1.35) vs.  $M_{\text{plastic}} = 2.34$  (SD = 1.05),  $F(1, 56) = 68.41$ ,  $p < .01$ ), compared to the plastic toothbrush, both perceptions assessed on 7-point scales (i.e., "the toothbrush is... 'expensive' (1 = strongly disagree, 7 = strongly agree), 'environmental'" (1 = strongly disagree, 7 = strongly agree).

Participants checked into their hotels on the evening of day 1. They were out of their rooms for their workshop during day 2 until the evening. On the morning of day 3, all participants attended a concluding session of the workshop, where they were asked by the company to take a survey about the hotel, and then take a separate survey about the workshop. The first survey contained several measures (detailed below), and had a cover story stating “The event planner looked at various hotels before choosing one. Now we want your feedback about this hotel”. The second survey was not related to our study. After completing the survey, participants checked out of the hotel. See Web Appendix D for the logistical details for the study.

### *Measures*

Below are the measures we collected from the survey, presented in the order they were collected in the survey, plus conservation-behavior. As green-perception was the first measure collected in the survey and electricity usage obtained from the hotel after the experiment, these two key variables cannot be affected by other variables measured in the survey.

#### *Dependent variables:*

Green-perception. We used a four-item measure ( $\alpha = .89$ ) for green-perception (“in my opinion, the hotel is... ‘committed to helping the environment’, ‘making a difference’, ‘is doing environmentally friendly practices’, ‘is committed to sustainability’”), each assessed on a seven-point scale (1= not at all, 7 = very much). We computed the average of the four items and used it as the measure of green-perception ( $M = 4.41$ ,  $SD = 1.49$ ).

Conservation-behavior. From each room’s smart meter, we collected actual electricity usage (“usage” in Kilowatt hours), from 10 a.m. on day 2 till 10 a.m. on day 3 (i.e., for a 24-hour period). This actual usage ( $M = 4.91$ ,  $SD = 1.83$ ) was the measure of conservation-behavior. In

addition, we collected daily-level electricity usage of each room for an additional 30 days: 15 days prior to our experiment and 15 days afterwards. By averaging the electricity usage over this 30-day period, we computed a daily “benchmark usage” for each room, in Kilowatt hours. This benchmark usage ( $M = 5.23$ ,  $SD = .94$ ) was later used as a covariate in ANOVAs and regressions, to control for room-specific idiosyncrasies, such as room size, direction of exposure, or efficiency of the electrical equipment.

*Manipulation checks.* We asked all participants to estimate the price of the hotel to assess if the price image manipulation worked as intended. To assess whether the firm-request manipulation worked as intended, participants were asked if they had seen the note located near the main power buttons. We did not ask people in the *no-note* condition whether they had seen a note (we felt that this could result in demand effects). In addition, we asked participants to guess what material the toothbrush in the bathroom was constructed from, and what they thought about the toothbrush (i.e., “the toothbrush is ... ‘expensive’, ‘environmental’” (both 1 = strongly disagree, 7 = strongly agree). Asking participants to rate the toothbrush on these dimensions *after* their own environmental behaviors had been observed, rules out measurement activating concepts that could have influenced their subsequent behavior, inadvertently or deliberately.

*Demographic variables.* We also obtained basic participant demographic information directly from their employer, including sex (66% men), age ( $M = 33.36$  ( $SD = 5.77$ ), education (67% college and above), and years of working ( $M = 11.33$  years ( $SD = 6.44$ ))<sup>5</sup>. None of the demographics varied significantly by condition ( $ps > .15$ ).

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<sup>5</sup> We find that participants with a college degree or above tend to perceive the hotel as less green, compared with participants who do not go to college ( $M_{\text{college}} = 4.22$  ( $SD = 1.54$ ) vs.  $M_{\text{no college}} = 4.79$  ( $SD = 1.29$ ),  $F(1,273) = 9.28$ ,  $p < .01$ ). We do not find any other significant correlations between the demographic variables and electricity usage.

## Results

*Manipulation checks.* As expected, the estimated price of the high price hotel was greater than that of the low price hotel ( $M_{\text{high-price}} = 824$  RMB (SD = 106) vs.  $M_{\text{low-price}} = 217$  RMB (SD = 42);  $F(1, 279) = 3935.11, p < .01$ ). All the participants in the *note* condition reported seeing the thermostat note, suggesting that these manipulations worked as intended.

In the *plastic* toothbrush condition, all participants reported that the toothbrush was made of plastic. In the *bamboo* toothbrush condition, 135 of 141 participants reported that the toothbrush was made of bamboo (4 said “wood”, 1 said “plastic”, and 1 said “cannot remember”). We dropped these 6 participants from the analyses of this study, but their inclusion does not meaningfully impact our results. As expected, the bamboo toothbrush was perceived as being more expensive ( $M_{\text{bamboo}} = 5.53$  (SD = 1.03) vs.  $M_{\text{plastic}} = 2.47$  (SD = 1.05),  $F(1, 273) = 594.32, p < .01$ ) and more environmentally friendly ( $M_{\text{bamboo}} = 5.41$  (SD = 1.00) vs.  $M_{\text{plastic}} = 2.55$  (SD = 1.02),  $F(1, 273) = 548.60, p < .01$ ) compared to the plastic toothbrush, with both means also significantly different than the mid-point of the scale ( $ps < .05$ ). Hence the manipulation of visible-firm-effort worked as intended.

### *Dependent variables:*

Green-perception. An ANOVA with firm-price-image, firm-request, and visible-firm-effort as independent variables and green-perception as the dependent variable revealed a significant main effect of firm-price-image ( $F(1, 267) = 168.06, p < .01$ ) and visible-firm-effort ( $F(1, 267) = 119.79, p < .01$ ). The main effect of firm-request was not significant ( $F(1, 267) = 1.50, p = .22$ ). The main effect of firm-price-image showed that the high price hotel ( $M_{\text{high-price}} = 5.20$  (SD = 1.17) was seen as being more green than the low price hotel ( $M_{\text{low-price}} = 3.59$  (SD = 1.33)), which is consistent with what we expected based on the more green-higher price

marketplace correlation, as well as an affordability argument (a high price hotel can afford to be green). The significant main effect of visible-firm-effort suggests that if a firm visibly spent money on green effort, it was perceived as being greener ( $M_{\text{bamboo}} = 5.10$  ( $SD = 1.17$ )) compared to one that does not ( $M_{\text{plastic}} = 3.74$  ( $SD = 1.45$ )), which serves as another manipulation check.

We also found significant two-way interactions between firm-price-image and firm-request ( $F(1, 267) = 4.79, p < .05$ ), firm-price-image and visible-firm-effort ( $F(1, 267) = 9.37, p < .01$ ), and firm-request and visible-firm-effort ( $F(1, 267) = 9.49, p < .01$ ). However, these effects were qualified by a significant three-way interaction ( $F(1, 267) = 6.69, p < .01$ ).

Decomposing the three-way interaction: when there was *no visible-firm-effort* (*plastic* toothbrush condition), we found a significant firm-price-image  $\times$  firm-request interaction, as predicted by H4 ( $F(1, 267) = 11.62, p < .01$ ; see figure 2 for means). Consumers perceived the high price hotel as being significantly less green when it placed a note suggesting patrons save electricity as compared to when it did not ( $M_{\text{note}} = 4.16$  ( $SD = 1.28$ ) vs.  $M_{\text{no-note}} = 5.27$  ( $SD = .84$ ),  $F(1, 267) = 21.03, p < .01$ ). However, for the low price hotel, firm-request did not change green-perception ( $M_{\text{note}} = 2.79$  ( $SD = .89$ ) vs.  $M_{\text{no-note}} = 2.74$  ( $SD = .95$ ),  $F < 1$ ).

[figure 2 about here]

On the other hand, when there was *visible-firm-effort* (*bamboo* toothbrush condition), the firm-price-image  $\times$  firm-request interaction was no longer significant ( $F < 1$ ) and only a significant main effect of firm-price-image emerged ( $M_{\text{low-price}} = 4.47$  ( $SD = 1.13$ ) vs.  $M_{\text{high-price}} = 5.68$  ( $SD = .89$ ),  $F(1, 267) = 48.13, p < .01$ ). The main effect indicates that the high price hotel was perceived as being more green than the low price hotel – whether or not it placed a note urging consumers to save electricity. Thus, the price image effect on green-perception holds when firms have visible signals that they are earnest about the environment and put money

behind such efforts – and this happens even when the hotel urges consumers to conserve energy. Together, the results for conservation behavior support H4.

Conservation-behavior: Total effect. We collected the actual electricity usage across participants ( $M = 4.91$  ( $SD = 1.83$ ),  $\min = 1.65$ ,  $\max = 10.18$ ) for the predetermined 24-hour period of their stay (higher numbers reflect more usage and lower conservation). An ANCOVA on electricity usage with firm-request, firm-price-image, and visible-firm-effort as independent variables, and benchmark usage for each room as a covariate showed a marginally significant main effect of visible-firm-effort ( $F(1, 266) = 3.442$ ,  $p = .065$ ), suggesting that consumers tended to use less electricity (conserve more electricity) when the hotel had visible costly environmental effort versus not ( $M_{\text{plastic}} = 5.13$  ( $SD = 1.84$ ) vs.  $M_{\text{bamboo}} = 4.67$  ( $SD = 1.80$ )). There was also a significant two-way interaction between firm-request and visible-firm-effort ( $F(1, 266) = 4.52$ ,  $p < .05$ ), and a marginally significant three-way interaction between firm-price-image, firm-request and visible-firm-effort ( $F(1, 266) = 2.913$ ,  $p = .089$ ). No other effects were significant ( $ps > .20$ ). See figure 3 for the means of electricity usage across conditions.

[figure 3 about here]

Decomposing this three-way interaction, in the *bamboo* toothbrush condition, we observe that the firm-request to save electricity (*note* condition) reduced actual electricity usage ( $M_{\text{no-note}} = 4.98$ ,  $SD = 1.90$  vs.  $M_{\text{note}} = 4.36$ ,  $SD = 1.66$ ;  $F(1, 266) = 4.26$ ;  $p < .05$ ), irrespective of the price image of the hotel – i.e., there was no interaction effect between firm-price-image and the firm-request to save electricity ( $F < 1$ ). For the high price hotel, electricity usage averaged 4.84 Kilowatt hours in the *note* condition ( $SD = 1.82$ ) and 5.52 Kilowatt hours in the *no-note*

condition (SD = 1.93); for the low price hotel, electricity usage averaged 3.86 Kilowatt hours in the *note* condition (SD = 1.33) and 4.37 Kilowatt hours in the *no-note* condition (SD = 1.69)<sup>6</sup>.

In contrast, in the *plastic* toothbrush condition, we found a significant interaction effect between firm-price-image and firm-request ( $F(1, 266) = 4.05, p < .05$ ), again supporting H4. Specifically, a firm request (*note* condition) did not significantly reduce electricity usage in the low price hotel ( $M_{\text{no-note}} = 4.78$  Kilowatt hours (SD = 1.71) vs.  $M_{\text{note}} = 4.46$  Kilowatt hours (SD = 1.72),  $F < 1$ ), and seemed to backfire and significantly increased electricity usage in the high price hotel ( $M_{\text{no-note}} = 5.25$  Kilowatt hours (SD = 1.70) vs  $M_{\text{note}} = 6.04$  Kilowatt hours (SD = 1.92),  $F(1, 266) = 4.18; p < .05$ ). We interpret these results as suggestive of the importance of consistency between a company's own green behavior and that which it asks its customers to engage in. Consumers acted greenest when they observed the firm also doing so.

Direct and indirect effects of firm-request on conservation-behavior (moderated-mediation model). The results discussed above are the overall (total) effects of our three factors on conservation-behavior. However, these total effects can be broken into direct and indirect effects, which may be in opposite directions. On one hand, consumers could comply with the message on the note, and resource usage may decrease (*Direct effect*, represented by the dotted line connecting firm request and conservation behavior in figure 1). On the other hand, when the firm does not engage in visible green efforts but asks the consumers to do so, it can lower green-perception for the high price firm, which could negatively impact resource conservation (*Indirect effect*, represented by the solid line in figure 1). We tested these two potential drivers of conservation-behavior (i.e., actual electricity usage) in mediation analyses.

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<sup>6</sup> After controlling for benchmark usage, we found no significant main effect of price on actual electricity usage in Kilowatt hours ( $p = .62$ ). The seemingly higher electricity usage in the high (vs. low) price hotel is a function of reporting raw electricity usage, which does not account for the fact that the high price hotel had larger rooms, more powerful ACs, and additional electronics.

First, we found that green-perception mediated the effect of the three-way interaction on conservation-behavior. A pathway analysis<sup>7</sup> revealed that the three-way interaction predicted green-perception ( $B = .16, p < .01$ ), which then predicted electricity usage in the full dataset ( $B = -.66, p < .01$ , the latter supporting H1). The bootstrapped 95% confidence interval did not include zero ( $-.2025, -.0311$ ), supporting mediation (see figure 4).

[figure 4 about here]

We next conducted a test of each factor in the model.<sup>8</sup> Examining the signs of the coefficients for each factor gives more insight into the direct and indirect effects of firm-request. Looking at the *direct effect*, we found that firm-request (i.e., the note) directionally reduced electricity usage in the full sample, but the effect was not significant ( $B = -.11, p = .26, 95\% \text{ CI: } -.3028, .0834$ ). Next, we examined the *indirect effect* of firm-request on electricity usage separately for the *plastic* and *bamboo* toothbrush conditions. In the *plastic* toothbrush condition, a firm-request by the high price hotel led to a lower level of green-perception, which increased actual electricity usage ( $B = .24, 95\% \text{ CI: } .1272, .4184$ ), i.e., the indirect effect of firm-request (through green-perception) backfired and reduced conservation. However, firm-request had no impact on conservation for the low price hotel ( $B = -.01, 95\% \text{ CI: } -.1171, .0812$ ). In the *bamboo* toothbrush condition, the indirect effect of firm-request (through green-perception) was not significant, either in the high price ( $B = -.06, 95\% \text{ CI: } -.1669, .0245$ ) or the low price hotel ( $B = -.04, 95\% \text{ CI: } -.1721, .0754$ ). Thus, the negative indirect effect of firm-request was only seen in the high price hotel with the plastic toothbrush. In sum, the results clearly identify two paths, one direct, and the other indirect, to consumers' conservation behavior.

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<sup>7</sup> PROCESS (Hayes 2013) macro, model 4, controlling for all lower order effects and benchmark usage. The correlation between green perception and actual usage is  $r = -.18$  ( $p < .01$ ); controlling for benchmark usage, this value is  $r = -.35$  ( $p < .01$ ).

<sup>8</sup> PROCESS (Hayes 2013) model 11, controlling for benchmark usage.



## *Discussion*

Study 1 demonstrates that consumers' perceptions of a firm's greenness are directly related to consumer conservation behavior (H1). Further, the study shows that both consumer perceptions and behavior depend in part on the actions taken by the firm (such as suggesting its patrons reduce electricity usage), but also on corroborating evidence that the firm is committed to the environment, and on the price image of the firm. Interestingly, all else being equal, high price firms are viewed by consumers as greener than low price firms. Here, we demonstrate the reverse inference. Further, the interactive effect of firm-price-image and firm-request on actual conservation behavior supports the notion that high and low price image firms are viewed differently when they ask consumers to conserve resources that save the hotel money: high price firms are seen as less green for doing so, whereas there is no significant change in perception of the low price firms. In showing that green perceptions guide actual conservation behavior, we identify two important and competing effects. While the hotel's note may induce consumers to save electricity, it may ironically backfire at a high price hotel, making the hotel look relatively less green, which increases consumer's actual electricity usage.

Cost savings for firms when they request consumer green effort. Although consumers used less electricity in many cases when the hotel used a bamboo toothbrush (versus a plastic one), the former costs the hotel more money per unit. Does this investment pay off? In other words, when a firm engages in costly environmental effort to show commitment, can it still save money overall due to the associated reduction in resources used by consumers? This was empirically testable in our data. By using a bamboo toothbrush instead of a plastic toothbrush in the *note* condition, the high price hotel saved, on average (per room), 1.2 Kilowatt hours per 24-

hour period, equal to a savings of 1.8 RMB. The low price hotel saved 0.6 Kilowatt hours per day, or a savings of 0.9 RMB. The wholesale price of a bamboo toothbrush is 1 RMB per unit, and that of a plastic toothbrush is 0.2 RMB per unit. Hence, by using a bamboo toothbrush, the high price hotel actually saved  $1.8 - (1 - 0.2) = 1$  RMB per room per night, and the low price hotel saved  $0.9 - (1.0 - 0.2) = 0.1$  RMB. Given the low margins in the hotel industry, these numbers correspond to a 0.9% profit increase for the high price hotel and 0.3% profit increase for the low price hotel<sup>9</sup>. This finding is important since we document an intervention that can lead to an optimal outcome for firms, as well as for the environment.

### ***STUDY 2: LABORATORY STUDY IN A REAL HOTEL – ROLE OF REACTANCE***

Our second study had two objectives. First, we sought to replicate the first study in a setting where participants were asked to conserve resources in multiple ways. Second, we wished to explore the role of reactance to the two firm goals: to be seen as green (attitude or perception) and to drive consumer conservation (behavior or intent). To maintain realism, we used actual hotel rooms as our laboratory. This is especially important when trying to invoke reactance, since reactance requires participants to feel engaged with the task. Also, we expected our manipulations (i.e., price image, firm request, and firm's costly effort) to be more salient in a real hotel room, where participants see real prices and actual props (e.g., a bamboo toothbrush) in the room. However, similar to conventional laboratory studies, we could still randomly assign (similar) participants to conditions and maintain full experimental control.

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<sup>9</sup> According to the 2012 financial report of this hotel chain, the average net profit margin (i.e., profit / price) per room per night is 14.2%. The price of the hotel room is 768 RMB (228 RMB) for the high (low) price hotel; thus, profit can be estimated at 109 RMB (32RMB) per night. A 1 RMB (0.1 RMB) savings would increase profit margins by approximately  $1 / 109 = 0.9\%$  ( $0.1 / 32 = 0.3\%$ ) in the high (low) price hotel.

### *Participants and Design*

This study used the same 2 (firm-price-image: high price vs. low price)  $\times$  2 (firm-request for consumer effort: note vs. no-note)  $\times$  2 (visible-firm-effort: effort-absent vs. effort-present) between-subjects design as study 1. Undergraduate college students ( $N = 548$ ) from a major Hong Kong university were recruited, paid HKD \$150, and randomly assigned to one of the eight conditions. The hotel rooms were located in separate hotels – a high price one and a low price one; the two hotels are located in the same district of downtown Hong Kong.

Similar to the electricity study, firm-price-image was manipulated by the hotel's actual price. The low price hotel charges HKD \$380 (about USD \$49) per night, while the high price hotel charges HKD \$2500 (about USD \$322) per night, for a standard room. Web Appendix E provides photos of the bathroom and bedroom of the two hotels<sup>10</sup>.

Within each hotel, we employed two manipulations conceptually identical to the previous study, but with multiple cues for strength of manipulation and generality. To manipulate firm-request, we had a *note* and a *no-note* condition, similar to our earlier study. In the *note* condition, we showed three cards in the room. First, a card in the bathroom read, “To save the environment, we encourage you to reuse your towels. Please drop unwanted towels on the floor” (see Web Appendix F). Second, we used a note about foregoing housekeeping on the bed, which read, “Be part of our energy savings program. Forgo daily housekeeping services during your stay and help us save our forest and natural habitats” (see Web Appendix F). Third, similar to the previous

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<sup>10</sup> 360-degree videos of the hotel rooms are available at <https://www.youtube.com/channel/UCfBUwxUIoE0Tg1d2kEkd73g/videos>. Additional photos and videos of the hotel rooms are available upon request. Because of the variation in room availability in the high price hotel across time, 107 (out of 269) participants were assigned to a room with two beds, 162 (out of 269) were assigned to a room with one bed. The prices of the two types of room are the same and there is no significant difference in the dependent variables ( $ps > .65$ ) between the two types.

study (see Web Appendix B), we used a note about saving electricity – this was placed at the main power buttons (one near the door of bedroom, one near the bed). Signage in Hong Kong hotels is bilingual (Chinese and English). All of these requests were modeled after real-world equivalents from actual hotels. In the *no-note* condition, no cards were placed in the room.

To manipulate visible-firm-effort, we used four signals. In the visible-firm-effort present (absent) conditions, 1) we used a bamboo toothbrush (a regular plastic toothbrush) in the bathroom; 2) on the bedroom tea table, we placed a hotel welcome cookie on a china plate (on a disposable plate); 3) next to the plate, we placed two china cups (two disposable plastic cups), and 4) we used toiletry bottles with an accompanying sign saying, “toiletry bottles are biodegradable and earth friendly; 100% recyclable materials” (no such sign). We expected that these props signaled that the hotel is committed (vs. not committed) to environmentalism at its own expense.<sup>11</sup> For ease of explication, we call the two conditions *bamboo-toothbrush-etc.* and *plastic-toothbrush-etc.* conditions.

### ***Materials and Procedure***

Participants were recruited through an advertisement for a study purportedly on academic research about consumer hotel experiences. They were told they would be taken to a real hotel room and then provide their opinions about the hotel. On the day of the experiment, each participant was sent an email with the name of the hotel that they should visit and were met by a research assistant in the hotel lobby. In the lobby, they were told the hotel’s room price for a single night (either HKD \$2500 or HKD \$380, depending on condition), and that they would

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<sup>11</sup> A between-subjects laboratory pre-test with 47 participants from a Hong Kong university confirmed that each of the props in the costly environmental commitment condition was perceived to be both more costly and more environmentally friendly as compared to each in the commitment absent condition ( $ps < .01$ ; “...is expensive”, “...is environmental” (both 1 = strongly disagree, 7 = strongly agree).

now visit the room. They were given the following other instructions at this point: “Imagine that you are spending YOUR OWN money on the room and you are staying in this hotel room for three nights. Please explore the bedroom and bathroom. You will then be asked a few questions about your opinions about the hotel room.” Participants then visited a room individually, and were given a survey containing our key measures to complete in the room while the research assistant waited outside.<sup>12</sup> Participants were paid and dismissed after completing the survey.

### *Measures*

*Dependent variables:* Below, are the three dependent measures we assessed; they are presented in the same order as in the survey.

Conservation-intention. We measured a suite of five green behaviors relevant to hotels: “I intend to forego housekeeping services during my stay”, “I will definitely tell housekeeping not to bother cleaning my room each day”, “I will re-use my hotel towels”, “I will save electricity during my stay at this hotel”, “I will set the AC at a warmer temperature to conserve power”, each assessed on a 9-point scale (“strongly disagree” to “strongly agree”,  $\alpha = .93$ ;  $M = 5.62$ ,  $SD = 2.05$ ). We utilized these items to capture consumers’ general intentions to conserve.<sup>13</sup>

Green-perception. We used a four-item measure for green-perception, identical to the one used in study 1 ( $\alpha = .83$ ;  $M = 4.28$ ,  $SD = 1.43$ ).

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<sup>12</sup> We measured the time when a participant went into the room and the time when (s)he left. We computed the time of staying in the room (in minutes) by taking the difference of the two time points (Mean = 11.53,  $SD = 2.55$ , Min = 4.58, Max = 18.88). Importantly, time does not differ across manipulated conditions; nor does it predict green perception or conservation intention ( $ps > .30$ ).

<sup>13</sup> We acknowledge that some of these items are more abstract than others. For example “set the AC at a warmer temperature” does not specify a temperature. Given the considerable variation in temperature preferences, we thought it best to assess conservation relative to an individual’s personal benchmark, rather than an objective standard. The exclusion of this item does not impact our results.

Reactance. In the *note* conditions (i.e., the conditions in which participants were asked to forgo housekeeping, save electricity, and reuse towels), we explicitly measured participants' felt reactance to the hotel's resource conservation requests – this was done using a three-item scale (sample item: “I felt like the hotel was trying to make me do what it wanted”, 1 = strongly disagree, 7 = strongly agree) borrowed from Fitzsimons, Moore, and Zemack-Rugar (2014) and a four-item scale (sample item: “thinking about the hotel environment signs... the advice restricted my autonomy to choose”, 1 = completely disagree, 7 = completely agree) from Dillard and Shen (2005). The two scales were highly correlated ( $r = .91$ ), loaded on a single factor (all loadings  $>.74$ , first eigenvalue explains 77% of variance), and were highly reliable as a single measure ( $\alpha = .94$ ). Hence, we computed the average of the items, and used it as our measure of reactance ( $M = 3.42$ ,  $SD = 1.34$ )<sup>14</sup>. It was impossible to assess reactance in the *no-note* condition because such measures have no context in such a case (there is nothing to react to if there is no request by the hotel). Web Appendix H shows the measures in full.

*Other measures*. We asked participants their overall liking for the hotel using a 9-point scale ( $M = .41$ ,  $SD = 2.45$ ) (-4 = very negative, 4 = very positive), and their willingness to stay at the hotel again using a 9-point scale ( $M = -.12$ ,  $SD = 2.20$ ) (-4 = not at all, 4 = very much). We also measured trait-reactance (an individual difference measure of an individual's propensity for reactance) using Hong's revised eleven-item, five-point trait reactance scale ( $\alpha = .83$ ;  $M = 3.15$ ,  $SD = .61$ ; sample items: “I become angry when my freedom of choice is restricted” and “I become frustrated when I am unable to make free and independent decisions”, 1 = strongly disagree, 5 = strongly agree, Hong and Faedda 1996; see Web Appendix H for the measures in full). Finally, we obtained basic participant demographic information, including sex (43% men),

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<sup>14</sup> For ease of interpretation, we use the simple average of the items of the two scales. An alternate way to construct the measure is to standardize scale scores before taking the average. That method produces identical results.

age ( $M = 20.07$  years,  $SD = 1.34$ ), years of speaking English ( $M = 16.62$  years,  $SD = 1.75$ ). None of the demographics varied significantly by condition ( $ps > .15$ ).

*Manipulation checks.* We asked all participants to estimate the price of the hotel. To assess the hotel's commitment to the environment, participants in the *note* condition were asked if they had seen each of the three notes in the hotel room. We did not ask people in the *no-note* condition whether they had seen notes (we felt that this could result in demand effects). In addition, we asked participants to guess what material the toothbrush in the bathroom was made from, what kind of plate this hotel used for the welcome cookie, what kind of cup the hotel used, and whether they saw a sign for the toiletry bottles in the bathroom (and what the sign stated).

## **Results**

*Manipulation checks.* As expected, the estimated price of the high price hotel was greater than that of the low price hotel ( $M_{\text{high}} = \$2491$  HKD ( $SD = 63$ ) vs.  $M_{\text{low}} = \$379$  HKD ( $SD = 13$ );  $F(1, 546) = 30140, p < .01$ ). In the *note* condition, 274 out of 278 participants reported seeing at least one note. Finally, 534 out of 548 participants correctly reported seeing at least one of the props (toothbrush, cookie plate, cup, and the note for toiletry bottle). Hence the manipulations worked as intended. In the subsequent analyses, we excluded the 15 participants who either incorrectly identified any of the props or reported not seeing any note in the *note* condition, but their inclusion does not materially change our results or conclusions.

### *Dependent variables:*

Green-perception. An ANOVA with firm-price-image, firm-request, and visible-firm-effort as independent variables and green-perception as the dependent variable revealed a significant main effect of firm-price-image ( $F(1, 525) = 97.71, p < .01$ ) and a significant main

effect of visible-firm-effort ( $F(1, 525) = 258.31, p < .01$ ). The main effect of firm-price-image showed that the high price hotel ( $M_{\text{high}} = 4.76$  ( $SD = 1.46$ )) was seen as being more green as compared to the low price hotel ( $M_{\text{low}} = 3.82$  ( $SD = 1.23$ )). The significant main effect of visible-firm-effort suggested that if a firm visibly spends money on green effort, it was perceived as more green ( $M = 5.03$  ( $SD = 1.15$ )), compared to one that did not ( $M = 3.52$  ( $SD = 1.27$ )). These two main effects replicate those in study 1.

We also found a significant two-way interaction between firm-request and visible-firm-effort ( $F(1, 525) = 12.25, p < .01$ ), and a marginally significant two-way interaction between firm-price-image and firm-request ( $F(1, 525) = 3.79, p = .052$ ). Importantly, these effects are all qualified by a significant three-way interaction between firm-price-image, firm-request and visible-firm-effort ( $F(1, 525) = 11.77, p < .01$ , see figure 5 and Web Appendix G for descriptive statistics by condition.

[figure 5 about here]

Decomposing the three-way interaction: in the *plastic-toothbrush-etc.* condition, we found the same firm-price-image  $\times$  firm-request interaction pattern observed in our previous study ( $F(1, 525) = 14.28, p < .01$ ). Consumers perceived the high price hotel as being significantly less green when it placed notes suggesting patrons conserve resources as compared to when it did not place the notes ( $M_{\text{note}} = 3.50$  ( $SD = 1.47$ ) vs.  $M_{\text{no-note}} = 4.46$  ( $SD = 1.18$ ),  $F(1, 525) = 25.37, p < .01$ ). However, for the low price hotel, firm-request did not change green-perception ( $M_{\text{note}} = 3.08$  ( $SD = 1.03$ ) vs.  $M_{\text{no-note}} = 3.02$  ( $SD = .72$ ),  $F < 1$ ). These effects fully replicate the previous study's results and support H4.

In the *bamboo-toothbrush-etc.* condition, the firm-price-image  $\times$  visible-firm-effort interaction was no longer significant ( $F(1, 525) = 1.11, p > .25$ ) and only a significant main



effect of firm-price-image emerged ( $M_{\text{low}} = 4.57$  (SD = 1.05) vs.  $M_{\text{high}} = 5.51$  (SD = 1.06),  $F(1, 525) = 50.19$ ,  $p < .01$ ), suggesting the high price hotel was perceived as being more green than the low price hotel – whether or not it placed a note urging consumers to conserve resources. Thus, when a firm showed it was earnest about the environment and put money behind such efforts, consumers perceived it as more green, supporting H4.

Conservation-intention. An ANOVA on conservation-intention with firm-price-image, firm-request, and visible-firm-effort as independent variables showed a significant main effect of visible-firm-effort ( $F(1, 525) = 263.30$ ,  $p < .01$ ), suggesting that consumers intend to conserve more when the hotel shows visible-firm-effort ( $M_{\text{bamboo}} = 6.71$  (SD = 1.70) vs.  $M_{\text{plastic}} = 4.49$  (SD = 1.76). The ANOVA also revealed a significant main effect of firm-price-image, suggesting a higher green behavioral intention for the high price versus the low price hotel ( $M_{\text{high-price}} = 6.17$  (SD = 2.08) vs.  $M_{\text{low-price}} = 5.06$  (SD = 1.88)). There was also a significant two-way interaction between firm-request and visible-firm-effort ( $F(1, 525) = 30.37$ ,  $p < .01$ ). Importantly, there was also a significant three-way interaction between firm-price-image, firm-request and visible-firm-effort ( $F(1, 525) = 10.08$ ,  $p < .01$ ), with descriptive statistics shown in figure 6 and Web Appendix G.

[figure 6 about here]

Decomposing this three-way interaction, in the *bamboo-toothbrush-etc.* condition, a firm-request (*note* condition) increased conservation-intention ( $M_{\text{note}} = 7.13$  (SD = 1.64) vs.  $M_{\text{no-note}} = 6.30$  (SD = 1.66;  $F(1, 525) = 18.27$ ;  $p < .01$ ), irrespective of the price image of the hotel. As predicted by H4, no interaction effect between price and the firm request to be green was observed ( $F(1, 525) = 2.14$ ,  $p > .10$ ). In contrast, in the *plastic-toothbrush-etc.* condition, requesting people to be green (*note* condition) did not increase conservation-intention in the low

price hotel ( $M_{\text{no-note}} = 3.94$  ( $SD = 1.29$ ) vs.  $M_{\text{note}} = 3.84$  ( $SD = 1.50$ ),  $F < 1$ ), and backfired (significantly decreasing) conservation-intention in the high price hotel ( $M_{\text{no-note}} = 5.73$  ( $SD = 1.67$ ) vs.  $M_{\text{note}} = 4.45$  ( $SD = 1.87$ ),  $F(1, 525) = 21.39$ ;  $p < .01$ ). In other words, we observed a significant interaction effect between firm-price-image and the firm-request ( $F(1, 525) = 9.17$ ,  $p < .01$ ), supporting H4. These results are also fully consistent with study 1. Again, we can interpret these results as suggestive of the importance of consistency between a company's own green behavior and that which it asks its customers to engage in.

Direct and indirect effects of firm-request on conservation-intention (moderated-mediation model). As in study 1, the direct and indirect effects of firm-request (the note) on conservation-intention may be in opposite directions and are explored using mediation analyses.

First, we again found that green-perception mediated the three-way interaction of firm-price-image, firm-request, and visible-firm-effort, on conservation-intention. A pathway analysis using the same model as in study 1 revealed that the three-way interaction significantly predicted green-perception ( $B = .16$ ,  $p < .01$ ), and that green-perception significantly predicted conservation-intention, in the full dataset ( $B = 1.05$ ,  $p < .01$ , the latter again supporting H1). The indirect effect revealed mediation (95% CI: .0749, .2743; see figure 7).

[figure 7 about here]

As in study 1, we then examined the effects of each factor in the model using moderated mediation. Looking at the direct effect, we found that firm-request increased conservation-intention in the full sample ( $B = .11$ ,  $p = .03$ , 95% CI: .0099, .2033). Next, in order to test the effect of visible-firm-effort, we again examined the indirect effects of firm-request on conservation-intention separately for the two visible-firm-effort conditions. First, in the *plastic-toothbrush-etc.* condition, asking consumers to reserve resources in the case of the high price

hotel led to a lower green-perception, which decreased conservation-intention ( $B = -.58$ , 95% CI:  $-.8662, -.3158$ ), an effect not present in the low price hotel ( $B = .03$ , 95% CI:  $-.1487, .2213$ ). In the *bamboo-toothbrush-etc.* condition, the indirect effect of firm-request on conservation-intention (through green-perception) was no longer significant, either for the high ( $B = .21$ , 95% CI:  $-.0044, .4253$ ) or low price hotels ( $B = .04$ , 95% CI:  $-.1757, .2650$ ). These results are consistent with the previous field study (where we measured actual behavior).

Reactance as the underlying mechanism. Our model proposes that consumers can experience reactance to both firm goals: being seen as green and getting consumers to conserve, with the former also predicting the latter. We first explored whether reactance was the process driving perceptions and intent. If reactance is the underlining process, we should observe two data patterns in the *note* conditions. First, reactance should be negatively correlated with green-perception and conservation-intention. As expected, reactance was significantly negatively correlated with both green-perception ( $r = -.59, p < .01$ ) and with conservation-intention ( $r = -.59, p < .01$ ). Second, we should observe an interaction pattern between firm-price-image and visible-firm-effort on reactance, showing that there is a larger effect of costly commitment in the high versus low price hotel. Indeed, in addition to the significant main effects in the expected direction for both firm-price-image ( $F(1, 259) = 37.96, p < .01$ ) and visible-firm-effort ( $F(1, 259) = 202.14, p < .01$ ), their interaction was also significant ( $F(1, 259) = 6.20, p = .01$ ). The pattern of means revealed a stronger effect of visible-firm-effort on reactance in the high price hotel ( $M_{\text{plastic}} = 4.05, SD = 1.04; M_{\text{bamboo}} = 2.07, SD = .88$ ) as compared to the low price hotel ( $M_{\text{plastic}} = 4.49, SD = .97; M_{\text{bamboo}} = 3.10, SD = .97$ ). Together, the evidence suggests that the interaction of price and visible firm effort drives reactance, and reactance drives both perceptions and intent.

Next, we tested for the indirect effect of firm-request on conservation behavior through reactance and green-perception (H2 and H3), i.e., we tested for the serial mediation shown in our conceptual framework (figure 1). As expected, the two-way firm-price-image x visible-firm-effort interaction predicted reactance ( $B = -.15, p = .01$ ), reactance predicted green-perception ( $B = -.29, p < .01$ ), and green-perception predicted conservation-intention ( $B = 1.06, p < .01$ ; see figure 8). Further, the indirect path was significant with the 95% confidence interval not containing zero (CI: .0109, .1044). However, there remained no significant direct pathway from reactance to conservation-intention ( $B = -.01, p = .83$ ) after the effect from reactance to green-perception was also estimated, likely given the strong correlation between green-perception and conservation-intention ( $r = .83$  in the full data,  $r = .88$  in the note condition, both  $ps < .01$ ). As a robustness check, we also specified an alternative mediational pathway, where reactance was the outcome of green-perception, rather than an antecedent to it (i.e., flipping the order of the mediators). Such a model fit significantly poorer, and did not indicate mediation (CI: -.0040, .0066). While documenting “true” causation in all of our model’s pathways is impossible given that reactance, green-perception and conservation-intent are all measured at the same point in time and none is manipulated, it appears that consumers’ conservation-intent is a function of both their reactance to the firm’s request and their green-perception, but the unique effect of each is not readily separable in our paradigm.

[figure 8 about here]

Reaction to persuasive messages to result in reactance is frequently construed as a situational response. However, Brehm (1966) suggests that individuals may differ in their potential for reactance, and subsequent research also finds this (Hong, Giannakopoulos and Laing 1994; Hong and Page 1989). In this study, we also measured trait-reactance for all

participants. While the state reactance items focus more on behaviors than attitudes, the trait scale is much more balanced. Another way to test for reactance as a process is to examine the effect for those high versus low in trait-reactance; if there are differences between such groups, it would point to our effects being due to reactance.

An ANOVA of trait-reactance ( $M = 3.15$ ,  $SD = .61$ ) on the three manipulated factors revealed no main effect or interaction effects ( $ps > .25$ ), suggesting that the individual difference variable was not contaminated by our manipulations. First, we observe a four-way interaction between our three manipulated factors and trait-reactance on both green-perception ( $B = 1.65$ ,  $p < .01$ ) and conservation-intention ( $B = 2.43$ ,  $p < .01$ ). Our theory would suggest that trait-reactance should moderate the effect of firm-request in the *plastic-toothbrush-etc.* condition, but this should not be the case in the *bamboo-toothbrush-etc.* condition. Consistent with this, the three-way interaction is significant in the former case (green-perception:  $B = 1.98$ ,  $p < .01$ ; conservation-intention:  $B = 2.47$ ,  $p < .01$ ), but not in the latter case (green-perception:  $B = .22$ ,  $p > .60$ ; conservation-intention:  $B = .04$ ,  $p > .95$ ).

Next, we conducted a spotlight analysis within the *plastic-toothbrush-etc.* condition. Specifically, we examined the magnitude of the indirect effect of firm-request on conservation-intention at three levels of trait-reactance: at the mean, and  $\pm 1$  SD from it. In the case of the high price hotel, the indirect effect was strongly negative at  $+1$  SD on trait-reactance ( $B = -2.63$ , 95% CI:  $-3.3141$ ,  $-2.0117$ ), weakened somewhat at the mean point ( $B = -1.04$ , 95% CI:  $-1.4795$ ,  $-.6132$ ), and diminished to a nonsignificant level at  $-1$  SD ( $B = .55$ , 95% CI:  $-.1042$ ,  $1.1989$ ). This pattern suggests that when the high price hotel has no visible green effort, people of higher trait-reactance are more attuned to perceiving the hotel as less green, and hence have a lower intention to be green -- supporting our framework. The indirect effect was not significant in the

low price hotel. In sum, in the absence of firm's visible costly green efforts, the backfire effect of a firm request in the high price hotel becomes accentuated when consumers are of high trait-reactance (and diminishes when trait reactance is low), but green-perception at low price hotels is not affected by trait-reactance. These results provide strong conceptual support for the hypothesis that reactance is the underlying process for our results.

Other measures. We find that overall liking of the hotel is positively correlated with green-perception ( $r = .66, p < .01$ ) and with conservation-intention ( $r = .58, p < .01$ ). In addition, we find that the willingness to stay at the hotel again is also positively correlated with green-perception ( $r = .56, p < .01$ ) and with conservation-intention ( $r = .48, p < .01$ ). These results suggest that our findings on firm-request and visible-firm-effort are managerially important, not only because the hotel's image and consumers' conservation behavior may be affected, but also because revenue may be affected by these factors.

### ***Discussion***

Study 2 replicates the results of the previous field study (H1 and H4) in a laboratory setting where participants were asked to conserve resources in several ways that necessitated effort or inconvenience. In addition, the study shows reactance as the driving process for green-perception (H2 and H3). We found that, in the absence of firms' visible environmental efforts, consumer reactance was strongly related to both perceptions of greenness and consumer intentions to engage in environmentally friendly behaviors. Further, this study again shows that consumers are likely to behave in more sustainable ways when they observe the firm doing so; however, requests from the firm (especially a high price firm) can backfire when the firm is not "putting its money where its mouth is". Finally, this study contributes by showing there are other

reputational consequences to the firm of acting green. We show that liking of the hotel, as well as willingness to return to the hotel, are strongly related to how green it is perceived. Thus, it further underscores the importance to the firm of managing consumer perceptions, and how conservation programs may sabotage consumer green behavior, hurt a firm's reputation, and undermine profits. However, executed correctly, we show that a firm's green reputation can be strengthened, and it can effectively promote consumers to conserve resources.

### ***GENERAL DISCUSSION***

Firms engage in many environmental actions, some of which require consumer participation and also save money for the firm. In our examination of such cases, we show the execution of such programs can affect both consumer judgments of the firm and actual conservation behavior.

We motivated the research with three questions: (1) can implementing a "green" program lead the company to be perceived in a negative light? (2) if so, how can this problem be addressed, and (3) how can such programs be implemented to ensure consumers participate? We provide answers to each of these questions. First, we show that there are potential negative reputational consequences to such programs, especially for high price firms; second, we show this problem can be addressed by visible (costly) evidence of the firm also expending effort on environmental efforts; and third, that programs should always couple their requests to consumers with proof that the firm is also exerting effort. We also show that reactance is a part of the underlying process of consumer response to firm programs, driving both consumer perceptions and consumer behavior.

We identify a crucial moderator that drives whether a firm request leads to favorable perceptions and consumer green behavior: namely, what consumers can observe of the firm's own efforts to help the environment. We also contribute to the literature on reactance by identifying a new and practically useful antecedent: visible commitment to the requested act by the requester. We show that when there are clear signals that the firm is spending its own financial resources in conservation efforts, reactance and unfavorable attributions from such requests are mitigated. In addition, under such circumstances, we find that actual consumer conservation increases. Further, even though the firm must spend money on environmental efforts to create optimal conservation programs, overall the firm can still save money in doing so. However, if the only "green" act a consumer sees is the firm asking her to expend effort, we show that a host of negative perceptions can be activated and compliance can decrease.

At first blush, our results stand in contrast to those of Newman et al. (2014). Newman et al. (2014) show that if firms intentionally (vs. unintentionally) help the environment, consumers can be less receptive to the product. At some level, our findings show the opposite: that signaling commitment by the firm is key to positive consumer response. Our findings are different from Newman et al.'s in three key ways. First, our context is one where consumers' effort is required for the environment to benefit; in their context, the firm exerts all of the effort. The literature on dual entitlement, effort, and reciprocity consistently shows this distinction is crucial for how consumers view firm actions. Second, we focus on consumption, while they focus on inputs. While both are clearly important from an environmental perspective, the focus on consumption changes often necessitates action from both firm and consumer. Third, their work does not examine price (or cost) issues. Given the importance of this issue to both firms and consumer sides, we believe its inclusion in our work is offers a meaningful advance.



Many questions still remain on consumer response to firm requests. We show that firm efforts must cost money and also be visible to the consumer, but our work cannot speak to how visible or exactly how costly such actions need to be. Visibility to consumers clearly is a continuum, but even “back office” functions can be better highlighted. While no consumer typically sees the eco-friendly laundry detergent a hotel uses, a firm could make this more salient to its patrons, by talking about it, or by placing a small sample in the room.

One finding of the research here shows that high price firms are consistently perceived as greener than their low price counterparts. It is interesting in itself that mere price positioning of a firm can trigger inferences (and perhaps expectations) about how socially responsible it is. This is a robust consumer perception in our data, but is there any real-world truth to it, i.e., are high price firms indeed more green? Also, in forming these perceptions, what other cues do consumers use? Specifically, are there certain cues that activate suspicion, persuasion knowledge, or counter arguing in the domain of green acts (e.g., Darke and Ritchie 2007, Kirmani and Campbell 2004)? Might differences in staff caliber, training, or behavior affect consumer metacognition? Understanding what triggers these attributions is crucial if firms are to design communications that effectively address them.

In addition, it would be interesting to examine how and why the link between price image and environmental responsibility, regardless of its veracity, originates and perpetuates. We proposed two reasons for the link – first, we suggest that green products are generally more expensive, and consumers may make the reverse inference – that high prices products (and firms) are more green. Second, consumers may believe that “greenness” is not a core product benefit, but is a frivolous expense that only high price firms can afford – hence, high price hotels may be more likely to be perceived as being green. Consumers may believe that low price firms

do not have money available to invest in “extras” like environmental benefits; and, when they do so, consumers may even perceive them as providing a lower value for the money. On the other hand, Chernev and Blair (2015), show that companies can be rewarded for CSR efforts in non-core areas, so long as the motive is deemed to be benevolent (as compared to financial interest). Their findings are consistent with our study 2 results, where we show a similar spillover effect to the one they find: namely, that consumers’ liking of the hotel and intentions to return are positively associated with perceptions of its motives.

The logic of how firm price might dictate consumer response can also be applied to asking consumers to go green. When a firm explicitly asks consumers to save the environment (and thus save the firm money), such an act can be seen as tacky when done by a high price firm. On the other hand, this request may not be out of place at a low price establishment. To the contrary, it may perfectly fit their core brand image of offering low prices, since saving enables them to do so. In fact, what if a low price firm’s plea was “help us save money”, rather than “help us save the environment”? Might this honesty pay off for them and encourage consumer conservation behavior? Future research should test such a speculation.

In closing, we hope that this research will spur further investigation into environmental efforts, perceptions and behaviors, with a view towards increasing environmental efforts both on the part of consumers, as well as on the part of firms.

Figure 1  
CONCEPTUAL FRAMEWORK

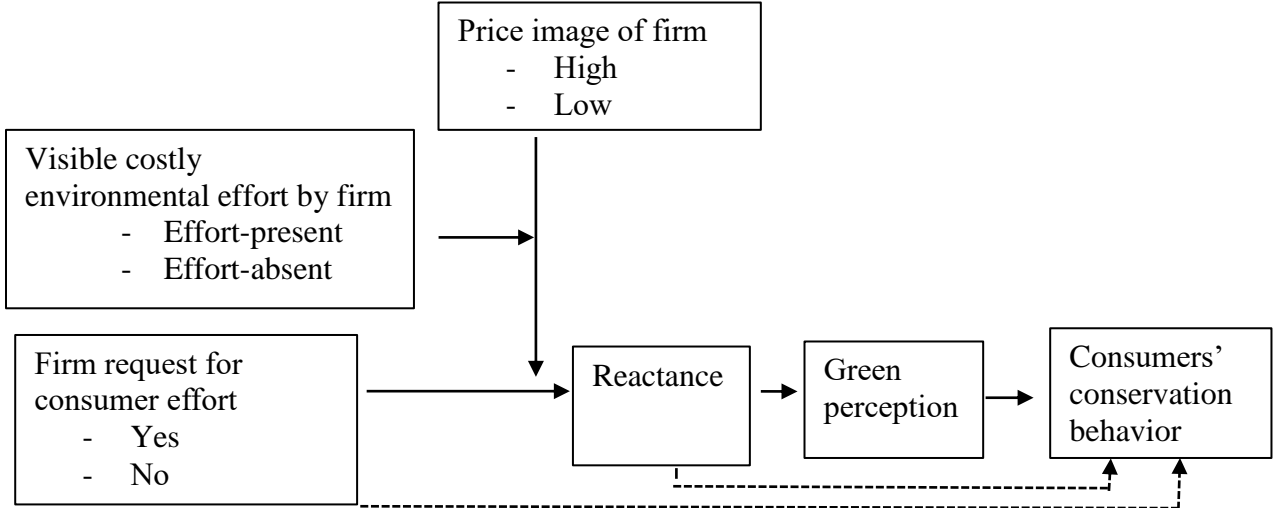
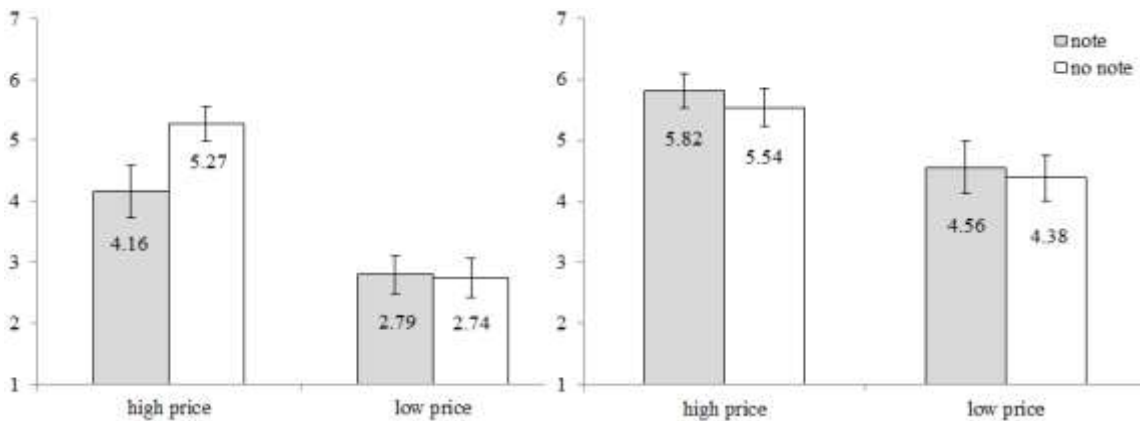


Figure 2

STUDY 1: GREEN-PERCEPTION AS A FUNCTION OF FIRM-PRICE-IMAGE, FIRM-REQUEST AND VISIBLE-FIRM-EFFORT\*

Visible-Firm-Effort Absent (Plastic toothbrush)      Visible-Firm-Effort Present (Bamboo toothbrush)

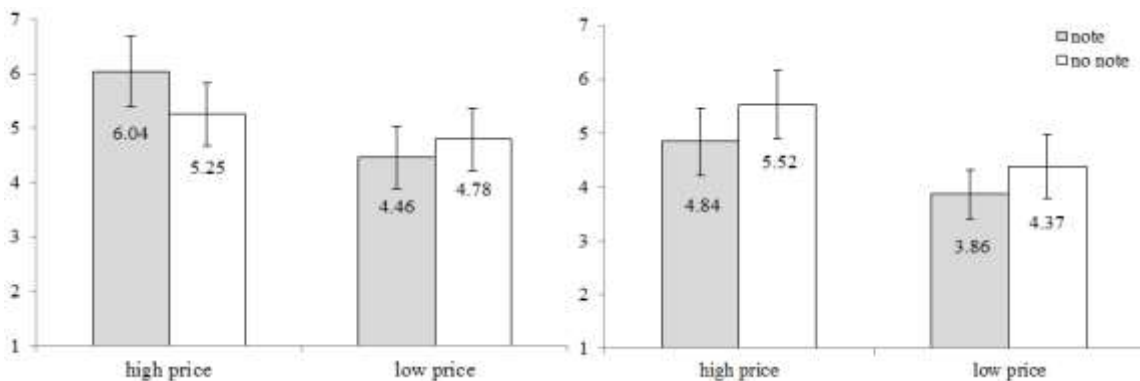


\* Error bars represent ±2 standard error of mean.

Figure 3

STUDY 1: ELECTRICITY USAGE IN KILOWATT HOURS AS A FUNCTION OF FIRM-PRICE-IMAGE, FIRM-REQUEST AND VISIBLE-FIRM-EFFORT\*<sup>15</sup>

Visible-Firm-Effort Absent (Plastic toothbrush)      Visible-Firm-Effort Present (Bamboo toothbrush)



\* Error bars represent ±2 standard error of mean.

Figure 4

<sup>15</sup> Figure 3 plotted the raw electricity usage in Kilowatt hours without controlling benchmark usage (i.e., 30-day room average usage). In the data reported in the paper, we controlled benchmark usage to account for room specific factors, such as room size, direction of exposure, efficiency of the electrical equipment, etc. In addition, using the ratio “actual usage / benchmark usage” as alternative DV yielded similar results to what we reported in the paper.

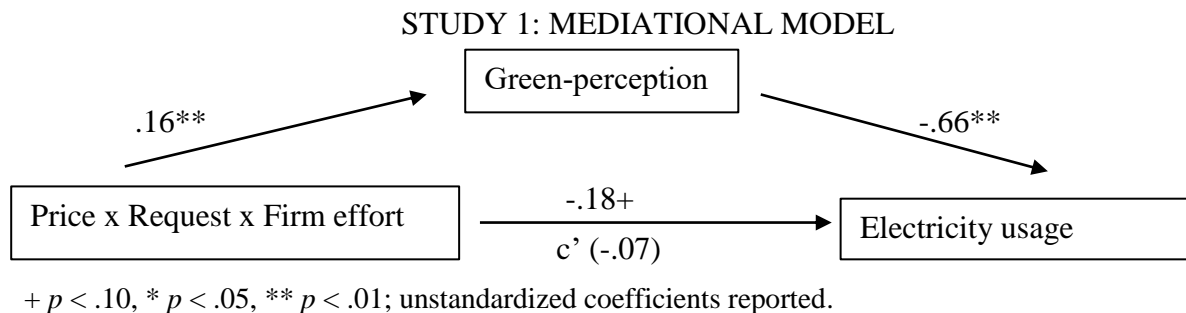
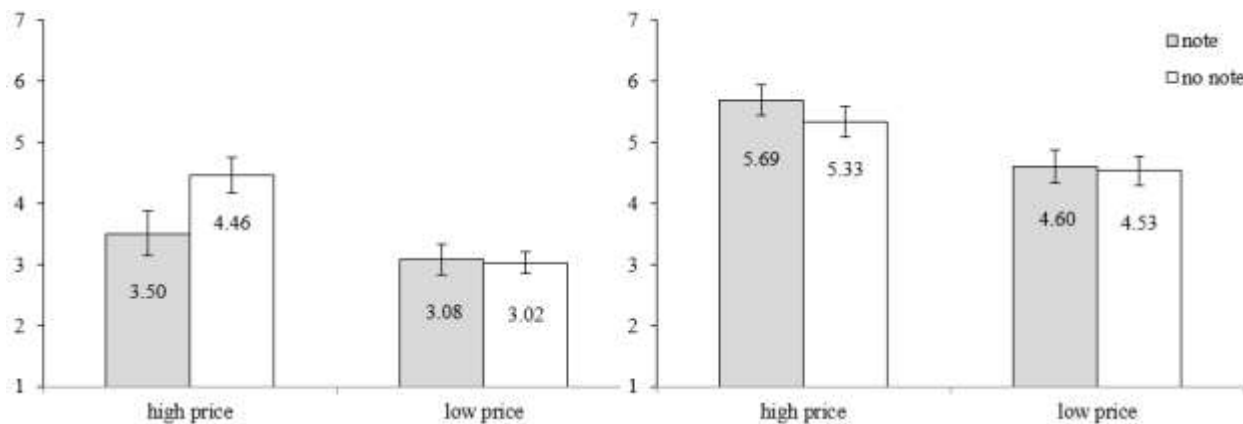


Figure 5

**STUDY 2: GREEN-PERCEPTION AS A FUNCTION OF FIRM-PRICE-IMAGE, FIRM-REQUEST AND VISIBLE-FIRM-EFFORT\***

Visible-Firm-Effort Absent (Plastic-toothbrush-etc.)    Visible-Firm-Effort Present (Bamboo-toothbrush-etc.)

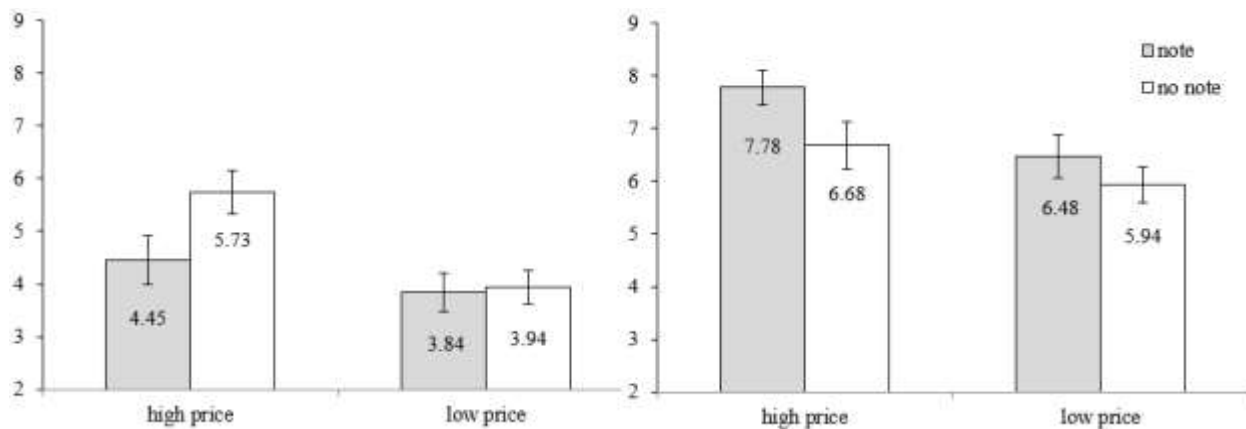


\* Error bars represent  $\pm 2$  standard error of mean.

Figure 6

STUDY 2: CONSERVATION-INTENTION AS A FUNCTION OF FIRM-PRICE-IMAGE, FIRM-REQUEST AND VISIBLE-FIRM-EFFORT\*

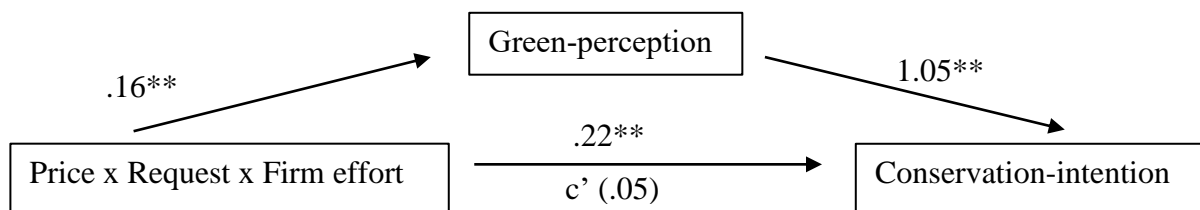
Visible-Firm-Effort Absent (Plastic-toothbrush-etc.)    Visible-Firm-Effort Present (Bamboo-toothbrush-etc.)



\* Error bars represent ±2 standard error of mean.

Figure 7

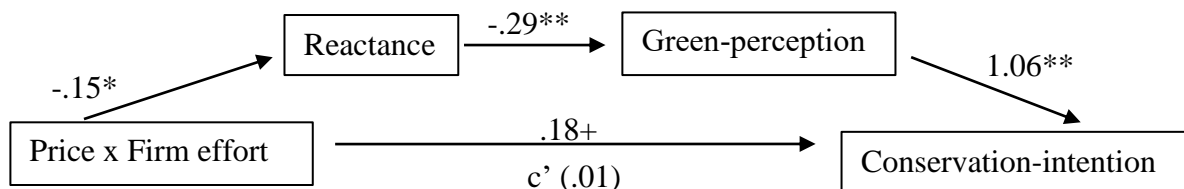
STUDY 2: MEDIATIONAL MODEL (FULL DATA SET)



+  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ ; unstandardized coefficients reported.

Figure 8

STUDY 2: SERIAL MEDIATIONAL MODEL (NOTE CONDITION ONLY)



+  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ ; unstandardized coefficients reported.

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