Resource Abundance and Conservation in Consumption

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ABSTRACT

In most consumption contexts, consumers tend to seek convenience, which typically leads to greater acquisition of resources than is necessary (e.g., it’s more convenient to take a lot of napkins at a restaurant rather than take one at the counter and then walk back for more). Such over-acquisition of resources is only possible when resources are abundant. When resources are not abundant, consumers need to carefully monitor their acquisition and consumption to not deplete the supply. Therefore, cues indicating non-abundance of a resource can prompt conservation behaviors. Importantly, we posit that the tendency to conserve triggered by non-abundance cues in a prior context can persist into subsequent consumption of unrelated resources. In five experiments, we demonstrate the proposed phenomenon and test the underlying psychological mechanism. For example, we show that providing the same amount of resource in a larger vs. smaller container leads participants to perceive the resource as less abundance and subsequently increases their tendency to conserve a different type of resource (e.g., energy). Further, we find that non-abundance cues regarding one particular resource decrease cognitive accessibility of the general construct of abundance, and that giving participants a chance to conserve before consumption (e.g., choosing which of two conservation charities to donate to) attenuates the impact of non-abundance cues on conservation whereas similar actions unrelated to conservation do not attenuate the effect (e.g., choosing which of two education charities to donate to). These results demonstrate that the underlying mechanism is motivational rather than priming of conservation-related concepts or frugality-related traits.
Managing conservation of resources has become an essential issue in maintaining the sustainability of our economy and society. Despite efforts to increase awareness of the importance of conservation, the rate of progress in reducing waste has been low. For example, Americans generated about 249.6 million tons of trash \(^1\) in 2008, almost triple compared to 50 years ago; likewise, the amount of trash generated per person per day has increased from 2.68 pounds in 1960 to 4.50 pounds in 2008 (United States Environmental Protection Agency 2009). From a firm’s perspective too, considerable cost savings can be realized if employees waste fewer resources. For example, a recent report shows that 60% of Ford’s employees do not shut idle computers at the end of the working day costing the firm an additional $1.2 million in power costs (Greener World Media 2010).

A rich body of research has explored factors that influence how much of an available resource people use in a given consumption context (e.g., Cheema and Soman 2008; Folkes, Martin and Gupta 1993; Geier, Rozin and Doros 2006; Goldstein, Cialdini and Griskevicius 2008; Hutton and Mcneill 1981; Hutton et al. 1986; Sexton, Johnson and Konakayama 1987; Van Houwelingen and Van Raaij 1989; Wansink 1996; Wansink and Ittersum 2003). These findings provide important insights for reducing resource consumption. In many consumption contexts, however, waste arises primarily from consumer’s over-acquisition of the amount of resources they will need.

In this article, we distinguish between the amount of resources consumers acquire to fulfill certain consumption purpose, the amount of resources they use in the course of action, and the amount of resources required to complete the given task. Examining these three elements in

\(^1\) The U.S. Environmental Protection Agency (EPA) defines municipal solid waste (MSW) as the things we commonly use and then throw away. MSW typically includes packaging, food scraps, grass clippings, old sofas, computers, tires, refrigerators, etc., but does not include industrial, hazardous, or construction waste.
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conjunction is important conceptually for understanding wasting behavior and how to influence conservation behavior.

We conceptualize waste in consumption as the difference between the amount of resources acquired and the amount of resources required for a consumption situation. We propose that waste in consumption has two instantiations. The first is pure loss of resources that occurs when the amount of resources acquired is greater than the amount of resources consumed. The second is inefficiency in usage that occurs when the amount of resources consumed is greater than the amount of resources required. For example, consider a consumer who takes four napkins in a fast food restaurant, uses only three of them and throws away one. This denotes a pure loss of one napkin as the number of napkins acquired is greater than the number of napkins consumed. Now consider a specific type of meal where most consumers on average use only two napkins, but some use much more. This constitutes inefficient usage as those who consistently use more napkins for the same meal waste resources because consumption is much more than required. Therefore, conservation can be achieved by both reducing pure loss of resources and reducing inefficiency in usage. Figure 1 represents a graphic illustration of our conceptualization.

[Insert Figure 1 about here]

The focus of this article is to examine whether cues indicating non-abundance versus abundance of one resource could prompt conservation behaviors in subsequent consumption situations even when different types of resource are being acquired and utilized. This question involves several interrelated essential issues. What is the interplay between resource abundance
and conservation? Can cues indicating non-abundance of a particular resource change people’s general perception about resource abundance? If so, can this perceptual change activate the tendency to conserve and therefore affect subsequent acquisition and consumption of unrelated resources? Finally, will giving people a chance to conserve before taking resources for subsequent consumption attenuate or exacerbate the impact of non-abundance cues on conservation?

The remainder of the paper is organized as follows. We review the relevant literature and the basis for our predictions about the interplay between resource abundance and conservation in consumption. Next, we report five studies that provide support for the proposed effect and underlying mechanisms. We conclude with implications of our findings.

**THEORY DEVELOPMENT**

Conservation and environmental issues is a textbook case of a “wicked problem” (Rittel and Webber 1973) as the problems are complex and ambiguous. Given the crucial role conservation plays in today’s economy and its impact on the sustainability of our society, researchers across several disciplines have investigated the effectiveness of direct interventions on conservation behaviors (see Kazdin 2009 for a complete review), such as educating the public about environmental problems or possible solutions (e.g., Leiserowitz 2006; Nickerson 2003; Singhal et al. 2003; Winett and Kagel 1984), providing feedback information (e.g., Hutton et al. 1986; Sexton, Johnson and Konakayama 1987; Van Houwelingen and Van Raaij 1989), and employing various incentives and disincentives (e.g., Clayton and Myers 2009; Costello, Gaines and Lynham 2008; Hutton and Mcneill 1981; Pitts and Wittenbach 1981). More recently,
in several interesting studies, messages manipulating social norms have been found to increase conservation in domains such as reusing hotel towels and conserving energy in the home (Goldstein, Cialdini and Griskevicius 2008; Nolan et al. 2008). The influences of individual characteristics such as altruism (e.g., Heberlein 1972; Hopper and Nielsen 1991; Griskevicius, Tybur and Van den Bergh 2010), values (e.g., Egri and Herman 2000; Ingelhart 1990; Hunecke et al. 2001), and risk perceptions (e.g., Bohm, Nerb and Spada 2001) on environmental orientations have also received attention.

In spite of this rich body of literature, why people do not conserve enough when consuming a resource continues to remain an open and intriguing question. Several findings have demonstrated that perceptions of the amount of resources available – both the actual quantity and contextual cues that bias perceptions of the supply amount influence how much of a resource people consume. For example, Folkes, Martin and Gupta (1993) show that the amount consumers indicated they would use generally decreased as the supply decreased. Wansink (1996) finds that small package sizes decreased usage volume because people perceived the unit cost as higher. Wansink and van Ittersum (2003) also shows perceptions of quantity can be influenced by shape of the container: an elongated glass reduced pouring and consumption volume because people perceived that the elongated glass as having a higher capacity. Additionally, smaller serving sizes have been shown to activate consumption norms and in turn regulate consumption. Geier, Rozin and Doros (2006) demonstrate that participants consumed substantially fewer candies when they were offered in small rather than large portions. Furthermore, Cheema and Soman (2008) show that partitioning an aggregate quantity into smaller units reduced the consumption quantity of chocolate and lottery tickets.

While the extant research provides interesting insights into how consumption depends on
cues that affect perceptions of supply level and have important implications for reducing inefficiency in usage, the impact of supply cues on resource acquisition and pure loss. (i.e., the difference between the amount acquired and consumed) remains an important area to be explored. Additionally, the level of specificity examined in existing literature is very domain specific. To elaborate, cues such as the shape of the juice glass are shown to influence juice consumption (Wansink and van Ittersum 2003). An intriguing question is whether cues suggesting a lower level of availability of a particular resource not only influence perceptions of the cue-specific resource but also impact the cognitive accessibility of the general notion of abundance. If indeed cues indicating a limited supply of a resource evoke a broad sense of non-abundance, it suggests that consumption of unrelated resources is also likely to decrease. Such a finding is conceptually important and also suggests that a very different approach can be used to influence conservation behaviors. Such approaches can operate at an unconscious level and may be very effective as they are indirect.

The key question we investigate is whether cues indicating non-abundance vs. abundance of one resource in a prior context also extend more broadly and reduce over-acquisition and waste in subsequent consumption contexts even when different types of resources are used. To address this issue, we need to first examine the interaction between resource abundance and conservation

**Resource Abundance and Conservation**

We conceptualize abundance to be an excessive supply of resources whereas non-abundance is sufficient but non-excessive supply of resources. Non-abundance differs from
scarcity in the sense that scarcity refers to insufficient supply of resources. We focus on situations where the supply is always sufficient but simply differs in terms of excessiveness.

Consumers are innately convenience seekers, which is essentially a tendency to save or simplify work and also to add to one’s ease or comfort. The tendency to seek convenience typically leads to greater acquisition of resources than is necessary. For example, at a fast food restaurant, it is more convenient to take excessive number of paper napkins, cutlery and condiments rather than allow for the possibility of running short and walking back for more. Thus taking more napkins eliminates the cognitive effort of estimating the quantity required as well as the physical effort of replenishing the resource. In a similar vein, it is more convenient to leave the lights on when leaving a room rather than turning off the lights, as the latter requires an additional action. In addition to seeking convenience, over-acquisition could also occur because people are greedy, or simply enjoy the sense of entitlement.

Importantly, consumers can afford to seek convenience, satisfy other personal motives and waste in the course of consumption only when resources are abundant. When resources are not abundant, consumers need to carefully monitor their consumption so as to not deplete the resource. Therefore, we would expect that perceiving resources as limited can temporally prompt conservation behaviors. This argument is consistent with the sociological perspective of “abundance psychology”, which suggests that in late-modern and industrialized society, as the means of mass production become mastered, abundance becomes more taken-for-granted and scarcity is therefore supplanted by abundance, leading to highlighted consumerism (Côté 1993, 1996; Riesman 1950).

*Abundance Cues and Conservation of Unrelated Resources*
Broadly building upon evidence suggesting that environmental cues in a prior context can influence decision-making in subsequent unrelated contexts by affecting mental representation and accessibility of different knowledge structure (e.g., Bargh et al., 2001; Dijksterhuis, Chartrand and Aarts 2007; Förster, Liberman and Friedman 2007; Kay et al. 2004; Neely, 1977; Srull and Wyer, 1979), we posit that cues indicating one particular resource as non-abundance can reduce the cognitive accessibility of the general construct of abundance and trigger the tendency to conserve. Further, the conservation tendency activated by non-abundance cues can persist into subsequent consumption even when different resources are utilized. Formally, we hypothesize that non-abundance cues about resource “A” can reduce both pure loss (i.e., the difference between the amount of resource acquired and consumed) and inefficiency in usage (i.e., the difference between the amount of resources consumed and required) of resource “B”.

There are several different reasons why non-abundance cues in a prior context could prompt conservation behaviors in subsequent consumption. First, cues highlighting non-abundance of a resource may lead people to waste fewer resources in subsequent unrelated consumption by passively activating a conservation goal (e.g., Förster, Liberman and Friedman 2007; Laran and Janiszewski 2008). Second, non-abundance cues presented in a prior task could prime conservation-related concepts and therefore increase the likelihood of conserving behaviors in subsequent context (e.g., Bargh and Barndollar 1996; Bargh, Chen and Burrows 1996). Third, it is possible that prior cues indicating non-abundance can prime frugality-related traits and therefore lead participants to act more frugally in subsequent consumption contexts (e.g., Kay et al. 2004; Dijksterhuis, Chartrand and Aarts 2007).

Moreover, we hypothesize that the effect of non-abundances cues on conservation will
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disappear when people get a chance to conserve before taking resources. We argue this is the case because the conservation tendency activated by non-abundance cues can only temporarily dominate convenience seeking and other personal motives that lead to increased waste in consumption, as the latter factors are more innate and are further highlighted by the abundance of modern societies. Once people get a chance to engage in any conserving behavior (e.g., donating to an environmental cause), conserving resources becomes less of a local and direct concern whereas satisfying motives such as seeking convenience reemerges as individuals’ primary propensity. Our explanation is consistent with recent findings by Mazar and Zhong (2010) showing that consumption is closely connected to social and ethical behavioral broadly across domains. For example, they demonstrate that people react less altruistically and are more likely to cheat and steal after purchasing green products as compared to conventional products.

Our prediction is consistent with the aforementioned motivation account explaining that cues highlighting non-abundance of a resource may lead people to waste fewer resources in subsequent unrelated consumption by passively activating a conservation goal. It is important to note that only the goal activation account predicts that giving people a chance to conserve would attenuate the effect of non-abundance cues on conservation as an unique characteristic about goal activation is that once the activated goal is satisfied, individuals will no-longer engage in goal-consistent behaviors (e.g., Förster, Liberman and Friedman 2007; Laran and Janiszewski 2008). However, both the conceptual priming and trait priming accounts predict that giving people a chance to conserve exacerbate the proposed effect, as engaging in a conservation action would have made conservation-related concepts or traits even more accessible and salient.

To summarize, our theoretical approach integrates amounts of resources acquired, resources consumed, and resources required to empirically explore the interplay between
resource abundance and conservation in consumption. Our key thesis is that cues indicating non-abundance of a resource can activate the tendency to conserve, which can persist into subsequent consumption and reduce waste of unrelated resources. In a series of five experiments, we first demonstrate the proposed phenomenon, showing that non-abundance cues regarding one resource can reduce pure loss (Experiment 1) and inefficiency in usage (Experiment 2) regarding different types of resource in subsequent consumption. Next, we test whether manipulating perceived non-abundance while holding the actual abundance level constant is sufficient to trigger conservation behaviors across consumption domains (Experiment 3). In the last two experiments, we test the underlying mechanisms that are responsible for the proposed behavioral effect. Experiment 4 examines whether cues indicating non-abundance regarding one particular resource can reduce the cognitive accessibility of the general construct of abundance. Finally, in Experiment 5 we test whether giving people a chance to conserve attenuates the effect of non-abundance cues on conservation. In doing so, we also test the motivational account against other theoretical accounts based on conceptual or trait activations.

**METHODOLOGY**

Given the main objective of our experiments is to test the interplay between resource abundance and conservation, it is key that we concentrate on only one of the reasons why people waste so that we can keep the underlying motive consistent across studies. In the current paper, we focus on convenience seeking, as this is a factor that is very important and intuitively appealing. We set up all the experiments such that seeking convenience conflicts with conserving behaviors. In these scenarios, we test how cues of resource abundance influence waste and
To validate that seeking convenience indeed is one important reason why people do not conserve, we ran a preliminary study to establish the linkage between convenience seeking and waste.

To do so, we manipulate convenience by altering the physical distance at which the resource is located. We anticipate that more resources will be wasted when it is more inconvenient to take/replenish a resource. Thirty-two participants recruited from the paid participant pool at a northeastern university received $2 for participating in a food evaluation study. Participants were seated in isolated computer cubicles so that they could not see other respondents. They were told that the purpose of the study was to elicit perceptions of the taste combination of three different flavors of chips with ketchup. Every participant was provided with a bowl with three chips each of a different flavor, a full bottle of ketchup (32 oz., squeezable bottle) and a small sampling plate. They were asked to squeeze the ketchup into the small plate and then taste the chip-ketchup combinations. Ratings of each taste were obtained on a 7-point scale anchored by “I dislike the taste- I like the taste.” For some participants, the ketchup bottle and small plate were placed on their own desk. Others were asked to go to the desk next to them to pour the ketchup and return to their original seat with the plate. The rest of the participants were asked to go to the room located on their right to pour the ketchup and then return to their original seat. The amount of ketchup that participants left in the small plate after finishing the taste test served as our main dependent variable.

We found a significant effect of ketchup location on the amount of ketchup wasted (F (2, 29) = 3.52, p < .05). Specifically, participants wasted significantly less ketchup when the ketchup

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2 In the next desk and next room conditions, we didn’t explicitly provide instructions regarding whether participants should leave the ketchup bottle in the original palace or whether they can go back to get more ketchup. In all sessions, none of our participants took the ketchup bottle away from their original place (i.e., none of them took the bottle to their own seat) and none them went back to the next desk or next room to pour more ketchup.
bottle was put on the same desk ($M_{\text{same desk}} = 1.82$ grams) than when it was located on the next
desk ($M_{\text{next desk}} = 4.12$ grams; $F(1, 30) = 4.53, p < .05$) or next room ($M_{\text{next room}} = 4.29$ grams; $F(1, 30) = 5.73, p < .05$). While the deviation from convenience led people to waste more ketchup,
the degree to which it was inconvenient to take and renew resources (i.e., going to next desk vs.
next room) did not produce a significant effect on the amount of waste ($F(1, 30) = .02, p = .89$).

These results confirm that seeking convenience leads to increased waste in consumption.

In all experiments, we will set up the consumption contexts in such a way that seeking
convenience conflicts with conserving so that we can keep the underlying motive why people
waste consistent across studies when examining the interplay between resource abundance and
conservation. Next, in five experiments, we test our main thesis, that is, cues indicating non-
abundance of one resource can trigger conservation behaviors regarding an unrelated resource.
We begin by reporting the results of two experiments that demonstrate the proposed effect for
pure loss of resources and inefficiency in usage respectively. We subsequently present three
additional experiments that demonstrate the robustness of the effect, further discriminating
among different theoretical accounts for the effect.

**EXPERIMENT 1: RESOURCE CUES AND PURE LOSS IN RESOURCES**

In this experiment we examine whether non-abundance cues regarding resource A can
reduce pure loss of resource B. To do so, we measure the amount of resources acquired,
resources consumed and the difference between the two. We predict that cues indicating non-
abundance vs. abundance of one resource in a prior unrelated task can reduce pure loss of a
different type resource in subsequent consumption. Reduction in pure loss which is the
difference between resources acquired and resources consumed can occur in different ways. For example, resources acquired may increase while consumption is unaffected. Alternatively, resources consumption may increase while acquisition remains unaffected. We test which of these possibilities occur.

**Method**

*Participants.* Sixty undergraduate students took part in two supposedly unrelated studies in exchange for extra course credit.

*Procedure.* Participants were told that they would take part in two unrelated studies. The first study was a figure drawing task, which randomly assigned participants to one of two conditions: abundance or non-abundance. Participants were seated in cubicles so that they could not see other respondents. They were instructed to trace an unbroken line between the boundaries that were formed by two, same shaped figures with one figure placed in the interior of the other similar figure. They were given four sets of shapes and instructed to try to keep the line in the middle of each set of the shapes. In the abundance condition, a stack of regular sized (7.5") sharpened pencils were placed in the front of the participants. In the non-abundance manipulation, participants were provided with one small pencil stub of a length of 2.5".

After completing the figure drawing task, all participants moved to a “food evaluation study.” They were told that the researchers were interested in their opinions on the taste of new low calorie snacks. Participants were asked to sample three new varieties of 100-calorie snacks. Participants were told to rinse their mouth well with water before beginning each tasting to avoid taste contamination. A full jug of water (1 gallon) and a 16.oz cup were placed on an adjacent
desk to their right. This made it inconvenient to get the water and to replenish it. Before
beginning the sampling, participants were asked to go to the next desk, fill water in the cup and
then return to their original seat. As instructed, participants rinsed their mouth with water before
sampling each snack. Evaluations of the snacks were elicited using a 7-point scale after finishing
each sample (1 = “I dislike the taste of the snack”, 7 = “I like the taste of the snack”).

After the food evaluation task, participants were asked to complete a feedback sheet,
which asked them to rate whether the figure drawing task was easy (1=very easy; 11=very
difficult); how expensive they thought the new snacks would be as compared to Lays potato
chips (1 = “less expensive than Lays”, 11 = “more expensive than Lays”); and whether they had
sufficient water to rinse (1 = “it was not enough”; 11 = ‘it was enough”). At the end of the
session, participants were quizzed about the objective of the study and then were debriefed,
thanked and dismissed. None of the participants correctly guessed the true purpose of the
experiment. One participant who failed to follow instructions and did not take water was
excluded from the analysis.

Measures. The key dependent measures are the amount of water that participants took
from the water jug, the amount of water that participants consumed for rinsing and the amount of
water that participants left in the cup after completing the task. The weight of the water jugs was
measured before and immediately after each lab session. The amount of water that participants
took was calculated by taking the difference in the before and after measures for each water jug.
The amount of the water that participant left in the cup was determined by taking the difference
in the before and after weights of each cup. Finally, we calculated the amount of water that
participants consumed by taking the amount of water poured from the jug minus the amount of
water left in the cup.
Results and Discussion

Amount of Pure Loss of Water. To test whether non-abundance cues presented in a prior task can reduce pure loss of a different resource in subsequent consumption, we first conducted a one-way ANOVA (Resource cue: abundance vs. non-abundance) on the amount of water that participant left in the cup after the task. As expected, we found a significant effect of resource cue on the amount of water wasted ($F(1, 57) = 5.18, p < .05$; see Figure 2). Specifically, participants in the non-abundance condition (pencil stub: $M_{\text{non-abundance cue}} = 1.21$ oz.) wasted significantly less water than participants in the abundant condition (stack of pencils: $M_{\text{abundance cue}} = 2.37$ oz.).

Amount of Water Acquired & Consumed. To examine whether this reduction in pure loss of resources is driven by the decrease in the amount of resources acquired or the increase in the amount of resources consumed, we ran two separate ANOVA’s on the amount of water poured from the jug and amount of water consumed respectively. We found a marginal significant effect of resource cue on the amount of water acquired ($F(1, 57) = 2.83, p < .10$); there was no significant effect of resource cue on the amount of water consumed ($F(1, 57) = .12, p = .73$; see Figure 2). That is, participants in the non-abundant condition poured less water from the jug than participants in the abundance condition ($M_{\text{abundance cue}} = 7.11$ oz. vs. $M_{\text{non-abundance cue}} = 6.18$ oz.). However, participants used about the same amount of water for rinsing ($M_{\text{abundance cue}} = 4.74$ oz. vs. $M_{\text{non-abundance cue}} = 4.97$ oz.).

[Insert Figure 2 about here]
**Evaluations.** There were no significant differences in the perceived difficulty of the figure drawing task. The task was rated as equally easy in both conditions ($M_{\text{abundance cue}} = 1.97$ vs. $M_{\text{non-abundance cue}} = 1.93$; $F(1, 57) = .01, p = .92$). Participants also perceived the snacks to be equally expensive in both conditions ($M_{\text{abundance cue}} = 7.16$ vs. $M_{\text{non-abundance cue}} = 7.19$; $F(1, 57) = .004, p = .95$). Finally, participants indicated that they had adequate amount of water to rinse their mouth in both conditions ($M_{\text{abundance cue}} = 10.50$ vs. $M_{\text{non-abundance cue}} = 10.48$; $F(1, 57) = .002, p = .96$). These results suggest that the differences found in the amount of water wasted and acquired cannot be explained by alternative explanations such as task difficulty or scarcity.

Experiment 1 provides support for the proposed carry-over effect of non-abundance cues on conservation by demonstrating that naturally occurring environmental cues highlighting non-abundance of a resource (e.g., a pencil stub) presented in a prior context can lead to reduction of pure loss of a different resource (water). Importantly, we demonstrate that non-abundance cues reduced pure loss of resources because participants decreased the amount of resources acquired, not because they increased the amount of resources consumed. Thus, the use of the non-abundance cue overcomes convenience seeking and over-acquisition. In the next experiment, we examine whether non-abundance cues can also reduce inefficiency in usage, the other instantiation of waste in consumption.

**EXPERIMENT 2: RESOURCE CUES AND INEFFICIENCY IN USAGE**

The objective of Experiment 2 is to provide further support for our main thesis that cues suggesting non-abundance of a resource can temporarily prompt conservation behaviors and
reduce waste in subsequent consumption. More specifically, in this experiment we examine whether a cue of non-abundance impacts usage efficiency.

**Method**

*Participants.* Ninety-five college students from a northeastern university took part in two supposedly unrelated studies in exchange for extra course credit.

*Procedure.* Participants were told that they would take part in two unrelated studies. The first study was a drink sampling task, which randomly assigned participants to one of two conditions: abundance or non-abundance. In both conditions, participants were asked to sample and evaluate a new type of flavored Vitamin water. After being seated in isolated cubicles, participants were asked to wait for the sample. The experimenter went to each subject’s cubicle with an unopened full bottle of the drink and a sampling cup and poured about 10 milliliters of the drink into the cup. In the non-abundance condition, the experimenter took the drink bottle away leaving only the sampling cup on the participants’ desk. In the abundance condition, after pouring, the experimenter left both the sampling cup and the full bottle on the participants’ desk. Participants were asked to evaluate the drink on a 7-point scale (1 = “I did not like the taste”, 7 = “I like the taste”). In a third control condition, participants did not sample the drink but responded to unrelated filler questions that took the same amount of time as the sampling task.

Next, all participants proceeded to a “wrapping box” task. Participants were told that the researchers were interested in how people wrap packages. Each participant was provided with a parcel box with dimensions of 11-5/16” x 8-3/4” x 2-1/2”, a roll of wrapping paper (width =

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3 None of the participants drank from the bottle directly. Several of them asked whether they can take the drink with them in the abundance condition, and the experimenter allowed them to do so.
17.5") of approximately equal length, a pop-up tape strip dispenser and scissors. The width of the paper was selected so that it was wide enough to cover the box from any starting point (length or breadth). Therefore, length of paper used is a good measure of the efficiency of resource usage. After finishing wrapping the box, participants in the abundance and non-abundance conditions indicated their purchase intentions for the drink sampled in the first study on a 7-point scale (1 = “I would not buy the drink”, 7 = “I would buy the drink”). Finally, all participants were quizzed about the purpose of the study. No one correctly guessed the objective.

Measures. The length of paper that participants used to warp the box served as our main dependent variable. The length of the paper rolls was measured before and right after each lab session. As the dimension of the parcel box was the same for each participant, relatively speaking, more wrapping paper used is an indicator of more inefficiency and waste of resources.

Results and Discussion

Length of Wrapping Paper Used. One participant who took more than three standard deviations from the mean was excluded from the analysis, leaving a total of ninety-four usable subjects. Across all conditions, participants on average used 28.02” of wrapping paper. We hypothesize that cueing non-abundance in a prior task can subsequently increase the efficiency in usage and reduce wastage on an unrelated resource. As expected, we found a significant effect of resource cue on the amount of paper acquired (F (2, 91) = 3.71, p < .05; see Figure 3). In the non-abundance condition, participants took significantly less wrapping paper after the drink bottle was taken away in the prior sampling task than participants in the abundance condition where the bottle was left on their desk (M_{abundance cue} = 28.65" vs. M_{non-abundance cue} = 26.82"; F (1, 92) = 5.62, p < .05). As compared to the non-abundance condition, participants in the control
condition where there was no sampling task, also significantly utilized more resources (M_{control} = 28.63; F (1, 92) = 5.50, p < .05). No significant difference was found between the abundance and control conditions (F (1, 92) = .001, p = .97).

**Drink Evaluations.** It could be argued that the difference in wrapping paper usage amount was driven by attitudes towards the drink rather than the abundance manipulation. To rule out this alternative explanation, we examine the evaluations of the drink. Participants in the control condition were not included in this analyses as they did not complete the sampling task. Two separate ANOVA’s (resource cue: abundance, non-abundance) reveal no significant difference in evaluation of the taste of drink and purchase intention. Participants in both conditions perceived the drink as equally tasty (M_{abundance cue} = 4.77 vs. M_{non-abundance cue} = 4.78; F (1, 61) = .00, p = .98), and had similar purchase intentions (M_{abundance cue} = 4.29 vs. M_{non-abundance cue} = 3.91; F (1, 61) = .49, p = .49).

[Insert Figure 3 about here]

The results of Experiment 2 support our key prediction that cueing non-abundance vs. abundance of a resource (in this case, flavored water) can temporarily prompt conservation behaviors and curb waste in subsequent unrelated consumption domains (in this case, reducing the inefficiency in usage of wrapping paper). It is important to note that the lack of difference between the abundance and control conditions may signify that by default, participants in our participation pool perceive resources as abundant rather than non-abundant.

A question that naturally arises from this perspective is: if consumers generally perceive resources as abundant, what is the practical importance of studying the impact of
resource cues on conservation? While by default consumers might perceive resource as abundant, we argue (and show) that there are subtle naturally occurring environmental and contextual cues that can automatically activate the tendency to conserve and curb waste in consumption.

In the next experiment, we extend the findings from Experiments 1 and 2 in two ways. First, in the first two experiments, abundance was manipulated by altering the real amount of resource availability. In Experiment 3, perception of abundance is manipulated rather than actual abundance.

Furthermore, in Experiments 1 and 2, convenience seeking conflicts with conservation because it is inconvenient to acquire or consume fewer resources than necessary. In Experiment 3, convenience conflicts with conservation in a different manner. It requires participants to take an extra action to stop acquiring resources when they no longer need them. More specifically, we measure the percentage of participants leaving an empty room leaving lights on vs. turning lights off.

**EXPERIMENT 3: PERCEIVED ABUNDANCE VS. NON-ABUNDANCE**

The main objective of Experiment is to test whether the perception of non-abundance vs. abundance is sufficient to prompt conservation in subsequent consumption. Specifically, we provided participants the same amount of resource in either a large or a small container. We predict that providing the resource in a large vs. small container would lead participants to perceive the resource as less abundant and thus generate conservation actions in a later unrelated context. The key dependent variable is whether participants shut the light off when leaving an
empty room. Note that in this consumption context, each additional unit of acquisition after participants leaving the room results into pure loss of energy, as participants no longer consume it.

**Method**

*Participants.* Eighty-six participants recruited from two large research participant pools at a northwestern university participated in a short product evaluation study for either $2 or extra course credit, in addition to the chance to win a $20 lottery drawing.

*Procedure.* Participants signed up for a short product evaluation study where they were required to evaluate the quality of a new brand of cooking oil. The experimental sessions were held individually: each session lasted about 5 minutes with a break of 10 minutes between sessions. Participants were randomly assigned to either the abundance or non-abundance condition. In both conditions, participants were provided with the same amount of cooking oil, that is, 1/3 cup. Whereas in the non-abundance condition 1/3 cup of cooking oil was provided in a large 4-cup measuring cup, in the abundance condition, the same amount of oil was provided in a small 1-cup measuring cup (see Appendix A for the stimuli used in Experiment 3). Participants were asked to rate the color, texture and smell of the cooking oil on a 7-point scale anchored by “dislike- like”. At the end of the survey, they were asked to indicate whether they had enough cooking oil to make a judgment (1 = “It was not enough”, 7 = “It was enough”).

After completing the oil evaluation task, participants were asked to go to the adjacent room (located on the right) to enter into a drawing for $20. As there was only one participant per session, the experimenter walked each of them individually to the next room, which was always
empty with the door closed. The experimenter first unlocked the door by entering a code. The experimenter did not enter the room but indicated to the participants that the light switch was on the wall near the door and the instruction sheet for the lottery drawing was on the computer desk. The experimenter then left leaving the participant alone in the room. Participants had to switch on the lights themselves in order to read the instruction sheet. The drawing required participants to pick a number from 1 to 1000 and write it on the instruction sheet. Participants were told that the number closest to the drawn number would win the $20 lottery. After deciding on the number, participants were instructed to place the instruction sheet with the number into the envelope provided, leave the envelope on the desk, and close the door when they left the room.

Measures. The dependent measure was whether the participant switched the lights off when leaving the room.

Results and Discussion

Manipulation Check. To test whether providing the same amount of resource (1/3 cup of cooking oil) in a large vs. small measuring cup indeed changed participants’ perception of resource abundance, we compared participants’ responses to the question whether they had enough cooking oil to make a judgment across the two experimental conditions. One participant didn’t respond to this question, leaving a total of eighty-five usable participants. We found a significant effect of container size (F (1, 83) = 7.42, p < .01). Participants perceived the same amount of cooking oil as less abundant when it was provided in the large measuring cup as compared to the small measuring cup (M large measuring cup = 5.86 vs. M small measuring cup = 6.63). Nevertheless, in both conditions, participants indicated that the amount of oil provided was
sufficient to make a judgment (t-tests against the scale midpoint 4: p’s < .001). There was no significant difference in participants’ evaluation of the color, texture or smell of the cooking oil (all p’s >.20).

**Percentage Turning Lights Off.** Our main prediction is that non-abundance cues prompt the tendency to conserve and therefore will increase the propensity to switch the lights off. As expected, there was a significant effect of abundance cue on the percentage of participants turning lights off ($\chi^2 (1) = 4.01, p < .05$; see Figure 4). In the abundance condition, only 47.7% switched the lights off whereas in the non-abundance condition, 69.0% switched the lights off.

The results of experiment 3 demonstrate that the perception of abundance vs. non-abundance is sufficient to prompt conservation in subsequent consumption. Further, when the cooking oil was provided in the bigger vs. smaller cup, participants still indicated that they had sufficient amount of resources. These findings suggest the deviation from abundance (i.e., non-abundance, denoting the sufficient but non-excessive supply of resources) rather than scarcity (i.e., denoting insufficient supply) is adequate to prompt conservation behaviors (in this case, taking an extra action to turn off lights when leaving a room).

In three experiments we have demonstrated the proposed phenomenon that cues indicating non-abundance of a resource can prompt conservation behaviors in subsequent consumption, even when different types of resources are utilized. We show that non-abundance cues lead to both reduction in losses and more efficiency in usage. We also find that this proposed effect occurs even when non-abundance is perceived rather than real. In the next two
experiments we test the underlying mechanisms that are responsible for the observed effect.
Experiment 4 examines whether cues indicating non-abundance regarding one particular resource can reduce the cognitive accessibility of the general construct of abundance. Finally, in Experiment 5 we study whether giving people a chance to conserve attenuate the effect of non-abundance cues on conservation. We also test against various activation processes underlying the focal phenomenon, including the motivation-based goal activation account and other semantic-based activation accounts.

**EXPERIMENT 4: RESOURCE CUES AND GENERAL PERCEPTION OF ABUNDANCE**

Experiment 4 tests whether cues indicating non-abundance vs. abundance of a particular resource in a prior unrelated task can reduce the accessibility of cognitive representation of the general construct of abundance. We first exposed participants to either non-abundance or abundance cues in a sampling task. We then measured the accessibility of cognitive representations of the notion of abundance employing a lexical decision task that requires participants to determine whether certain letter strings are words or not (Bargh and Chartrand 2000; Fazio 1990; Laran and Janiszewski 2009). If cueing is successful, we expect that participants who are exposed to the non-abundance cue will respond slower to abundance-related words than participants initially exposed to the abundance cue.

**Method**

*Participants.* Thirty-one participants took part in two supposedly unrelated studies in
exchange for extra course credit.

Procedure. The first task was a drink sampling task, which randomly assigned participants to either the abundance or non-abundance condition. The procedures were similar to those used in the Experiment 2. In both conditions, participants were asked to sample and evaluate a new drink. The experimenter went to each subject’s cubicle with a full bottle of the drink and a sampling cup and poured about 10 milliliter of drink into the cup. In the abundance condition, the experimenter left both the sampling cup and the bottle on participant’s desk while in the non-abundance condition, the experimenter took away the bottle.

After evaluating the drink, all participants completed an ostensibly unrelated lexical decision task on a computer. Participants were told that the purpose of the study was to test their attentional capability in a task involving how quickly they could identify whether certain letter strings are words or non-words. Participants were told to look at the middle of the computer screen, where they would see letter strings that were either words (e.g., ORANGE) or non-words (e.g., HPPE). Their task was to, as quickly and as accurately as possible, press “1” if the letter string was a word or “0” if the letter string was not a word. Participants first completed a trial run consisting of 10 word and non-word letter strings; then preceded to the main task where three types of letter strings were presented one at a time, including 10 abundance-related words (e.g., ABUNDANCE, EXCESSIVE), 10 neutral words unrelated to abundance (e.g., FOOTNOTE, MESSAGE), and 30 non-words (e.g., SUBSKRIBE, BAFTERY). The dependent measure was the latency for recognition of each word.

Results and Discussion

After removing all incorrect answers, we performed a natural log transformation of response times for words correctly identified. Times that exceeded three standard deviations from their cell
mean were eliminated from the analysis (Bargh and Chartrand 2000; Fazio 1990; Laran and Janiszewski 2009). We then averaged the response times to generate one score for the abundance and neutral words for each participant.

A 2 (Resource cue: abundance vs. non-abundance, between-subjects) X 2 (Word type: abundance words vs. neutral words, within-subjects) ANOVA revealed a significant two-way interaction of resource cue and word type ($F (1, 29) = 6.26, p < .05$; see Figure 5). As predicted, participants in the non-abundance condition (where the drink bottle was taken away in the sampling task) were significantly slower to respond to the abundance-related words than participants in the abundance condition where the drink bottle was left on their desk ($LnMean_{abundance\ words,\ abundance\ cue} = 6.55\ \text{ms} \ vs.\ LnMean_{abundance\ words,\ non-abundance\ cue} = 6.66\ \text{ms};\ F (1, 29) = 19.87, p < .001$). There was no significant differences in the response times for neutral words across conditions ($LnMean_{neutral\ words,\ abundance\ cue} = 6.53\ \text{ms} \ vs.\ LnMean_{neutral\ words,\ non-abundance\ cue} = 6.58\ \text{ms};\ F (1, 29) = .92, p = .35$). These results suggest that using subtle cues to manipulate abundance such as taking away the drink bottle as compared to leaving it on the desk dose influence participants’ perception of resource abundance. In particular, cuing non-abundance of a resource makes the general construct of abundance less accessible.

[Insert Figure 5 about here]

In the next study, we examine whether the effect of non-abundance cues on conservation exacerbates or attenuates when people get a chance to conserve before taking resources for subsequent consumption. This test not only allows us to identify an important moderator for our finding but also helps test again multiple underlying activation process, such as passive activation of a conservation goal, priming of conservation-related concepts and priming of

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frugality-related traits (e.g., Chartrand and Bargh 1996; Förster, Liberman and Friedman 2007; Laran and Janiszewski, 2008; Sela and Shiv 2009).

**EXPERIMENT 5: ACTIVATION PROCESS**

Experiment 5 examines whether giving participants a chance to conserve (e.g., donating to a conservation charity) before taking resources for subsequent consumption moderates the influence on non-abundance cues on conservation. We predict that the effect of non-abundance cues on conservation will be attenuated when people get a chance to conserve before taking resources. We explain that the conservation tendency activated by non-abundance cues can only temporarily dominate convenience seeking and other personal motives because the latter factors are more innate and are further highlighted by the abundance of modern societies. If given an opportunity to engage in a conserving behavior after being exposed to non-abundance cues, we anticipate that individuals will return to seeking convenience and satisfying other personal motives in subsequent consumption.

The current study also allows us to discriminate against different theoretical accounts that could be responsible for the effect of non-abundance cues on conservation. Specifically, only the motivational goal-activation account predicts giving people a chance to conserve would attenuate the proposed effect of non-abundance cues on conservation as an unique characteristic about goal activation is that once the activated goal is satisfied, participants will no-longer engage in goal-consistent behaviors (e.g., Förster, Liberman and Friedman 2007; Laran and Janiszewski 2008). However, the non-motivational accounts of priming conservation-related concepts and traits predict the opposite pattern, as engaging in a conservation action would have made conservation-
related concepts and traits even more accessible and salient.

**Method**

*Participants.* One hundred and eighty-seven undergraduate students took part in several supposedly unrelated studies in exchange for extra course credit.

*Procedure.* The experiment employed a 2 (Resource cue: abundance vs. non-abundance) x 2 (Charity type: conservation cause vs. non-conservation cause) between-subjects design. Participants were asked to complete several ostensibly separate studies. The first study was a figure drawing task. The procedures were identical to those in Experiment 2. That is, we provided participants with either a pencil stub (non-abundance condition) or a stack of regular pencils (abundance condition) and asked them to draw a line between four sets of same-shaped, different-sized figures. After completing the figure drawing task, participants were asked to indicate whether the task were easy on a 7-point scale anchored by “very easy-very difficult”.

Next, participants were told that before moving to the next study, the experimenters wanted their vote on which charity to donate to. More specifically, they were told that one of the experimenters’ colleagues at a southwestern University was planning to donate money to two charities and that $1 would be donated for each participant⁴. Half participants were asked to choose between two environmental charities that primarily focused on conservation issues, that is, “Conservation International” and “Conservation Fund”. They were given the following descriptions, “Conservation International is committed to helping societies adopt a more sustainable approach to development- one that considers and values nature at every turn” and

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⁴ The colleague actually refers to one author of this paper who donated a total of $187 to the charities on behalf of the students who participated in Experiment 4.
“Here at the Conservation Fund we’re committed to protecting America’s working landscapes-the forests, farms and ranches that define our horizon- and history.” The other half of the participants were asked to choose between two education charities - “Institute of International Education” and the “The Children’s Scholarship Fund”. The descriptions were “The Institute of International Education is among the world’s largest and most experienced international education and training organizations” and “The Children’s Scholarship Fund gives low-income children four-year partial scholarship to private school”.

After indicating which charity they preferred, all participants moved to a product evaluation task, which asked them to evaluate the color and smell of a new detergent. Participants were given a full bottle of detergent and a clear crystal sampling cup. They were asked to pour some detergent into the cup to make the evaluation. The evaluations were elicited using two 7-point scales anchored by “I dislike the color-I like the color” and “I dislike the smell-I like the smell”. Finally, all participants were quizzed about the purpose of the study, which no one correctly guessed.

*Measures.* The weight of detergent that participants poured into the crystal cup served as our main dependent variable. The weight was determined by taking the difference in cup weight between the before and after measurements. Since the cup was crystal, participants only need a minimal amount in order to make the evaluations. Relatively speaking, the more they poured into the cup, the more inefficient they were in terms of resource utilization.

**Results and Discussion**

*Amount of Detergent Poured*: One participant insisted on using his own pen for the
figure drawing task while two participants poured the detergent into the cap rather than the crystal cup provided. We excluded these participants from our analyses, leaving a total of one-hundred and eighty-four participants. Across all the four conditions, participants on average poured 28.34 grams of detergent. As the distribution of the amount of detergent poured were highly skewed (skewness statistic = 1.65; SE = .18), we performed a natural log transformation of detergent weights for further analysis.

A 2 (Resource cue: abundance vs. non-abundance) X 2 (Charity type: conservation vs. non-conservation) ANOVA revealed a significant two-way interaction of resource cue and charity type (F (1, 180) = 3.19, p < .05) as well as a marginal main effect of charity type (F (1, 180) = 2.64, p = .11; see Figure 6). Consistent with our earlier findings, in the education charity condition where participants chose between two educational causes, we replicated the carry-over effect of non-abundance cues on conservation: that is, participants in the non-abundance condition poured significantly less detergent (LnMean education charities, non-abundance = 2.72 grams) than those in the abundance condition (LnMean education charities, abundance = 3.10 grams; F (1, 180) = 4.37, p < .05).

As hypothesized, in the environmental charity conditions where participants were given an opportunity to conserve, the impact of non-abundance cues on conservation was attenuated: there was no difference in the amount of detergent poured between the abundance and non-abundance conditions (LnMean conservation charities, non-abundance = 3.20 grams vs. LnMean conservation charities, abundance = 3.05 grams; F (1, 180) = .68, p = .41).

[Insert Figure 6 about here]

Evaluations. As before, there were no significant differences in participants’ rating of the
difficulty of the figure drawing task. No matter whether they used a pencil stub or a regular pencil to draw the lines, participants indicated the task as equally easy ($M_{\text{abundance cue}} = 1.61$ vs. $M_{\text{non-abundance cue}} = 1.44$; $F(1, 181) = 2.07$, $p = .15$). Additionally, there was no significant interaction of resource cue * Charity type on participants’ evaluation of the color and smell of the detergent ($p’s > .72$).

In addition to identifying an important moderator for our findings showing that giving participants a chance to conserve before taking resources attenuates the proposed effect of non-abundance cues on conservation, Experiment 5 allows us to test against multiple underlying mechanisms, including the motivation goal activation account and the non-motivational accounts of conceptual priming and trait priming.

As discussed earlier, the goal activation account predicts that giving participants a chance to conserve (e.g., choosing which of two conservation charities to donate to) would attenuate the influence of non-abundance cues on conservation, as once the activated goal is satisfied, participants will no-longer engage in goal-consistent behaviors. However, both the conceptual priming and trait priming accounts would not predict the observed attenuation, as choosing which of two environmental charities to donate to would have made conservation-related concepts and traits even more accessible and salient. The findings of experiments provide empirical evidence that the underlying mechanism responsible for the observed effect is motivational, rather than priming of conservation-related concepts or frugality-related traits.

The results of Experiment 5 also help rule out the alternative explanation of demand effect arguing that the differences found in subsequent consumption in our previous studies are simply driven by the fact that non-abundance cues presented in the prior task made participants to believe that the experimenter have only limited resources for running studies and they should
therefore take less of the experimenter’s resource in the following consumption task. However, this explanation cannot explain the interaction of resource cue and charity type. As the simple action of choosing between two conservation vs. education charities should not change participants’ judgment about how many resources the experimenter has and therefore, we should have observed that in the education charity conditions, participants also poured less detergent out after being provided with a pencil stub rather than a stack of pencils in the figure drawing task. Additionally, one could argue non-abundances cues presented in the prior unrelated task can activate certain social norm such as taking only limited amount of resource in the laboratory. Again, this social-norm based explanation predicts that we would observe the same carry-over effect in the education charity and environmental charity conditions, which is inconsistent with the interaction pattern found in Experiment 5.

**GENERAL DISCUSSION**

Our objective was to investigate the impact of resource abundance, a crucial factor in determining resource utilization, on conservation and waste in consumption. While resource abundance allows people to acquire more resources than necessary in consumption; perceiving resources as limited prompts conservation behavior. We build upon prior findings that show environmental cues in a prior unrelated context can influence subsequent decision-making. We propose that cues indicating non-abundance vs. abundance of a particular resource can decrease cognitive accessibility of the broad construct of abundance and activate a general tendency to conserve. This, in turn, can persist into subsequent consumption and reduce waste even when different resources are utilized. In five experiments, we find support for the proposed effects and
the theoretical underpinnings. We demonstrate the proposed carry-over effects of non-abundance cues on conservation across different scenarios including reducing pure loss of resources and inefficiency in usage, across different resource domains such as paper, water and energy, and through different types of manipulations such as varying actual or perceived amount of resources provided.

The first two experiments were designed to demonstrate the proposed phenomenon for both instantiations of waste in consumption. Experiment 1 shows that non-abundance cues presented in an irrelevant prior task can reduce pure loss of an unrelated resource: those participants previously exposed to a pencil stub rather than a stack of pencils subsequently took and wasted relatively less water in a following snack sampling study. Experiment 2 extends the impact of non-abundance vs. abundance cues to another instantiation of waste in consumption, inefficiency in usage. The results show that simply taking away or leaving a drink bottle on participant’s desk in a drink sampling reduced the amount of wrapping paper participants used in a later wrapping box task.

Experiment 3 extends findings from the first two studies by showing that perceived non-abundance is sufficient to prompt conservation behaviors across resource domains. We find that providing the same amount of resources (1/3 cup of cooking oil) in a large vs. small cup was sufficient to change the perception of abundance and led people to subsequently take a proactive action to conserve energy (turning lights off when leaving an empty room).

In the last two experiments, we test the underlying mechanisms that are responsible for the proposed behavioral effect. Experiment 4 shows that cues indicating non-abundance regarding one particular resource can reduce the cognitive accessibility of the general construct of abundance. After being exposed to a non-abundance cue vs. an abundance cue in a prior
sampling task, participants reacted to abundance-related words slower while their reaction time to neutral words didn’t differ. Finally, in Experiment 5 we study whether giving people a chance to conserve attenuates the effect of non-abundance cues on conservation. We find that allocating $1 donation between two conservation charities (i.e., having a chance to conserve before consumption) attenuates the impact of non-abundance cues on conservation whereas allocating $1 donation between two education charities (i.e., engaging in similar actions unrelated to conservation) do not attenuate the effect. These results demonstrate that the underlying mechanism is motivational rather than priming of conservation-related concepts or frugality-related traits.

This article offers several theoretical contributions. While extant consumer behavior literature has primarily focused on consumption, our theoretical approach also incorporates resource acquisition – which is crucial to understanding wasting behavior. We conceptualize waste in consumption as the difference between resources acquired and required, and classify it further into pure loss of resources (the difference between resources acquired and consumed) and inefficiency in usage (the difference between resources consumed and required).

While a rich body of literature has examined the linkage between resource supply and consumption, the level of specificity examined in existing literature is domain specific. For example, researchers have shown that both actual resource supply and contextual cues that bias perceived supply amount can produce significant influences on how much of the same resource people consume (e.g., Cheema and Soman 2008; Folkes, Martin and Gupta 1993; Geier, Rozin and Doros 2006; Wansink 1996; Wansink and van Ittersum 2003). The current research extends existing literature by demonstrating that cues suggesting a lower level of availability of a particular resource not only influence perceptions of the cue-specific resource but also impact the
cognitive accessibility of the general notion of abundance and therefore trigger conservation behaviors regarding an unrelated resources.

We find preliminary evidence that participants acquire and waste about the same amount of resources in the abundance and control conditions (Experiment 2). These results suggest that our participants seem to naturally perceive resources as abundance rather than non-abundant, which is consistent with the sociology literature arguing that people in modern and industrialized society have moved away a scarcity mindset and instead take abundance as granted (Côté 1993, 1996; Riesman 1950). Additionally, we find that when we manipulated the perception of abundance vs. non-abundance by providing the same amount of resource in a small vs. big container, participants indicated that they had enough resources even in the non-abundance condition, which clearly demonstrates that it is the deviation from abundance (sufficient but not excessive supply of resource) rather than scarcity (insufficient supply of resources) that is adequate to activate conservation tendency.

Furthermore, we find that the activation of a conservation goal is only temporary. Once people get a chance to engage in any conserving behavior before acquiring resources for subsequent consumption, conserving resources become less of a local and direct concern and seeking convenience and satisfying other personal motives reemerge as individuals’ primary propensity. These results are consistent with recent literature on “green licensing” showing that purchasing green products can produce unintended effects licensing people to act unethically in subsequent tasks (Mazar and Zhong 2010).

Our findings suggest that a very different approach can be used to influence conservation behaviors. Existing literature on conservation-related topics have center attention upon the effectiveness of direct interventions on conservation behaviors, such as providing information,
feedbacks and incentives (e.g., Clayton and Myers 2009; Costello, Gaines and Lynham 2008; Goldstein, Cialdini and Griskevicius 2008; Leiserowitz 2006; Nickerson 2003 Nolan et al. 2008).

Our approaches can operate at an unconscious level and may be very effective as they are indirect. Participants in our experiments were not aware of the influences of non-abundance cues on their acquisition and consumption behaviors. In all our studies, participants were quizzed about the purpose the experiments at the end of the lab sessions, and none of them correctly guessed our hypotheses.

We all know that it’s very difficult to change people’s attitude; even if we can successfully do so, these attitudinal changes may not necessary translate into behavioral changes. For example, Geller (1981) finds that the positive attitudes and behavioral intentions regarding energy conservation reported by attendees of an energy-conservation workshop produced little impact on their actual energy-conservation behaviors at home. In their review of interventions studies aimed at household energy conservation, Abrahamse et al. (2005) conclude that information tends to result in higher knowledge level but not necessarily in energy-savings. In this research, we show that non-abundance cues, on the other hand, can directly change people’s conservation behaviors without attempts to convince or persuade them.

Our findings also offer implications for marketing practitioners and employers. From a cost standpoint, costs can be curtailed if employees waste fewer resources and also if customers waste fewer resources that they are not paying for (e.g., condiments, napkins cutlery in fast food restaurants). The finding that non-abundance can be cued in unrelated domains is particularly useful. Thus, managers should consider cueing non-abundance in attributes that are relatively unimportant for consumers or those that do not impact quality perceptions.
The findings open up some future questions for investigation. What type of cues can evoke non-abundance is a natural extension to our research questions. In all our manipulations, the non-abundance cue was embedded in tasks that participants were required to actively engage in. Whether more subtle and irrelevant cues available in the environment can be equally effective is important from a managerial perspective.

In the current research we examined situations where people are not paying for the focal resources. These resemble several common consumption scenarios where cost and price are not involved or salient at the point of consumption. For example, house-hold energy and water bills are often paid monthly rather than daily. Whether non-abundance cues can lead to conservation where consumers are aware of the costs can also be a fruitful area of inquiry (e.g., lunch buffet, car self-cleaning).

On one hand, price serves as a stimulus to think (Wathieu and Bertini 2007) and deliberation may highlight the unused utility involved in pure loss and inefficiency and thus lead to aversion to waste (Arkes 1996). On the other hand, a small fine can actually decrease the likelihood of people engaging in behaviors that benefit the group or society however hurt personal interests, as the small price provides people an excuse not to engage in such behaviors (Greenzy and Rustichini 1998). So it’s possible that a small price may well provide justifications for consumers to take more than necessary as they won’t mind paying a small amount of money. Further research is needed to gain insights into how cost interacts with resource abundance and conservation in consumption.
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Resource Abundance and Conservation in Consumption


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FIGURE 1: CONCEPTUALIZATION OF WASTE IN CONSUMPTION

Resources Available

- Resources Acquired
  - Resources Consumed
    - Resources Required

Pure Loss of Resources
= Resources Acquired – Resources Consumed

Inefficiency in Usage
= Resources Consumed – Resources Required
FIGURE 2: IMPACT OF RESOURCE CUE ON AMOUNTS OF WATER ACQUIRED, CONSUMED AND WASTED (IN OZ.)
(EXPERIMENT 1)

Error bars: +/- 1 SE
FIGURE 3: IMPACT OF RESOURCE CUE ON WRAPPING PAPER USAGE * (IN INCHES)

(EXPERIMENT 2)

Error bars: +/- 1 SE
FIGURE 4: IMPACT OF PERCEPTION OF ABUNDANCE VS. NON-ABUNDANCE ON PERCENTAGE OF PARTICIPANTS TURNING LIGHTS OFF

(EXPERIMENT 3)
FIGURE 5: IMPACT OF RESOURCE CUE ON REACTION TIME TO ABUNDANCE VS. NEUTRAL WORDS ($LN_{MILLISECONDS}$) (EXPERIMENT 4)

Error bars: +/- 1 SE
FIGURE 6: IMPACT OF RESOURCE CUE AND CHARITY TYPE ON AMOUNT OF DETERGENT POURED ($LN_{GRAMS}$)

(EXPERIMENT 5)

Error bars: +/- 1 SE
APPENDIX A: STIMULI USED IN EXPERIMENT 3

ABUNDANCE CONDITION  NON-ABUNDANCE CONDITION