A Study on Sustainable Behavior Inducement: The Role of Information and Feedback

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Abstract

This study develops a further understanding of the role of information availability – in either detailed or color cue feedback form – in inducing sustainable behavior. The hypothesis was that the Color Cue Feedback Group would be more likely to make sustainable decisions on the whole since color cues should invoke System I cognitive processes. A survey-based experiment including 364 participants was conducted at the University of Oxford. First, it was found that information availability in general appears to increase sustainable decision-making, and the hypothesis that color cue feedback (moral suasion) is the most effective for invoking sustainable choices was generally, though not conclusively, confirmed. Second, color cues (moral suasion) may be preferable for quick decisions and detailed information (information provision) may be preferable for decisions that take more time to develop. Third, the presence of undesirable social norms regarding sustainable behavior could mean that the desirable (sustainable) behavior is most often not adopted. Fourth, individuals may aspire to and find value in sustainable practices, but are less likely to actually engage in this behavior when the opportunity to do so arises. Lastly, the data suggest that while information availability will affect decision-making, for the greatest impact it must also be accompanied by supportive policies or campaigns that simultaneously reduce barriers for sustainable behavior and increase the barriers for unsustainable behavior.

Introduction

Significance

The span and scope of emerging environmental issues is intimidating. Environmental issues are unique in that they are entwined with essentially every component of life, ranging from the necessities to luxuries available in the modern day. We can expect these issues to undermine various facets pertaining to our quality of life and therefore we require not only bold but also a complex range of solutions.

This study addresses one element fueling environmental problems that requires a solution: individual behavior. Changes in individual behavior will certainly not be enough on its own to enhance the sustainability of modern life. There must also, for example, be sweeping improvements in numerous technologies. But behavioral change is nonetheless essential, especially when

considering the increasing demand for the planet's resources as developing countries improve their standard of living and several billion more people will be added to the human population by mid-century.

A comparison between the effectiveness of two (related) categories of environmental solutions is made in this study regarding their likelihood to induce behavioral change. The two categories being compared include *information provision* and *moral suasion*. Both items fall within a general taxonomy of state intervention for addressing environmental issues that ranges from the *free market* at one end to *nationalized delivery* at the other and are situated in the portion of the spectrum closest to *free market* (Hepburn 121). Information provision can be described as a situation in which "government assumes the role of aggregating and disseminating information on externalities and their shadow prices, but nothing more," and moral suasion as government providing and possibly seeking to "persuade people and firms to change their preferences and objectives" (Hepburn 121). For the sake of simplicity – and since both information provision and moral suasion involve making information available in one form or another – the term *information availability* (and related phrasing) will convey a reference to both terms.

Objective

The main purpose of this study was to further understand the role of information availability – in either detailed or color cue feedback form – in inducing sustainable behavior. The term *detailed form* falls under the *information provision* category and refers to information about the environmental impact of a decision issued in either written text or as an eco-label. The term *color cue feedback*, on the other hand, falls under the *moral suasion* category and refers to environmental impact information given in the form of colors. The colors range on a spectrum from red to green, with red signifying a high (detrimental) environmental impact and green denoting a low (positive) impact on the environment. The detailed form of information availability provides more information than color cue feedback does; the former illustrates various aspects of the impact of a decision on the environment, while the latter solely offers a color as feedback to an individual's choices. These two forms of information thus offer individuals two different ways to learn about the environmental impact of their decisions.

In order to determine which format is preferable for achieving more sustainable decision-making, this study addresses the research question "Is information about the environmental impact of a decision made available in detailed or color cue feedback form more effective in its ability to induce sustainable behavior?" Furthermore, the study also aims to gain insight as to whether offering either form of information at all makes a difference compared to the status quo, in which limited or zero environmentally-related

information is readily available for the decisions that individuals make.
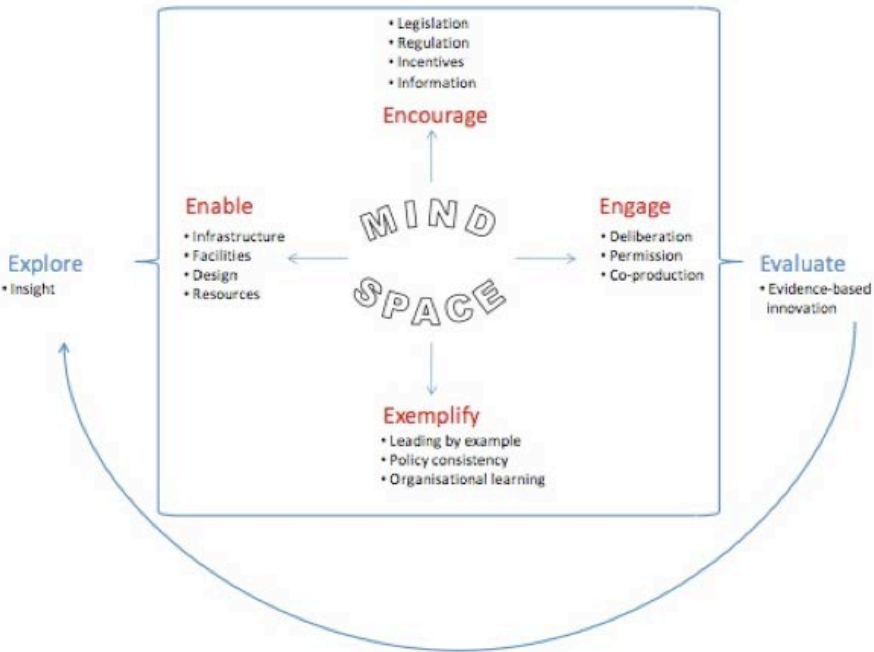
Related Work

During the past few years our knowledge of how information availability, in various forms, impacts individual behavior has increased. In particular, there have been interesting discoveries relating to moral suasion. Excitement over this category of environmental solutions is that *moral suasion* "can lead to low cost, low pain ways of 'nudging' [individuals] into new ways of acting by going with the grain of how we think and act. This is an important idea at any time, but is especially relevant in a period of fiscal constraint" (Dolan 7). By employing research on behavioral theory, incentives and information availability can be designed more effectively. Research by Dolan, et al. offers the following set of the nine most robust (non-coercive) influences on behavior as a checklist for making effective policies. The list can be remembered by a simple mnemonic: MINDSPACE (Dolan 8).

Messenger	We are heavily influenced by who communicates information
Incentives	Our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
Norms	We are strongly influenced by what others do
Defaults	We 'go with the flow' of pre-set options
Salience	Our attention is drawn to what is novel and seems relevant to us
Priming	Our acts are often influenced by sub-conscious cues
Affect	Our emotional associations can powerfully shape our actions
Commitments	We seek to be consistent with our public promises and reciprocate acts
Ego	We act in ways that make us feel better about ourselves

(Dolan 8)

The factors that affect the way in which individual decisions are made can be used as tools to nudge individuals (non-coercively) toward making preferable choices. Moreover, they serve as the core tools of policy pertaining to behavioral change. The work by Dolan, et al. notes that the tools offered by MINDSPACE provide a pathway to implement behavioral change and

should be applied within a larger framework to Enable, Encourage, Engage, and Exemplify behavioral change (Dolan 9). In addition to these '4Es', "MINDSPACE requires two supporting actions: Explore, which takes place before policies are implemented, and Evaluate, which judges the success of the policy" (Dolan 9). In practice, MINDSPACE "powerfully complements and improves conventional policy tools, rather than acting as a replacement for them" and may also "help identify any barriers are currently preventing changes in behavior" (Dolan 10).

Dolan 9

In a related work titled *Nudge*, Richard Thaler and Cass Sunstein discuss how choice architecture affects individual decision-making. They argue that utilizing liberal paternalism – via nudges – encourages individuals in a non-coercive manner to make decisions that are in their own best interest because they are in society's best interest More specifically, a *nudge* "is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler 6). Furthermore, an intervention must be easy and cheap to avoid in order to be considered a nudge because they are not mandates;

they are preferable and perhaps more politically admissible to outright bans. By utilizing research on framing, priming, and default options, policymakers can encourage behavior that improves the health of individuals and the environment. In terms of energy conservation, for example, a campaign framed as helping people *not lose* money will be more effective than helping people *save* money (Thaler 37). Publishing information in a neighborhood about how much energy each household uses will compel people to reduce their energy use. Similarly, people will be "more likely to recycle if they learn that lots of people are recycling" (Thaler 67). In the following example, which served as one of the primary reasons for investigating the role of *color cue feedback* in inducing behavioral change, the use by a California energy utility of the Ambient Orb – a ball that provides feedback by glowing red when a customer is using lots of energy but green when energy use is modest – led to 40% energy reductions (Thaler 196).

Other similar products have been developed to provide feedback to individuals: The iPed is a piece of jewelry, such as a lapel pin, "that would change color depending on [people's] carbon footprint" (Thaler 257). This would encourage people to reduce their footprint, since this information would be publicly displayed. Smart/energy meters, since they offer constant feedback to consumers, have been shown to encourage people to reduce their energy use. For instance, there is a power cord that lights up and intensifies depending on how long an appliance has been switched on. By the same token, a device that makes a beeping noise after every half gallon of water that is used while taking a shower should reduce water use.

The findings presented in both MINDSPACE and *Nudge* about the impact of behavioral theory on decision-making lie behind the rationale for the primary hypothesis described later in this paper.

A secondary, related hypothesis for the survey data is based on previous research about social norms. Research on social norms indicates that behavior is driven by the expectations (or beliefs) individuals hold, not only about themselves, but also about others. It has been found in numerous studies that what other people do or are expected/believed to do plays a major, though underappreciated, role in individual behavior. Thus, similar to nudges, social norms play a larger (often subconscious) role in determining individuals' behavior than they realize.

In terms of the effect of social norms on sustainable behavior, there have been correlational and experimental findings. It was found that self-reported contributions to prevent climate change (by using public transportation instead of driving) were "strongly correlated with normative beliefs about what other people did ($r = .77$)" (Göckeritz 515). In another study, it was found that the strongest predictor of energy conservation was "the belief that other people are doing it ($r = .45$, $p < .01$)," even though participants "did not detect the influence of these messages" about these

descriptive normative beliefs on their behavior, rating them as the least motivating reason to engage in energy conservation (Nolan 916, 920). Furthermore, it was found that participants with very low recycling rates "recycled more after they had received information about the actual (higher) recycling rates of other residents in the community" (Nolan 914). Thus, people are not only much more likely to adopt sustainable behaviors based on what other people do but are also quite unlikely to know how the behavior of other people affects their own behavior.

Experiment

Survey Design

The research question for this study was addressed with an online survey-based experiment. The survey was divided into eight sections to find if the type of situation plays a role in determining which form of information availability is more effective. In other words, perhaps written form is more effective for policy views while color cue feedback offers greater potential for more sustainable purchasing decisions. The eight sections included reusable (tote) bags, energy use, land development, grocery store purchases, clothing store purchases, recycling, and companies.

Each section asked participants to rate their level of agreement with a set of statements using a 1-7 scale. On the scale, selecting "1" indicated low agreement with a statement, while selecting "7" indicated high agreement with the statement.

The statements spanned various categories of behavior. The statements addressed participants' viewpoints, likelihood of engaging in a behavior or in supporting a certain decision, expectations, and other statements pertaining more specifically to the section at hand. Participants were also asked to rate other people's viewpoints, likelihood of engaging in a behavior or in supporting a certain decision, and expectations. The purpose of this was to determine whether there is a difference between how individuals rate statements and how they think others would rate the same statements. Thus, these statements were intended to help detect if undesirable social norms (those that inhibit the widespread adoption of sustainable behavior) are present. To note, the statements within each section were randomly sorted in order to minimize the effects of priming on participants.

Participants in each of the three survey groups rated their level of agreement for the *same* statements. The only difference among the three groups was the way in which information – limited information, color cue feedback, or detailed information – was offered to them. The three survey groups included the following:

The Control Group (Survey Group 1) was offered limited information about products, behavior, and policy in order to represent the

domain in which most individuals make decisions today: with limited or zero information about the environmental impact of their choices.

The Color Cue Feedback Group (Survey Group 2) was given information about the environmental impact of a decision via colors. A color spectrum from red to green (or green to red) was displayed above the statements that participants were asked to rate. The color spectrum was divided into seven parts so that it would correspond to the 1-7 rating scale. Participants could thereby receive quick feedback on the environmental impact of their decision by comparing their rating on the 1-7 rating scale to the corresponding number on the color scale. Due to the connotation of color with positive (green) or detrimental (red) environmental impacts, the color scale may invoke injunctive norms – what is approved or disapproved of – since a green rating implies 'good' behavior and a red rating implies 'bad' behavior.

The Information Group (Survey Group 3) was given information in either the form of written text or eco-labels. The written text offered very detailed information about the benefits and/or detriments of a certain product, practice, or policy. The eco-labels came in two forms. The label used for grocery store products was slightly less detailed, since it gave products a rating on a scale of one to five stars (five being the most environmentally-friendly). The label used for clothing store products was more detailed and was modeled after *Nutrition Facts* label used for food and drinks in the United States. To note, this was the label that I presented at *The Economist* magazine's *Carbon Economy Summit* in November 2009 (with slight modifications).

Setting and Participants

The experiment was conducted at the University of Oxford in Nuffield College's Centre for Experimental Social Sciences (CESS). It took place over the first two weeks of July 2011.

An electronic message was sent from CESS to a participant pool including students and non-students in the surrounding Oxford community. The pool of participant recruits included individuals who had previously agreed to receive messages about CESS experiments. Email addresses were randomly sorted into one of the three survey groups. 500 electronic messages were sent for each survey group and thus 1,500 total electronic messages were sent. Participants completed the survey on their own time and in a place of their choosing.

There were 364 completed surveys, which is a response rate of 24.3%. 141 participants completed Survey 1, 120 participants completed Survey 2, and 103 participants completed Survey 3. There were a handful of individuals who began the survey but did not complete it. Of the 36 individuals that started but failed to complete the survey, 13 were from the Survey 1 Group, 12 were from the Survey 2 Group, and 11 were from the Survey 3 Group.

Information was collected regarding the gender, age, and student/non-student status of participants. Sixty percent of the participants were female and forty percent were male. About half of the population was between ages 18-24, about one-quarter was between age 25-34, and the remaining one-quarter included participants age 35 or above. Lastly, there was an even split between participants who were students at the University of Oxford and those that were not; the survey population thus is more representative of the younger segment of the adult UK population. The results may thereby provide more information about future trends in this realm since most participants have not yet reached middle age.

Because the population included members of the Oxford, UK community, the participants were expected to be in the middle-range of viewpoints regarding sustainability related issues held by individuals in developed nations. Oxford is a small city bordering rural and industrial areas, yet is also only about an hour-long drive from London. Generalizations about the viewpoints regarding sustainability issues held by British individuals compelled the expectation that the participant pool would tend to have less environmentally-friendly views than people from nations like Sweden or Germany, but perhaps more environmentally-friendly views than those from a nation such as the United States.

Procedure

Participants were sent an electronic message from CESS requesting them to participate in a study on *Consumer Preferences*. The message did not refer to the sustainability aspect of the study in order to reduce or avoid bias in the participants that agreed to take the survey. Individuals could choose to participate at their leisure over the course of the study period in early July 2011. They were told in the electronic message that the survey would remain open until a sufficient number of surveys were completed. Participants selected the link given at the bottom of the electronic message to begin the survey, which directed them to one of the three surveys. The survey generally took participants 15 to 20 minutes to complete.

The three online surveys were each designed using SurveyMonkey®. As participants completed their respective surveys, SurveyMonkey® collected the data and provided a general analysis of the results. In order to complete a more detailed statistical analysis, the data was exported to Excel and then converted for use on the program JMP 8. Mean difference tests and other related significant difference tests of the results were completed using JMP 8.

As an incentive for individuals to participate in this study on *Consumer Preferences*, they were told that ten participants who completed the survey would be randomly selected to win a £30 (about $50) reward. In order to enter their names into the reward lottery, participants had to enter their email address after the final survey question.

Once ten participants were randomly selected to win the reward, a message was sent notifying them about their selection. The message also included an offer for an additional £10 (about $16) if they agreed to participate in a brief ten-minute interview when they came to CESS to collect their reward. Nine of the ten participants collected the £30 reward and eight of the ten participants participated in the brief interview for the additional £10. To note, the participant that collected the reward but did not participate in the interview was out of town and had a friend come to CESS to collect the £30 reward; an interview could therefore not be offered to this person. One participant did not respond about collecting the £30 reward.

The interview on *Consumer Preferences* was used to ask related follow-up questions. These questions aimed at gaining further insight into the perspectives that individuals maintain in this realm and to see if – with the presence of another individual who would hear the individual's responses – there would be any notable trends when compared to the survey results. The number of interviews was certainly very small – a total of eight – but nonetheless was another opportunity to learn about individual decision-making.

The interviews took place in the CESS seminar room and lasted between five to ten minutes. Participants were asked 33 questions that addressed the subjects of energy conservation, purchasing habits, recycling, and views of sustainable business practices. The majority of the questions requested yes/no responses. Participants were asked to elaborate when they appeared to want to say more, provided a restrained response, or if the response was vague (for the questions that were not in the yes/no format).

Hypothesis

The objective of this experiment, as already stated, was to determine which method of making environmental impact information available would be more effective for inducing sustainable behavior. Furthermore, the experiment also addressed whether information availability in either form has an impact on decision-making at all, or whether making information available – for a lack of better terms – is a waste of time and effort. My hypothesis was that the Color Cue Feedback Group on the whole would be more likely to make sustainable decisions. This may appear to be a less intuitive hypothesis than selecting the Information Group; one might expect people with detailed information to make preferable ('greener') choices than those simply receiving color feedback. The reasoning behind the hypothesis is that colors will invoke System 1 cognition – automatic, fast, easy, effortless mental processes – since people may have a (positive or negative) 'gut' reaction to whether the color feedback is green or red. People may want to make decisions that are closer to green on the spectrum than they would otherwise make without such color feedback being provided; they may

compare where they originally stood on the color spectrum and modify their choices. Color may thus imply rather subtly whether a decision is acceptable or not. Individuals in the Information Group, on the other hand, would likely need to utilize System 2 cognition – effortful, time-consuming, slow mental processes – since it will require effort to interpret what the detailed environmentally related information states about the product or practice. Since individuals shy away from utilizing System 2 processes whenever possible due to related high (cognitive) costs, the Information Group was expected to be less effective overall than the Color Cue Group in adopting sustainable behavior.

A secondary hypothesis related to the statements in the survey pertain to expectations. In this study, it was expected that the results would illustrate the presence of undesirable social norms that may in fact inhibit the widespread adoption of sustainable behavior. That is, it was expected that there would be a difference between empirical (what an individual expects others to do) and normative (what an individual thinks that other people expect him or her to do) expectations. Individuals were thought to be more likely to expect (or believe) others would engage in sustainable behavior than what individuals believed others would expect of them. In other words, empirical expectations were seen likely to be higher than normative expectations. Furthermore, individuals would also probably think that their own desire to engage in, their actual engagement in, and their approval of sustainable behavior is greater than their descriptive normative beliefs (what they expect others to do in a particular situation) and their injunctive normative beliefs (what an individual expects others to approve or disapprove of) (Göckeritz 515). These gaps in expectations, if found to be true, would support the notion that undesirable norms – that inhibit the more widespread adoption of sustainable behavior – are present.

Analysis by Section

The results of this study are based on the ratings that participants provided for the 76 statements distributed among the eight sections of the survey. The following analysis is based on two items. First, comparisons were made between the mean rating that each survey group offered for each of the 76 statements with the actual responses. The purpose of these comparisons was to determine if information had an effect and, if it did, which form of information was most likely to induce sustainable decision-making. Second, comparisons were made between related statements based on their overall mean rating. To note, these comparisons are referred to as 'inter-statement' comparisons. The overall mean rating for each statement was simply the mean of the entire participant population – combining the results from each of the three survey groups – for that statement. The aim of these comparisons was to look for more general trends in the data and, in particular, to examine

questions pertaining to social norms.

In terms of overall results, the Color Cue Group possessed the more sustainable rating for 32 of the statements, the Information Group for 28 of the statements, the Control Group for 16 of the statements. It appears that information – in either form – makes a difference compared to zero or limited information in terms of inducing more sustainable choices. Thus, as hypothesized, the color cue feedback overall appears to induce more sustainable decisions than the other types of information. Offering colors instead of more detailed, text-based information therefore appears, in general, to be more likely than the others to induce sustainable behavior if it becomes utilized in the real world. However, as will be addressed in the more detailed analyses below comparing the groups, whether it is the Color Cue or Information Group that compels the more sustainable response for a given statement appears to be related to the situation. Moreover, it seems that color cues are preferable for situations in which decisions are made more quickly – such as shopping – while information in written form may be preferable for situations in which decisions typically take slightly more time to develop – such as policy viewpoints.

To note, one of the main reasons the Control Group had as many (16) top ratings as it did is due to the questions pertaining to the acceptability and necessity of eco-labeling. More on this can be found later in this section.

A detailed analysis of the eight sections of the survey is provided below. To note, Alpha=0.05 was used as the level to achieve statistical significance for all mean difference tests.

Reusable Bags

Disposable bags are a visible source of waste that people see everyday. When people have take away from restaurants or make a purchase at a store, they most often leave not only with their purchase but also with a disposable bag. These bags are a modern day icon of waste: despite the amount of energy and material that goes into making these bags, their lifespan is quite short – lasting merely from when an individual leaves the store until the arrival at home – before being thrown away or left as litter on the street. It would seem like a small shift in behavior for individuals to remember to keep a reusable bag with them in order to eliminate the need of disposable bags. Yet in practice this is more difficult than might be expected.

In the Reusable Bags section, the Information Group had the more sustainable rating for seven of the nine statements. The Color Cue and Control groups split the other two statements. There was only one instance of inter-statement group differences reaching statistical significance: the Information Group held a significantly greater view of a restaurant or store charge for disposable (paper or plastic bags) than the Control Group. The survey population as a whole, however, seems relatively lukewarm to the

use of reusable bags: none of the groups for any of the statements had a mean rating greater than 5.85 (out of 7). Also, it is interesting to note that in this section the Color Cue Group scored worse than it does for any other section; it had the least sustainable rating for six of the nine statements.

Comparisons were made between the overall mean ratings (the mean of the entire participant population) of various statements. Five of these inter-statement comparisons achieved a statistical significance level of Alpha=0.05: individuals find themselves more likely to hold a favorable view of reusable bags, be more likely to use reusable bags, and feel better about using reusable bags than other people. A restaurant or store charge for disposable bags is looked upon more favorably than an outright ban of disposable bags. Lastly, and perhaps the most interesting results from this section, people's favorable view of reusable bags is significantly higher than their likelihood of actually using the bags. This point illustrates perhaps a lack of commitment and/or incentive to use reusable bags. Were a commitment device or incentive developed, the gap between beliefs and action might be bridged.

Reusable Bags									
Statement	Greenest Rank	(1) Control Group Average	(2) Color Cue Group Average	(3) Information Group Average	Overall Average	1vs 2	1 vs 3	2 vs 3	Viewpoint Difference
1. Your view towards tote bags	7	5.63	**5.82**	5.81	5.74				Statements (1)vs(2), (1)vs(3), (3)vs(4), (5)vs(6), and (7)vs(8) are significantly different from each other
2. Others' views toward tote bags	7	4.38	4.34	**4.56**	4.42				
3. The likelihood that you will use a tote bag	7	5.5	5.27	**5.64**	5.46				
4. The likelihood that others will use tote bags	7	4.34	4.23	**4.46**	4.34				
5. How you feel about using a tote bag	7	5.73	5.61	**5.85**	5.72				
6. How others feel about using tote bags	7	**4.46**	4.36	4.43	4.42				
7. A city ban of disposable (paper and plastic) bags is ok	7	4.45	4.76	**4.81**	4.65				
8. It is ok for a restaurant or store to charge for disposable bags since this will encourage people to use tote bags	7	5.14	5.36	**5.75**	5.39			X	
9. Tote bags are not awkward to use, even if you receive odd gazes from others	7	5.57	5.49	**5.62**	5.56				

Energy Use

 To meet future energy demands, energy conservation is not an option but a requirement. Yet like so many efforts related to sustainability, encouraging individuals to reduce energy use is onerous. Part of the problem is that for many individuals, especially in the United States, reducing energy use seems to imply a diminishing standard of living. There are two aspects that must be considered in formulating a solution to energy-related issues. One is technological and the other, which is addressed in this paper, is behavioral. Determining the most effective ways to address energy conservation in behavioral terms is an emerging area of interest across the globe. The questions pertaining to energy in the survey focused more on what form of information would enhance viewpoints toward policy for energy conservation.

 In the Energy Use section, the Information Group possessed the more sustainable ratings for all five statements. The Color Cue Group was second in line for four of the five statements. The Information Group made a significantly more sustainable rating than the Control Group in terms of its overall views of a (policy) mandate to reduce energy use and its view that the mandate is necessary and will not impose burdensome costs. Overall, none of the three groups view an energy reduction mandate highly since the ratings all fell between 3.82 and 5.37.

Two inter-statement mean differences achieved statistical significance. Individuals have a more favorable view of an energy mandate than they think others possess. They also believe that the argument for an energy mandate is better when it is for the purpose of reducing energy use rather than for reducing dependence on foreign oil.
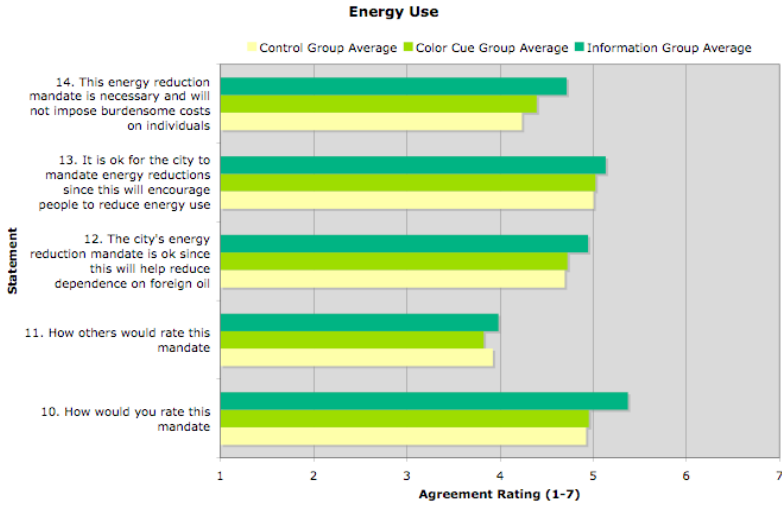

Energy Use

Statement	Greenest Rank	(1) Control Group Average	(2) Color Cue Group Average	(3) Information Group Average	Overall Average	1vs 2	1 vs 3	2 vs 3	Viewpoint Difference
10. How would you rate this mandate	7	4.92	4.95	5.37	5.06		X		Statements (10)vs(11) and (12)vs(13) are significantly different from each other
11. How others would rate this mandate	7	3.92	3.82	3.98	3.90				
12. The city's energy reduction mandate is ok since this will help reduce dependence on foreign oil	7	4.69	4.72	4.94	4.77				
13. It is ok for the city to mandate energy reductions since this will encourage people to reduce energy use	7	5	5.02	5.13	5.04				
14. This energy reduction mandate is necessary and will not impose burdensome costs on individuals	7	4.23	4.39	4.71	4.42		X		

Land Development

Many environmental problems are directly linked to land use decisions. Roads and highways, for example, increase runoff and erosion rates, contribute to the heat island effect, divide and destroy natural habitats, and foster activities that pollute both air and water. Likewise, coastal development destroys or disrupts wetlands (that both absorb pollution before it reaches water sources and reduces the impact of storm surges) and natural habitat. People may not consider the environmental impact of land use decisions, and the aim of the section was to determine which form of information induces more sustainable decisions in this regard.

In the Land Development section, the Information Group once again selected the more sustainable rating for each of the (four) statements. In fact, the choices the Information Group made were significantly more sustainable than both the Color Cue and Information Group for all four statements. There was also a significant difference between how individuals view the decision to not approve a coastal development project and how they think others will view the decision.

Land Development

Control Group Average ■ Color Cue Group Average ■ Information Group Average

18. The decision of the city council is ok because it will preserve the coastline's natural beauty

17. Critics of the council's decision to reject the development plan argue that this will restrict economic growth in the area. The development project should therefore be approved.

16. How other people would rate the plan's rejection

15. How you would rate the plan's rejection

Statement

Agreement Rating (1-7)

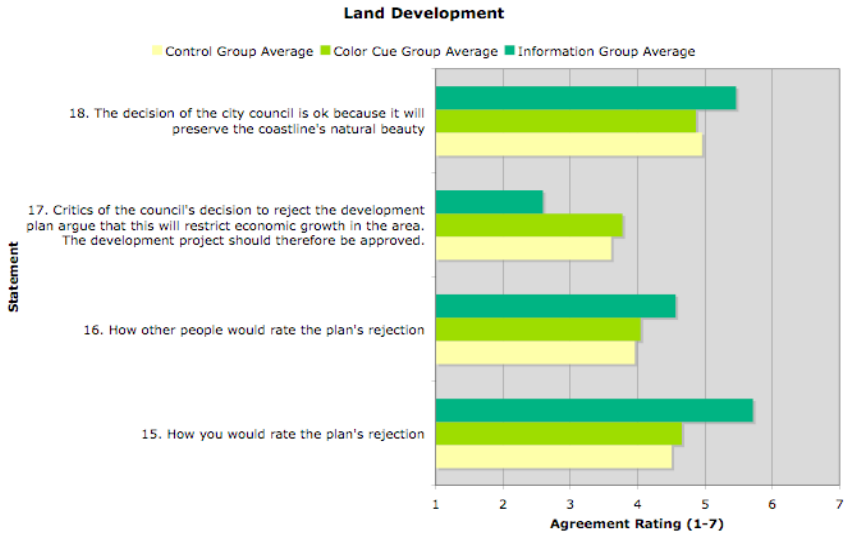|		Land Development							
Statement	Greenest Rank	(1) Control Group Average	(2) Color Cue Group Average	(3) Information Group Average	Overall Average	1vs 2	1 vs 3	2 vs 3	Viewpoint Difference
15. How you would rate the plan's rejection	7	4.5	4.65	5.71	4.89		X	X	Statements (15)vs(16) are significantly different from each other
16. How other people would rate the plan's rejection	7	3.95	4.04	4.56	4.15		X	X	
17. Critics of the council's decision to reject the development plan argue that this will restrict economic growth in the area. The development project should therefore be approved.	1	3.6	3.77	2.59	3.37		X	X	
18. The decision of the city council is ok because it will preserve the coastline's natural beauty	7	4.95	4.86	5.46	5.06		X	X	

Grocery Store Purchases – Eco Label

Going to the grocery store is a frequent activity. It is also a necessity for most people in order to purchase the food one needs. Food production, transportation, and the disposal of food containers are also some of the major sources of water and energy use, waste production, and air and water pollution. Encouraging more sustainable food choices is thus an opportunity to reduce the impact a person makes on the environment since these decisions are made on such a frequent basis. It will, however, probably be one of the more difficult behavioral changes to invoke.

In the Grocery Store Purchases – Eco Label section, the Color Cue and Control groups both selected the more sustainable rating for seven statements, while the Information Group made the more sustainable choice for two statements. Only one statement had a statistically significant difference between two groups: the Color Cue Group was less likely than the Information Group to think that other people would continue to purchase the same products if other people learned that these products have a detrimental impact on the environment but cost much less than sustainable products.

Inter-statement mean differences achieved statistical significance in six comparisons that were made. Individuals think they are more likely to look at and use an eco-label than other people. They believe they are less likely to continue to buy the products they normally buy (that receive poor scores on the eco-label) than other people if the products that receive good scores are either more expensive or cost the same as products receiving poor scores. Individuals think that both they and other people will change the products they normally buy (that receive poor scores on the eco-label) when products receiving good scores on the eco-label cost about the same compared to when products receiving good scores are more expensive. People also find it more acceptable to offer environmental impact information so that they

know the impact of their own purchases than for the purpose of informing other people about the impact of other people's purchases.

It is worth noting that while the Control Group selected more sustainable choices for seven statements, five of these statements pertained to the acceptability of eco-labels and how likely people would be to use them. Though these differences did not reach statistical significance, the Control Group generally finds it to be more acceptable to publish eco-labels, that without eco-labels it is not possible to determine the environmental impact of products, and that people would use the labels. In other words, once individuals were shown an actual eco-label – in the form of text or color cues – they appear somewhat less accepting, less likely to find the value in, and less likely to intend on using the eco-label.

Groceries - Eco Label

Control Group Average ■ Color Cue Group Average ■ Information Group Average

Statement

22. If the products with poor and good scores on this eco-label cost about the same, you would still purchase the products you typically buy

21. If the products you typically buy receive poor scores on this eco-label and they cost considerably less than products with good scores, you would still purchase the products you typically buy

20. After learning of the poor scores, you would still want to purchase the products you typically buy but will not do so

19. After learning of the poor scores, you would still purchase the products you typically buy

Agreement Rating (1-7)

Groceries - Eco Label

Control Group Average Color Cue Group Average Information Group Average

26. You would look at this eco-label and make a decision based on what it says about the product

25. A label of this kind would impose an unnecessary burden on businesses to collect and publish the required information

24. Without an environmental impact label, there is no way for you to figure out the impact of your purchases on the environment

23. It is ok to provide a label with information about the environmental impact of products you purchase so that you are aware of the impact of your purchase on the environment

Statement

Agreement Rating (1-7)

Groceries - Eco Label

Control Group Average Color Cue Group Average Information Group Average

30. If products with poor and good scores on this eco-label cost about the same, others would still purchase the products they typically buy

29. If the products others typically buy receive poor scores on this eco-label and they cost considerably less than products with good scores, others would still purchase the products they typically buy

28. After learning of the poor scores, others would still want to purchase the products they typically buy but will not do so

27. After learning of the poor scores, others would still purchase the products they typically buy

Statement

Agreement Rating (1-7)

Recycling

Groceries - Eco Label

Control Group Average ■ Color Cue Group Average ■ Information Group Average

Statement

34. Others would look at this eco-label and make a decision based on what it says about the product

33. A label of this kind would impose an unnecessary burden on businesses

32. Without an environmental impact label, there is no way for others to figure out the impact of their purchases on the environment

31. It is ok to provide a label with information about the environmental impact of products others purchase
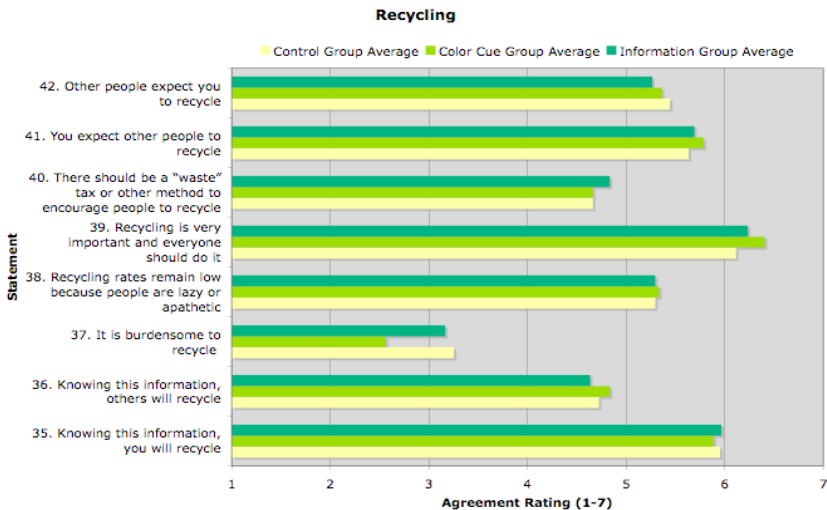
Agreement Rating (1-7)

Statement	Greenest Rank	(1) Control Group Average	(2) Color Cue Group Average	(3) Information Group Average	Overall Average	1vs 2	1 vs 3	2 vs 3	Viewpoint Difference
Groceries - Eco Label									
19. After learning of the poor scores, you would still purchase the products you typically buy	1	3.6	3.48	3.41	3.51				Statements (26)vs.(34), (29)vs(30), (21)vs(29), (21)vs(22), (23 vs. (31), and (22)vs(30) are significantly different from each other
20. After learning of the poor scores, you would still want to purchase the products you typically buy but will not do so	7	3.64	4.17	3.8	3.86				
21. If the products you typically buy receive poor scores on this eco-label and they cost considerably less than products with good scores, you would still purchase the products you typically buy	1	4.39	4.2	4.29	4.30				
22. If the products with poor and good scores on this eco-label cost about the same, you would still purchase the products you typically buy	1	2.47	2.61	2.56	2.54				

23. It is ok to provide a label with information about the environmental impact of products you purchase so that you are aware of the impact of your purchase on the environment	7	6.07	**6.15**	6.06	6.09	
24. Without an environmental impact label, there is no way for you to figure out the impact of your purchases on the environment	7	**4.72**	4.61	4.5	4.62	
25. A label of this kind would impose an unnecessary burden on businesses to collect and publish the required information	1	**2.71**	2.77	2.92	2.79	
26. You would look at this eco-label and make a decision based on what it says about the product	7	4.8	**5.05**	4.8	4.88	
27. After learning of the poor scores, others would still purchase the products they typically buy	1	4.45	**4.38**	4.58	4.46	
28. After learning of the poor scores, others would still want to purchase the products they typically buy but will not do so	7	**3.76**	3.56	3.72	3.68	
29. If the products others typically buy receive poor scores on this eco-label and they cost considerably less than products with good scores, others would still purchase the products they typically buy	1	5.04	**4.9**	5.36	5.08	x
30. If products with poor and good scores on this eco-label cost about the same, others would still purchase the products they typically buy	1	3.62	3.74	**3.6**	3.65	
31. It is ok to provide a label with information about the environmental impact of products others purchase so that they are aware of the impact of their purchases on the environment	7	**5.92**	5.82	5.79	5.85	
32. Without an environmental impact label, there is no way for others to figure out the impact of their purchases on the environment	7	**4.65**	4.54	4.64	4.61	

Recycling is an effective way to reduce the amount of waste going to landfills and to extend the lifespan of raw materials. It enables materials to be utilized more than once, which reduces the amount of energy and material required to acquire new material. Were more products designed with a notion of recycling in mind, more products could be recycled and reutilized rather than being thrown away after a one-time use. Recycling represents a very simple – though once again surprisingly difficult – behavioral change that would reap many benefits. All it takes is putting disposable material into one bin instead of another, yet individuals are often not only forgetful but also defiant about recycling.

In the Recycling section, the Color Cue Group made the more sustainable choice for five of the eight statements. The Information and Control groups made the more sustainable selection twice and once, respectively. The Color Cue Group was significantly more likely than the Control Group to find recycling important (and think that everyone should do it) and to see recycling as not being burdensome.

There were four inter-statement mean differences that achieved statistical significance. Individuals believe they are more likely to recycle than other people. They are more likely to expect other people to recycle than they think other people expect them to recycle. People think they are more likely to recycle than others, and believe they will recycle more frequently than others expect them to. Most importantly, there is a significant difference between how important people find recycling and how likely they are to actually recycle, the former being more likely than the latter.

Recycling

Control Group Average ■ Color Cue Group Average ■ Information Group Average

Statement:

42. Other people expect you to recycle
41. You expect other people to recycle
40. There should be a "waste" tax or other method to encourage people to recycle
39. Recycling is very important and everyone should do it
38. Recycling rates remain low because people are lazy or apathetic
37. It is burdensome to recycle
36. Knowing this information, others will recycle
35. Knowing this information, you will recycle

Agreement Rating (1-7)

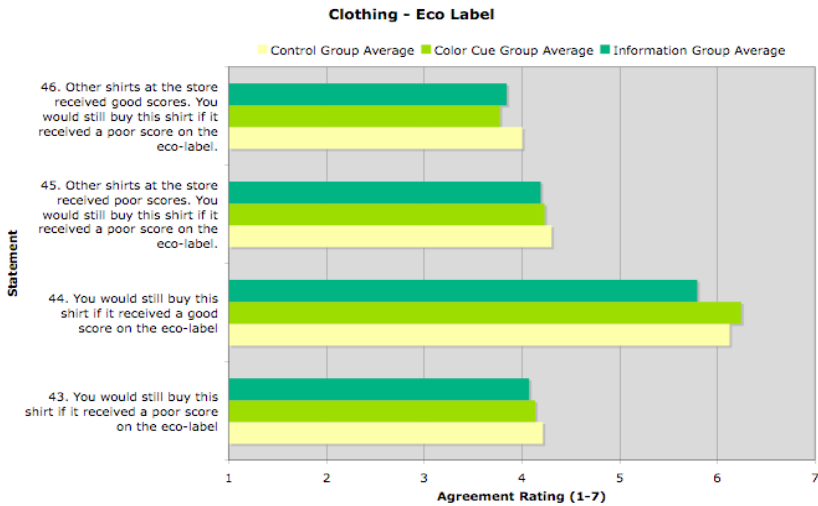|		(1)	(2)	(3)					
Statement	**Greenest Rank**	**Control Group Average**	**Color Cue Group Average**	**Information Group Average**	**Overall Average**	**1vs 2**	**1 vs 3**	**2 vs 3**	**Viewpoint Difference**
					Recycling				
35. Knowing this information, you will recycle	7	5.95	5.88	**5.96**	5.93				Statements (35)vs(41), (35)vs(36), (35)vs(39), (35)vs(42), and (41)vs(42) are significantly different from each other
36. Knowing this information, others will recycle	7	4.72	**4.83**	4.63	4.73				
37. It is burdensome to recycle because it involves separating recyclable materials from other materials that are thrown into the trash	1	3.25	**2.56**	3.16	3.00		X		
38. Recycling rates remain low because people are lazy or apathetic	7	5.29	**5.33**	5.29	5.30				
39. Recycling is very important and everyone should do it	7	6.11	**6.4**	6.23	6.24		X		
40. There should be a "waste" tax or other method to encourage people to recycle	7	4.66	4.66	**4.83**	4.71				
41. You expect other people to recycle	7	5.63	**5.78**	5.69	5.70				
42. Other people expect you to recycle	7	**5.44**	5.36	5.26	5.36				

Clothing Store Purchases – Eco Label

Similar to food, clothing production, transportation, and the disposal of related byproducts are a major source of water and energy use, waste production, and air and water pollution. Encouraging more sustainable clothing purchases is thus an opportunity to reduce the impact a person makes on the environment. While there will be challenges with encouraging more sustainable purchasing habits for items like clothing, it will, however, probably be easier to invoke changes in this category that it would be in the food category. Clothing is purchased much less frequently than food and is less of an established habit. There is also more flexibility in clothing choices. Choosing between a new shirt versus a different shirt or not buying a new shirt because of its detrimental environmental impact is one thing; choosing between bread, vegetables, or meat versus a replacement or none at all because of their detrimental environmental impact is another.

In the Clothing Store Purchases – Eco Label section, the Color Cue Group selected the more sustainable rating seven times, the Information Group four times, and the Control Group three times. Statistical significance was reached between groups for two statements. Both the Color Cue and Control groups were more likely to buy a shirt if it received a good score on an eco-label than the Information Group. The Color Cue Group was also much less likely than the Information Group to think that other people would continue to buy a product that receives a poor score on the eco-label.

There were seven inter-statement mean differences that reached a level of statistical significance. Individuals believe they are less likely than others to buy a shirt that receives a poor score on the eco-label and that they are more likely than others to buy a shirt that receives a good score. Individuals are more likely to buy a shirt that receives a good score than a poor score on an eco-label and believe that other people are likely to do the same. They believe they are less likely than others to purchase a shirt that received a poor score when other shirts in the store received poor scores or when other shirts received good scores. Moreover, individuals are less likely to buy a shirt that received a poor score on the eco-label if other shirts in a store received good scores than if other shirts received poor scores.

Interestingly, two of the three times the Control Group selected the more sustainable choice once again occurred with the statements relating to the acceptability of using eco-labels. This group finds it more acceptable to provide eco-labels to illustrate for individuals the environmental impact of their own and other's decisions. However, unlike the label used for Grocery Store Purchases, this (more detailed) label that resembles the Nutrition Facts Label in the United States compelled the Information Group to believe more than the other groups that without the eco-label they could not find out the information on their own. Furthermore, members of the Color Cue Group were the least likely to believe an eco-label would impose burdensome costs.

Toxics - Fertilizers

Clothing - Eco Label

Control Group Average ■ Color Cue Group Average ■ Information Group Average

Statement

46. Other shirts at the store received good scores. You would still buy this shirt if it received a poor score on the eco-label.

45. Other shirts at the store received poor scores. You would still buy this shirt if it received a poor score on the eco-label.

44. You would still buy this shirt if it received a good score on the eco-label

43. You would still buy this shirt if it received a poor score on the eco-label

Agreement Rating (1-7)

Clothing - Eco Label

Control Group Average ■ Color Cue Group Average ■ Information Group Average

Statement

49. A label of this kind would impose an unnecessary burden on businesses

48. Without an environmental impact label, there is no way for you to figure out the impact of your purchases on the environment

47. It is ok to provide a label with information about the environmental impact of products you purchase

Agreement Rating (1-7)

Clothing - Eco Label

Control Group Average ■ Color Cue Group Average ■ Information Group Average

Statement

53. Other shirts at the store received poor scores. Other people would still buy this shirt if it received a poor score on the eco-label.

52. Other shirts at the store received good scores. Other people would still buy this shirt if it received a poor score on the eco-label.

51. Others would still buy this shirt if it received a good score on the eco-label

50. Others would still buy this shirt if it received a poor score on the eco-label

Agreement Rating (1-7)

Clothing - Eco Label

Control Group Average ■ Color Cue Group Average ■ Information Group Average

Statement

56. A label of this kind would impose an unnecessary burden on businesses

55. Without an environmental impact label, there is no way for other people to figure out the impact of their purchases on the environment

54. It is ok to provide a label with information about the environmental impact of products others purchase

Agreement Rating (1-7)

		Clothing – Eco Label						
Statement	Greenest Rank	(1) Control Group Average	(2) Color Cue Group Average	(3) Information Group Average	Overall Average	1vs 2	1 vs 3	2 vs 3
43. You would still buy this shirt if it received a poor score on the eco-label	1	4.21	4.13	4.07	4.14			
44. You would still buy this shirt if it received a good score on the eco-label	7	6.12	6.24	5.79	6.07	x	x	
45. Other shirts at the store received poor scores. You would still buy this shirt if it received a poor score on the eco-label.	1	4.3	4.23	4.19	4.25			
46. Other shirts at the store received good scores. You would still buy this shirt if it received a poor score on the eco-label.	1	4	3.77	3.84	3.88			
47. It is ok to provide a label with information about the environmental impact of products you purchase so that you are aware of the impact of your purchases on the environment	7	6.04	5.99	5.89	5.98			
48. Without an environmental impact label, there is no way for you to figure out the impact of your purchases on the environment	7	4.75	4.61	4.98	4.77			
49. A label of this kind would impose an unnecessary burden on businesses to collect and publish the required information	1	2.82	2.75	3.19	2.90			
50. Others would still buy this shirt if it received a poor score on the eco-label	1	4.81	4.66	4.83	4.77			
51. Others would still buy this shirt if it received a good score on the eco-label	7	5.81	5.76	5.53	5.71			
52. Other shirts at the store received good scores. Other people would still buy this shirt if it received a poor score on the eco-label.	1	4.58	4.46	4.89	4.63			x
53. Other shirts at the store received poor scores. Other people would still buy this shirt if it received a poor score on the eco-label.	1	4.95	4.83	4.97	4.92			
54. It is ok to provide a label with information about the environmental impact of products others purchase so that they are aware of the impact of their purchases on the environment	7	6.09	5.99	5.86	5.99			
55. Without an environmental impact label, there is no way for other people to figure out the impact of their purchases on the environment	7	4.91	4.71	5.02	4.88			
56. A label of this kind would impose an unnecessary burden on businesses to collect and publish the required information	1	2.89	2.88	3.23	2.98			

Fertilizer is an example of a toxic material that individuals regularly use and that imposes various costs on the environment. In particular, as fertilizer is carried to water resources due to rainfall, it reduces water quality and can lead to massive fish kills and/or 'dead zones.' While it may be more difficult to encourage the agricultural industry at the present moment to reduce or eliminate fertilizer use, it should be less difficult to reduce or eliminate fertilizer use on residential and commercial lawns.

In the Toxics – Fertilizers section, the Color Cue Group made the more sustainable decision in response to four of the seven statements. The Information and Control groups selected the more sustainable choice twice and once, respectively. Statistical significance was achieved between survey groups in two questions. The Information Group was significantly less likely to use fertilizer than the Control Group. The Color Cue Group was significantly less likely than the Control Group to think that it is acceptable to use fertilizer on one's lawn or cropland.

There were five inter-statement mean differences that achieved significance. Individuals believe themselves to be less likely to use fertilizer than other people. Individuals think they are less likely to use fertilizer than others, and believe they will use it less than others expect them to. People are less likely to believe that others expect them to use fertilizer than individuals are to expect others to use fertilizer. Lastly, individuals find it more acceptable for government to mandate either a reduction in the concentration of or types of nutrients in fertilizer than a 'polluter pays' principle in which an extra charge on fertilizer would be levied to pay for the environmental damage resulting from the use of the fertilizer.

Toxics - Fertilizers

Control Group Average ■ Color Cue Group Average ■ Information Group Average

63. Other people expect you to use fertilizer

62. You expect other people to use fertilizer

61. People who use fertilizer should pay for the water pollution and damage to marine ecosystems that their fertilizer causes

60. It is ok for government to make a mandate that limits the concentration and/or type of nutrients in fertilizer

59. It is ok for people to use fertilizer on their lawns and/or croplands

58. Knowing this information, others would use fertilizer

57. Knowing this information, you would use fertilizer

Statement

Agreement Rating (1-7)

Statement	Greenest Rank	(1) Control Group Average	(2) Color Cue Group Average	(3) Information Group Average	Overall Average	1vs 2	1 vs 3	2 vs 3	Viewpoint Difference
Toxics - Fertilizers									
57. Knowing this information, you would use fertilizer	1	3.77	3.28	3.23	3.46		x		Statements (57)vs(58), (57)vs(62), (57)vs(63), (62)vs(63), and (60)vs(61) are significantly different from each other
58. Knowing this information, others would use fertilizer	1	4.71	4.44	4.59	4.59				
59. It is ok for people to use fertilizer on their lawns and/or croplands	1	4.35	3.76	3.94	4.04	x			
60. It is ok for government to make a mandate that limits the concentration and/or type of nutrients in fertilizer	7	5.51	5.6	5.75	5.61				
61. People who use fertilizer should pay for the water pollution and damage to marine ecosystems that their fertilizer causes	7	4.74	4.96	4.66	4.79				
62. You expect other people to use fertilizer	1	3.89	3.92	4.11	3.96				
63. Other people expect you to use fertilizer	1	3.35	3.23	3.24	3.28				

Companies

Many companies – ranging from small businesses to major corporations – are adopting sustainable business practices and investing in other ways to reduce their impact on the environment. Companies are also a driving force behind many environmental problems and, as a result, are in a position where they are expected by the public to make changes. There are a number of benefits companies can realize by adopting sustainability into their business practices, including but not limited to cost savings, competitive advantage, and enhanced risk management. There are opportunities for sustainability in every business sector, though some are larger than others. The difficulty is convincing businesses to adopt the changes, despite the clear short- and long-term gains that are within any business' grasp.
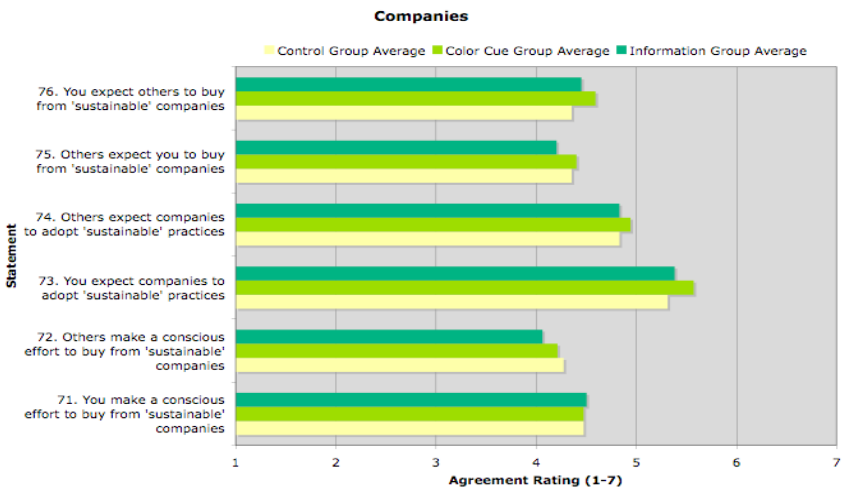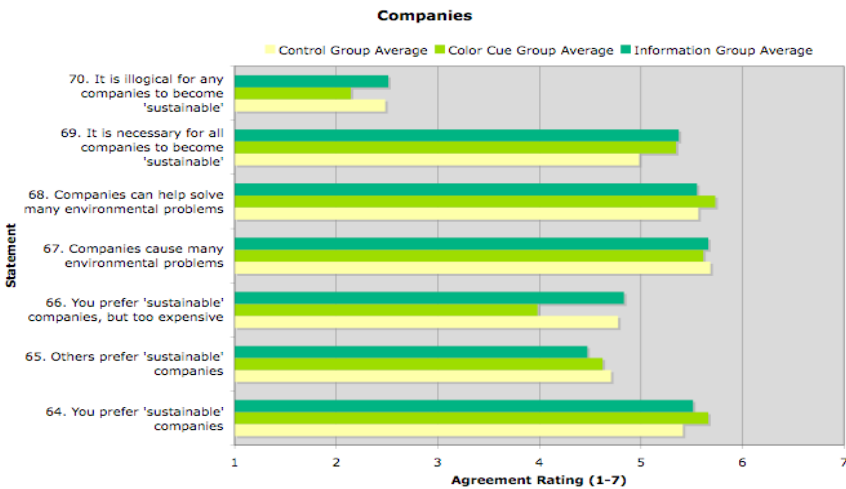
In the Companies section, the Color Cue Group made the more sustainable choice in eight of the statements, while the Control Group did so for three statements and the Information Group for two statements. Statistical significance was achieved between survey groups for one statement: the Color Cue Group was less likely than either the Control or Information groups to believe that products made from sustainable companies are too expensive to buy.

There were four inter-statement means difference tests that reached significance. Individuals believe they are more likely than other people to prefer sustainable companies, expect companies to adopt sustainable practices, and to make a conscious effort to buy from sustainable companies. However, individuals are significantly less likely to make a conscious effort to buy from sustainable companies than the (supposed) necessity they claim for companies to adopt sustainable practices. This point demonstrates why it may appear to companies that there is a lack of demand for sustainability,

since the market signals consumers give do not match their beliefs or expectations regarding sustainable business practices.

It is also worth noting that while it did not quite reach a significance level of Alpha = 0.05, individuals appear to be more likely to expect other people to buy from sustainable companies than they think other people expect them to buy from sustainable companies. In other words, individuals may find they have higher expectations for other people than other people have for them in terms of buying sustainable products.

Interviews

Companies

☐ Control Group Average ■ Color Cue Group Average ■ Information Group Average

- 70. It is illogical for any companies to become 'sustainable'
- 69. It is necessary for all companies to become 'sustainable'
- 68. Companies can help solve many environmental problems
- 67. Companies cause many environmental problems
- 66. You prefer 'sustainable' companies, but too expensive
- 65. Others prefer 'sustainable' companies
- 64. You prefer 'sustainable' companies

Statement

Agreement Rating (1-7)

Companies

☐ Control Group Average ■ Color Cue Group Average ■ Information Group Average

- 76. You expect others to buy from 'sustainable' companies
- 75. Others expect you to buy from 'sustainable' companies
- 74. Others expect companies to adopt 'sustainable' practices
- 73. You expect companies to adopt 'sustainable' practices
- 72. Others make a conscious effort to buy from 'sustainable' companies
- 71. You make a conscious effort to buy from 'sustainable' companies

Statement

Agreement Rating (1-7)

		Companies						
Statement	Greenest Rank	(1) Control Group Average	(2) Color Cue Group Average	(3) Information Group Average	Overall Average	1vs 2	1 vs 3	2 vs 3
64. You prefer 'sustainable' companies	7	5.41	5.66	5.51	5.52			
65. Others prefer 'sustainable' companies	7	4.7	4.62	4.47	4.61			
66. You prefer 'sustainable' companies, but their products or services are too expensive for you to buy	1	4.77	3.98	4.83	4.53	X		X
67. Companies cause many environmental problems	7	5.68	5.61	5.66	5.65			
68. Companies can help solve many environmental problems	7	5.56	5.73	5.55	5.61			
69. It is necessary for all companies to become 'sustainable'	7	4.98	5.34	5.37	5.21			
70. It is illogical for any companies to become 'sustainable'	1	2.48	2.14	2.51	2.38			
71. You make a conscious effort to buy from 'sustainable' companies	7	4.47	4.47	4.5	4.48			
72. Others make a conscious effort to buy from 'sustainable' companies	7	4.27	4.21	4.06	4.19			
73. You expect companies to adopt 'sustainable' practices	7	5.31	5.57	5.38	5.42			
74. Other people expect companies to adopt 'sustainable' practices	7	4.83	4.94	4.83	4.87			
75. Other people expect you to buy from 'sustainable' companies	7	4.35	4.4	4.2	4.32			
76. You expect other people to buy from 'sustainable' companies	7	4.35	4.59	4.45	4.46			

Eight interviews were conducted at the CESS lab with participants that completed the survey. As previously stated, these interviews were optional for the ten participants selected by lottery to win a £30 reward and would reward participants an additional £10 for engaging in the interview.

The interviews addressed four issues: energy, purchasing habits, recycling, and companies. Interviewees were told, similar to the survey, that the interview would address *consumer preferences*. The responses from the interviews were more qualitative than the responses from the survey. Responses ranged from yes/no answers to short sentences elaborating a participants' viewpoints.

In general, the results of the interviews point to several items. First, while the acceptance and importance placed on the sustainability-related issues addressed in these four sections was consistently high, participants confirmed the survey results in that beliefs and actual behavior do not tend to match. Second, individuals have an inflated view of the size of the environmental benefits associated with the (very little) sustainable behavior they actually engage in. This leads them to feel content with the amount of effort they exert to protect the environment. For example, individuals seem to believe they are successful in reducing energy if they remember to turn off the lights and that this is sufficient for reducing their home's energy use. While turning off lights not in use does reduce energy use, this is by no means enough for the scale of what has to be achieved at the household level to reduce energy use. Third, individuals do not have a clear sense of how frequently other people engage in sustainable behavior. For example, beliefs about the percentage of other people that recycle ranged from less than 20% to 75%. Fourth, as expected, a major barrier that is keeping people from making more sustainable choices is (monetary) costs and perceptions about these costs. Fifth, it was agreed upon that there are no legal (except for a few notes about the carbon trading scheme in the EU) or social repercussions for *not* engaging in sustainable behavior. There are thus no (or few) barriers inhibiting unsustainable behavior.

Discussion

Interpretation of Results

In this section, a more detailed analysis of the meaning of the survey results is provided. There were five notable trends in the results. First and foremost, information availability – in either form – appears to make a difference in inducing more sustainable decision-making. While people may have a less favorable view of this information after it transitions from hypothetical to reality, both treatment groups nonetheless offered indications that information availability may invoke modifications towards more sustainable behavior. Furthermore, the primary hypothesis that the

Color Cue Group would be most effective in inducing sustainable behavior generally appears to be supported by the results. It did not separate itself as much from the other two groups in some situations, which leads to the second notable finding.

In order to increase the effectiveness of information availability, the form of information offered to individuals should depend on the type of decision that is involved in a given situation. That is, *situations that involve quick decisions should utilize* <u>*color cue feedback*</u> *and those that involve situations in which decisions take more time to develop should instead provide information in* <u>*written form.*</u> For example, color cue feedback may be preferable for shopping and recycling, while information in written form may be preferable for developing policy preferences.

Third, the secondary hypothesis about the presence of undesirable social norms regarding sustainable behavior was supported by the survey results. Statistical significance was achieved for nearly all of the comparisons between both an individual's own and an individual's thoughts about other people's expectations or beliefs. Individuals believe they are more likely than others to aspire to and actually engage in sustainable behavior; they expect others to adopt sustainable behavior but do not think other people expect the same of them. These findings may indicate the presence of undesirable social norms relating to multiple sources of environmental problems. Individuals want to use reusable bags, support sustainable energy and land use policy, make 'greener' purchases, recycle, use fewer toxic chemicals, and support sustainable companies but expect that others hold different views. This has implications in determining whether or not people actually make sustainable choices. If the individual does not expect others to engage in a certain behavior and the individual does not think that others expect the same of the individual, then the individual will not (or at least be less likely to) engage in that behavior. Thus, the desirable (sustainable) behavior is most often *not* adopted.

These undesirable social norms may be sustained by pluralistic ignorance: individuals think that other people engage in behavior for different reasons than they themselves do. An individual may choose not to use a reusable bag, recycle, buy 'greener' products, support sustainable companies, stop using toxic chemicals at home, and support sustainable policies because they do not think that other people do. And an individual's thoughts about others are supported by the fact that other people's revealed actions match their expectations; other people do not appear to engage in sustainable behavior. But an individual does not consider that other people's reason for not engaging in sustainable behavior is the same reason as their own, that other people do not engage in this behavior because they do not expect others to. Were everyone to learn that the majority of individuals want to engage in sustainable behavior, pluralistic ignorance would be diminished,

and beneficial behavioral modifications may then ensue.

The concept of self-fulfilling prophecies may also play a role in the continued presence of these undesirable social norms. In particular, perceptual confirmation may be a key driver of such norms. Perceptual confirmation is the notion that an individual's perception of another's behavior confirms the expectations that the individual holds. Selective attention, weighting, memory, and interpretation – and thereby the disregard of information that might indicate differing conclusions – thus may affect how an individual perceives the behavior of others and thereby confirms the initial expectations he or she possessed. By focusing individuals' attention on the various examples of sustainability-related changes in behavior that many people are adopting and clarifying how it should be interpreted, it may be possible to modify the expectations that individuals hold about others.

The fourth and perhaps most disappointing trend in the results is the gap between individuals' beliefs and their actual behavior. People support sustainable companies and think that all companies should adopt sustainable practices, yet they are less likely to make a conscious effort to buy from such companies. Likewise, people do not match the apparent importance of recycling or using reusable bags with the related behavioral change. Solutions to address these findings should address removing barriers associated with the beneficial behavior and increasing the barriers associated with the detrimental behavior.

For example, there are several methods that would likely increase recycling rates. First and foremost, there should be more recycling bins available in public places than at present and in theory there should be more recycling bins overall than trashcans. Second, on side-by-side trash and recycling receptacles, placing a lid or covering of some sort on trashcans but no such covering on recycling bins would make it easier to put disposable items into recycling bins than trashcans. Moreover, perhaps something as simple as placing a trashcan behind recycling bins (arranged perpendicular to a wall) rather than side-by-side (arranged parallel to a wall) would increase recycling by requiring more effort to physically reach the trashcan.

In addition, there are ways to reduce disposable bag usage and to increase the use of reusable bags. First, and the most obvious solution of them all, is an outright ban of disposable bags. This, however, is not popular. A close second-best, as well as more popular, option is for stores and restaurants to charge a small fee for their disposable bags. If a store or restaurant does not want to go so far as charging customers for a disposable bag, a very simple solution is to change the disposable bag 'default'. Instead of automatically giving customers a product in a bag or asking customers if they would like a bag, no disposable bag should be given or offered to customers unless the customers requests one. In addition, merely giving customers that request a disposable bag a stamp with a frowning face may also be sufficient to invoke

behavioral change.

Fifth, the section in the survey of much interest – the *Companies* section – delivered interesting findings. Individuals are equally (and very) likely to find companies as both the source and the solution to many environmental problems. It is thus not only seen as a duty and necessity of companies to adopt sustainable practices, but more importantly it is expected of them. In order to meet the expectations of customers, companies therefore need to adopt the changes that will lead them to reduce their impact on the environment. Arguments against sustainable practices may not be in a company's best interest, as individuals largely disagree with the notion that sustainable practices are illogical or impractical. Marketing for companies should focus on the environmental efforts that the company has achieved – though be careful not to overstate the accomplishments – and strive to inform consumers about the environmental benefits associated with the production and delivery of the company's products versus its competitors.

For companies that have already made accomplishments in adopting sustainable business practices and those that will soon be utilizing such practices, there are clear opportunities at present for developing a competitive advantage. First, these companies should support the development of eco-labels – particularly in the form of *color cue feedback* – either within the company, within the industry, or at the policymaking level. The reason for this is that color cue feedback appears to increase the expectation for companies to adopt sustainable practices. Color cue feedback also appears to increase how much individuals expect others to buy from sustainable companies. Thus, a color cue feedback label may lead to increases in consumer expectations (and demands) for certain sustainability criteria that a sustainable company already meets and its competitors do not. Additionally, the color cue feedback label may increase the amount of sustainable products people buy and therefore the products that are made by sustainable companies.

It is a prime moment for taking a first-mover advantage in this emerging sustainability space in order to be known as the market leader in sustainability before competitors adopt similar practices. Consumers are beginning to demand sustainability as a component of products that they buy and this trend should continue to grow in the future. It will most likely reach similar importance (or will be seen as equivalent) to product quality and product safety. Similar to the advantage Japanese carmakers – particularly Toyota – gained after capturing the automobile market due to their reputation for quality and safety, the race is now on for determining who will be the winners in sustainability. Those that win this race will not only reap the benefits of being a market leader but will also serve as the example others will aspire to model.

Relation to Affiliated Research

Behavioral research suggests "a more complex, less idealized, view" about how people make decisions than the focus on information and price derived from traditional economic models of rational choice (Allcott 1204). Individual decision-making is affected by, though not limited to, peripheral (subconscious) factors, procrastination, default options, wandering attention, and lack of commitment. Actions with clear long-term benefits are resisted "if they are unpleasant in the short-run" (Allcott 1204). Moreover, small changes in context – nudges – "can affect behavior as much large price changes" (Allcott 1204).

The results of the experiment on sustainable behavior inducement – similar to other research on the impact of "social approval, consumption feedback, goal setting, commitments, and other mechanisms" on decision-making – point to the potential role of non-price-based behavioral interventions (Allcott 1204). Such interventions may be less expensive to establish than regulatory-, price-, or technology-based interventions.

Similarly, interventions that utilize the power of social norms may also be effective. Beliefs about what other people do, as has been stated, play a major role in determining an individual's behavior. By demonstrating to individuals the sustainable behavior that other people engage in, coupled with the injunctive normative beliefs (approval) of that behavior, more people would adopt sustainable behavior. In other words, believing that other people engage "in a highly approved behavior therefore increases the likelihood of engaging in that behavior" (Göckeritz 520). Providing (normative) information about what other people do may alleviate the consistent finding about social dilemmas "that individuals are less likely to cooperate and act in ways that benefit the group (typically requiring self sacrifice) in the absence of evidence that others in the group are also cooperating" and thereby foster more cooperative, sustainable behavior (Göckeritz 521).

Norms can be successfully utilized to induce sustainable behavior. For example, Arizona's Petrified Forest National Park found itself in a situation in which about one ton of wood per month was stolen from the park. By changing the sign encouraging visitors to not steal wood from focusing on the descriptive norm (what is being done in a given situation) to the injunctive norm (what is approved or disapproved of in a given situation), theft rates were decreased from 7.92% to 1.67% (Cialdini 107). In other words, posting signs stating the disapproval of theft in the park instead of signs that describe how many people steal wood from the park sharply reduces the undesirable behavior. Thus, when an environmental problem stems from the pervasiveness in which individuals contribute to that problem, information should focus on what is approved or disapproved of rather than on how many people contribute to the problem. Injunctive norms have been, in fact, found to be "the most widely applicable in their ability to encourage specific

behaviors across a variety of situations and target populations" (Bator 536).

Commitment devices may help bridge the gap between the intention that individuals have to engage in sustainable behavior and the importance they place on this behavior. It has been found that commitment "is the catalyst that drives individuals to experience an internal conviction for both a new identity and the corresponding behavior" (Bator 537). Once an individual internalizes the related conviction, the associated "identity and behavior can continue even beyond the duration of commitment" (Bator 537). Commitment devices can range from small household signs or car bumper stickers declaring support for an issue, to wearing t-shirts with an issue-based message, to signing a non-binding agreement to join a cause.

Conclusion

Noteworthy Findings

There were five main findings associated with this study. These findings summarize the results found within the eight sections of the survey. First, information availability in general appears to increase sustainable decision-making. Moreover, the hypothesis that color cue feedback is the most effective in its ability to invoke sustainable choices was generally, though not conclusively, confirmed. This leads us to the next point. Second, the form of information availability should rely on the type of decision involved with the related situation. Color cues (moral suasion) may be preferable for quick decisions and detailed information (information provision) may be preferable for decisions that take more time to develop. Third, the presence of undesirable social norms regarding sustainable behavior was supported by the data. Individuals believe they are more likely than others to aspire to and actually engage in sustainable behavior; they expect others to adopt sustainable behavior but do not think other people expect the same of them. Individuals want to use reusable bags, support sustainable energy and land use policy, make 'greener' purchases, recycle, use fewer toxic chemicals, and support sustainable companies but expect that others hold different views. This has implications in determining whether or not people actually adopt sustainable behavior. Thus, the desirable (sustainable) behavior is most often not adopted. Fourth, there is a gap between an individual's aims and his or her actual behavior. An individual may aspire to and find value in sustainable practices, but is less likely to actually engage in this behavior when the opportunity to do so is presented. Lastly, companies are believed to be both a major source and solution to environmental problems. It is seen as a necessity and an expectation for companies to adopt sustainable practices. Arguments against sustainability made by companies will work against a company's favor. Furthermore, making information available, particularly as color cue feedback, is in the best interest of companies that are already or will

soon be utilizing sustainable practices to gain a competitive advantage now.

Since there are various costs (barriers) associated with adopting sustainable practices and likewise a lack of barriers associated with preventing unsustainable behavior, there is little to no perceived reason for individuals to change their habits. Solutions for inducing sustainable behavior must, in order to be successful, remove barriers (or costs) for sustainable – desirable – behavior and increase barriers (or costs) for unsustainable – undesirable – behavior. There are various ways in which these *barriers* might be formulated, including a mix of economic, social, and/or cognitive components. Solutions must – however they are formulated – focus on how to foster desirable behavior and inhibit undesirable behavior. Otherwise it will remain too easy to avoid changing habits.

Moving Forward

It is necessary to describe the limitations of the findings in this study. The results – while interesting and some of which achieved statistical significance – are based on survey data. It is possible that the results of the survey offer an accurate portrayal of the effects of information on decision-making, but it cannot be confirmed unless it is examined in a real-world setting. An opportunity is therefore present for expanding this area of research by examining the effects of information availability – in both forms – with field experiments. Such experiments may indicate that information has a smaller (or possibly a shorter-term) effect on decision-making than the survey results would imply. On the other hand, it may be that field experiments would illustrate the contrary, that information availability – in one form or the other – has a larger impact on decision-making than this survey indicates.

The feasibility of a field experiment to address the effectiveness of information availability may, however, be impractical. It would require acquiring all of the necessary information, publishing it, putting it on display, and educating consumers about the information's meaning. A field experiment would thus call for the same amount of time and effort it would take to actually publish the 'real' information. Survey data may therefore be the most practical method for determining if environmentally-related information availability would induce sustainable behavior.

Based on the results of this study, it is recommended that information be made available for individuals with the aim of encouraging more sustainable decision-making. The form of the information given should depend on the type of decision it involves: situations that involve quick decisions should utilize color cue feedback (moral suasion), while those that involve decisions that take more time to develop should provide more detailed information (information provision). If sustainable habits are to be developed and if sustainability-related norms are to be formulated,

then environmentally-related information must become available because without information in any form, such changes will not be possible.

The data from the study suggests that while information availability will affect decision-making, it must also be accompanied with supportive policies or campaigns that simultaneously reduce barriers for sustainable behavior and increase the barriers for unsustainable behavior. These supportive policies or campaigns would help bridge the gap between beliefs about the importance of sustainable behavior and the actualization of behavioral change. To achieve this aim, they could take advantage of economic, social, and/or cognitive components in order to create the incentives, peer pressure, nudges, commitment devices, and the like that will further compel behavioral change. For example, an information campaign could take advantage of insight from research on the impact of expectations in shaping social norms. Even better, more accurate pricing (by including environmental costs) could be established.

Besides the need for supportive policies or campaigns, information availability has hurdles of its own before it can be provided for the general public. There currently exists and will most likely continue to be resistance by various entities to prevent environmentally-related information from becoming available. This will make information provision difficult to offer in reality and is largely related to how information will reveal the shortcomings and detrimental impact of not only companies but also the decisions people make every day.

Furthermore, information availability alone will be insufficient to solve environmental problems; changes in technology, investments, and other policy will also need to change. But without information and the potential changes in habits, viewpoints, and norms it could reap, a culture of sustainability – and the beneficial related changes in demand for certain technology, investments, and policy – will be less likely to emerge. Information availability, in one form or another, is thereby one of the prerequisites for sustainability. It will be a major contributor to the foundation on which a sustainable society can be built.

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