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# Default Effects in the Endorsement of Environmental Policies

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**DEFAULT EFFECTS IN THE ENDORSEMENT OF  
ENVIRONMENTAL POLICIES**

by

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A Thesis Submitted to the Faculty of  
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## **ABSTRACT**

### **DEFAULT EFFECTS IN THE ENDORSEMENT OF ENVIRONMENTAL POLICIES**

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When making decisions, people are often presented with a default option. Across many different domains, individuals show an inflated preference for the default option, a phenomenon known as the default effect. The current research examined the default effect and the role of loss aversion and implied endorsement in the context of environmental policy. Two hundred nineteen undergraduate participants were asked to vote on an ostensible ballot question regarding the enactment of seven environmental policies. Participants were randomly assigned to one of three conditions based on a manipulation of the default option: a default to enact the policy (the opt-out condition), a default to not enact the policy (the opt-in condition), and a forced-choice control condition. The current study found default effects to be present for three of the seven policies. Of these three policies, participants in the opt-out default condition endorsed the policy more often than participants in the opt-in or forced-choice condition. This pattern of results supports the endowment effect (i.e., an extension of loss aversion) as an explanation of default effects, but an explicit measure of loss aversion did not. Perceptions of policymaker endorsement did not differ across default conditions and political affiliation did not predict voting behavior.

**This thesis is dedicated to my parents, James and Marian Bent, and my brother Kyle.**

## **ACKNOWLEDGMENTS**

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## CHAPTER I

### INTRODUCTION

Climate change and sustainability are growing concerns in the United States and around the world. Experts have estimated that the current rate of climate change could have devastating effects. Unique ecosystems are being threatened, extreme weather events are becoming increasingly likely, and millions of people could be affected by coastal flooding, diminished water supply, and adverse health consequences (Smith et al., 2009). As a result, many government entities are enacting policies that push its citizens to “go green.” According to the Environmental Protection Agency (EPA), environmental policy at the state or local level (hereafter labeled *green policy*) has the ability to reduce greenhouse gas emissions, increase energy security, reduce air pollution, aid economic development, and improve overall quality of life (US EPA, 2012).

The benefits of green policy, as outlined by the EPA, do not come without costs. As with many government-run programs, the expense of environmental protection and conservation are covered by the taxpayer. Funding government-sponsored environmental initiatives without cutting other programs requires an increase in taxes. Future savings are possible, but not without an initial increase in cost. For example, in 2007 the United States government passed the Energy Independence and Security Act which raised the efficiency requirements of light bulbs. Many consumers opted to buy compact fluorescent lights (CFLs) which have a higher price tag than the traditional incandescent bulbs. The extended lifespan and increased efficiency of CFLs produce savings over

time; however, these benefits are still subject to an initial cost (US EPA, 2011). In sum, the passing of any green policy is subject to an analysis of costs and benefits.

Contrary to theories in economics which state that decisions are based on rigid analysis of costs and benefits (such as theories by Leonard Savage as cited in Kahneman & Tversky, 1979), recent evidence from psychology suggests that a variety of situational contexts are capable of influencing an individual's preferences and decisions (for a review see Lichtenstein & Slovic, 2006). For example, Tversky and Kahneman (1981) demonstrated that a preference for a pair of medical treatments with identical outcomes hinged critically on whether the outcomes were worded in terms of lives saved or lives lost. In their study of a hypothetical foreign disease that infected 600 people, two groups of participants were given the following scenarios:

Group 1: Treatment A guarantees that 200 people will be saved. Treatment B has a 1/3 probability of saving 600 people and a 2/3 probability of saving no one.

Group 2: Treatment C guarantees that 400 people will die. Treatment D has a 1/3 probability that nobody will die and a 2/3 probability that 600 people will die.

Treatments A and C, as well as B and D, have equivalent outcomes. However, participants in group 1 favored treatment A, while participants in group 2 favored treatment D (Tversky & Kahneman, 1981). Expected utility theory, which is based only on costs, benefits, and probabilities, was not able to account for reversal of preferences (Kahneman & Tversky, 1979). Tversky and Kahneman's experiment is just one of many

examples of how decisions are influenced by more than a mathematical cost-benefit analysis (for other examples see Thaler & Sunstein, 2008).

Evidence from the field of neuroscience also supports the view that individuals do not make decisions solely based on hard and fast calculations. For example, in a review of the moral judgment literature, Greene and Haidt (2002) found that moral decisions are largely driven by emotions. Additionally, emotional centers of the brain can impact decision making, even when these decisions are largely economic in nature. Damasio (1996) suggested that emotional events (somatic markers) work in concert with explicit cognition to inform decision making. This hypothesis still drives many of the theories about the roles of emotions in decision making (Reimann & Bechara, 2010).

Understanding how humans construct their preferences and make decisions can significantly alter the future of the environment. According to a recent report by the California Council on Science and Technology (2011), by 2050 California could achieve emissions rates that are 60 percent below the levels from 1990 by using technology that is currently available. Although this estimate is unique to California, technological innovations are not sufficient for changing the environment. Human decision making is ultimately responsible for implementation of these innovations. The current study examined how one aspect of constructed preferences, default effects, impacted endorsement of environmental policies.

## **CHAPTER II**

### **EXPLANATIONS OF DEFAULT EFFECTS**

#### **STATUS QUO BIAS**

Individuals have been shown to have an inflated preference for the status quo (Anderson, 2003). Under certain circumstances a preference for the status quo is beneficial. For example, an individual may genuinely prefer the status quo or deviations from the status quo may require high transaction costs (Anderson, 2003). In these cases, a preference for the status quo is a perfectly rational behavior. However, individuals often select the status quo even when this is a suboptimal decision (Samuelson & Zeckhauser, 1988). For example, Samuelson and Zeckhauser (1988) studied the health plans of Harvard professors in the 1980s. The professors were able to switch healthcare plans yearly at minimal cost. An overwhelming number of professors, however, continued with the same plan year after year. This alone does not necessarily reflect a bias, but the authors compared the choices of long-term enrollees to the selections made by new enrollees. New enrollees are presumably free from a status quo bias having not previously selected a plan. Therefore, the new enrollees served as a control group to gauge an objective level of preference from year to year. In the early portion of the decade, Blue Cross Blue Shield was heavily favored by the majority of professors. However, as the years progressed and other plans were added, the balance began to shift towards different healthcare plans. The change in selection resulted mostly from new enrollees; current professors rarely switched to new plans. Assuming that the new enrollees provided an objective evaluation of the healthcare plans, and after controlling

for the age of the participants, a status quo bias still persisted in the face of suboptimal choices (Samuelson & Zeckhauser, 1988).

### **DEFAULT EFFECTS AND THE OMISSION BIAS**

When individuals are presented with a set of choices, the decision maker commonly has the option to take no action. In many non-trivial decisions, individuals prefer to take no action. This effect has been labeled an omission bias (Spranca, Minsk, & Baron, 1991). Spranca, Minsk, and Baron (1991) found that omissions were viewed as more morally justifiable compared to commissions (actions). Initially, the status quo bias and omission bias were thought to be confounded (Ritov & Baron, 1992), and in many cases these biases do act in conjunction with one another; taking no action (i.e., the omission bias) will lead to no change in the current state of affairs (i.e., the status quo). However, these biases have been shown to be distinct from one another (Schweitzer, 1994). For example, if changes are imminent then taking no action will lead to a new state (i.e., deviation from the status quo).

A preference for no action, often coupled with a preference for the status quo, leads many individuals to select the default option. The default is the option that an individual will receive if he or she does not explicitly state otherwise. Defaults have been shown to have significant impacts on preferences. For example, Johnson, Bellman, and Lohse (2002) included a check box at the end of an online survey asking participants if they could be contacted about future surveys. The default of the check box varied. In one condition, participants had to check the box if they wished to be contacted in the future; if they did nothing then they would not be contacted. In the second condition, participants had to check the box if they did not want to be contacted in the future; if they

did nothing then they would be contacted. The researchers found the level of future participants was largely dependent upon the default option. More participants were contacted for future surveys in the second condition where they had to check the box in order to not be contacted (Johnson et al., 2002). Psychologists refer to this pattern of decisions as a default effect.

The selection of the default can have a very meaningful impact. Johnson and Goldstein (2003) examined the effect of defaults on organ donation both in the United States and Europe. In the United States, a large discrepancy was observed between the approval rating of organ donation and the actual percentage of Americans who are organ donors. The authors hypothesized that this difference was due to the fact that in the United States donors must explicitly indicate their desire to be organ donors. That is, the default for organ donation is to not be a donor. In an experiment manipulating the default, rates of organ donation were significantly higher when participants had to opt out of the organ donation program compared to a condition that had participants opt into the program (Johnson & Goldstein, 2003). A comparison of actual organ donation rates in European countries indicated that countries with opt-out policies had significantly higher rates of organ donation than countries with opt-in policies. The discrepancy found in the real world data was even stronger than the discrepancy in the experimental manipulation (Johnson & Goldstein, 2003).

Default effects also become evident when decision makers are allowed to make multiple selections. For example, Park, Jun, and MacInnis (2000) instructed participants to imagine the purchase of an automobile and indicate which options they would include. In this study, the decisions took two forms. Half of the participants were presented with a

fully loaded car and asked to eliminate the options that they did not prefer. Alternatively, other participants were initially presented with a base model and asked to indicate the options that they preferred to add on. The default in the first scenario was to include every option, while the default in the second scenario was to not include any additional options. Participants in the fully-loaded default condition consistently preferred more options and paid more money than those in the base model condition (Park et al., 2000).

The effects of defaults in multi-selection decision scenarios extend beyond automobile purchases. These effects were observed with other consumer items such as computers, treadmills (Park et al., 2000), and pizza (Levin, Schreiber, Lauriola, & Gaeth, 2002). Additionally, a group of geriatric patients opted for more end-of-life treatments when instructed to indicate the treatments they wanted withheld rather than the treatments they wanted to be provided (Kressel, Chapman, & Leventhal, 2007).

These results suggest that default effects may have serious implications on how the public will vote on environmental policies. Advocates, opposition groups, and policymakers need to be aware of these consequences when selecting defaults. When it comes to green policy, defaults have the ability to promote or inhibit environmentally friendly action. Policymakers can use this information to advance or prevent the adoption of green policy based on how they construct the available options—a process Thaler and Sunstein (2008) refer to as “libertarian paternalism.”

Two notable studies have demonstrated the ability of defaults to impact eco-friendly action. Pichert and Katsikopoulos (2008) found that the preference for green energy (e.g., solar, wind, hydro, etc.) over “grey” energy (i.e., coal powered) was associated with green default options. Data from energy companies in two German cities

indicated that citizens generally opted for the default green energy when other options became available. In one instance the default effect persisted in a city where citizens had recently displayed opposition to green energy. In the other natural experiment, citizens refused to switch energy options, even when alternatives were cheaper and no switching costs would be incurred. Pichert and Katsikopoulos (2008) also found default effects in two lab studies which compared green and grey defaults. Preferences for green energy were consistently higher when green energy, as opposed to grey energy, was the default.

Similarly, an experiment by Dinner, Johnson, Goldstein, and Liu (2011) found that a preference for incandescent light bulbs or CFLs is largely influenced by the default option. Participants were given a backstory about renovations to their home. The critical manipulation was that the contractor had either installed incandescent bulbs or CFLs in the home. Participants were asked if they wished for the contractor to replace the bulbs free of charge. When CFLs were the default option (i.e., already installed) compared to an incandescent bulb default, participants were more likely to choose CFLs.

In order to more fully understand the default effects on green policy, it is necessary to examine the factors contributing to these effects. Of the many factors identified (Dinner et al., 2011), effort, implied endorsement, and reference dependence have received the most attention.

## **EFFORT**

The effort explanation proposes that taking no action requires less cognitive or physical energy than taking action (Johnson & Goldstein, 2003). Deciding on an option other than the default may involve a series of taxing calculations or taking physical action



such as filling out a form or making a phone call. The disproportionate selection of the default presumably stems from the fact that default choices are simply easier.

Johnson and Goldstein (2003), who examined the rates of organ donation cited above, hypothesized that effort contributed to the disparity between their experimental and observational results. Default effects were present in both cases, but the real-world data (i.e. the results of the observational study) showed a stronger divide between organ donation rates in opt-in vs. opt-out countries. The physical effort required in the experiment was simply to click a computer mouse. However, to actually change your organ donation preference in the real world requires filling out paperwork and sending mail.

### **IMPLIED ENDORSEMENT**

Implied endorsement posits that decision makers infer that the default condition was selected because of its greater value, and that those who set the default are recommending this option. The default effect occurs because decision makers rely on this recommendation when making a choice. Implied endorsement is thought to be especially important in socially charged decisions (McKenzie, Liersch, & Finkelstein, 2006).

McKenzie, Liersch, and Finkelstein (2006) systematically examined the implied endorsement hypothesis in a series of experiments. In Experiment 1, the authors instructed participants to act as state officials and select a default policy for organ donation. Participants chose between two policies where the default was either being an organ donor or not being an organ donor. The resulting policy selections were found to be related to the participants' willingness to be an organ donor as well as their general

attitudes towards organ donation. Those who indicated that they were willing to be an organ donor were significantly more likely to set organ donation as the default policy than those who indicated that they were not willing to be an organ donor. Additionally, participants who thought that other people ought to be organ donors were more likely to set organ donation as the default policy compared to participants who thought other people should not be organ donors (McKenzie et al., 2006).

Experiment 2 examined what participants inferred about policymakers based on the default organ donation policy. Participants were more likely to infer that policymakers were willing to be organ donors when the default policy was “organ donor” compared to “not an organ donor.” Also, those in the “organ donor” default condition were more likely to infer that policymakers believed other people ought to be organ donors compared to those in the “not a donor” default condition. (McKenzie et al., 2006). Together, these studies indicate that policymakers’ preferences may their selection of a default (Experiment 1) and that other people actively make inferences about these preferences (Experiment 2).

Additional evidence has come from consumer research. Brown and Krishna (2004) presented participants with products that came with three customizable categories, e.g., a computer with different available keyboards, monitors, and hard drives. Each product category had two options, high quality and high price versus low quality and low price. The experimenters manipulated which of these options was set as the default (high or low) as well as the amount of information that the participants received about the seller. In the limited information condition, participants were provided with a simple description of the retailer. In addition to the retailer description, participants in the

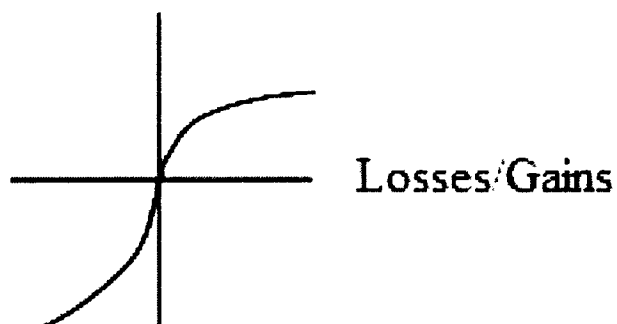
enhanced information condition read a paragraph indicating that the seller was a reputable organization yet was in jeopardy of going out of business.

Compared to a forced-choice control condition (participants chose a product option but no default was identified) participants in the high default condition chose the more expensive option more often. However, in the enhanced information condition, this effect was not present. The researchers reasoned that the default option influenced choices by providing information about the marketer. Specifically, when the retailer was threatened with going out of business, the consumers were motivated to generate reasons why the marketer might be setting the default as the more expensive option (Brown & Krishna, 2004). There is no explicit evidence that the participants in the limited information condition used the default option as an unbiased recommendation. However, the results in the enhanced information condition do indicate that defaults have the ability to carry information about those who set them.

## **REFERENCE DEPENDENCE**

The reference dependence explanation of default effects draws from prospect theory, which hinges on the notion that gains and losses are not viewed in absolute terms, but rather as deviations from a reference point. Additionally, the value function for gains and losses are not equivalent (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). As can be seen from Figure 1, the value function for losses is steeper than it is for gains. This discrepancy is due to a human tendency towards loss aversion: people see more negativity in a loss of  $x$  value than they see positivity in a gain of  $x$  value. Initial evidence for this phenomenon came from an examination of individuals' preferences in a

## Subjective value



*Figure 1.* A theoretical value function according to prospect theory.

series of gambles. Decision makers consistently opted to take risks to avoid a loss, but were unwilling to take equivalent risks to enhance a gain (Kahneman & Tversky, 1979).

Loss aversion explains default effects by assuming the default to be the reference point. Any option other than the default is evaluated in terms of losses or gains.

Deviations from the default can have both positive and negative effects, but because losses are weighted more heavily than gains, the positive deviations are generally voided by negative deviations. A related line of research on consumer behavior has suggested an endowment effect (Thaler, 1980) that refers to an imbalance between money that people are willing to pay (WTP) for a product and the amount that people are willing to accept (WTA) to sell a product ( $WTA > WTP$ ). For example, in an experiment by Knetsch (1989), participants were initially given two candy bars or two dollars. Participants endowed with the candy bars were asked the minimum dollar amount they would accept to sell their candy. Likewise, participants endowed with the money were asked how much money they were willing to pay for the candy bars. The average value given to the

candy bars by those endowed with them was much higher ( $M = \$1.38$ ) than those endowed with money ( $M = \$0.90$ ). Similar to default effects, loss aversion is able to explain this preference for an initial endowment. The thought of giving up an item drives up its perceived value (Kahneman, Knetsch, & Thaler, 1991).

An extension of these ideas is that people generally focus on what they are giving up. In the context of purchasing tickets to a basketball game, Carmon and Ariely (2000) showed that sellers generally assessed value based on what they would be surrendering by selling the ticket (e.g., the importance of the game). Conversely, buyers traditionally are surrendering money in a transaction, so their focus was based on monetary concerns. Not only did the two groups display dissimilar attitudes towards value assessment, but manipulating aspects of the transaction affected the two groups differently. Changes in monetary conditions (e.g., the sticker price of a ticket) had stronger effects on buyers than sellers; changes in items conditions (e.g., the atmosphere of the crowd at the game) had a stronger effect on sellers than buyers.

Reference dependence and its byproducts of loss aversion and the endowment effect have been displayed in previous research on green defaults. Dinner et al. (2011) found that reference dependence was a key contributor to the selection of incandescent bulbs or CFLs. Furthermore, Pichert and Katsikopoulos (2008) found that participants required much more money to give up green energy than participants were willing to pay for green energy. This willingness to pay/willingness to accept discrepancy supports the endowment effect. However, when asked to explicitly state the reasons for their decisions (e.g., cost, environmental impact, etc.), no differences were found between conditions.

Each of the preceding mechanisms (effort, implied endorsement, and reference dependence) is capable of producing default effects and there is no evidence to suggest that they are mutually exclusive. The default option may require less effort, be perceived as highly recommended, and focus individuals on losses rather than gains. The more likely scenario, however, is that some of these mechanisms are more prevalent than others depending on the context. In order to understand how default effects operate in the evaluation of green policy, the impact of each of these mechanisms must be measured.

The current study looked at default effects in green policy, the nature of how they operate, and their impact on potential voters' preferences. Past research has studied the effect of defaults on environmentally friendly behavior (Dinner et al., 2011; Pichert & Katsikopoulos, 2008), but the current study adds to the current literature in three ways. First, this experiment is not based on tangible and immediate outcomes, but instead on policies with future impact. For example, rather than investigating how a house's current light bulb affects a preference for incandescent or CFL bulbs (Dinner et al., 2011), the current study examined how defaults potentially impact the preference for a light bulb efficiency mandate. Additionally, past research has often been limited to dichotomous choices (e.g., incandescent vs. CFL), but the current study measured the default effects in multi-faceted decisions (i.e., the decision makers are able to make multiple selections). This form of default research has been limited to the domain of consumer behavior (Levin et al., 2002; Park et al., 2000), but the current study extends the multi-choice paradigm to environmental decision making. Finally, the current study explored the impact of environmental loss versus monetary loss to see which of these factors has a larger influence on the preferences for green policies.

### CHAPTER III

### PREDICTIONS

The current study asked participants to indicate their preferences for a series of green policies and their associated costs. The critical manipulation is the nature of the default. In one condition, the participants were presented with an array of policies and asked to indicate which programs they want to be enacted (the *opt-in* condition). Participants in the other condition were presented with the same set of policies but told to indicate which policies they do not wish to be enacted (the *opt-out* condition). A control condition did not have a default. Participants in the control condition were asked to indicate their preference to either enact or eliminate each presented policy (forced-choice).

These differences in defaults are predicted to lead to differential preferences in the number of endorsed green policies. Specifically, participants in the opt-out condition are willing to endorse more policies (and thus spend more of their tax dollars) than participants in the opt-in condition. Reference dependence is expected to be the key contributor to this explanation. Because of the nature of the task, physical effort, as described by Johnson and Goldstein (2003), was not measured. The current experiment does not offer a meaningful comparison group, so measuring effort would not lead to any substantial conclusions. Implied endorsement (McKenzie et al., 2006) is expected to differ across conditions. Policymakers in the opt-out condition will be seen as favoring green policies more than those in the opt-in condition. This difference is expected to be small, however, because in both conditions the policymakers are presenting voters with

green initiatives. In other words, even though the opt-in condition has a default of no action, legislators would have to be involved for the policies to make it to a ballot. Therefore, differences in implied endorsement are expected to explain minimal amounts of variance in the number of preferred green policies.

For reference dependence to adequately explain default effects in green policy, participants must be focused on the losses in each condition. According to Carmon and Ariely (2000), loss aversion leads to a “focus on the forgone.” The forgone aspect in the opt-out condition is environmental benefits while the forgone in the opt-in condition is money. Therefore, the loss of environmental benefits should have a greater influence on participants in the opt-out condition compared to the opt-in condition. Alternatively, those in the opt-in condition are predicted to be more influenced by monetary losses than those in the opt-out condition. In sum, the proposed study makes the following predictions:

H<sub>1</sub>: Participants in the opt-out condition will vote for more environmental programs, and thus be willing to spend more in taxes, than participants in the opt-in condition.

H<sub>2</sub>: Participants in the opt-out condition will perceive the policy makers as more strongly endorsing green initiatives than participants in the opt-in condition.

H<sub>3</sub>: Participants in the opt-out condition will report a stronger influence of environmental effects on their decisions compared to participants in the opt-in condition. Participants in the opt-in condition report a stronger influence of the monetary cost on their decisions compared to participants in the opt-out condition.



H<sub>4</sub>: The effects of loss aversion, as measured by the reported influence of monetary and environmental concern, will explain more variance among conditions than implied endorsement.

Each of these hypotheses comes with a caveat. In matters of green policy, one important factor that cannot be overlooked is political affiliation. Although default effects have been found to be robust across multiple experimental and observational areas, the effects can be diminished when the decision maker has particularly strong emotions towards the domain (Samuelson & Zeckhauser, 1988). Previous research found that Democrats are more willing than Republicans to support green policy (Aldy, Kotchen, & Leiserowitz, 2012; O'Connor, Bord, Yarnal, & Wiefek, 2002). Additionally, Republicans and Independents have been shown to be less willing to support green policy when the expenditures are labeled as “taxes” (the methodology used for the current study) as opposed to “offset” (Hardisty, Johnson, & Weber, 2010). Due to these findings, political party affiliation is expected to interact with the default effects. Participants were asked to identify their affiliation in order to examine a possible interaction.

## CHAPTER IV

### METHOD

#### PARTICIPANTS

The final sample consisted of 219 undergraduate students (58.40% female) who completed the experimental task in exchange for research credit. All eligible students also had the opportunity to complete similar tasks for equivalent credit. Each participant was issued a unique identification number by the Department of Psychology in order to administer research credit. These numbers were recorded by the experimenter but were not linked to individual data. Because responses remained anonymous, a review committee in the College of Sciences classified the study as exempt. The mean age of participants was 20.68 years ( $SD = 5.04$ ); ten participants did not report their age. Among all participants, 94 were Democrats, 51 were Republican, and 74 did not affiliate with either party. Participants' responses remained anonymous although

#### MEASURES

**Implied endorsement.** Implied endorsement was measured with an item adapted from McKenzie et al. (2006). Participants indicated their level of agreement using a 7 point scale from -3 (*completely disagree*) to 3 (*completely agree*) with the following statement: I voted for the policies that I did because I felt like the policymakers wanted me to select these options. In previous studies this item was able to detect significant differences in implied endorsement across default conditions (McKenzie et al., 2006; Dinner et al., 2011)

**Reference dependence.** In order to assess reference dependence, the current study employed methods consistent with the account of loss aversion endorsed by Carmon and Ariely (2000). Participants were asked to indicate how much their responses were driven by both monetary and environmental concerns. Specifically, participants were asked how much of their decision was influenced by the environmental benefits of the policy and the cost of the policy. Participants indicated their responses by dragging sliders on scales from 0 to 100 to indicate the influence of the environmental benefits and costs independently.

**Political affiliation.** The measure of political affiliation followed from Hardisty et al. (2009) by asking participants to indicate if they identify as *Democrat*, *Republican*, or *none of the above*.

**Ballot question.** Preferences for green policy were assessed by participants' "votes" on an ostensible Virginia state ballot questionnaire. The questionnaire contained a series of environmental policies and their associated annual costs to the citizens. Participants were instructed to check a box if they were in favor of passing the policy. Three versions of the questionnaire were presented which represented three levels of the primary independent variable (i.e., opt-in, opt-out, and forced-choice). One group of participants saw an empty checkbox next to the policy. Another group saw the checkbox already checked. Finally, the control group was presented with a forced-choice ballot. That is, these participants were instructed to indicate a yes or a no for each policy.

The Virginia state ballot questionnaire was developed through an online search for environmental policies that are either implemented or under consideration in municipalities across the United States. This search generated a list of seven potential

environmental policies. In many cases, policies included actual or estimated costs to taxpayers. For some policies, a “ballpark” cost was generated by the investigator using per capita cost estimates. For example, the cost of eco-fees was estimated by dividing the revenue from eco-fees in British Columbia (where the program is already in place) by the population of the province. These policies were then examined by members of a local environmental protection organization. The members of the environmental protection organization independently rated each policy across a number of categories in order to validate the measurement instrument. Categories included the following: the policy addresses a real environmental issue; the policy could be implemented by a state or local government; the policy would have a positive environmental impact; the cost is a reasonable “ballpark” estimate; implementation of the policy will result in an increased cost. The subject matter experts showed high levels of agreement in nearly every category for each proposed policy (see Table 1 for complete results). Full descriptions of the policies and their associated costs, as shown to the participants, are listed in the Appendix.

Table 1  
*Mean Expert Ratings by Policy and Validation Criterion*

	Real Issue	Gov't	Positive Impact	Estimate	Cost
Recycling	4.50	4.17	4.33	3.33	4.17
Green Mileage	4.83	3.50	4.00	3.17	4.83
Lighting	4.33	3.17	3.50	3.50	4.17
Storm Water	5.00	4.83	5.00	3.50	4.50
Compost	4.33	4.17	4.17	2.83	4.33
Carbon Tax	4.50	3.50	3.67	3.33	4.67
Eco-Fees	4.33	2.83	3.33	3.33	4.67

*Note.* Categories: This policy addresses a real environmental issue; This policy would be proposed by a state or local government; This policy will have a positive environmental impact; The projected program costs stated in the policy represent a reasonable “ballpark” estimate; Implementation of the policy will result in an increased cost, either direct or indirect, to the voter. Ratings were done on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*).

## PROCEDURE

The experiment was conducted in a single computer-based session. Small groups of participants (< 15) independently completed the survey in a campus computer lab.

The measures outlined above were integrated into a single questionnaire using Qualtrics survey development software. The first page of the survey was a notification statement informing the participants of the general concept of the study and the rights of the participant. The next page asked for the demographic information of sex and age. After completing the demographic section, participants read instructions asking them to imagine that state legislators have placed seven environmental policies on a state ballot

question. Participants were told that: (1) each of the policies will result in increased taxes, (2) the estimated costs will be presented with each of the policies, and (3) policies will be enacted if more than half of total voters approve the policy. Participants were asked to vote as they would in a real situation.

Participants read the description of each policy and had to correctly answer two attention-check questions before proceeding to the vote. These questions assessed comprehension to assure that the participants had an understanding of the costs and benefits of each policy. Each description was paired with the voting procedure so participants voted on each policy and indicated the influence of monetary cost and environmental benefits before moving onto the next policy. The full policy description remained available to participants throughout the voting procedure.

After the voting procedure, participants were asked to complete the items assessing implied endorsement and political affiliation. Political affiliation was presented last so as to not influence the other measures by activating an ideological schema.

## CHAPTER V

### RESULTS

After data collection was complete, internal consistency of the ballot question was found to be below acceptable levels in each condition ( $\alpha < .495$ , average inter-item correlation  $< .110$ ). These reliability statistics indicated that votes on one policy were not related to votes on other policies and using a composite score of total endorsed policies was not appropriate. Therefore, each policy was analyzed independently using a logistic regression model. The alpha level for all significance tests was set to .05.

Individual completion times were recorded in order to estimate participants' adherence to the task instructions and to check for outliers. The total number of words in the entire instrument was calculated. Because some instructions were repeated, these words were not included in the word count. Carver (1992) reported that college students read at an approximate rate of 300 words per minute which translates into a minimum completion time of 15.5 minutes. Participants who completed the survey in less than 15.5 minutes were excluded from analysis. These 41 participants were reasoned to not have taken enough time to adequately comprehend the policies and survey instructions. Further evidence on reading rates suggests that reading on a computer is slower than reading on paper (Ziefle, 1998), but the 300 word per minute rate maintained a conservative approach to data cleaning. Of the remaining 227 participants, eight had completion times that were more than three standard deviations from the mean; therefore, 219 participants were included the final analysis.

Figure 2 displays the proportion of participants in each condition who voted for each policy. Logistic regression analysis was performed to test for default effects (see Table 2). Logistic regression models displayed significant  $X^2$  values for the green mileage, compost, and carbon tax policies. Default conditions were dummy-coded with the forced-choice condition as the reference group. Only the opt-out condition was significantly different from the forced-choice condition for both the green mileage and compost policies. No individual predictors were significant when analyzing the carbon tax policy. These results demonstrated that when a default effect is present the opt-out condition is driving the effect. The opt-in condition did not significantly change participants' preferences relative to the baseline forced-choice condition.

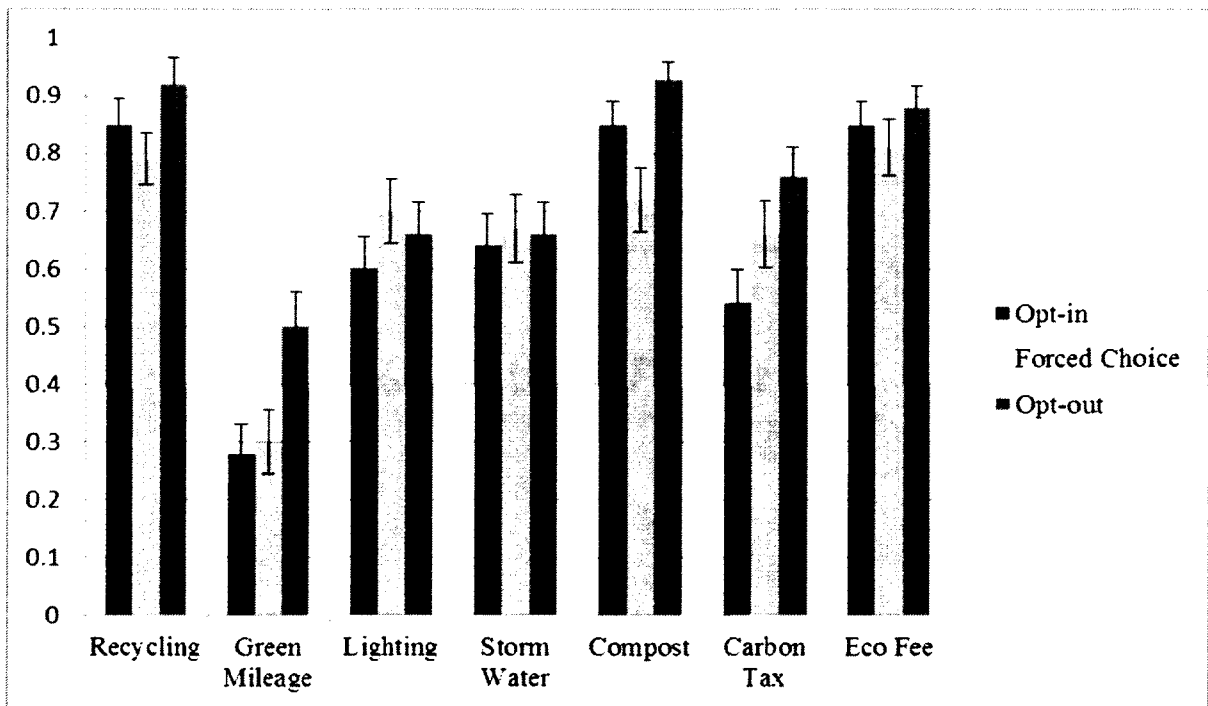


Figure 2. Proportion of respondents in each default condition who voted for each policy. Error bars represent  $\pm 1$  standard error.



Table 2  
*Logistic Regression Analysis*

Policy	X <sup>2</sup>	Wald	Odds Ratio	95% CI for Odds Ratio
Recycling	4.90			
Opt-out		1.58	1.99	[0.68, 5.81]
Opt-in		0.76	0.68	[0.29, 1.62]
Green Mileage	9.31*			
Opt-out		5.83*	2.35	[1.17, 4.70]
Opt-in		0.05	0.92	[0.45, 1.90]
Lighting	1.60			
Opt-out		0.25	0.83	[0.41, 1.70]
Opt-in		1.54	0.65	[0.32, 1.29]
Storm Water	0.16			
Opt-out		0.04	0.96	[0.48, 1.93]
Opt-in		0.15	0.87	[0.44, 1.74]
Compost	12.25**			
Opt-out		10.01**	5.46	[1.91, 15.64]
Opt-in		3.52	2.18	[0.97, 4.91]
Carbon Tax	8.05*			
Opt-out		1.69	0.19	[0.78, 3.38]
Opt-in		2.07	0.61	[0.31, 1.20]
Eco-Fee	1.40			
Opt-out		1.38	1.74	[0.69, 4.38]
Opt-in		0.41	0.52	[0.56, 3.14]

Note. \*  $p < .05$ ; \*\*  $p < .01$

All other predictors (i.e., importance of environmental and monetary considerations, implied policymaker endorsement and political affiliation) did not demonstrate their expected effects. A univariate analysis of variance (ANOVA) was employed to assess significant differences in the influence of cost and environmental benefits across conditions. For both analyses, the residuals approached normality. Levene's test indicated homogeneity of variance for both cost,  $F(2, 216) = 0.28, p = .755$ , and environmental benefit,  $F(2, 216) = 0.32, p = .728$ . No significant differences were

observed on the reported importance of environmental benefits,  $F(2, 216) = 0.04, p = .960, \eta^2 < .001$ , or cost,  $F(2, 216) = 1.88, p = .155, \eta^2 = .017$  (see Table 2).

Table 3  
*ANOVA Results for the Influence of Cost and Environmental Benefits*

	SS	df	MS	F
<i>Cost</i>				
Condition	56812.15	2	28406.07	1.88
Error	3264284.47	216	15112.43	
Total	3321096.61	218		
<i>Environment</i>				
Condition	1043.40	2	521.70	0.04
Error	2733945.92	216	12657.16	
Total	2734989.32	218		

Across all conditions, participants rated the environmental benefits as more influential than the monetary costs  $t(218) = 7.76, p < .001, d = .730$ . The environmental benefits were more influential for every policy except green mileage (see Table 4). Participants in each condition found the cost to be more influential when voting on the green mileage policy.

Table 4  
*Influence of Policy Costs and Environmental Benefits (0 – 100)*

Policy	Opt-in <i>M (SD)</i>	Forced Choice <i>M (SD)</i>	Opt-out <i>M (SD)</i>
Recycling			
Cost	51.6 (27.1)	48.1 (27.0)	52.8 (24.0)
Benefit	74.6 (21.6)	77.1 (19.2)	75.2 (20.8)
Green Mileage			
Cost	63.1 (26.6)	60.5 (30.7)	63.1 (26.6)
Benefit	56.5 (25.5)	51.5 (26.5)	60.4 (26.4)
Lighting			
Cost	56.5 (24.7)	50.9 (26.7)	59.1 (25.7)
Benefit	66.0 (26.8)	66.5 (26.7)	63.5 (24.8)
Storm Water			
Cost	59.2 (24.8)	56.4 (26.7)	57.7 (26.2)
Benefit	66.0 (23.9)	66.5 (22.4)	61.2 (24.9)
Compost			
Cost	52.3 (25.8)	50.3 (27.7)	55.9 (24.6)
Benefit	76.3 (21.2)	72.5 (20.7)	73.7 (17.7)
Carbon Tax			
Cost	59.2 (27.3)	51.6 (29.4)	56.3 (26.9)
Benefit	62.7 (26.2)	65.5 (25.9)	65.4 (24.1)
Eco-Fee			
Cost	54.9 (27.5)	46.2 (27.4)	51.4 (28.5)
Benefit	74.9 (22.0)	72.6 (25.0)	73.6 (21.7)
Total			
Cost	56.7 (16.7)	52.0 (18.8)	57.3 (17.0)
Benefit	68.2 (15.7)	67.4 (15.7)	67.6 (16.8)

ANOVA was used to assess differences in perceived policymaker endorsement. Residuals approached normality and Levene's test indicated that the assumption of homogeneity of variance was met,  $F(2, 216) = 0.62, p = .541$ . Participants in each default condition perceived roughly the same endorsement from the policymakers,  $F(2, 216) = 0.03, p = .970, \eta^2 < .001$ . Also, political affiliation did not predict votes for any policy ( $p$ 's  $> .05$ ) using logistic regression analysis. Because neither the measures of

reference dependence nor implied endorsement differed across conditions, Hypothesis 4 was not tested and is not discussed further.

## CHAPTER VI

### DISCUSSION

#### DEFAULT EFFECTS

The decision making literature has indicated default effects to be a robust phenomenon and the results of the current study partially support their existence in the context of environmental policies (Hypothesis 1). When voting for a policy that would tax individuals based on energy usage, the default option was a significant predictor of the participant's response. Additionally, participants were more likely to vote in favor of a green mileage and compost policy when the default vote was in favor of the policy rather than not in favor of the policy. Votes for policies regarding a recycling program, energy efficient lighting standards, improved storm water systems, and eco-fees were unaffected by the default option.

One possible explanation for why only three policies displayed default effects is that participants were unfamiliar with these three policies. The communities surrounding the university where the research was conducted have municipal recycling programs, charge a fee for the upkeep of storm water systems, and some local industries apply eco-fees (e.g., tire dealers charge a fee for the proper disposal of old tires). Currently these communities do not have any policies in place regarding a carbon tax, green mileage fee, or compost program. Previous research has reported that the selection of the default option increases as outcome uncertainty increases (see Anderson, 2003 for a review). This principle could explain why default effects were only present for unfamiliar policies. If participants were unfamiliar with the carbon tax, green mileage, and compost program

policies then one could assume that the participants were uncertain of the policy outcomes. This uncertainty might have led to the selection of the default option. Alternatively, the familiar policies could be associated with familiar outcomes. Therefore, participants would be more willing to deviate from the default option when voting for these policies. Future studies should measure familiarity/certainty in order to verify this explanation.

### **OPT-IN VERSUS OPT-OUT**

Of the three policies which demonstrated statistically significant default effects, only the opt-out default condition was significantly different from the forced-choice condition. This finding supports an endowment account of default effects. One outcome of the endowment effect is that individuals require more money to sell a good in their possession than they would pay to purchase the same good. In terms of the current study, participants would need more money to give up the environmental benefits of a policy than others would be willing to pay in order to pass the policy. The opt-out condition is different than the opt-in and forced-choice conditions in one important way. Doing nothing alters the status quo in the opt-out condition but not in the other two. Participants are not already in “possession” of the environmental benefits in the opt-in and forced-choice conditions. Therefore, participants in both of these conditions must ask how much they are willing to pay for the environmental benefits. Because  $WTP < WTA$ , participants in the opt-in and forced-choice conditions were less likely to endorse the policy than participants in the opt-out condition. This result is supported by the reference dependence account of the default effect. The endowment effect is a byproduct of reference dependence which provides partial support for Hypothesis 3. This endowment

account of default effects aligns with the findings of Pichert and Katsikopoulos (2008) who found that participants required more money to relinquish environmental benefits than they were willing to pay for those same benefits. Previous research on reference dependence and green defaults has focused on consumer products with tangible outcomes (Pichert & Katsikopoulos, 2008; Dinner et al., 2011). One distinguishing component of the current study is that the default effect is examined at the policy level. The findings from this experiment indicate that policy decisions may be susceptible to the same influences as consumer decision making.

### **COST VERSUS ENVIRONMENTAL BENEFITS**

As stated above, the observed pattern of default effects supports the endowment effect but the explicit measures of cost and environmental influence do not. Participants did not report differences in the influence of cost or environmental benefits across conditions. Hypothesis 3, which stated that the influence of the monetary costs and environmental benefits would differ across conditions, was not supported by this measure.

The lack of support for Hypothesis 3 has multiple possible explanations. On average, participants rated the environmental benefits as more influential in their decision making process than the cost associated with each policy. The green mileage policy was the only individual policy in which participants across conditions rated the cost as more influential than the environmental benefits. The green mileage policy was also the most expensive and was endorsed by the fewest participants. Figure 2 shows that the green mileage policy did not garner a majority of votes in any condition (the opt-out default

condition was split exactly at 50%)—the only policy to do so. Cost appeared to have a negative effect on policy endorsement across all conditions.

Participants were specifically instructed to indicate how important the cost was to their decision, not just their opinion of the policy's value. These results show that participants only considered cost to be more influential than environmental benefits when cost was high. When costs were low participants were more focused on the environmental benefits. Perhaps costs are negligible when they are below a specific threshold. Interestingly, Aldy, Kotchen, and Leiserowitz (2012) found that the average American is willing to pay \$162 per year in higher electricity bills to help the environment. The green mileage policy was the only policy with an estimated annual cost greater than \$162.

Another possible explanation for the relative unimportance of policies' monetary cost is delay discounting. Delay or hyperbolic discounting states that individuals generally prefer immediate gains and delayed losses (Thaler, 1981). Stating annual costs instead of immediate costs might have given the impression that participants would not suffer any financial loss until sometime in the future. Delaying payment would thereby lessen the impact of the cost.

### **IMPLIED ENDORSEMENT**

Participants did not perceive different levels of policymaker endorsement across conditions; Hypothesis 2 was not supported. The fact that participants did not differ in their levels of policymaker endorsement was not expected, although this effect was expected to be smaller than the reference dependence explanation. The proposed policies had already made it to a ballot so participants may have felt that policymakers in each



condition supported the policies by putting them to a vote. Additionally, the default option may have been seen as a part of the ballot system and unrelated to the wishes of the policymakers. Moreover, previous research on implied endorsement has asked participants to explicitly consider the consequences of the default option. While individuals have shown that they perceive recommendations in default options (McKenzie et al., 2006), no evidence suggests that these recommendations lead to a preference for that option. This study suggests that, at least on an explicit level, implied policymaker endorsement has no effect on preferences for environmental policies.

### **LIMITATIONS**

Given the nature of the experimental task, the use of a student sample likely affected the results and limited the study's generalizability. The current study depended on an ostensible voting scenario. A large proportion of the participants were 18 years old when the data was collected in the summer and fall of 2013. Many of these students may have never participated in an election. Furthermore, the youth of the participants may have limited their understanding of the financial consequences presented in each scenario. For example, if the students were not familiar with paying storm water fees in the past then the implications of a fee increase may not have been fully understood. Additionally, the task may have been too artificial for participants to actually appreciate the effect of the losses. Voting for a policy in a lab is much different from a true scenario in which real money is involved.

The policies in the current study were meant to reflect a high level of external validity. Each policy was based on realistic estimates of costs and benefits while sacrificing internal validity. The heterogeneous costs and benefits among policies may

have added too much unexplained variability to the outcomes, thereby obscuring statistical significance.

Finally, measuring the role of loss aversion in default effects relied on explicit measures (i.e., participants were directly asked how the cost and environmental impacts influenced their decisions). Upon review, these items could be susceptible to a social desirability bias. Participants may have wanted to be viewed as charitable or generous which would explain the greater reported influence of environmental impacts compared to costs. Given the subject matter, this effect may have especially prevalent. Research has shown that people are more likely to buy green products in public and that “going green” can be motivated by social status and reputation (Griskevicius, Tybur, & Van den Bergh, 2010). Having small groups of peers complete the survey at the same time may have exacerbated the desire to be environmentally conscious. Future research should incorporate less obvious items often used in the study of the endowment effect. Measures of willingness to pay and willingness to accept (Carmon & Ariely, 2000; Pichert & Katsikopoulos, 2008) may produce a more genuine measure of the effect of loss aversion.

## **FUTURE RESEARCH**

The current study focused on one particular aspect of constructed preferences—default effects. However, many other factors have been shown to elicit economically irrational behavior. One particular line of research relevant to environmental policies is intertemporal choice (i.e., decisions with payoffs and losses at different points in time). Research has demonstrated that future gains and losses are not evaluated in the same manner as immediate gains and losses (Estle, Green, Myerson, & Holt, 2006; Frederick,

Loewenstein, & O'Donoghue, 2002; Green & Myerson, 1996; Thaler, 1981). The rewards of environmental policies are almost always distributed across time. For example, consumers will not reap immediate rewards by purchasing energy efficient light bulbs, but over time the environmental and economic rewards will start to add up. The way in which these future costs and benefits are communicated to voters and consumers will presumably impact their preferences. Future research should examine how these effects alter preferences.

The finding that default effects differed among policies is another avenue for future research. Although a link between familiarity and certainty of environmental policy costs and benefits was presented here, this connection is in need of further investigation. Additionally, the current experiment tried to reflect a reasonable estimate of externally valid policies. Using such diverse policies has created a challenge of finding an underlying factor structure. Future research should aim to identify the factors of each policy and how those factors influence the decision making process. The current study tried to isolate two broad categories of cost and environmental benefits, but a more finely tuned approach is needed.

Along with identifying underlying differences among policies, an alternate line of research would attempt to identify individual differences among voters. Socioeconomic status, for example, may be associated with voting behaviors. The participants in the current study were all college students so the impact and immediacy of these policies may be perceived differently relative to individuals with different economic or educational backgrounds.

Although the influence of monetary and environmental factors did not display the expected effect in the current study, future research should examine how these two factors interact. Implementing a willingness to pay versus willingness to accept paradigm, as mentioned above, will help determine the relative value of each factor on voter behavior. Specifically, these studies would help policymakers determine how much voters are willing to pay for differing degrees of environmental protection/benefit.

Finally, the political affiliation of policymakers should be investigated. The current study did not find a perceived difference in implied policymaker endorsement, but the boundaries of implied endorsement should be further examined. Perhaps making traits of policymakers more salient to voters will have a greater influence on how voters make their decision. Brown and Krishna (2004) predicted a reversal of default effects when consumers are given knowledge about the company who established the default. By explicitly stating which political party member has determined the default option, the opposing party's voters might purposefully choose against the default option while the voters with the same party affiliation may be more apt to adopt the default. This method would evoke the participants' political schema which may be a necessary factor for implied endorsement to have an effect.

## **CHAPTER VII**

### **CONCLUSIONS**

For some environmental policies, voting scenarios which enact the policy by default (voters must opt out) led to a higher level of endorsement than a forced-choice or opt-in policy which partially confirmed Hypothesis 1. Explicit measures of the effects of loss aversion and implied endorsement could not explain the default effect which did not support Hypotheses 2 and 3. However, for those policies demonstrating default effects, the pattern of results supported an endowment account (and reference dependence by proxy) of default effects. This endowment effect shows that processes affecting consumer behavior may also be driving voting behavior. Future research should examine other aspects of constructed preferences in the context of environmental policy as well as determining the individual and policy factors which drive voting behavior.

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## **APPENDIX**

### **POLICY DESCRIPTIONS**

**Taxpayer funded recycling program:** Your city is no longer able to fully fund a program for the proper collection and disposal of recyclable products (plastic bottles, mixed paper, aluminum cans, etc.). In order to continue the government run program, your city is charging a monthly fee that exclusively covers all costs associated with the operation and maintenance of a residential recycling program. Each year these fees will total \$35.

**Green mileage fee:** Automobiles are a major source of pollution and greenhouse gas emission. A tax is being proposed that charges a fee based on the number of miles driven. This fee would be assessed at different rates based on the environmental impact of the vehicle. For example, a hybrid electric vehicle would be taxed at a lower rate than a gasoline fueled sport utility vehicle. Based on current data, the average annual rate for such a tax would be \$180 per year. The revenue from these fees would be used to help develop cleaner forms of transportation.

**Energy efficient lighting:** Light emitting diode (LED) light bulbs are the most energy efficient bulbs on the market today. LEDs produce the same amount of light as incandescent and compact fluorescent light (CFL) bulbs, but require considerably less energy to do so. The increased energy efficiency means a reduction in greenhouse gas emissions. The Virginia government is altering the federal Energy Independence and Security Act of 2007 to incorporate LED technology. Under the amended Act, all

households would be required to exclusively use LED bulbs by year 2021. The average consumer would need to spend \$75 annually to meet these new standards in the allotted time.

**Storm water fees:** As the name suggests, storm water refers to the water that results from precipitation. The water that does not soak into the ground ends up carrying many pollutants into the areas natural waterways. To combat this pollution and control flooding, the cities of Hampton Roads have established storm water management systems. These systems are paid for by “storm water fees” that are charged to residents. Fees vary by city, but imagine that the current storm water fee for your city is \$95 per year. This is the average yearly fee across the Hampton Roads area. City managers are planning an upgrade to the system that would decrease waterway pollution by an additional 15%. To pay for the upgrade, residents will have to pay an additional \$12 per year.

**Compost:** Food scraps and lawn trimmings account for 27% of the waste in U.S. landfills. However, the majority of these materials can be composted. Composting is the process breaking down organic material into a soil-like substance that can be used to strengthen soil or grow plants. The use of compost reduces the reliance on potentially hazardous chemical fertilizers which runoff into natural waterways, remediates contaminated soil, decreases pollution created by landfills, and much more. Your city is planning a compost collection service. Yard trimmings and kitchen scraps would be

collected weekly, much like a curbside recycling program. The cost of implementing and maintaining such a program would cost each household \$23 per year.

**Carbon tax:** City officials want to implement a tax based on energy usage. This program would affect all households that use electricity, but reduced rates would be granted to users of “green energy” sources such as solar or wind power. The fee (or “carbon tax”) would be added to each resident’s utility bill. Funds would be used by the city to develop eco-friendly initiatives and help reduce greenhouse gas emissions. An average resident would pay \$16 per year for this carbon tax.

**Eco-fees:** Many items that end up in landfills are not properly discarded. A product may not be readily recycled by the current recycling program, or hazardous materials are not disposed of in a safe manner. For example, automobile tires can be recycled but they are not accepted by municipal curbside programs. Similarly, antifreeze that is sent to the landfill can seep into the soil, polluting groundwater and harming wildlife. The state government has proposed a program of Extended Producer Responsibility (EPR) to fight these harmful effects. EPR mandates that manufacturers or importers of certain materials are responsible for setting up a recycling program to recover the waste at the end of the product life. For example, tire manufacturers are responsible for creating easily accessible programs to recycle old tires. The proposed law would initially only affect the manufacturers of motor oil, antifreeze, tires, paint, and aerosol cans. Because these manufacturers must pay for the new recycling programs, they would presumably pass these costs onto the consumer. When consumers purchased one of the designated

products, an “eco-fee” would be added to their bill. This new law would result in the average consumer paying \$10 more per year.

## VITA

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### EDUCATION

- B. S. University of Illinois at Urbana-Champaign**  
 Psychology, 2010
- M. S. Old Dominion University**  
 Experimental Psychology, 2014 (Expected)
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### PRESENTATIONS

- Bent, B. J. & Streets, V. N. (accepted). *Personnel decisions as a function of task framing*. Poster to be presented at the Association of Psychological Science Annual Convention, San Francisco, CA.
- Bent, B. J. (2014). *Default effects in the endorsement of environmental policies*. Poster presented at the Old Dominion Graduate Research Achievement Day, Norfolk, VA.
- Langlais, P. J. & Bent, B. J. (2013, May). *The influence of individual and organization factors on graduate students' ethical decision making in research activities*. Poster presented at the Association of Psychological Science Annual Convention, Washington DC.

### JOURNAL ARTICLES

- Langlais, P. J. & Bent, B. J. (2013). Individual and organizational predictors of the ethicality of graduate students' responses to research integrity issues. *Science and Engineering Ethics*. Advance online publication. doi: 10.1007/s11948-013-9471-2