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Does Active Choosing Promote Green Energy Use? Experimental Evidence

Simon Hedlin and Cass R. Sunstein***

Many officials have been considering whether it is possible or desirable to use choice architecture to increase the use of environmentally friendly (“green”) products and activities. The right approach could produce significant environmental benefits, including large reductions in greenhouse gas emissions and better air quality. This Article presents new data from an online experiment in which 1245 participants were asked questions about hypothetical green energy programs. The central finding is that active choosing had larger effects in promoting green energy use than did green energy defaults (automatic enrollment in green energy), apparently because of the interaction between people’s feelings of guilt and reactance. This finding is principally driven by the fact that when green energy costs more, there is a significant increase in opt-outs from green defaults, whereas with active choosing, green energy retains considerable appeal even when it costs more.

More specifically, we report four major findings. First, forcing participants to make an active choice between a green energy provider and a standard energy provider led to higher enrollment in the green program than did either green energy defaults or standard energy defaults (automatic enrollment in standard energy). Second, active choosing caused participants to feel more guilty about not enrolling in the green energy program than did either green energy defaults or standard energy defaults; the level of guilt was positively related to the probability of enrolling. Third, respondents gave lower approval ratings to the green energy default than to the standard energy default, but only when green energy cost extra, which suggests reactance towards green defaults when enrollment means additional private costs.

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Fourth, respondents appeared to have inferred that green energy automatically would come at a higher cost and/or be of worse quality than less environmentally friendly energy.

These findings raise important questions both for future research and for policy making. If they reflect real-world behavior, they suggest the potentially large effects of active choosing—perhaps larger, in some cases, than those of green energy defaults.

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INTRODUCTION

In recent years, both public and private institutions have shown mounting interest in using choice architecture¹ to increase the likelihood that people will choose, or end up with, a socially desired outcome.² In designing programs, a pervasive question is whether to enroll people automatically and then allow

1. For discussion of choice architecture, see RICHARD H. THALER & CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* 83–104 (2008).

2. See, e.g., Pauline W. Chen, *Using a D.M.V. Wait to Enroll Organ Donors*, N.Y. TIMES (May 17, 2012), <http://well.blogs.nytimes.com/2012/05/17/using-a-d-m-v-wait-to-enroll-organ-donors/>, (discussing use of driver license renewals to prompt organ); Brendan I. Koerner, *Bather, Spare that Towel*, N.Y. TIMES (Sept. 24, 2006), http://www.nytimes.com/2006/09/24/business/yourmoney/24_goods.html (describing making hotel guests reuse towels in order to reduce water and electricity consumption); Richard H. Thaler, *Shifting Our Retirement Savings Into Automatic*, N.Y. TIMES (Apr. 6, 2013), <http://www.nytimes.com/2013/04/07/business/an-automatic-solution-for-the-retirement-savings-problem.html> (examining use of automatic enrollment in pension plans to increase retirement saving).

them to opt out (an “opt-out” policy), or instead not to enroll them and allow them to opt in (an “opt-in” policy). This question has received considerable attention from national governments in many domains of public policy.³

Typically, opt-out policies produce much higher levels of enrollment than opt-in policies.⁴ For that reason, many people have expressed a keen interest in shifting from opt-in to opt-out approaches, including in the environmental context.⁵ Suppose that a nation, a state, or a city wishes to reduce greenhouse gas emissions, conventional air pollutants, or other sources of environmental harm. A great deal of evidence suggests that it could do so by using a green default rule, which automatically enrolls people in (for example) environmentally preferred energy sources, subject to the right to opt out.⁶

But in many settings, there may be legitimate reasons, on grounds of both welfare and autonomy, to question the use of automatic enrollment. At least in theory, policies that do not involve active choosing might cause public resentment and hence “reactance,”⁷ making them less effective than might be anticipated. Or suppose that the population has diverse preferences and values; if so, automatic enrollment might be a poor fit for many people, who might be injured as a result.⁸ Automatic enrollment could be especially undesirable when the issue at hand involves complex moral questions, such as organ donation, or when enrollment can impose significant costs on choosers who do not opt out, as in the case of expensive (but clean) energy sources, or high-cost (“Cadillac”) insurance plans. In such cases, inertia and procrastination might lead choosers to end up with outcomes that they (strongly) dislike.

An alternative policy to automatic enrollment would ask people to make an active choice. Those who favor individual autonomy, and who are suspicious of institutions that select default rules, might well favor an approach of this kind.⁹ Such a policy might take the form of some kind of requirement (a

3. See, e.g., DAVID HALPERN, *INSIDE THE NUDGE UNIT* ch. 2 (2015); Katrin Bennhold, *Britain's Ministry of Nudges*, N.Y. TIMES (Dec. 7, 2013), <http://www.nytimes.com/2013/12/08/business/international/britains-ministry-of-nudges.html>.

4. See Madeleine Broman Toft, Geertje Schuitema & John Thøgersen, *The Importance of Framing for Consumer Acceptance of the Smart Grid: A Comparative Study of Denmark, Norway and Switzerland*, 3 ENERGY RES. SOC. SCI. 113, 114 (2014); James J. Choi et al., *Optimal Defaults*, 93 AM. ECON. REV. 180, 180–185 (2003); Julie S. Downs, George Loewenstein & Jessica Wisdom, *Strategies for Promoting Healthier Food Choices*, 99 AM. ECON. REV.: PAPERS & PROCEEDINGS 159, 160 (2009); Eric J. Johnson & Daniel Goldstein, *Do Defaults Save Lives?*, 302 SCIENCE 1338, 1339 (2003).

5. Toft et al., *supra* note 4, at 114.

6. See Felix Ebeling & Sebastian Lotz, *Domestic Uptake of Green Energy Promoted by Opt-out Tariffs*, 5 NATURE CLIMATE CHANGE 868, 868 (2015).

7. The term refers to a negative reaction to intrusion or coercion, causing people to rebel and thus to do the opposite of what is demanded. See SHARON S. BREHM & JACK W. BREHM, *PSYCHOLOGICAL REACTANCE: A THEORY OF FREEDOM AND CONTROL* 4–7 (1981). Reactance typically occurs in situations where a person perceives that their choices or freedom are threatened. See *id.*

8. See Cass R. Sunstein, *Active Choosing or Default Rules? The Policymaker's Dilemma* 2–3 (May 14, 2014) (preliminary draft article), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2437421.

9. See RICCARDO REBONATO, *TAKING LIBERTIES: A CRITICAL EXAMINATION OF LIBERTARIAN PATERNALISM* 248–56 (2012).

“forced choosing” policy) or a mere request (“prompted choice”). In the context of organ donation, for example, when people pick up a driver’s license, they might be required or asked to fill out a form stating whether they would be willing to donate organs or not.¹⁰

There are several reasons why active choosing—in the form of either forced choosing (our principal interest here) or prompted choice—might be preferable to a default rule. Such approaches should overcome the problem of inertia. They might also increase learning and, if properly designed, they ought to be able to handle the issue of changing preferences and values over time.¹¹ It is also possible to support active choosing on the ground that it is less paternalistic than a default rule.¹²

But there is evidence that in some contexts, active choosing does not increase participation, or at least does so either far less often or to a much smaller extent than would a default rule.¹³ In producing the outcomes that choice architects seek to achieve, an opt-out rule may be more effective, and possibly far more effective, than a policy of active choosing. In addition, active choosing can be burdensome, indeed highly unwelcome, and hence there are circumstances in which people would prefer not to choose. When people prefer not to choose, forcing them to do so may be paternalistic in its own way, and it can have pernicious effects on welfare.¹⁴

In environmental policy, opt-out policies have been found to have a significant and sometimes surprisingly large impact on outcomes, certainly when compared with opt-in policies. Take for example double-sided printing and paper waste. When Rutgers University changed its default rule from single-sided printing to double-sided printing, the university’s paper consumption fell by 44 percent.¹⁵ A major Swedish university also found substantial results.¹⁶ In the latter study, the authors compared the green default with a more conventional nudge; the environmental coordinator at the university sent out emails to employees at certain departments, encouraging them to use double-sided rather than single-sided printing.¹⁷ The employees were also reminded how easy it is to switch to double-sided printing.¹⁸ But there were no

10. See Judd B. Kessler & Alvin E. Roth, *Don’t Take “No” for an Answer: An Experiment with Actual Organ Donor Registrations 2* (Nat’l Bureau Econ. Research, Working Paper No. 20378, 2014), <http://www.nber.org/papers/w20378.pdf>.

11. See Cass R. Sunstein, *Choosing Not to Choose*, 64 DUKE L.J. 1, 28–39 (2014).

12. See Nicolas Cornell, *A Third Theory of Paternalism*, 113 MICH. L. REV. 1295, 1317–18 (2015).

13. See Kessler & Roth, *supra* note 10, at 4 (suggesting that forced choosing can be ineffective).

14. See CASS R. SUNSTEIN, *CHOOSING NOT TO CHOOSE: UNDERSTANDING THE VALUE OF CHOICE* 74 (2015).

15. See Cass R. Sunstein & Lucia A. Reisch, *Green by Default*, 66 KYKLOS 398, 399 (2013).

16. Johan Egebark & Mathias Ekström, *Can Indifference Make the World Greener? 2* (Research Inst. of Indus. Econ., IFN Working Paper No. 975, 2013), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2324922.

17. *Id.* at 2–3.

18. *Id.* at 6.

discernible differences between the departments that received the encouraging emails and those that did not. The central finding of the study—the major savings from a double-sided default—demonstrates the effect that green defaults (as we shall call them) can have compared with less environmentally friendly (sometimes called “standard energy” or “gray”) defaults, even when people are encouraged to opt-in.¹⁹

Perhaps more dramatically, both lab experiments and real-world studies of electricity consumption in Germany have found that households are far more likely to use environmentally friendly energy (“green energy”) if the default is opt-out rather than opt-in.²⁰ In one experiment, participants who were randomly assigned to a green energy default were much more likely to choose it than those who were assigned to a gray default.²¹ A recent study in the same nation, based on actual behavior, found a similar (and very substantial) effect.²² Setting the default choice to more expensive green energy produced a nearly tenfold increase in purchases of green energy. With an opt-in approach, membership in the Green Party was a strong predictor of participation. But with opt-out, membership ceased to be a predictor.

As these findings suggest, green defaults could be an effective environmental tool. The standard explanations given for the frequent ineffectiveness of opt-in approaches—procrastination, inertia, and signaling²³—apply in the environmental context, as well. Moreover, negative stereotypes may be associated with green products and services, and these might make people less likely to opt in, even if they would not opt out if they were automatically enrolled.²⁴ Another relevant factor, of particular importance in the environmental setting, is *guilt*. Empirical evidence suggests that green defaults can make people feel guilty about opting out if they think that there are good moral reasons to stay with the default, as in the case of reusing towels at hotels, or receiving electronic, rather than paper, statements.²⁵ In the environmental context, green defaults might trigger intense feelings of guilt, and could be especially effective for that reason.

19. *Id.* at 19.

20. See Daniel Pichert & Konstantinos V. Katsikopoulos, *Green Defaults Information Presentation and Pro-Environmental Behaviour*, 28 J. Env'tl. Psychol. 63, 65 (2008); Ebeling & Lotz, *supra* note 6, at 868.

21. Pichert & Katsikopoulos *supra* note 20, at 65.

22. Ebeling & Lotz, *supra* note 6, at 868; see also Toft et al., *supra* note 4, at 121 (finding similar results in a Denmark, Norway, and Switzerland study).

23. See SUNSTEIN, *supra* note 14, at 34, 40.

24. Previous studies have found that people tend to think that environmentally friendly food products are healthier because the labels are green. See, e.g., Jonathon P. Schuldt, *Does Green Mean Healthy? Nutrition Label Color Affects Perceptions of Healthfulness*, 28 HEALTH COMM. 1, 6–7 (2013). This is an example of a positive stereotype. Similarly, it is possible that there are negative stereotypes, too. Perhaps people think that certain green products are costlier or of lower quality.

25. Aristeidis Theotokis & Emmanouela Manganari, *The Impact of Choice Architecture on Sustainable Consumer Behavior: The Role of Guilt*, 131 J. BUS. ETHICS 423, 423 (2014).

But do these considerations demonstrate that green defaults are necessarily more effective than active choosing? On the basis of the existing body of research, it is reasonable to hypothesize that active choosing will generally lead to higher enrollment than gray or standard energy defaults, but to lower enrollment than green defaults.²⁶ Nevertheless, there are reasons to speculate that active choosing might actually be more effective than green defaults in some contexts, because of the distinctive set of values and emotions that it triggers.

Suppose, for example, that active choosing between green and less environmentally friendly energy options primes certain attitudes and norms, leading people to choose the former. Suppose, too, that green defaults trigger, in some people, a form of resentment, leading them to opt out. If active choosing triggers guilt and green defaults trigger resentment, the former might overall be the more effective approach.

It is relevant that previous studies have repeatedly found that when people feel that their freedom is restricted, they may display reactance.²⁷ Of course, a green default does not literally restrict freedom, because a user remains free to opt out. Hence we cannot conclude, from existing research, that automatic enrollment will necessarily breed reactance.²⁸ But if it does, green defaults may backfire, and a number of those who are automatically enrolled will opt out simply because they are resentful.²⁹

This Article describes the results of several novel tests of the effect of different forms of choice architecture on enrollment in hypothetical green energy programs. Some of our findings are quite surprising, and they may have implications for law and policy. We acknowledge that our experimental setup does not provide decisive evidence about real-world behavior. In particular,

26. SUNSTEIN, *supra* note 14, at 48.

27. See, e.g., Lijiang Shen, *Antecedents to Psychological Reactance: The Impact of Threat, Message Frame, and Choice*, 2014 HEALTH COMM. 1, 8; Kristin Laurin, Aaron C. Kay & Gavan J. Fitzsimons, *Reactance Versus Rationalization: Divergent Responses to Policies That Constrain Freedom*, 23 PSYCHOL. SCI. 205, 205 (2012); see also Ayala Arad & Ariel Rubinstein, *The People's Perspective on Libertarian-Paternalistic Policies* 4–5 (July 2015) (unpublished article), <http://arielrubinstein.tau.ac.il/papers/LP.pdf>.

28. Cf. Arad & Rubinstein, *supra* note 27, at 24–25 (finding reactance in the context of savings plans).

29. Indeed, a study of automatic enrollment into a program that aimed to reduce electricity consumption in California found suggestive evidence that some of the automatically enrolled participants not only opted out but also increased their electricity consumption. See Dora L. Costa & Matthew E. Kahn, *Energy Conservation “Nudges” And Environmentalist Ideology: Evidence From A Randomized Residential Electricity Field Experiment*, 11 J. EUR. ECON. ASS'N 680, 685 (2013). A study of the impact of the default thermostat setting in an Organisation for Economic Co-operation and Development (OECD) office found that lowering the default by one degree Celsius led to a greater reduction in the average office temperature than when the default setting was lowered by two degrees Celsius. See also Zachary Brown et al., *Testing the Effect of Defaults on the Thermostat Settings of OECD Employees*, 39 ENERGY ECON. 128, 133–34 (2013). The explanation behind this puzzle is that when default rules go “too far,” they will become counterproductive. *Id.* at 134. The lesson is that default rules tend to be sticky, but not if they make people upset.

participants might state in a survey that they would opt out when in fact they would not. The force of procrastination and inertia might also be underestimated in surveys. We suspect that the actual opt-out rate is likely to be lower in the real world than in surveys, since in the latter case people's attention is expressly focused on the opt-out question, and they are prompted to answer.

Moreover, respondents assigned to an active choosing condition might say that they would choose green energy when they would not. In the abstract, and in a hypothetical scenario, that option might seem more appealing than it would be in reality—particularly if it costs money.³⁰ Nonetheless, experimental findings in this domain can illuminate behavioral responses to different forms of choice architecture. As will be discussed further, numerous online and lab experiments in the past have increased our knowledge about human decision making with respect to the environment.

We recruited a total of 1245 participants using Amazon Mechanical Turk. We randomly divided the participants into nine groups, using a so-called 3x3 design. We presented each group with a different vignette about a hypothetical green energy program that had been introduced by a state government. Each vignette involved one of three types of policies: (1) green energy defaults, (2) standard energy defaults, and (3) active choosing. Additionally, participants received three variations of each policy with respect to price and quality: (1) enrolling in the green energy program was described as costing an extra \$25 per month; (2) no information about the price and quality of the green energy program was explicitly given; or (3) it was explicitly stated that the price and quality of the green energy program were identical to the respondent's current energy source. This design resulted in nine unique vignettes, one for each group. We hypothesized that the variations in the information given would have significant effects on people's responses, whether the question involved green energy defaults, standard energy defaults, or active choosing.

After reading one of the nine vignettes, each respondent answered a brief survey that included questions about whether she would want to enroll in the green energy program or not, whether she approved of the choice architecture of the program, and whether she felt guilty about not participating in the program.

Our central finding, and the most counterintuitive one, is that *active choosing had larger positive effects on enrollment than did green energy defaults*³¹—primarily when the participants were asked to imagine that green

30. For an example of how appealing green energy may appear in surveys, see Daniel Vecchiato & Tiziano Tempesta, *Public Preferences for Electricity Contracts Including Renewable Energy A Marketing Analysis with Choice Experiments*, 88 ENERGY 168, 174 (2015). In their study, 86 percent of the respondents stated that they were willing to pay more for green electricity contracts. *Id.*

31. See Toft et al., *supra* note 4, at 113 (showing that active choosing and opt-out produce essentially the same enrollment rates). We also note, however, that participation in a smart grid confers clear private benefits to participants; the purpose of installing smart meters is to optimize electricity

energy was more expensive. We hypothesize that this result was a product of the interaction between guilt and reactance. Our findings suggest that active choosing can have significant effects on behavior when guilt (or conscience) is triggered, and that reactance may reduce the effectiveness of default rules. If the goal is to increase use of environmentally friendly policies and programs, active choosing may therefore turn out to be a highly attractive policy.

More particularly, we report four main findings. First, when participants were forced to make an active choice between a green energy provider and a standard, less environmentally friendly energy provider, the level of enrollment in the green program was higher than with either green energy defaults or standard energy defaults. This finding is driven by people's behavior in scenarios where green energy costs more than standard energy. In that condition, they become substantially more likely to opt out of green energy defaults.

This result stands in contrast to those in other contexts, which have suggested either no significant difference between the effects of active choosing and green defaults, or higher enrollment from green defaults. We speculate that the choice with respect to a green energy program led participants in the active-choosing groups to feel particularly guilty about not enrolling, even when green energy was more expensive. By contrast, we hypothesize that participants in the green energy default groups displayed relatively high levels of reactance when green energy was more expensive, because they were resentful toward the idea that the government would automatically enroll them in the program.

Second, consistent with the first finding, active-choosing policies caused participants to feel more guilty about not enrolling in the green energy program than did either green energy or standard energy default policies. Notably, *the level of guilt was positively related to the likelihood of enrolling*. The fact that guilt was correlated with enrollment amplifies the robustness of the first result. It would be natural to assume that people who feel more guilty about not enrolling would be more likely to enroll.

It is not obvious why an active-choosing policy would lead to a higher level of guilt, relative to a green energy default policy. A potential explanation is that some people resent being automatically enrolled in a costly program because they feel that they have been treated disrespectfully, or that their freedom has been restricted in some sense. As a result, they feel less guilty about opting out. Active choosing may be different because the policy maker

consumption, which means lower utility bills (in addition to the public benefit of being environmentally friendly). Because of those private benefits, it would be logical to expect any form of reactance to the green default, on average, to be reduced—as well as to expect any form of guilt about not participating under active choosing to generally be lower as well. Under active choosing, those who actively choose not to participate in a smart grid know that they will miss out on a possible opportunity to contribute to the common good, but they also know that they will miss out on a private benefit, which may cause them feel less guilty about not enrolling.

(the state government in our experiment) has not implicitly told individuals what they should choose. Forced to make a choice, individuals may choose to enroll in the green energy program because they would feel guilty about not enrolling (even if it is more costly). In short, active choosing could trigger moral values and social norms that are less at work in a green energy default design.

Third, respondents showed lower approval rates for the active-choosing policy than for the green energy default and standard energy default policies. We suggest, however, that this difference in approval rates be taken with a grain of salt, in light of particular features of the survey design (which we discuss in later Parts). We therefore focus our analysis more narrowly on the difference between green and standard energy defaults only. We find that respondents do give lower approval ratings to the green energy default compared with the standard energy default, but only when participation in the green energy program costs extra. This result, although it does not provide conclusive evidence, is consistent with our hypothesis that when enrollment in green programs is associated with an additional private cost, psychological reactance towards green defaults will be heightened.

Fourth, respondents were, on average, less likely to enroll in the green energy program when no information about cost or quality was available than when the vignette explicitly said that the green energy program would provide energy of the same quality for the same price as their current energy provider. It therefore appears that the respondents automatically assumed that green energy would come at a higher cost, and/or be of worse quality, than less environmentally friendly energy. Implicit assumptions to this effect help account for relatively low levels of opting in, which suggests the potential importance of corrective information.

These four findings have significant implications for policy making and for future research. Most important, they suggest that active choosing, which can be seen as most respectful of people's agency, might also be the more effective approach from the standpoint of environmental protection, or at least more effective than one might anticipate. And given the finding that active choosing may lead to higher enrollment figures than would green energy default and standard energy default policies, it is essential to establish under what real-world circumstances that finding would occur, and why. Does the result apply only to green energy programs or to environmental policy in general? Or does it apply even more broadly than that? Do guilt and reactance explain the difference in impact between active choosing and green energy defaults (as we believe), or are other important factors involved?

With respect to our findings, are there differences between the experimental setting and real-world behavior, where automatic enrollment has been found to have significant effects?³² We emphasize that in a survey, it is

32. See Egebark & Ekström, *supra* note 16, at 2; Sunstein & Reisch, *supra* note 15, at 399.

relatively easy to say that one would opt out of defaults, even if one would not do so in practice. A survey essentially forces respondents to focus on that question—in a sense, it is a form of active choosing—whereas in the real world, people might ignore the question or procrastinate. For that reason, we suspect that surveys systematically underestimate the actual effects of defaults. And in surveys, it is possible that people would be more likely to say that they would enroll in green energy than would in reality, at least where the cost is not zero. In practice, the costs of enrollment might loom larger than they do in a survey.

An additional question is whether green products and services suffer from negative stereotypes with respect to price and quality, and whether these stereotypes have a significant impact on consumer choice. We find evidence that the answer to both questions is “yes.” Might it be helpful for private or public institutions to inform people (if and when it is true) that the price and quality of environmentally friendly products is similar or identical to that of less environmentally friendly, but otherwise comparable, products and services? Can people be taught that green products and services are not necessarily more expensive, or of lesser quality? In other words, is there a learning effect?

Before proceeding, we offer a few cautionary notes. A full analysis of policy instruments must consider the effects of those instruments on social welfare, and that is not provided merely by a demonstration that, say, active choosing significantly increases use of green energy. It is necessary to understand the social benefits of any such increase. Are the effects on environmental quality (including human health) large or small? Is there a significant reduction of greenhouse gas emissions? What is the social cost of carbon? What is the effect on subjective wellbeing? It is also necessary to understand the full set of relevant costs. Are consumers paying more? If so, how much more? In view of the answers to these questions, a switch to green energy may or may not have significant net benefits.

In addition, a corrective tax, or some system of cap-and-trade, is usually the preferred instrument for producing an optimal level of pollution.³³ A default rule in favor of green energy, or a system of active choosing, is not likely to be nearly as efficient as a corrective tax (including a carbon tax). Nonetheless, efforts to increase use of green energy are an important part of the mix of policy instruments, and they might avoid some of the political constraints that apply to both corrective taxes and cap-and-trade. In the aftermath of the 2015 Paris climate talks, and as the United States, Germany, and many other nations embark on ambitious efforts to change the energy mix, with particular reference to greenhouse gases, green defaults and active choosing are likely to receive serious attention. While their impact on behavior

33. For clear and superb discussion, see William Nordhaus, *Climate Casino: Risk, Uncertainty, and Economics for a Warming World* 233–43 (2013).

may be smaller, and while they would be less efficient, active choosing and green defaults may well be easier to implement in practice than, say, enacting a corrective tax. For example, many utility companies could easily choose to enroll new customers automatically in a green energy program.

The remainder of this Article proceeds as follows. Part I offers general background and a brief review of existing research on choice architecture, guilt, reactance, and stereotypes. Part II describes the method and the data, and explains in greater detail the nine vignettes, and other aspects of the experimental design. Part III presents each of the four main results in turn. Part IV discusses interpretation of the data, caveats, and the implications of this study for future research and policy making.

I. CHOICE ARCHITECTURE AND THE ENVIRONMENT

A. *Default Rules and Active Choices*

We have pointed to several cases in which default rules have had significant effects on promoting environmental goals. An especially revealing example involved an experiment with graduate students about reusing towels.³⁴ Participants were asked to imagine that they were staying in a fictitious hotel and were divided into two groups: a green default and a gray default.³⁵ Those in the green default group were told that the hotel replaced towels every three days, unless guests left a designated card in the bathroom stating that they wanted them changed.³⁶ The students in the gray default group were instructed that their towels would be changed every day, but that they could leave a (different) designated card in the bathroom to “opt in” and reuse the towels.³⁷ When asked whether they would want to reuse their towels or not, the students in the green default group were much more likely to say that they would than were those in the gray default group.³⁸

In a related study, the authors of the towel experiment tested the impact of active choosing compared with green defaults.³⁹ In this study, students were randomly divided into three groups: green default, gray default, and active choosing.⁴⁰ They were asked to imagine that they faced a hypothetical scenario with their bank.⁴¹ In the green default scenario, students were told that the bank had announced that all paper statements would automatically be replaced with electronic statements, but that they had the option to “opt out” and request

34. Theotokis & Manganari, *supra* note 25, at 426.

35. *Id.*

36. *Id.*

37. *Id.*

38. *Id.* at 427.

39. *Id.* at 428–29.

40. *Id.*

41. *Id.* at 428.

paper statements.⁴² Those who were assigned to the gray default, in contrast, were told that they could register for electronic statements, or they would continue to receive paper statements. The third group was forced to choose between receiving either electronic statements or paper statements.

The results showed that the green default was highly effective; under this policy, 70 percent chose electronic statements, compared with only 56 percent with the gray default.⁴³ The active-choosing policy was also effective, and led to 79 percent enrollment in electronic statements.⁴⁴ However, the difference between the green default and the active choice was not statistically significant at conventional levels, suggesting no difference in effectiveness between the two.⁴⁵

The lack of a significant difference between green defaults and active choices with respect to electronic bank statements fits with findings from other experiments. One online experiment presented participants with hypothetical scenarios about enrolling in a particular type of proenvironmental energy program.⁴⁶ The program is often called “smart grid,”⁴⁷ which has been defined as an “electricity network that can intelligently integrate the behavior and actions of all users connected to it—generators, consumers and those that do both—in order to efficiently deliver sustainable, economic and secure electricity supplies.”⁴⁸ Participation in a smart grid typically involves the installation in one’s home of a “smart meter,” a device that in its most advanced form allows the energy supplier remotely to control certain in-house appliances in order to reduce the demand for energy when the aggregate demand in that electricity network is peaking. If a sufficient number of households installs meters and joins smart grids, proponents argue, aggregate demand will become more flexible, which will make it possible for producers to switch to inflexible sources, such as renewables.

In the online experiment, 3802 participants were recruited from Denmark, Norway, and Switzerland.⁴⁹ The respondents read brief factual statements about how a smart grid works, and were then asked to imagine that their utility

42. *Id.* at 429.

43. *Id.*

44. *Id.*

45. *Id.* However, as we discuss further in subsequent Parts, one should note that Theotokis and Manganari do in fact hypothesize that active choosing may be more effective than green defaults—and for good reasons. A possible explanation for why they do not find a significant difference (between 79 percent enrollment under active choosing and 70 percent enrollment under green defaults) may be that they have a relatively small sample size of 107 students split into three groups. *Id.*

46. See Toft et al., *supra* note 4, at 115.

47. See, e.g., Kim Yoo-chul, *LSIS Chief Urges Gov’t Support for “Smart Grid”*, KOREA TIMES (July 12, 2015), http://www.koreatimes.co.kr/www/news/tech/2015/07/133_182600.html (showing how smart grids are currently being proposed to policy makers).

48. Cédric Clastres, *Smart Grids Another Step Towards Competition, Energy Security and Climate Change Objectives*, 39 ENERGY POL’Y 5399, 5400 (2011) (citing *Smart Grids European Technology Platform*, Smart Grids, <http://www.smartgrids.eu> (last visited Jan. 16, 2016)).

49. Toft et al., *supra* note 4, at 113.

company wanted to install smart meters in their homes at no additional cost.⁵⁰ They were divided into three groups: green default with the possibility to opt out, gray default with an invitation to opt in, and active choosing.⁵¹ In accordance with the experiment on registration for electronic bank statements,⁵² green defaults were more effective at boosting participation than gray defaults, and there was no statistically significant difference between green defaults and active choices.⁵³

B. Guilt

What makes green defaults so effective at promoting proenvironmental behavior? We have previously mentioned inertia and procrastination, as well as another highly relevant factor to choice architecture, of particular importance in the environmental setting: guilt. Empirical evidence suggests that green defaults can make people feel guilty about opting out if they think that there are good moral reasons to stay with the default. With respect to the two aforementioned experiments about reusing towels and receiving electronic bank statements, Theotokis and Manganari hypothesize that anticipated guilt plays a crucial mediating role.⁵⁴ Stronger feelings of guilt, they claim, help make both green defaults and active choosing effective.⁵⁵

This claim is reasonable. Research has found that guilt can motivate people to take action to promote social change,⁵⁶ and specifically to protect the environment.⁵⁷ Assuming that automatic enrollment and active choices in the environmental context trigger stronger feelings of guilt than an opt-in policy, we would expect guilt to be a mediating factor that causes higher enrollment. Return to the example of single-sided vs. double-sided printing. If there is a single-sided default rule, then users may perceive it as socially acceptable, even though they may be well aware of the problem of paper waste. By contrast, if the default is double-sided, then users who want to opt out must actively make the choice to behave in a less environmentally friendly way, which may trigger feelings of guilt. Similarly, users who are presented with an active-choosing policy may feel guilty about selecting the single-sided option.

50. *Id.* at 116.

51. *Id.*

52. See Theotokis & Manganari, *supra* note 25, at 429.

53. Toft et al., *supra* note 4, at 118.

54. Theotokis & Manganari, *supra* note 25, at 425.

55. *Id.*

56. See, e.g., Linda Brennan & Wayne Binney, *Fear, Guilt, and Shame Appeals in Social Marketing*, 63 J. BUS. RES. 145 (2010) (“Guilt can be motivating but only when accompanied by some hope that individual action is both needed and capable of making the requisite social change.”); Sally Hibbert et al., *Guilt Appeals Persuasion Knowledge and Charitable Giving*, 24 PSYCHOLOGY & MKTG. 728 (noting guilt is positively related to charitable donations).

57. See, e.g., Florian G. Kaiser et al., *Extending Planned Environmentalism Anticipated Guilt and Embarrassment Across Cultures*, 13 EUR. PSYCHOLOGIST 288, 288 (2008).

In their study of reusing towels, Theotokis and Manganari find evidence that supports this notion.⁵⁸ They report that “consumers experience higher levels of guilt in the opt-out policy, because the anticipated environmental harm is an outcome of their actions.”⁵⁹ They argue that anticipated guilt may be an important variable that helps explain the effectiveness of green defaults.⁶⁰

Theotokis and Manganari hypothesize that the absence of a default rule requires active thinking on the part of the consumer, which could augment both the perceived level of responsibility and anticipated guilt, thus leading to even higher enrollment under active choosing than under green defaults.⁶¹ As we previously noted, they do not find conclusive evidence in support of their hypothesis in the study.⁶² But we mentioned that one reason for this may simply be the relatively small sample size.⁶³ An additional explanation points to the context of their experiment itself.

We suspect that in environmental scenarios (which typically involve social benefits such as biodiversity, cleaner air, and less water pollution), an important question for choice architects is whether choosing the greener options involves private benefits, private costs, or neither. If enrolling in a green energy program comes at the price of a larger utility bill, we would expect people to feel less guilty about choosing a conventional energy source, regardless of whether the policy is a green default, a gray default, or an active choice. A higher price could give the individual consumer a rationale for not choosing the green option, even though the option otherwise might be perceived as morally desirable. This rationale does not apply in situations where environmentally friendly options are offered at no additional cost.

Standard economic theory emphasizes the importance of cost: If they carry an additional cost, green energy programs offered with green defaults, gray defaults, and active choices will generally see lower enrollment rates than green energy programs offered with the same policies but at no extra cost. We are adding a point about the role of guilt. The rates in green energy programs, we predict, will be lower across all three policy options in part because the extra cost attenuates feelings of guilt.

But an important question remains: Will the difference in rates between the two types of green energy programs be uniform? In other words, if a green energy default were found to be at least as effective as an active choice when the green energy program is offered at no extra cost, will the default also be as effective where the green energy program costs more than conventional energy? We think that the answer might be no, and that active choice might be more effective in that situation.

58. Theotokis & Manganari, *supra* note 25, at 428.

59. *Id.*

60. *Id.*

61. *Id.*

62. *Id.*

63. *See supra* note 45 and accompanying text.

C. Reactance

When a socially beneficial good or service is offered at an extra cost, automatic enrollment may backfire as a result of reactance.⁶⁴ Typically described as a negative response by individuals against constraints placed on their freedom,⁶⁵ the presence of reactance may have important implications for choice architecture, in particular for the design of default rules. Of course, a default rule is not literally *constraining* freedom; the individual is perfectly free to opt in or out, regardless of what the default option is.⁶⁶ But arguably what matters most is a person's perception. If a default rule is perceived as a constraint on freedom—perhaps because people think that the choice architect, in a way, already has made the decision for them—people may display reactance, which could cause an automatic enrollment policy to backfire if a substantial number of individuals opt out. Reactance can thus work as a counterpoint to guilt, or perhaps even reduce it.

There is some evidence to suggest that default rules sometimes do produce the opposite effect of what is intended.⁶⁷ An online experiment tested the impact of default rules on people's attitudes to hypothetical government policies—including the creation of a special savings account with a high interest rate, with the catch that the money would be available only after ten years.⁶⁸ The findings suggest that psychological reactance caused “a significant number of participants to opt-out of [the hypothetical savings account] even though they would have joined the arrangement had they simply been offered it.”⁶⁹

Another example comes from default tip suggestions in taxis in New York City.⁷⁰ Many taxis have installed credit card touchscreens that provide suggested tip amounts (e.g., 15 percent, 20 percent, and 25 percent).⁷¹ Because some taxi companies provide lower suggested percentages than others, it is possible to see what effect higher default tips have on the likelihood of tipping.⁷² A quasi-experimental analysis of thirteen million taxi rides found that, although higher default tips led to higher average tips, the likelihood of

64. See, e.g., Shen, *supra* note 27, at 8.

65. See, e.g., Laurin, Kay & Fitzsimons, *supra* note 27, at 205.

66. This is why default rules fit the policy framework of libertarian paternalism: they are choice-preserving.

67. See Arad & Rubinstein, *supra* note 27, at 24–25; Costa & Kahn, *supra* note 29, at 685; Brown et al., *supra* note 29, at 133–34; Kareem Haggag & Giovanni Paci, *Default Tips*, 6 AM. ECON. J.: APPLIED ECON. 1, 1 (2014).

68. Arad & Rubinstein, *supra* note 27, at 6.

69. *Id.* at 7.

70. Haggag & Paci, *supra* note 67, at 1.

71. *Id.* at 1–2. Some restaurants that use tablets to process credit card payments have also similarly started the practice of providing their customers with suggested tip amounts.

72. It should be noted, however, that default tips are not identical to default rules. A default rule implies that an option has been preselected, but tipping in taxis still requires the customer to make a choice—it is not possible to do nothing. Yet because the suggested amounts lead to anchoring effects, they have similar effects as default rules. See Sunstein, *supra* note 14, at 27–28.

tipping was significantly lower when the defaults were set higher.⁷³ In other words, the participation rate was lower.⁷⁴ The most plausible interpretation of the data is that when some customers saw the higher suggested tipping amounts, they displayed a form of reactance and chose not to tip at all—whereas they might have tipped either if the defaults were lower, or if there were no defaults at all.⁷⁵

Behaviorally informed approaches can also backfire in the environmental context. A study of a program that aimed to reduce electricity consumption in California found suggestive evidence that some of the participants who were informed of the social norm actually increased their electricity consumption.⁷⁶ These results imply that it is possible that green defaults may backfire due to reactance, and that some of those who are automatically enrolled will opt out simply because they are resentful, and not necessarily because they oppose the environmentally friendly option.

If it is correct to hypothesize that green defaults sometimes breed psychological reactance in the presence of private costs, thus reducing the enrollment rate, it follows that the level of reactance should be positively related to the cost of the default option. We expect people to be more likely to resent default options if, in addition to the risk of being perceived as overly paternalistic, those options come at an extra cost. This leads to an empirical question that we attempt to answer in our experiment: Do significant private costs under green defaults reduce the enrollment rate to such an extent that active choosing becomes a more effective policy? We think that may be the case.⁷⁷

Building on the same logic, we would expect green defaults that produce *private benefits* to be highly effective. If the default option leads to a benefit for the individual, the likelihood of displaying reactance should be lower, simply because it is harder to be resentful about a policy that results in some personal gain. Return to the experimental study on choice architecture and smart grids.⁷⁸ As we discussed, participating in a smart grid should lead not only to increased use of renewable sources of energy but also to a reduction in utility expenses. In these circumstances, it should not be surprising that the authors of the study found that a green default was at least as effective as an active choice.⁷⁹

73. Haggag & Paci, *supra* note 67, at 2–3.

74. *Id.*

75. *Id.*

76. Costa & Kahn, *supra* note 29, at 685.

77. Because reactance can reduce feelings of guilt, we also expect private costs to lead to a difference in average levels of guilt felt by people facing a green default or an active choice, where the latter group will feel more guilty about not making the environmentally friendly (and socially beneficial) choice.

78. See Toft et al., *supra* note 4.

79. We also note that participating in smart grid merely leads to “small financial gains.” *Id.* at 114. Had the benefit been larger (or had enrollment not entailed the privacy intrusion associated with a

D. Stereotypes

A separate issue involves negative stereotypes. It is well known that people have widely held beliefs about green products and services. An example of a positive stereotype is the belief that simply by virtue of being organic, organic food items have fewer calories.⁸⁰ One study has even found that people associate the color green with health. In a randomized experiment, participants thought that a candy bar with a green label was more healthy than one with a red label, despite the fact that the candy bars had the same calorie count.⁸¹

But perhaps green goods and services are subject to negative stereotypes, too. While organic food may often be perceived as healthier, it is possible that certain products are seen as costlier and/or of lower quality than conventional ones. For instance, green lightbulbs might be seen to have significantly lower quality than conventional lightbulbs.⁸² Sometimes the stereotypes are true. For example, surveys have found that organic food typically comes at a price premium.⁸³ Some consumers may have had bad experiences with certain green products, such as low-quality but efficient lightbulbs.⁸⁴ Or they might extrapolate negative stereotypes of certain green products onto other goods and services—thinking, for instance, that since organic food sometimes costs more than conventional food, green energy probably costs more than conventional energy.

If policy makers or businesses offer goods and services that suffer from negative stereotypes, but are, in fact, neither of lesser quality nor more expensive, then a simple information nudge, emphasizing that the green goods and services have the same quality and price as conventional alternatives, could significantly increase consumption or participation. Such a nudge could serve to overcome the stereotype. We will explore the antecedent question, which is whether any such stereotype exists in the context of green energy usage.

II. METHOD AND DATA

Participants for this study were recruited using Amazon Mechanical Turk for the explicit purpose of answering a brief survey about the environment. In

remotely operated smart meter), one might speculate that automatic enrollment would have been significantly more effective than active choosing.

80. See J.P. Schuldt & Norbert Schwarz, *The "Organic" Path to Obesity? Organic Claims Influence Calorie Judgments and Exercise Recommendations*, 5 *Judgment & Decision Making* 144, 144 (2010).

81. See Schuldt, *supra* note 24, at 1.

82. See Leora Broydo Vestel, *Why Efficient Light Bulbs Fail to Thrive*, N.Y. TIMES (Jan. 27, 2009), <http://green.blogs.nytimes.com/2009/01/27/why-efficient-light-bulbs-fail-to-thrive/>.

83. Samuel Bonti-Ankomah & Emmanuel K Yiridoe, ORGANIC AND CONVENTIONAL FOOD: A LITERATURE REVIEW OF THE ECONOMICS OF CONSUMER PERCEPTIONS AND PREFERENCES 11, tbl. 3 (Organic Agric. Ctr. of Canada, 2006), <http://www.organiccentre.ca/Docs/BONTI%20%26%20YIRI%20DOE%20April%2028%202006%20Final.pdf>.

84. See Vestel, *supra* note 82.

total, 1245 participants were recruited. Online experiments are generally accepted as a feasible alternative to lab experiments,⁸⁵ but some potential idiosyncratic biases should be taken into account. In online experiments, it is possible that participants use multiple accounts and take the same survey several times. Participants in online experiments are less likely to pay attention and take the study seriously than participants in a lab setting.

To account for these and other potential biases, we took the following steps. First, we excluded six Amazon Mechanical Turk users who had already participated in another experiment with vignettes (on a different topic) a few weeks earlier.⁸⁶ Second, respondents who did not complete all the questions in the survey, or who completed the survey within an unrealistically short timeframe, were deemed unserious, and were also excluded. Third, Amazon Mechanical Turk users were allowed to take the survey only once, and the survey tool itself also prevented more than one survey response per computer from being submitted. Fourth, the survey contained a very simple question that was designed to gauge whether the respondent was paying attention or not, and failure to answer this question correctly resulted in exclusion from the analysis.⁸⁷ Fifth, to prevent the use of multiple accounts, individuals who used the same IP address to fill out the survey were excluded. The final sample that was analyzed comprised 1037 unique responses to the survey. The average age of the participants was thirty-three years. The youngest respondent was eighteen, and the oldest was seventy-four. About 61 percent of the participants were male. They represented D.C. and all of the 50 states but Wyoming, and they had a median household income of between \$25,000 and \$50,000. A majority had graduated from college.

At the beginning of the survey, the participants were randomly assigned to one of nine groups. The smallest group had ninety-seven participants. After answering demographic and socioeconomic questions, including questions about gender, age, income, race, and education, members of each group were presented with one, and only one, of the following nine vignettes.⁸⁸ The vignettes were based on a “3x3 design” where we combined one of three policies (green energy defaults, standard energy defaults, and active choosing)

85. See, e.g., John J. Horton, David G. Rand & Richard J. Zeckhauser, *The Online Laboratory Conducting Experiments in a Real Labor Market*, 14 EXPERIMENTAL ECON. 399, 399 (2011).

86. The rationale behind the exclusion is to reduce the risk of a potential “Hawthorne effect” whereby respondents adjust their behavior in response to being observed. Respondents who have participated recently in an experiment with similar design arguably have a heightened susceptibility to the Hawthorne effect, as they perhaps could more easily guess what outcomes the researchers are studying. However, this group of individuals is very small, and excluding them does not significantly alter any of the results that we present in this Article.

87. See generally Adam J. Berinsky, Michele F. Margolis & Michael W. Sances, *Separating the Shirkers from the Workers? Making Sure Respondents Pay Attention on Self-Administered Surveys*, 58 AM. J. POL. SCI. 739 (2014) (discussing how to filter out respondents that do not pay attention to online surveys).

88. The vignettes were obviously presented to the participants without the numbers and the titles; these are only meant for the reader’s convenience.

with one of three cost and quality conditions (more expensive green energy; no cost or quality information provided; and information about identical cost and quality provided), which produced nine unique prompts.

(1. Green energy default with more expensive green energy)

Assume that the government in your state has decided to automatically enroll all households in a new “green” energy program, which means that you now get energy from a new provider that is more environmentally friendly than your previous one. However, the green energy program costs an extra \$25 per month compared with what you are used to pay. If you do not wish to stay in the program you can choose to opt out to save \$25 per month, and then choose any energy provider that you wish. Will you stay in the green energy program or opt out?

(2. Standard energy default with more expensive green energy)

Assume that the government in your state has decided to offer all households the option of enrolling in a new “green” energy program, which means that you would get energy from a new provider that is more environmentally friendly than your current one. However, the green energy program costs an extra \$25 per month compared with what you currently pay. If you wish to join the program you can choose to opt in and pay an additional \$25 per month to participate, or else you will keep your current energy provider. Will you join the green energy program or keep your current energy provider?

(3. Active choosing with more expensive green energy)

Assume that the government in your state has decided to cancel all existing energy plans in order to force all households to choose between two types of energy providers. You can choose either a new “green” energy provider, which means that you will get energy from a new provider that is more environmentally friendly than your previous one, or some other, less environmentally friendly energy provider, including the one that you used to have. However, the green energy program costs an extra \$25 per month compared with other providers. Will you choose the green energy provider or some other provider?

(4. Green energy default without information on cost and quality of green energy)

Assume that the government in your state has decided to automatically enroll all households in a new “green” energy program, which means that you now get energy from a new provider that is more environmentally friendly than your previous one. If you do not wish to stay in the program you can choose to opt out and then choose any energy provider that you wish. Will you stay in the green energy program or opt out?

(5. Standard energy default without information on cost and quality of green energy)

Assume that the government in your state has decided to offer all households the option of enrolling in a new “green” energy program, which

means that you would get energy from a new provider that is more environmentally friendly than your current one. If you wish to join the program you can choose to opt in, or else you will keep your current energy provider. Will you join the green energy program or keep your current energy provider?

(6. Active choosing without information on cost and quality of green energy)

Assume that the government in your state has decided to cancel all existing energy plans in order to force all households to choose between two types of energy providers. You can choose either a new “green” energy provider, which means that you will get energy from a new provider that is more environmentally friendly than your previous one, or some other, less environmentally friendly energy provider, including the one that you used to have. Will you choose the green energy provider or some other provider?

(7. Green energy default with information on identical cost and quality of green energy)

Assume that the government in your state has decided to automatically enroll all households in a new “green” energy program, which means that you now get energy from a new provider that is more environmentally friendly than your previous one. Except for the environmental impact, the energy offered by the two providers is identical in every aspect, including both cost and quality. If you do not wish to stay in the program you can choose to opt out and then choose any energy provider that you wish. Will you stay in the green energy program or opt out?

(8. Standard energy default with information on identical cost and quality of green energy)

Assume that the government in your state has decided to offer all households the option of enrolling in a new “green” energy program, which means that you would get energy from a new provider that is more environmentally friendly than your current one. Except for the environmental impact, the energy offered by the two providers is identical in every aspect, including both cost and quality. If you wish to join the program you can choose to opt in, or else you will keep your current energy provider. Will you join the green energy program or keep your current energy provider?

(9. Active choosing with information on identical cost and quality of green energy)

Assume that the government in your state has decided to cancel all existing energy plans in order to force all households to choose between two types of energy providers. You can choose either a new “green” energy provider, which means that you will get energy from a new provider that is more environmentally friendly than your previous one, or some other, less environmentally friendly energy provider, including the one that you used to have. Except for the environmental impact, the energy offered by the two types of providers is identical in every aspect, including both cost and quality. Will you choose the green energy provider or some other provider?

After reading one of the nine vignettes, each respondent was asked whether she would choose the green energy provider, or some other, less environmentally friendly, energy provider. The participants were then asked to rate on a scale from 1 (“I absolutely disapprove”) to 7 (“I absolutely approve”) whether they approved of the state government’s new energy program. In addition, respondents rated on a scale from 1 (“I absolutely disagree”) to 6 (“I absolutely agree”) whether they agreed with the following statement: “I feel guilty if I don’t participate in the green energy program.”⁸⁹

III. RESULTS

This Part is divided into four subparts that, in turn, discuss each of the four main findings of the study.

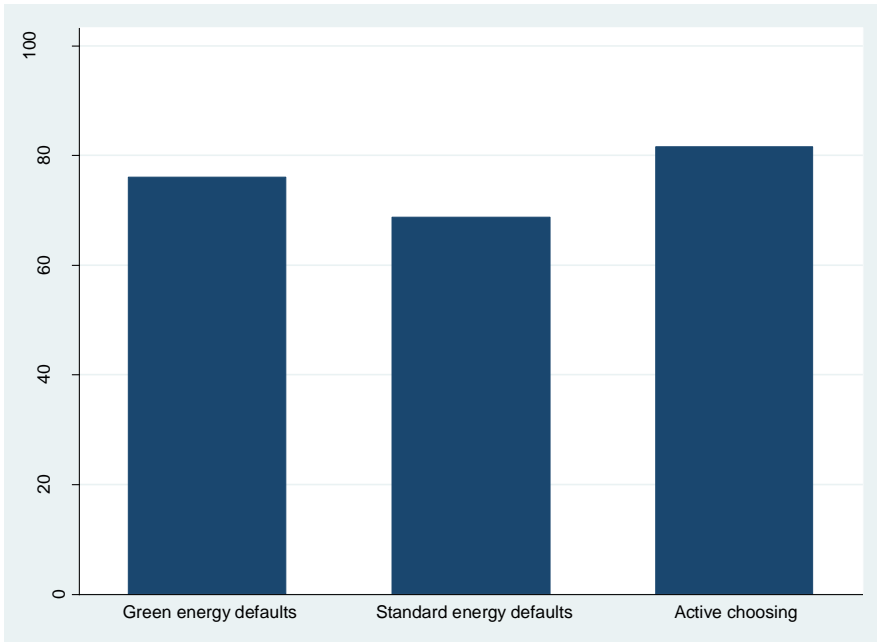
A. Active Choosing Led to Higher Enrollment than Did Green Energy Defaults and Standard Energy Defaults

The results of analysis of variance (ANOVA) tests examining the effect of policy and cost and quality information on enrollment in the green energy program indicated a significant effect of both policy ($F_{1, 1036} = 13.62, p < 0.001$) and cost and quality aspects ($F_{1, 1036} = 205.28, p < 0.001$).

Contrary to what might be expected on the basis of most previous research, participants who were presented with the active-choosing policy were *more likely to enroll in the green energy program than were those who were automatically enrolled and given the choice to opt out*. On average, across all nine groups, about 82 percent of the respondents who were presented with the active-choosing policy wanted to enroll in the green energy program. By contrast, the green energy default policy led to an enrollment rate of 76 percent, and the standard energy default policy led to an enrollment rate of about 69 percent. We observe that, consistent with prior research, the green energy default policy had a greater effect than standard energy defaults.

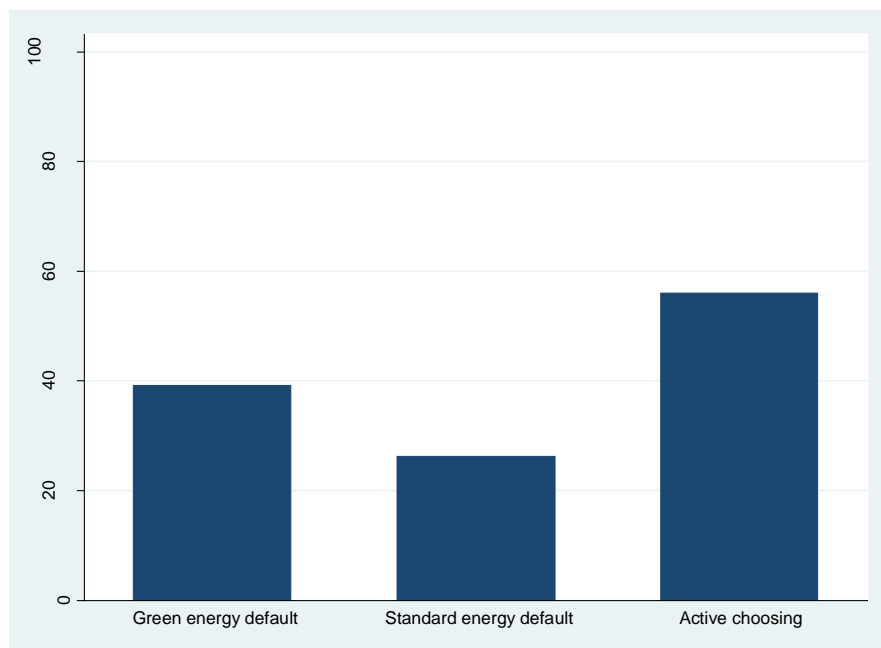
89. We based this question on the research design in Theotokis & Manganari, *supra* note 25, at 428.

Figure 1: The average enrollment rate in the green energy program across all nine groups (sorted by policy)



The difference between active-choosing and standard energy defaults was statistically significant ($p < 0.001$), whereas the difference between active-choosing and green energy defaults was marginally significant ($p < 0.1$). However, it is important to note that these results included all nine groups. The differences in enrollment rates among the three policies is driven primarily by groups one through three, which read the vignettes about the green energy program that cost an extra \$25 per month. Among these three groups, active choosing was, in relative terms, even more effective in producing higher enrollment figures. Active choosing led to an enrollment rate of 56 percent, green energy defaults just 39 percent, and standard energy defaults merely 26 percent. It is worth underlining these numbers, which demonstrate the intuitive point that extra cost is likely to have a significant effect in decreasing participation in green energy programs—and may also heighten the differences among the three forms of choice architecture.

Figure 2: The average enrollment rate in the green energy program only in the three groups where the green energy cost extra (sorted by policy)



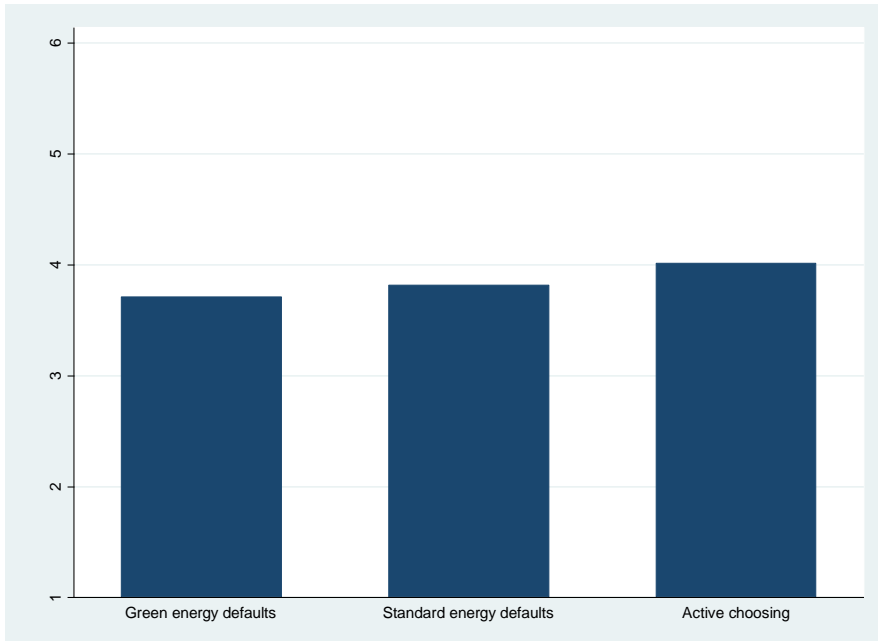
When only the three groups where green energy cost extra were analyzed, the difference between active choosing and green energy defaults was statistically significant ($p < 0.05$). In the remaining six groups, active choosing similarly led to higher enrollment than both green energy defaults and standard energy defaults, but the difference between active choosing and green energy defaults was not statistically significant at conventional levels. Notwithstanding this point, it should be noted that the relative sizes of the point estimates mimicked those in the first three groups. In each of the three sets of three groups (with different cost and quality aspects), active choosing had the highest point estimate, green energy defaults the second-highest point estimate, and standard energy defaults the lowest. This finding suggests that active choosing, at least as far as hypothetical green energy programs are concerned, is more effective than green energy defaults, but that the effect is smaller when no extra cost is associated with enrollment in the green energy program.

B. Active Choosing Produced More Guilt than Did Green Energy Defaults and Standard Energy Defaults

We have noted that in previous research, guilt has been contributed to the effectiveness of active choosing and green energy defaults. Guilt also played an important role in our study, as participants who encountered the active-

choosing policy experienced relatively high levels of guilt. However, in contrast to results reported in some previous experiments,⁹⁰ the green energy default policy led to lower levels of guilt than did the standard energy default policy.

Figure 3: The average level of guilt reported by participants, on a scale from 1 to 6, across all nine groups (sorted by policy)



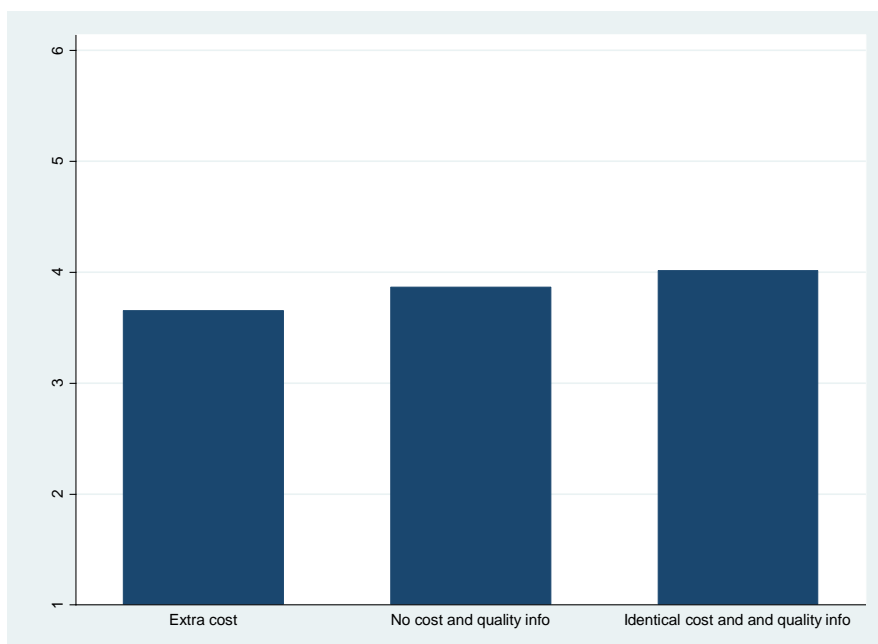
The difference in levels of guilt caused by active choosing and standard energy defaults was marginally significant ($p < 0.1$). By contrast, the difference between active choosing and green energy defaults was more clearly significant ($p < 0.01$). Regression analyses revealed that a person's average level of guilt had a substantial and significant positive relationship to the likelihood that the person would enroll in the green energy program ($b = 0.076$, $p < 0.001$). Note, however, that because green energy defaults were much more effective than standard energy defaults,⁹¹ and yet caused less guilt among the participants, guilt cannot be the sole explanatory factor. But it may nonetheless help explain why active choosing had a greater impact on enrollment than did green energy defaults.

90. See, e.g., Theotokis & Manganari, *supra* note 25, at 432.

91. We speculate that the greater effect of the green energy default is a product of a standard factor that accounts for the influence of defaults: the informational signal that it contains. See SUNSTEIN, *supra* note 14, at 37–40.

Another notable result is that the level of guilt varied not only across policies, but also across cost and quality aspects. As one would expect, participants who were offered the choice to enroll at the additional cost of \$25 per month felt on average less guilty about not enrolling than those who were given no information about the cost and quality of the green energy, and those who were told explicitly that the cost and quality of the green energy was identical to that of their current energy provider. If people are told that an environmentally beneficial product or technology costs significantly more, they should feel less guilty, because refusing to pay significant sums may not offend social norms or moral commitments.

Figure 4: The average level of guilt reported by participants, on a scale from 1 to 6, across all nine groups (sorted by cost and quality aspects)

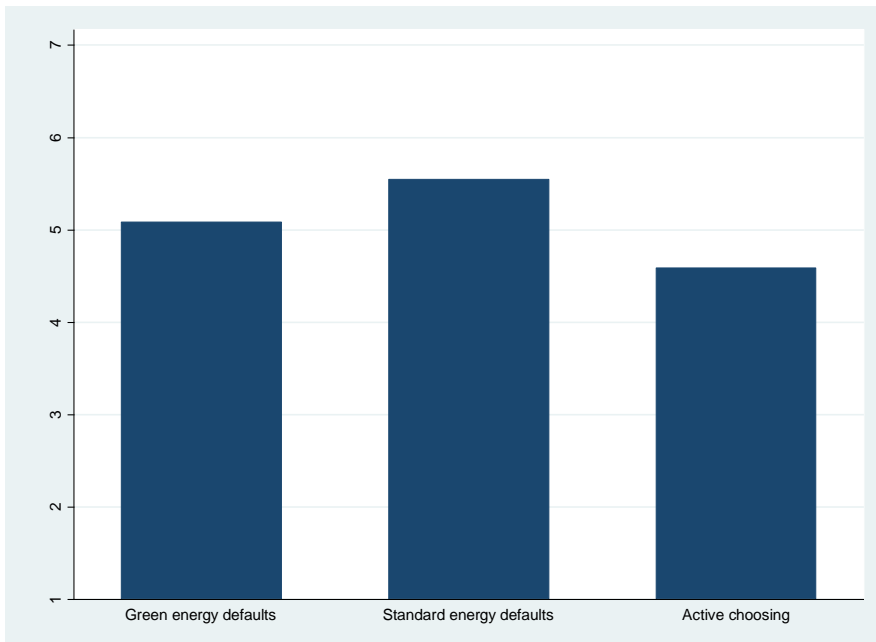


With respect to guilt, the difference between the three groups that were told they would have to pay extra for the green energy and the three groups that were given no cost and quality information was statistically significant ($p < 0.05$). Not surprisingly, the difference between the groups that had to pay extra for the green energy and the groups that were told that the cost and quality of the green energy was identical to what they currently had was also significant.

C. Green Energy Defaults Had a Lower Approval Rating than Standard Energy Defaults

Across all nine groups, respondents showed lower approval rates for the active-choosing policy than for the green energy default and standard energy default policies. Active choosing received the lowest approval rating, followed by green energy defaults, and then standard-energy defaults. This may appear puzzling. Recall our hypothesis that active choosing was more effective at raising enrollment than green energy defaults largely because the latter led to reactance. If that hypothesis is correct, would it not be expected that green energy defaults would receive a lower approval rating as a result? Not necessarily.

Figure 5: The average approval of each of the three policies, on a scale from 1 to 7, across all nine groups (sorted by policy)

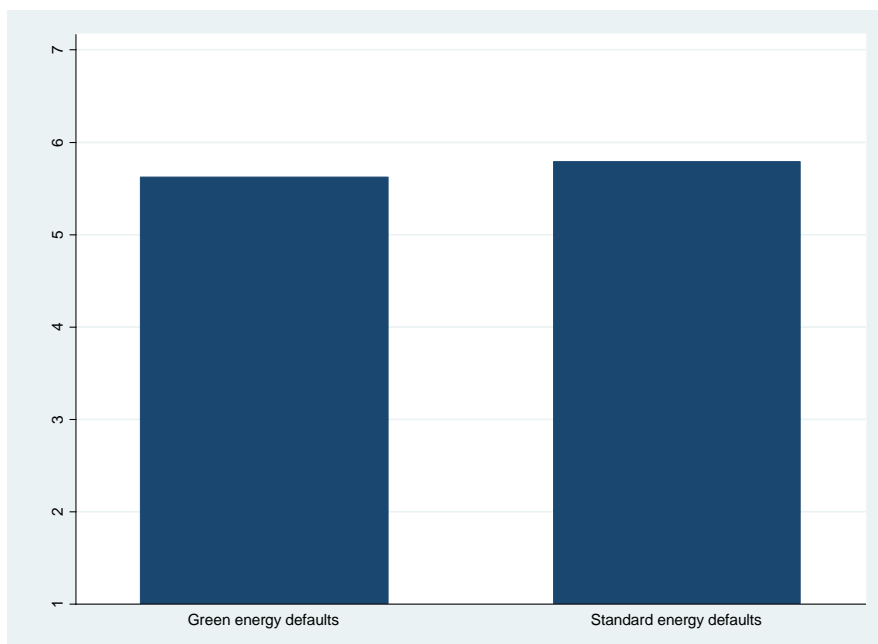


In this case, the lower approval rating of the active-choosing policy may simply reflect the fact that the participants had to imagine that the state government forced them to make a choice by first cancelling their current energy plans. If so, the lower approval rating is not indicative of reactance (in terms of a moral concern with perceived reductions in autonomy and freedom of choice), but rather of the respondents' objection to cancellation, and perhaps

their concern with the possibility that some households that failed to respond might be left without an energy plan.⁹²

A cleaner approach to capturing potential effects of psychological reactance may thus be to focus on the similarities and differences between the green and standard energy defaults alone. Perhaps the most interesting finding is how the approval ratings varied based on cost and quality. When participants were told that the cost and quality of the green and standard energy programs were identical, there was, notably, no significant difference ($p > 0.1$) in approval rating between green and standard energy defaults. This suggests that people *do not show resentment towards green energy defaults when participation comes with no change in cost and quality*.

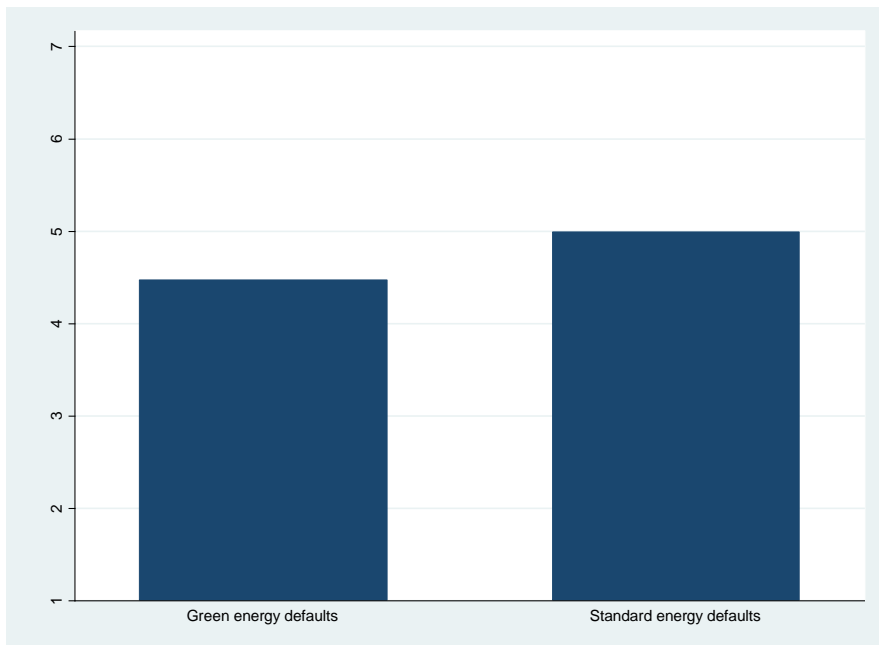
Figure 6: The average approval of green and standard energy defaults, on a scale from 1 to 7, only in the two groups with information about identical cost and quality (sorted by policy)



92. There are, however, other potential explanations for this result. Perhaps respondents approved even less of the active choosing policy than the green energy default policy because the former led them to feel guiltier about not enrolling. If one were to assume that guilt had a stronger negative impact on approval than did reactance, it would make sense that the active choosing policy would receive the lowest approval ratings. One might hypothesize that people sometimes do not approve of being forced to make a choice, because then they will feel guilty enough to make what they might themselves consider the right choice.

By contrast, when we consider the scenario where the green energy cost extra, the green energy default received a significantly lower approval rating ($p < 0.05$). This was not unexpected, but it provides evidence of when and why people will disapprove of defaults. Of course, people's reactions will depend on their antecedent values and preferences. In a population of strong environmental activists, or with high levels of green self-identification, automatic enrollment in green energy might be met with widespread approval, and reactance would not be a problem, even if green energy cost more.⁹³ But in a population without high levels of green self-identification, and with a degree of diversity, automatic enrollment in green energy that comes at an additional cost should be expected to produce at least some degree of disapproval.

Figure 7: The average approval of green and standard energy defaults, on a scale from 1 to 7, only in the two groups where green energy cost extra (sorted by policy)



The difference in approval between green energy defaults and standard energy defaults is striking when we take into account the fact that participation and approval are highly correlated. Regression analyses of the green energy and standard energy defaults, when green energy cost extra, showed that respondents who gave the policies a higher approval rating were also more likely to enroll ($b = 0.085$, $p < 0.001$). This creates a puzzle: Since the green

93. See Ebeling & Lotz, *supra* note 6, at 868 (noting that in an opt-in system, Green Party identification is a strong predictor of whether people would opt in).

energy default was much more effective at raising enrollment than the standard energy default, why is it that the green energy default received a lower approval rating, even though approval was positively related to enrollment? Would it not be expected that green energy defaults would receive a higher approval rating?

One explanation of these seemingly conflicting findings is that most respondents gave approval ratings, on a scale from 1 to 7, that were around the median. But for the green energy default with the extra cost, a significant minority showed reactance and gave especially low scores as a result, which substantially reduced the mean approval rating for the green energy default. Some further findings support this potential explanation. In the scenarios where the green energy cost extra, the median approval rating was 5 for both green energy and standard energy defaults, but the standard deviation was greater for the green energy default. In addition, the green energy default policy also received many more 1s—the lowest possible approval rating—than did the standard energy default.

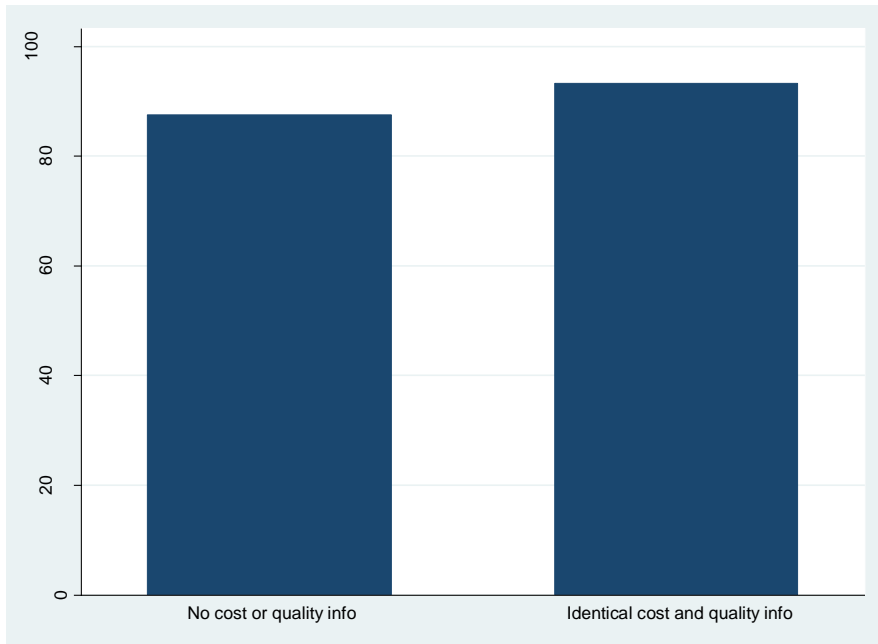
Reactance is difficult to measure, and our results do not conclusively show that resentment among the participants explains the difference in effectiveness between active choosing and green energy defaults. Nonetheless, the fact that green energy defaults received a lower approval rating than standard energy defaults only when green energy cost extra certainly fits our hypothesis that people are more likely to show reactance when enrollment is associated with a private cost. In addition, the fact that the respondents in that scenario were also more likely to give the green energy default the lowest possible approval score provides suggestive evidence of reactance, and it merits further consideration of our hypothesis.

D. Including Information About Identical Cost and Quality Led to Higher Enrollment than When the Information Was Excluded

As expected, a much smaller percentage of participants (41 percent) wanted to enroll in the green energy program when they had to pay an additional \$25 per month compared with scenarios where no cost or quality information was provided (almost 88 percent), or when it was explicit that the cost and quality of the green energy would be identical to that of their current provider (93 percent). If protection of a public good, like clean air, requires people to bear a private cost, such as increased utility expenses, fewer people would choose to do so.

Less expected was the finding that including the very brief statement, “the energy offered by the two providers [the green provider and your current provider] is identical in every aspect, including both cost and quality,” would have a significant effect on the enrollment rate. Compared with the three groups that received no cost or quality information, the impact of including the statement amounted to a nearly 6 percentage point increase in participation in green energy programs.

Figure 8: The average enrollment rate in the green energy program only in the six groups with and without information about identical cost and quality (sorted by cost and quality aspects)



The difference between the groups that were told that the cost and quality were identical and those that were not given explicit cost and quality information was statistically significant ($p < 0.01$). It therefore appears that the participants inferred that green energy would come at a higher cost and/or be of worse quality than less environmentally friendly energy.

IV. DISCUSSION

The results reported in this study raise four related puzzles. First, why did active choosing appear to be more effective than green energy defaults? Second, why did active choosing lead to the highest level of guilt among the three policies, and green energy defaults to the lowest level? Third, why did the green energy default receive a lower approval rating than the standard energy default, even though approval was positively related to enrollment and the green energy default was more effective at boosting participation? Fourth, why did enrollment increase when we included a simple statement clarifying that green energy was neither worse nor more expensive than the energy that the respondent currently had? While our study does not provide full answers to these questions, they are worth discussing because of their implications for future research and policy making.

We have speculated that the greater effectiveness of active choosing, as compared with green energy defaults, might well be a result of guilt and reactance. This speculation is supported by the fact that there were relatively high levels of opt-out in the condition in which green energy cost more. Begin with the relationship between guilt and active choosing. When people are required to choose, that mere requirement might trigger otherwise dormant or ineffective moral values and social norms, ensuring different results from standard energy defaults. In general, we can readily imagine that inertia and procrastination will lead people not to engage in various forms of helping behavior (including environmentally beneficial behavior). But when a question is put to people about what they would do, perhaps they say that they will do whatever they believe morality requires.

Certain issues make individuals feel a strong sense of guilt about not enrolling when forced to make an active choice, which substantially increases the likelihood of enrollment. We hypothesize that these include issues where the private cost of enrolling is perceived as relatively low compared with the social cost of not enrolling. A decision not to enroll, in these circumstances, is likely to produce guilt.

These points could help explain the significant effectiveness of active choosing in the context at hand, and we suspect that, at least broadly, similar results would be observed in real-world situations. As we have noted, however, a green default frame has also been found in previous research to trigger feelings of guilt⁹⁴ (and to have significant effects compared with standard energy defaults,⁹⁵ as we observe in our study, too). To explain the lesser effectiveness of automatic enrollment compared with active choosing, we have mentioned reactance, which can operate as a counterpoint to guilt or even reduce it, and thus lowers the likelihood of enrollment.⁹⁶ This suggestion is consistent with the finding of a significant difference between active choosing and automatic enrollment when green energy has a small but nonnegligible monetary cost. In such cases, reactance might increase, as some people think that choice architects are pushing or even manipulating them.

If this account of guilt and reactance is correct, then we would expect active choosing, in certain situations, to be more effective than green energy defaults. We would also expect active choosing to cause more guilt, and green energy defaults to cause greater reactance (at least where green energy costs more than standard energy). This account thus could provide an explanation of why active choosing caused the highest level of guilt among participants, and why green energy defaults caused the lowest level: The reactance associated with green energy defaults may have reduced the feeling of guilt among the participants who were automatically enrolled.

94. See Theotokis & Manganari, *supra* note 25, at 428.

95. See Pichert & Katsikopoulos *supra* note 20, at 65.

96. See Arad & Rubinstein, *supra* note 27, at 24–25 (finding reactance in the savings context).

Understood in light of this account, our findings would fit fairly well with the results reported in previous research. Recall that with respect to presumed reuse of towels when staying in a hotel (a form of automatic enrollment), it has been shown that people feel guilty about not reusing towels.⁹⁷ But enrolling in a towel-reuse program usually does not involve any monetary cost, or a significant cost of any kind, and so an automatic enrollment policy should produce only low levels of reactance. In the context of towel reuse, one would thus not expect active choosing and green defaults to have different effects on enrollment, which is in line with the existing evidence.⁹⁸

If the green energy default policy caused significant reactance, one might expect green energy defaults to be met with a lower approval rating than the active choosing policy. This is not what we find here, which may seem puzzling. But as noted, this may be explained by the experimental design, which may render it difficult to find unambiguous evidence of reactance when comparing the approval ratings of the default rules and active choosing. When we instead focused on the similarities and differences between the green and standard energy defaults alone, we find that some respondents may potentially have shown reactance towards the green energy default policy when enrollment was associated with an additional cost. The green energy default received a lower approval rating than the standard energy default, but only when green energy cost more.

This finding might at first appear surprising, since approval was positively related to enrollment, and because the green energy default, in every case that we considered, was more effective at raising enrollment than was the standard energy default. But we suspect that this puzzle in part could be explained by the behavior of a significant minority that opted out of the green energy default and gave the policy an unusually low approval rating (and substantially reduced the mean approval of the green default), a type of behavior that could indicate resentment.

Future research will clearly benefit from trying to distinguish among reactance, guilt, and approval, and from pinning down any mediating effects that guilt and reactance may have on the relationship between choice architecture and consumer behavior. In the same vein, it might be helpful to investigate whether people engage in environmentally friendly behavior not to avoid guilt, but to enhance their self-esteem and to feel a kind of “warm glow.” We did not test for this possibility, which might be merely the mirror image of guilt, but which could also have its own dynamic.

97. Theotokis & Manganari, *supra* note 25, at 427.

98. *Id.* Theotokis and Manganari do in fact hypothesize that active choosing may be more effective than green defaults when guilt is involved, and in one of their experiments they do find a difference in point estimates between active choosing and green defaults, but that it is not statistically significant. A possible reason that they do not find a significant difference (between 79 percent enrollment under active choosing and 70 percent enrollment under green defaults) may be that they have a relatively small sample of 107 students, split into three groups.

A final puzzle raised by the results is why the informational statement about identical cost and quality raised the enrollment rate. The most straightforward explanation is that some respondents assumed that green energy would come at a higher cost and/or be of worse quality than less environmentally friendly energy. Why would this be? One possibility is that participants may have had previous experiences with green energy programs that were costlier and/or of worse quality. Alternatively, and perhaps more likely, there may be widespread negative stereotypes about environmentally friendly products and services. For this reason, a brief statement, counteracting those stereotypes, might turn out to be a valuable low-hanging fruit (and should, of course, be used only if it is true).

If our findings are replicated in real-world settings, which form of choice architecture is the best? The answer will depend on several factors, including the private and social costs of green energy. Where that form of energy costs a great deal more and is only modestly more beneficial on environmental grounds, there is little to be said for encouraging its use. But let us simply stipulate that, in some settings, society as a whole is significantly better off if people use that form of energy. If so, there is a strong argument for active choosing, because it seems to produce the highest enrollment rates, at least in the presence of small but nonnegligible private costs. A supplemental point on behalf of active choosing is that it might well seem the most respectful of people's agency, because it adopts no presumption, and asks people to choose on their own. Our findings provide a reason to give careful consideration to active choosing, even if households would be forced to choose, and even though an active choosing policy in some contexts may be difficult to implement. We offered reasons to think that in the real-world, green defaults might well turn out to have the largest effects, but our findings at least raise the possibility that active choosing might in some cases be more effective.

A plausible counterargument would emphasize that, despite (or perhaps because of) its effectiveness, people actually like active choosing the least. We have emphasized the ambiguity of our finding to this effect, but a negative public reaction to a policy surely must be counted, in part because it matters in a democratic society, and in part because it suggests a welfare loss.⁹⁹ The strength of the counterargument depends on how much people prefer other approaches to active choosing, and on exactly how beneficial active choosing turns out to be on environmental grounds, as compared with the alternatives. If active choosing produces genuinely significant environmental benefits, it might seem like the better idea, at least if people have only a mild preference for using default rules. But if active choosing and green defaults are very close on environmental grounds, there is still a good argument on behalf of green defaults if people genuinely prefer them. One may also find that a green default

99. See Arad & Rubinstein, *supra* note 27, at 5.

is the better policy in instances where it is significantly harder to force consumers to make an active choice than to introduce a default rule.

CONCLUSION

Many policy makers are now considering how to encourage people to use environmentally friendly products and technologies, a project that is especially important in light of efforts by many of the world's nations to reduce greenhouse gas emissions. Our central finding here involves the power of a simple intervention: requiring people to make an active choice.

Specifically, forcing participants to make an active choice between a green energy provider and a standard energy provider led to higher enrollment in green energy programs than did green energy default and standard energy default policies. The best explanation for that unexpected finding, driven by the conditions in which green energy costs more, comes in part from another result in the experiment, which is that active choosing caused participants to feel more guilty about not enrolling in the green energy program than did green energy default (or standard energy default) policies—and that the level of guilt was significantly related to the probability of enrolling.

We have also found that respondents gave lower approval ratings to the green energy default than to the standard energy default, but only when green energy cost extra. This finding supports our hypothesis that reactance towards automatic enrollment may be heightened when participation comes at an additional private cost. Finally, respondents appear to have assumed that green energy would come at a higher cost and/or be of worse quality than less environmentally friendly energy. A brief statement, counteracting that assumption, had a significant effect on people's choices.

We emphasize that survey findings might not map onto actual behavior, especially in the environmental context, where green defaults have been found to have significant effects on people's choices.¹⁰⁰ Nonetheless, our findings suggest that in some contexts, the effects of active choosing may be quite large, and possibly even larger than those of green defaults. This is a topic well worth exploring in future research.

If our results reflect actual behavior, there is an intriguing and potentially productive implication: Those who favor active choosing as a matter of principle, and who are suspicious of defaults in general, might be able to make common cause with those who favor those forms of choice architecture that are more effective in achieving perceived social goals. In some contexts, active

100. See Ebeling & Lotz, *supra* note 6, at 868.

choosing might not only be the preferred way to respect people's agency; it might also be better from the environmental point of view.

