

## Environmental Policies Can Buttress Conservation Norms

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### ABSTRACT

In an attempt to solve large-scale environmental problems, government agencies often resort to formal sanctioning systems: market-based incentives or command-and-control regulations, to promote cooperation. The purpose of this study was to investigate how the presence of these formal sanctioning systems impacts informal sanctioning systems for environmental protection. Study 1 used an experimental game to explore the influence of market-based and regulatory programs on informal sanctioning in a laboratory setting. Study 2 was a quasi-experimental field survey that compared informal sanctioning among Massachusetts residents living in towns with voluntary, mandatory, and pay-as-you-throw recycling programs. Results showed that in the presence of a formal sanctioning system, individuals felt guiltier for not engaging in the cooperative behavior and expressed more disapproval for non-cooperators. Combined, these results show that environmental policies can buttress conservation norms.

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Should recycling be mandatory? Should carbon dioxide emissions be taxed? As environmental problems continue to mount, so too does pressure on leaders to find solutions. One option available to policymakers is the passage of laws that would create markets or impose regulations designed to increase cooperation and prevent further damage to the environment. These types of laws or regulations are part of formal sanctioning systems (FSSs).

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### Formal Sanctioning Systems

FSSs typically involve written laws that are imposed by a central authority and use third parties to monitor and enforce compliance (North 1990). Many towns and cities in the United States are using FSSs to increase their recycling rates. FSSs can be divided into regulatory and market-based programs (Frey 1997; Kelman 1981). Regulatory, or command-and-control, programs make the desired behavior mandatory and typically use the threat of legal or monetary sanctions to deter defection. For example, towns with mandatory recycling programs require households to recycle and fine those who are caught putting recyclables in the trash. Market-based programs use economic incentives or disincentives to make the cooperative option more appealing. For example, in towns with a “pay-as-you-throw” (PAYT) program, households pay for trash removal, either by weight or by volume, and receive recycling services for free.

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Reliance on FSSs is justified by the immediate gains that are seen in conservation. Both market-based and regulatory programs have been used successfully to promote recycling (Miranda et al. 1994; Skumatz and Freeman 2006). Among a sample of recycling coordinators from 264 cities throughout the United States, those employing a mandatory recycling program reported a significantly higher rate of participation (74%) and amount of waste diverted from landfills (22%) compared to those from towns with voluntary recycling programs (40 and 12%, respectively; Folz and Hazlett 1990). The effectiveness of FSSs has also been demonstrated for reducing water consumption (Van Vugt and Samuelson 1999; Van Vugt 2001) and plastic bag usage (Convery, McDonnell, and Ferreira 2007). In the United States, the number of communities with a PAYT recycling program increased by 68% from 1997 to 2006 (Skumatz and Freeman 2006).

From a social dilemma perspective, the effectiveness of FSSs is not surprising (Platt 1973). Under a voluntary recycling program, individuals who cooperate by recycling incur costs, such as allocation of space for recycling containers and spending time and energy separating recyclables. The benefits of recycling might include reducing air and/or water pollution and extending the life of the local landfill. Thus, the individual bears the costs of cooperation, but the benefits are realized by society at large. Given this breakdown of costs and benefits, it is not surprising that many people are tempted to throw everything in the trash. However, installing a formal sanctioning system changes the pay-off structure so that acting in one's self-interest (i.e., defecting) is less tempting. In some cases the dilemma between individual and collective interests may even be eliminated, because the immediate benefit of defecting is now countered by the punishment applied to that action (e.g., higher trash fees or a fine; Platt 1973). While FSSs can soften or eliminate the social dilemma inherent in many environmental problems, it is unclear how formal systems for regulating behavior impact the informal sanctioning systems, or normative culture, that surrounds the regulated behavior.

### Informal Sanctioning Systems

Informal sanctioning systems are based on social norms and conventions that arise naturally in interdependent groups and are endogenously enforced within those groups. Informal sanctions include both internal and social sanctions. Internal sanctions manifest in the form of shame, guilt, and/or embarrassment when a person has violated self-standards for his or her own behavior (e.g., Horne 2003) and as a "warm glow" when one has behaved consistently with one's ideals (e.g., Andreoni 1995). Social sanctions refer to rewards and punishments that are delivered by other people and can be direct or indirect. Individuals experience indirect social sanctions when they perceive that others approve or disapprove of their behavior (Reno, Cialdini, and Kallgren 1993; Rege and Telle 2003), while direct social sanctions (also called social control; cf. Chekroun 2008) include everything from subtle nonverbal behaviors such as a dirty look, to overt behaviors such as gossip, criticism, pushing, and ostracism (Wiessner 2005). A plethora of research has established that individuals are willing to employ a wide range of social sanctions, both in laboratory and in field settings, to promote the collective good (Fehr and Gächter 2000; Chekroun and Brauer 2002; Fehr and Gächter 2002; Wiessner 2005). Collectively, these informal sanctions provide a powerful mechanism for guiding social behavior.

The long-term success of proenvironmental government policies depends upon the interplay between formal and informal sanctioning systems. That is, for behavioral changes to be sustained without ongoing and costly monitoring and enforcement, environmental policies must influence the culture surrounding the regulated behavior. Ideally, FSSs would increase the felt moral obligation to engage in the regulated behavior, as well as the perceived and expressed approval for the regulated behavior (cf. Bowles and Hwang 2008). 100

### The Downsides of Formal Sanctioning Systems

Unfortunately, a large and growing body of research has documented numerous downsides to FSSs. In addition to the potentially high monetary costs of monitoring and enforcement, sanctions may also have detrimental cognitive consequences (Van Dijk, Mulder, and De Kwaadsteniet 2014). First, there is a danger that the regulated behavior will become bound by the external controls. Behavior under formal sanctioning often shows a typical reinforcement effect, a quick and dramatic increase in cooperation, followed by a decrease when the reinforcers are removed (Fehr and Gächter 2002; Mulder et al. 2006). For example, within Serengeti National Park, low levels of poaching were achieved with high levels of enforcement (Hilborn et al. 2006). However, when funding for enforcement decreased, poaching levels increased once again. 105 110

Second, external rules and regulations may “crowd out” intrinsic motivation (Frey 1997; Bowles 2008). This is especially true when the rules or regulations reduce an individual’s sense of autonomy (Deci and Ryan 2000; Vansteenkiste, Lens, and Deci 2006). For example, when young people were mandated to volunteer and perceived that their behavior was externally controlled, their future intentions to volunteer decreased (Clary and Snyder 1999). 115

Third, just as FSSs can lead to changes in attributions (i.e., explanations) for one’s own behavior, they can also lead to changes in how individuals explain the cooperative behavior of others. Typically, the presence of an FSS decreases trust in the cooperative intentions of others and has been observed both while an FSS is in place (Tenbrunsel and Messick 1999) and after it is removed (Mulder, van Dijk, and De Cremer 2006). In experimental games research, this change in trust manifests as a decrease in the expectation that fellow players will cooperate or as a belief that the cooperative behavior of others is bound by the external control of the FSS. 120 125

Fourth, formal sanctions may change the way an individual frames the choice between cooperation and defection (Tenbrunsel and Messick 1999; Gneezy and Rustichini 2000). Tenbrunsel and Messick (1999) found that players in a formal sanction condition were more likely than those in a control group to reframe the choice to either defect or cooperate as a business decision, rather than an ethical one. A shift in decision frame is important in its own right, but also because it impacts willingness to cooperate. Of those who saw the decision as an ethical one, 91% cooperated, compared to only 39% of those who saw it as a business decision. 130 135

### The Effects of formal Sanctioning Systems on Informal Sanctioning Systems

FSSs increase cooperation by making defection costly. However, little is known about the long-term impact that FSSs, such as those created by environmental policies, have on

informal sanctioning systems. There is some preliminary evidence to suggest that FSSs will buttress informal sanctioning systems. For example, in a retrospective quasi-experiment on smoking in Norway, participants reported that they sanctioned guests who smoked in their homes more after laws were passed prohibiting smoking in public places such as restaurants (Nyborg and Rege 2003). The presence of a public antismoking law spilled over into unregulated locations, such that smokers expected more negative reactions to their smoking and felt more pressure to ask for permission before smoking in someone's home. Similarly, residents living in a town with PAYT recycling expressed greater self-efficacy and personal norms for recycling (Thøgersen 2003). The installation of an FSS may be seen as a natural outgrowth of informal sanctioning systems (ISSs), in which case those who break the formal rules may also be seen as norm violators.

Formal sanctioning may also increase the perception that the desired behavior is approved (i.e., indirect social sanctioning). In a case study of landowners in Costa Rica, Uphoff and Langholz (1998) found that landowners who had joined a government-sponsored program that provided an incentive for conserving land were more likely to agree that "maintaining a natural area is a prestigious thing to do" (p. 258) compared to those who set aside land for protection but did not join the government-sponsored program.

Finally, the installation of a formal sanctioning system may be a signal that the situation is severe enough to require government intervention. The increase in perceived severity of the problem in turn leads to greater concern for the good of the collective. For example, Van Vugt and Samuelson (1999) report that households with water meters expressed greater concern for the collective costs of overconsumption compared to those living in unmetered homes.

## The Present Research

The primary purpose of the research in this article is to explore how the presence of a formal sanctioning system impacts informal sanctioning systems. Previous research suggests two competing hypotheses. Given the downsides of formal sanctions, the presence of an FSS promoting a cooperative environmental behavior might undermine informal sanctions in the same way that it has been shown to undermine intrinsic motivation and trust. Conversely, FSSs may buttress an individual's willingness to impose informal sanctions, making conservation norms even stronger. While there is some evidence to support the "buttressing" hypothesis, this research is limited in that none of the extant studies experimentally manipulated the presence of formal sanctions and none of them looked at the comprehensive effects of FSSs on both internal and social sanctions. A secondary goal of this research was to investigate the potential downsides of FSSs that have been identified in previous research in the context of environmental behavior. In the remainder of this article, the methods and results of a laboratory-based experimental games study (Study 1) and a quasi-experimental field survey (Study 2) are reported, followed by a general discussion of the results.

### Study 1

Study 1 utilized the methodology of the social dilemma paradigm to manipulate formal sanctioning and observe the effects on informal sanctioning using an experimental game. Environmental problems are often characterized as large-scale social dilemmas (e.g.,

Hardin 1968; Van Vugt 2009), and research shows that the public does recognize their social dilemma properties (Capstick 2013). Experimental games are also high on psychological realism. That is, they capture the tension experienced by people in the real world who have to make a choice, such as whether or not to recycle, between their own self-interest and the good of the group. Indeed, a recent issue of *Psychological Science in the Public Interest* was dedicated to explicating how experimental games research can be used to inform public policy on issues such as climate change (Parks, Joireman, and Van Lange 2013). Study 1 also included the additional dependent variables of expectations of cooperation, intrinsic motivation, and decision frame. Based on previous research on the downsides of FSSs it was predicted that FSSs would reduce intrinsic motivation, make participants more likely to frame their cooperative decision as an economic, rather than an ethical, one, and lead participants to expect greater cooperation from fellow participants that were tied to the threat of punishment.

### Method

Participants for this experiment were 92 university students (46 males, 46 females) tested in groups of 3 to 5 who were participating for course credit.

The procedure for this study was similar to that used in other experimental games research on public goods dilemmas (e.g., Chen, Pillutla, and Yao 2009). Upon arrival at the lab, participants were seated in a cubicle with a computer and were told that they would be taking part in an experiment on decision making in groups. Deception was used to maximize experimental control and ensure that only the variable of interest (formal sanctioning system) varied across conditions. Participants were led to believe that they were part of an eight-person group.<sup>1</sup> At the beginning of each round participants were given 10 points and had to decide how many of these points to contribute to a group account. Participants were told that points contributed to the group account would be doubled and distributed equally among all eight members of the group, while points left in the personal account did not change in value. Participants were told that the experiment was intended to simulate decisions that groups make in everyday life and were told that their decision to cooperate or defect was similar to the decision of whether or not to recycle. They were also told that each point that they earned could be redeemed for a raffle ticket to win a \$50 gift card (cf. Fehr and Gächter 2000).<sup>2</sup> The experimenter recommended that all players contribute at least seven points to the group account. This recommendation was intended to simulate the general encouragement citizens receive to voluntarily participate in their towns' curbside recycling programs, and to provide a reference point that was consistent across the conditions.

On Round 1 all participants read the following instructions:

Round 1

All members of your group have been given a starting amount of 10 Points.

The experimenters have recommended that all players contribute at least 7 Points to the group account, however the decision of how much to contribute is your own.

SPECIAL INSTRUCTIONS: None.

They were then asked to indicate how many of their 10 points they wanted to contribute to the group account. On Round 2, participants saw the same information as in Round 1,

except that the independent variable (formal sanction) was manipulated by including special instructions that differed across the three experimental conditions. Participants assigned to the market-based formal sanction condition saw “Special Instructions” that were intended to create the perception that keeping points in the private account was a fee-for-service transaction. That is, participants were told “On this round only, you must pay a fee of one point” for the service of keeping “more than three points in your private account. Thus, if you contribute fewer than seven points to the group account a fee of one point will be deducted from your private account.” Participants assigned to the regulatory formal sanction condition saw “Special Instructions” that read: “On this round only, the experimenter is requiring that all members of your group contribute at least seven points to the group account. The experimenter will be monitoring your contributions during this round. If you are caught contributing less than seven points to the group account, the experimenter will deduct one point from your private account.” The instructions for the regulatory condition were intended to create the perception that keeping points in the private account was a violation that would be punished by a formal authority. The experimenter was not actually monitoring participants’ accounts and no information was provided to participants about the monitoring or detection rate. Participants who had been randomly assigned to the no formal sanction condition did not receive any special instructions before Round 2, but still saw the statement from Round 1 reminding them that the experimenter had recommended that all participants contribute at least seven points to the group account.

After making their contribution decision in Round 2, participants completed a 24-item survey. Fourteen of the items were adapted from Mulder (2008); one item was used to measure internal sanctions (e.g., “Putting few points in the group account is something I would feel guilty about), nine items measured indirect social sanctions ( $\alpha = .84$ ; e.g., “I think putting few points in the group account is morally wrong”), and four items measured motive of collective interest ( $\alpha = .71$ ; e.g., “I wanted everyone to earn an equal amount of points”). Perceived threat of being punished was measured with the item “In choosing how many points to contribute to the group account in Round 2, I think the other group members were guided by the threat of being punished.” This item was used to verify the successful manipulation of the independent variable (formal sanction). Perceived choice was measured with seven items adapted from the Intrinsic Motivation Inventory (Ryan 1982;  $\alpha = .81$ ; e.g., “I felt like I had to contribute to the group account”). Responses for all of the previously mentioned items were made on a 7-point scale that ranged from 1 (strongly disagree) to 7 (strongly agree). Following Shinada and Yamagishi (2007), expectations of cooperation were measured with one item: “How many points do you think the other players in your group contributed, on average, to the group account during Round 2?” Lastly, decision frame was measured with a forced-choice item from Tenbrunsel and Messick (1999) that asked participants to choose whether their “decision about how much to contribute to the group account during Round 2” was best described as an “economic” or an “ethical” decision.

Following the survey, participants received feedback indicating that one of their fellow players had defected and contributed three points to the group account, while another had cooperated and contributed nine points to the group account during Round 2. The order of presentation of this feedback was counterbalanced so that half of the participants saw the defecting feedback first, while the other half saw the cooperative feedback first.

After each type of false feedback, participants were given the opportunity to respond. First, participants were asked whether they would like to send a message. Those who said yes were provided with an open-ended text box to type their message. Second, participants were asked whether they would like to send an emoticon (e.g., 😊).<sup>3</sup> Participants had the option of selecting one of five emoticons to accompany their message. The original emoticon scale ranged on a 5-point scale from 1 (very angry) to 5 (very happy), but for ease of presentation this scale has been recoded so that  $-2 = \text{very angry}$ ,  $-1 = \text{sad}$ ,  $0 = \text{neutral}$ ,  $+1 = \text{happy}$ , and  $+2 = \text{very happy}$ . Third, participants were asked whether they would like to add or deduct points from the player's account. Participants had to pay .25 points for every point they added or subtracted.

Participants were told that all messages would be sent and received before the start of Round 4. Thus, participants made their contribution in Round 3 without having seen the (preprogrammed) messages from other players. Round 3 did not include any special instructions and was the last critical round in the experiment. However, to minimize suspicion, the experiment was carried out for all five rounds. At the end of the experiment participants were thanked for their participation and fully debriefed using an electronic version of the procedure recommended by Aronson and Carlsmith (1968).

## Results

### Manipulation Check

The results of a one-way analysis of variance (ANOVA) showed that there was a significant difference across the three conditions on the measure of perceived threat of punishment,  $F(2, 86) = 7.57, p < .001$ . Post hoc comparisons showed that participants in the no formal sanction condition scored significantly lower on the measure of perceived threat ( $M = 3.50$ ) compared to participants in the market-based and regulatory conditions ( $M = 4.87$  and  $4.90$ , respectively; both  $p$ 's  $< .05$ ).<sup>4</sup>

### Contribution Decisions

A  $3$  (formal sanction)  $\times$   $3$  (round) mixed model ANOVA, with formal sanction as a between-subjects factor and round as a within-subjects factor, was conducted on the contribution decisions made by the participants on Rounds 1, 2, and 3 of the experiment. The results of the analysis showed that there was a marginally significant Formal Sanction  $\times$  Round interaction,  $F(4, 178) = 2.10, p < .10$ , but no main effect for formal sanction, or round ( $p$ 's  $> .29$ ). To explore the marginal interaction, follow-up univariate ANOVAs of the simple main effects were conducted. On Round 1, before the introduction of the independent variable, formal sanction, contributions to the group account did not differ across the three conditions ( $p = .68$ ). However, following the introduction of the independent variable at the beginning of Round 2, there was a significant main effect across the three conditions,  $F(2, 89) = 5.97, p < .01$ . Planned comparisons showed that participants in the market-based ( $M = 7.81, SD = 1.01$ ) and regulatory ( $M = 7.76, SD = 1.43$ ) conditions contributed more on Round 2, compared to participants in the no sanction condition ( $M = 6.48, SD = 2.37$ ; both  $p$ 's  $< .01, d = .73$  and  $d = .65$ , respectively), replicating the results of Fehr and Gächter (2000). However, this effect did not persist following the removal of the formal sanction in Round 3, ( $p = .80$ ).

### Informal Sanctions

With respect to internal sanctions, analysis of the survey responses using a one-way ANOVA showed a marginally significant effect,  $F(2, 89) = 2.17, p = .12$ . Those in the market-based condition said they would feel guiltiest, followed by those in the regulatory condition, and then those in the control condition (see Table 1 for means, standard deviations, and significant pairwise comparisons). 320

With respect to indirect social sanctions, a one-way ANOVA on formal sanction showed a significant difference across the three conditions,  $F(2, 89) = 3.89, p < .05$ . Follow-up post hoc comparisons showed that participants exposed to the market-based and regulatory FSSs expressed greater disapproval for those who would contribute few points to the group account compared to those in the control condition (both  $p$ 's  $< .05, d = .60$  and  $d = .64$ , respectively). 325 330

The results for direct social sanctions were analyzed separately for responses to feedback indicating the other player had cooperated versus defected. There were no significant differences across the three conditions in response to the cooperating feedback so those data are not discussed further. In response to the defecting feedback, 23 participants sent a message, 53 sent an emoticon, and 36 added or deducted points. There was a significant main effect of formal sanction for the intensity of emoticons sent to defectors,  $F(2, 47) = 4.15, p < .05$ . Post hoc tests showed that participants in the no formal sanction condition expressed significantly less ( $p$ 's  $< .05$ ) anger toward defectors ( $M = .29, SD = 1.45$ ) compared to participants in the market-based ( $M = -.85, SD = 1.09, d = .88$ ) and regulatory conditions ( $M = -.69, SD = 1.14, d = .75$ ). The difference between the market-based and regulatory conditions was not significant ( $p > .5$ ). The differences between the three conditions on the measures of message intensity and point sanctioning were not significantly different, nor were any of the interactions or order effects (all  $p$ 's  $> .05$ ). 335 340

### Additional Measures

A multivariate analysis of variance (MANOVA) was conducted with formal sanction as the independent variable and motive of collective interest, perceived choice, and expectations of cooperation as dependent variables (see Table 1 for means). The MANOVA was significant, Wilks's  $\Lambda = .84, F(6, 166) = 2.55, p < .05$ . Follow-up univariate ANOVAs revealed that the overall effect was driven by significant differences between the three conditions on the measure of expectations of cooperation,  $F(2, 85) = 4.83, p < .05$ . Post hoc comparisons showed that participants in the no formal sanction condition expected fellow players to contribute fewer points to the group account compared to participants in both the market-based ( $d = .48$ ) and regulatory conditions ( $d = .81$ ). 345 350

**Table 1.** Means and standard deviations for internal sanctions, indirect social sanctions, expectations of cooperation, motive of collective interest, and perceived choice by formal sanction condition.

	Formal sanction		
	None	Market-based	Regulatory
Internal sanctions	3.53 (1.80) <sub>a</sub>	4.45 (1.77) <sub>b</sub>	4.03 (1.70) <sub>a,b</sub>
Indirect social sanctions	2.95 (.94) <sub>a</sub>	3.49 (.87) <sub>b</sub>	3.59 (1.06) <sub>b</sub>
Expectations of cooperation	6.45 (1.25) <sub>a</sub>	7.00 (1.05) <sub>b</sub>	7.27 (.70) <sub>b</sub>
Motive of collective interest	4.76 (.85)	4.71 (.69)	4.42 (.56)
Perceived choice	5.25 (.90)	5.28 (1.02)	4.99 (1.08)

Note. Means in each row with different subscripts differ from one another at  $p < .05$ .



On the measure of decision frame, a chi-squared analysis showed that there was a marginally significant difference between the groups,  $\chi^2(2, n = 92) = 4.99, p < .10$ . Follow-up chi-squared analyses showed that a greater percentage of people in the two formal sanction conditions perceived their contribution as an ethical decision (52%) compared to those in the no formal sanction condition (28%),  $\chi^2(1, n = 92) = 4.71, p < .05, r = .23$ . There was no difference between the market-based (48%) and regulatory (55%) conditions,  $\chi^2(1, n = 60) = .28, p = .60$ . 355

## Study 2 360

Study 1 provided preliminary support for the buttressing hypothesis; informal sanctioning was stronger in the presence, versus absence, of an FSS. Participants in both the market-based and regulatory conditions sent significantly more negatively valenced emoticons to defectors compared to participants in the no formal sanction condition. In addition, participants in the market-based condition also showed higher levels of internal sanctioning compared to the control condition. Although Study 1 yielded interesting results, it is fair to question the mundane realism of the experimental procedure. 365

Thus, the primary purpose of Study 2 was to see whether the results from Study 1 would generalize to a real-world setting. In Study 2, the self-reported magnitude and frequency of informal sanctioning was compared between residents living in three different communities: one with a voluntary recycling program, one with a mandatory recycling program, and one with a PAYT recycling program. Based on the results of Study 1, it was predicted that residents living in a town with a PAYT or mandatory recycling program would show higher levels of informal sanctioning. 370

## Method 375

### Town Selection

The three communities included in the present study were matched, by inspection, on their recycling rates, and eight demographic variables (see Table 2). Recycling rates were held (relatively) constant across the three communities because perceived approval/disapproval is related to participation levels (Göckeritz et al. 2010). In addition, it is well established that formal sanctioning systems increase cooperation; thus, participation was not a dependent variable of interest. 380

### Participants

A compact disc containing all current phone listings for Massachusetts was purchased from Idearc Media Corp, and approximately 450 phone numbers were randomly selected from each of the three towns.<sup>5</sup> Over a 2-month period, trained research assistants made three attempts to contact 1362 residents (voluntary,  $n = 444$ ; PAYT,  $n = 447$ ; mandatory,  $n = 446$ ). All calls were made on evenings and weekends, or by appointment on a weekday. In total, 150 residents (58% female, 42% male) living in three different municipalities in Massachusetts completed the survey (voluntary,  $n = 38$ ; PAYT,  $n = 58$ ; mandatory,  $n = 54$ ), resulting in a response rate of more than 11%.<sup>6</sup> 385 390

### Survey

Respondents were asked to answer a survey that included measures of three types of informal sanctioning: internal sanctioning, indirect social sanctioning, and direct social

**Table 2.** Comparison of demographics for selected Massachusetts municipalities.

Program type <sup>a</sup>	Voluntary	PAYT <sup>b</sup>	Mandatory
Recycling rate (% waste diverted) <sup>c</sup>	28	27	31
Population size	27,149	27,139	33,858
Language (% English speaking)	82	93	90
Tenure at the address (% at same address in 1995)	65	59	65
Owner-occupied homes (%)	75	69	84
Seasonal residents (%)	0.6	0.3	0.3
Multifamily housing units (%)	17.2	15.7	14.1
Education (% high school graduates)	86	89	93
Income	\$57,838	\$59,371	\$70,207

Note. The three communities included in Study 2 were matched, by inspection, for each of the variables listed in this table.

<sup>a</sup>The type of recycling program was determined by contacting recycling coordinators in each town.

<sup>b</sup>PAYT = Pay-as-you-throw.

<sup>c</sup>Recycling rates reflect the percentage of municipal solid waste that was diverted from landfills in Calendar Year 2006 (Massachusetts Department of Environmental Protection 2006). Data for all of the remaining variables were taken from Summary File 1 of the 2000 Census.

sanctioning, as well as measures of intrinsic motivation (i.e., perceived choice) and trust 395  
(operationalized as attributions for why others recycle). Single-item measures and brief  
scales were used to minimize drop-out from the study.

Internal sanctioning was measured with two items adapted from Grasmick, Bursik, 400  
and Kinsey (1991) and Heywood and Murdock (2002). The items were “I would feel  
guilty if I didn’t recycle” and the reverse-coded item, “I would not feel ashamed if I  
did not recycle.” Responses ranged on a 5-point scale from 1 (strongly disagree) to 5  
(strongly agree). Indirect social sanctioning was measured with three items that asked 405  
participants how much people in their town approve or disapprove of someone who  
(a) always recycles, (b) often recycles, and (c) never recycles, with responses ranging  
from 1 (strongly disapprove) to 5 (strongly approve). Direct social sanctioning was measured 410  
with six items. Four items, adapted from Opp (2002), began with the stem “If I had  
neighbors who did not recycle, I would ...” and ended with the following four comple-  
tions: “urge them to start recycling,” “talk about them to a mutual acquaintance,” “tell  
them that it bothered me that they did not recycle,” and “give them a dirty look.” An  
additional two items were generated specifically for this experiment. These two items 415  
were “If I had neighbors who did not recycle, I would refuse to interact with them,”  
and “If I had neighbors who did not recycle, I would report them to a local government  
official,” with responses to all six items ranging on a 5-point scale from 1 (strongly  
disagree) to 5 (strongly agree). The aggregate six-item scale had adequate reliability  
( $\alpha = .71$ ).

Intrinsic motivation was operationalized with two items adapted from the perceived 420  
choice subscale of Ryan’s (1982) Intrinsic Motivation Inventory (IMI),<sup>7</sup> “I recycle because  
I want to” and “I feel like it is not my choice to recycle,” with responses ranging on a  
5-point scale from 1 (strongly disagree) to 5 (strongly agree). These items are designed  
to assess a person’s perception that her behavior is freely chosen.

Attributions for recycling were measured with two open-ended questions that asked 425  
respondents why they chose to participate in their town’s curbside recycling program  
(self-attributions) and why they thought other people in their town chose to participate  
in the town’s curbside recycling program (other attributions). Other attributions were  
interpreted as a measure of trust.

## Results

### Informal Sanctions

A MANOVA was conducted with recycling program as the independent variable and the five measures of informal sanctioning as the dependent variables. The MANOVA was significant, Wilks's  $\Lambda = .82$ ,  $F(10, 220) = 2.37$ ,  $p < .01$ . Follow-up tests are reported in the subsequent sections. 430

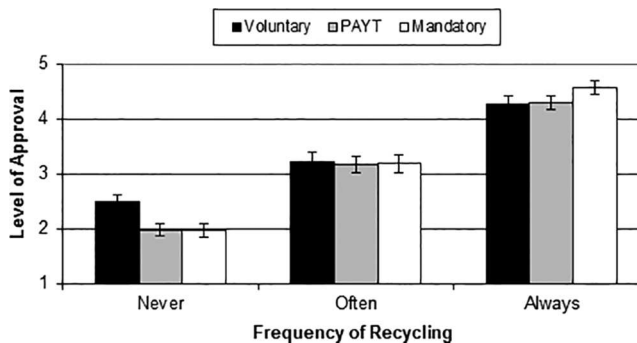
The two items used to measure internal sanctions were significantly correlated at  $r = .35$ ,  $p < .001$ , and averaged to form an aggregate measure. A one-way ANOVA of internal sanctions with type of recycling program as the independent variable was significant,  $F(2, 148) = 5.08$ ,  $p < .01$ . Post hoc comparisons showed that respondents in the mandatory community expressed significantly greater ( $p$ 's  $< .01$ ) levels of internal sanctioning ( $M = 4.32$ ,  $SD = .97$ ) compared to those in both the voluntary ( $M = 3.74$ ,  $SD = .1.05$ ,  $d = .57$ ) and PAYT communities ( $M = 3.79$ ,  $SD = 1.04$ ,  $d = .53$ ). 435

Univariate ANOVAs on the measures of indirect social sanctions showed that the only significant difference between the three communities was on the measure of approval for those who never recycled,  $F(2, 114) = 3.99$ ,  $p < .05$  (see Figure 1). Post hoc comparisons showed that those living in the voluntary recycling community expressed significantly less ( $p$ 's  $< .05$ ) disapproval for someone who never recycled compared to those living in communities with PAYT or mandatory recycling programs. 440

Although the pattern of means was consistent with the other informal sanctioning measures ( $M_{\text{voluntary}} = 1.57$ ,  $M_{\text{PAYT}} = 1.82$ ,  $M_{\text{mandatory}} = 1.78$ ), the difference between the three communities on the measure of direct sanctioning was not significant ( $p = .25$ ). Failure to find differences between the three groups may be due in part to the restricted range of responding for five out of the six questions in which the vast majority of respondents (from 56 to 89%) strongly disagreed with the statements related to sanctioning a non-recycling neighbors. This finding is interesting in its own right. 445

### Additional Measures<sup>8</sup>

Respondents were asked why they chose to recycle and why other people in their town chose to recycle. The results showed that respondents most commonly cited "benefits to 450



**Figure 1.** Respondents' perception of how much other people approved or disapproved of someone recycling by frequency of other's recycling and recycling program ( $\pm$ SE). Level of approval refers to respondents' perception of how much other people in their town approve or disapprove of a given frequency of recycling.

the environment” and “the right thing to do” as their motivation for recycling (48 and 30%, respectively). A chi-squared analysis showed that there were no significant differences across the three recycling programs in terms of the self-attributions made for recycling,  $\chi^2(16, N^9 = 193) = 18.29, p = .31$ . However, there was a significant difference on the ratings of other attributions for recycling,  $\chi^2(18, N^7 = 184) = 39.29, p < .01$ . Follow-up chi-squared tests showed that twice as many respondents in the PAYT community attributed the recycling behavior of others to “saving money” ( $n = 22$ ) compared to respondents in the voluntary and mandatory programs combined ( $n = 10$ ),  $\chi^2(1, n = 32) = 4.50, p < .05$ . Similarly, more respondents in the mandatory community attributed the recycling behavior of others to the presence of the mandatory ordinance ( $n = 16$ ) compared to those in the voluntary and PAYT programs combined ( $n = 7$ ),  $\chi^2(1, n = 23) = 3.52, p < .10$ . These results replicate previous research showing that trust in the motivations of others is undermined in the presence of a formal sanctioning system.

## General Discussion

The primary purpose of the present research was to explore how the presence of an FSS impacted informal sanctioning. The combined results of two studies suggest that, consistent with previous research on smoking by Nyborg and Rege (2003), FSSs buttress informal sanctioning of cooperation. That is, the presence of an FSS seemed to support and encourage punishment of defection by members of the group. In both studies, feelings of shame and guilt and the perception that other people disapprove of individuals who do not cooperate were stronger in the presence of an FSS. In Study 2, respondents in towns with FSSs perceived that there was greater disapproval for non-recyclers in their town, compared to respondents living in the community with a voluntary recycling program. However, consistent with recent research showing that partial recycling represents a point of indifference when examining the “normativeness of recycling” (Nolan 2014), there were no differences in perceived approval for residents who recycled often but not always.

There was also an important difference between the two studies. In the lab study, the presence of an FSS buttressed direct social sanctioning of defectors (using emoticons), while in Study 2 only a small minority of participants were willing to sanction a non-recycling neighbor. These results contradict previous field research on reactions to social norm violations (e.g., Chekroun and Brauer 2002), but are in line with more recent research showing that individuals are relatively unwilling to impose direct social sanctions on non-recyclers (Nolan 2013). Future research should continue to explore the characteristics of settings and behaviors that make individuals more or less likely to impose social sanctions.

Study 1 and Study 2 each had their limitations. The strength of the conclusion comes from combining the results of these two complementary approaches. Study 1 utilized an experimental game with high psychological realism that established a causal relationship between formal and informal sanctioning systems, but was lacking in mundane realism. Study 2 was high on mundane realism but used a quasi-experimental design that made it difficult to establish a cause-and-effect relationship between the presence of an FSS and individuals’ willingness to impose informal sanctions. For example, although the three towns were matched as closely as possible on the eight demographic variables, the higher income and educational attainment of the mandatory community could provide an

alternative explanation for the results of Study 2. It is possible that wealthier, more educated towns, already more likely to install an FSS, are also more predisposed toward disapproving of those who do not recycle. However, combined with the results of Study 1 this alternative explanation seems unlikely. 500

The secondary goal of this research was to investigate the potential downsides of formal sanctioning systems in the context of environmental behavior. The only negative side effect observed for the FSSs was the undermining of trust. Although participants expected greater cooperation in the presence of an FSS, they were also more likely to attribute the cooperative behavior of others to external pressures. In the field study, this was demonstrated in the analysis of attributions made about why other people recycle. In the lab study, participants' exposed to an FSS were more likely to believe that their fellow players only cooperated to avoid being punished for defection. These results are consistent with previous research showing that, in the presence of an FSS, trust is undermined as participants come to attribute the cooperation of fellow players to the presence of the FSS (Mulder et al. 2006). 505 510

The buttressing of informal sanctioning systems combined with the undermining of trust suggests that FSSs communicate both that the rules imposed by the central authority are moral (the buttress effect) and that the rules are broken (the undermining effect). Thus, FSSs may not impact all psychological motives in the same way. On the contrary, an important contribution of the present research is that it shows that FSSs can have a positive impact on one type of psychological motive (e.g., informal sanctioning) while simultaneously having a negative impact on another type of motive (e.g., trust in the cooperative intentions of others). The challenge for future research is to understand the variables that moderate when FSSs will have an enhancing effect and when they will have an undermining effect. Mulder, Verboon, and de Cremer (2009) have offered preliminary support for the moderating roles of sanction severity and trust in authorities, specifically for internal sanctions. Other potential moderators of the relationship between formal and informal sanctioning systems might include recognition of the need for the formal sanctioning system and the prevalence of the regulated behavior. 515 520 525

In the present research, there was no evidence that FSSs negatively influenced participants' framing of their cooperative choice. Instead, participants exposed to an FSS in Study 1 were more likely to see their choice as an ethical decision. One possible explanation for the difference between the findings of the present research and former studies is that FSSs make inherent frames more salient. In the present study, the target behavior, recycling, may begin with an inherently moral frame, whereas the behaviors investigated in Tenbrunsel and Messick (1999; i.e., running the smokestack scrubbers on a hypothetical manufacturing plant) and Gneezy and Rustichini (2000; i.e., paying for day care services) may begin with an inherently business frame. In each case, the presence of the FSS may have polarized the inherent frame. Some support for this contention comes from a recent study showing that fines framed as compensatory (vs. retributive) are more likely to lead to infractions of the regulated behavior and less likely to be perceived as moral transgressions (Kurz, Thomas, and Fonseca 2014). Future research should explore the effects of framing FSSs on decision frame and informal sanctioning in the context of environmental behavior. 530 535 540

There was also no evidence in the present research that formal sanctions crowded out intrinsic motivation. People in towns with PAYT or mandatory recycling were just as likely as people in the voluntary recycling town to attribute their participation in the curbside

recycling program to a desire to provide environmental benefits and to the idea that recycling is “the right thing to do.” In the lab, participants had comparable scores on the measure of perceived choice across the three formal sanction conditions. Although others have suggested that regulatory programs are more likely than market-based programs to crowd out intrinsic motivation (e.g., Frey 1997), there was no evidence of this difference in the current set of studies. Indeed, there were few meaningful differences between the two formal sanctioning conditions.

## Conclusion

The combined results of Study 1, a laboratory experiment, and Study 2, a field based quasi-experiment, provide converging evidence in support of the buttressing effect. Not only do FSSs provide the benefit of directly increasing cooperation by changing the costs and benefits of cooperation, but they also support informal sanctioning within groups. FSSs intensify the moral obligation that individuals feel to cooperate and the internal sanctions that are activated when they defect. FSSs also increase feelings of disapproval for defectors and the willingness to express that disapproval. As leaders confront some of the world’s most urgent environmental problems, the use of regulations and market-based incentives may be a viable approach for augmenting conservation norms.

## Notes

1. Participants were not actually playing against others. The feedback they received was preprogrammed into the computer.
2. In reality, each participant had the same chance of winning the \$50 gift card.
3. Previous research has shown that emoticons are a valid way to communicate approval/disapproval in the context of an experimental game (e.g., Takács and Janky 2007) and in the real world (e.g., Schultz et al. 2007).
4. The difference between the two formal sanction conditions was not significant ( $p > .10$ ).
5. The goal was not to acquire a representative sample from each community, but instead to acquire comparable samples across the three communities.
6. The difference in response rates across the three recycling programs was not significant.
7. A description of the IMI can be found at <http://www.selfdeterminationtheory.org/intrinsic-motivation-inventory>. A copy of the scale can be downloaded after registering.
8. There was no difference across the three communities on the measures of perceived choice (both  $F$ 's  $< 1.2$ ).
9.  $N$  in this context refers to the total number of themes.

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

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

Q3

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