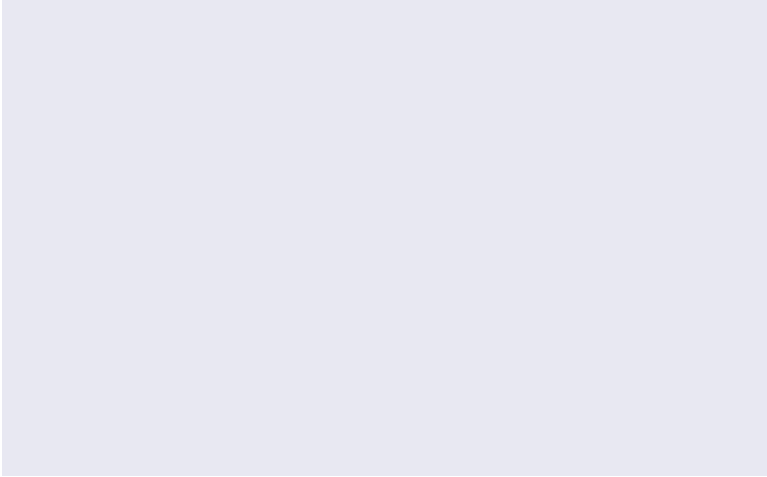


SOCIETY & NATURAL RESOURCES

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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).

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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

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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 2006) and were

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

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After each type of false feedback,

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With respect to internal sanctions, analysis of the survey responses using a one-way ANOVA showed a marginally significant effect,  $F$  320

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**Results**

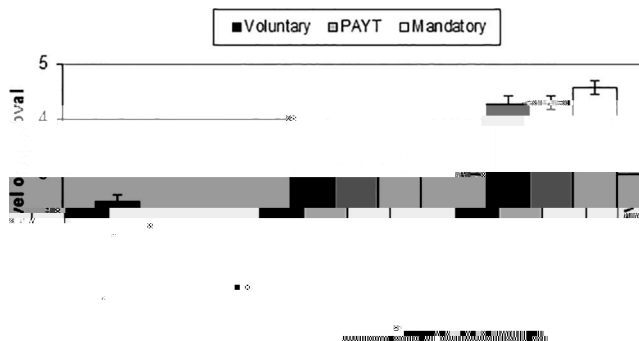
A MANOVA was conducted with recycling program as the independent variable and the five measures of informal sanctioning as the dependent variables. The MANOVA was significant, Wilks's  $\lambda = .82$ ,  $F(10, 220) = 2.37$ ,  $p < .01$ . Follow-up tests are reported in the subsequent sections. 430

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

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



Respondents' perception of how much other people approved or disapproved of someone recycling by frequency of other's recycling and recycling program (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,  $\chi^2(16, N^9 \sim 193) \sim 18.29, p \sim .31$ . However, there was a significant difference on the ratings of other attributions for recycling,  $\chi^2(18, N^7 \sim 184) \sim 39.29, p < .01$ . Follow-up chi-squared tests showed that twice as many respondents in the PAYT community attributed the recycling behavior of others to "saving money" ( $n \sim 22$ ) compared to respondents in the voluntary and mandatory programs combined ( $n \sim 10$ ),  $\chi^2(1, N \sim 100) \sim 10.00, p < .01$ .

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alternative explanation for the results of Study 2. It is possible that wealthier, more educated

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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.

## Acknowledgments

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## Funding

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This research was part of a dissertation supervised by University of Arkansas faculty, Drs. Dave Schroeder, Eric S. Knowles, Denise R. Beike, and Ana Bridges, and supported in part by the Marie Wilson Howell's Fund in the Psychology Department.



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