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How Much Versus Who: Which Social Norms Information Is More Effective?

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How Much versus Who: Which Social Norms Information is More Effective?

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Abstract

We conduct an experiment to investigate how different information about social norms affects individuals' stated contributions to a specific pro-environment program, a student "green fee," in the context of a referendum. Compared to students that receive no information about peer contributions, on average, students that receive information about the dollar value range of contributions at peer institutions contribute less while students that learn about the high percentage of students voting "yes" on green fee programs at peer institutions contribute more. The results are economically significant as the absolute values of both effects represent approximately 25% of average contributions. These results suggest that information about participation rates can be more effective than information about dollar amounts in encouraging contributions to environmental initiatives. Of interest to stated preference researchers, we find that results do not change when controlling for self-selection into survey completion.

Keywords: social norms; stated preference; pro-environment behavior; referendum

JEL classification: Q50; H41; C90; D03

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1 Introduction

Previous research has uncovered multiple settings in which people tend to conform to a peer group's participation in a pro-environmental behavior. For example, Goldstein et al. (2008) find that providing descriptive social norms motivate hotel guests to reuse their towels more effectively than providing information about environmental benefits. A group of studies finds that providing information to consumers about neighbors' energy usage can reduce energy consumption (Allcott, 2011; Ayres et al., 2012; Nolan et al., 2008; Schultz et al., 2007). Similarly, information about others' water usage can affect behavior (Ferraro et al., 2011; Ferraro et al., 2013). In each of these cases, individuals are choosing to behave in a more environmentally friendly manner because of a social norm. However, social norms in a given context can often be described in a variety of ways. Specifically, many behaviors can be described in terms of participation rates (extensive margin) or the intensity of participation (intensive margin). We seek to analyze which of these descriptors is more effective in motivating pro-social behavior. Therefore, our first contribution to the social norms literature is that we examine the effects of information about both the extensive and intensive qualities of a reference group's behavior.[1]

Moreover, in the real world, often the amount of a public good provided depends on a vote rather than a series of individual actions. For example, many countries, states, and localities decide referenda via the ballot on public policies including issues such as increased school funding, increased open space or trail ways, and increased fire or police services. Organizations spend vast amounts of money attempting to garner support for their referenda, often appealing to the social benefits of the policy. Perhaps information about social norms could be more persuasive. Thus, our second contribution to the social norms literature is that we examine the effects of information about a reference group's contribution in the context of a referendum. Specifically, we investigate how differing types of information about a peer group's behavior affect university students' stated contributions for environmental improvement programs.

There has recently been a push in the campus sustainability movement across the US. For example, 685 schools have signed on to the American College & University President's

[1] Throughout the manuscript, we use the term "extensive" as a measure of how many people participate in the behavior and the term "intensive" as a measure of how frequently or intensely people participate in a behavior.

Climate Commitment. Signatories commit to develop a plan to eliminate net greenhouse gas emissions. Other schools have investigated the possibility of joining the commitment but concerns about the costs of reducing carbon emissions during a period of increasing budgetary pressures have prevented signing. In turn, students at many institutions have searched for ways to fund environmentally focused programs such as the President's Climate Commitment. The "green fee" has emerged as a partial solution at over 70 known colleges and universities. Through referenda, students establish a "green fund" from extra student fees that supports purchasing renewable energy produced off-campus and/or funding renewable energy and energy conservation projects on-campus.[2]

We utilize a survey of 559 students at a U.S. Midwestern liberal arts university (hereafter MLAU) to test for differences in students' reported contributions to "green fee" programs based upon the type of peer information provided. We test for effects from social norms information with a treatment that describes the range of green fee dollar values adopted at peer institutions (dollar value treatment), a treatment that describes both the number of institutions that have adopted green fees and the percentage of students at peer institutions that have voted "yes" to the implementation of green fees (extent of participation treatment), and a treatment that presents all of the information combined in the first two treatments (combination treatment). Each of these treatments is then tested against a control group that receives no information about peers. Under the assumption that any hypothetical bias in our stated preference surveys affects only levels but not differential responses to treatments, we find that information given about a peer group significantly impacts respondents' reported contributions. Interestingly, the two types of information about social norms (extensive and intensive) have opposite effects on stated contributions.

Both t-tests for difference in means between groups and regression analysis confirm that gaining information about the dollar value of peer green fee contributions results in a decrease in mean contributions of about $8 to $9 and gaining information about the high participation rate of peers in green fee programs at other institutions results in an increase in mean contributions of about $7 to $8. Presenting both pieces of information together into one treatment leads to no change in mean contributions relative to the control group.

[2] The Association for the Advancement of Sustainability in Higher Education (AASHE) provides extensive information about higher education green fees in the United States (AASHE, Dedicated Student Fees for Renewable Energy and Energy Efficiency).

A common concern with survey data is that the pool of respondents may not be representative of the population because individuals self-select into completing the survey. This can potentially bias the results in several areas including the stated contribution amount and the size of the treatment effects. Fortunately, we have access to several key variables about each individual in the domestic student population of MLAU and we can link this information to the completed surveys so we can build a model to explain the survey participation decision. Utilizing a Heckman sample selection model, we find that official grade point average, race/ethnicity, and gender associate significantly with the survey participation decision. However, the treatment effects are qualitatively similar between the models that do and do not control for sample selection. It may be reassuring to other stated preference researchers that there is little to no difference when accounting for the sample selection.

2 Related Literature

The power of social norms has been documented in a variety of contexts in the psychology literature. Steg and Vlek (2009) recognize the influence of social norms as one of the factors influencing environmental behavior. Two examples in an environmental context include Cialdini et al. (1990) and Cialdini et al. (2006). In this literature, descriptive social norms are described as, "informing individuals of what is likely to be effective or adaptive behavior in that situation" (Goldstein et al. 2008). This is very similar to the idea of "conformity" in the economics literature, where the more commonly accepted definition of conformity relates to a social phenomenon where individuals take cues from others as to what is acceptable behavior. For example, Bardsley and Sausgruber state that conformity, "involves perceiving others' behavior as a guide to what is socially or morally appropriate. It therefore predicts that people may conform independently of the material consequences of doing so" (Bardsley and Sausgruber, 2005). A related phenomenon in the economics literature has been termed "reciprocity," which predicts a matching behavior where individuals attempt to match others' contribution levels. The distinction here is that reciprocity is driven by a desire to create fairness whereas conformity does not have its roots in a desire of fairness but rather in a desire to not deviate from the actions of others.

Conformity and reciprocity are often difficult to separately identify because both motivators will give rise to "conditional cooperation," which broadly states that individuals

contribute more to a public good when others also contribute. As pointed out by Frey and Meier (2004), there are at least three theoretical explanations that can explain the results of their study. People may want to conform to a social norm, people may desire fairness and hence exhibit reciprocity behavior, and contributions by others might signal the quality of the public good (Vesterlund, 2003). A group of field experiments have examined the extent of conditional cooperation in a variety of contexts including movie rating behavior (Chen et al., 2010), contributions of students in Zurich to social funds supporting other students (Frey and Meier, 2004), contributions to a radio station (Shang and Croson, 2009; Croson and Shang, 2008), contributions to cross-country track maintenance (Heldt, 2006), and museum donations to transparent boxes (Martin and Randal, 2008).

The effect of information about a reference group's contributions on stated contributions has not been studied as much. Alpizar et al. (2008) investigate whether information about the contributions matters more for hypothetical contributions than for actual contributions at a national park in Costa Rica. They state, "as far as we know, no previous study has looked directly at how information about the contributions of others affects stated contributions" (Alpizar et al., 2008). While they do find a substantial hypothetical bias, they do not find that the influence of peer information is larger for stated contributions compared to actual contributions. Hypothetical bias has also been documented in many environmental valuation studies.[3] However, given that we are more interested in how the average contribution changes in response to differential information and are less concerned with the absolute baseline contribution amount we abstract from any hypothetical bias concerns.

3 Survey Description

Prior to conducting the survey, we held focus groups with 25 students to discuss their opinions about green fees and to learn the relevant range of contributions for the payment card portion of the survey. During October of 2011, we conducted a survey of 559 MLAU students. The entire MLAU student population, which is approximately 1850 students, was contacted via direct email solicitation making the response rate approximately 30 percent. Potential respondents were provided a link in the email to the online survey, hosted by

[3] See Whitehead and Cherry (2007) for an overview of many studies documenting hypothetical bias and the approaches that researchers have taken to mitigate the bias.

SurveyGizmo. Respondents could only access the survey via the link in their email, which ensured that each respondent only completed the survey once. On the welcome page of the survey, respondents were informed that the purpose of the study is to find out how MLAU students view environmental issues and to gage the level of support for increasing funding for sustainability projects on campus. Respondents learned that the results of the survey would be shared with campus decision makers including the administration, faculty committees, and the MLAU Council on Student Affairs. As there was recent talk on campus about the President's Climate Commitment and potential green fees, respondents had sufficient reason to take the hypothetical fee referendum seriously.

In the introduction of the survey, students learn about the recent and current environmental initiatives on MLAU's campus. The subsequent section gathers information about the respondents' environmental awareness and extent of "green" behavior. These questions are important because they can potentially explain differences in willingness to contribute to a green fee. The second section of the survey informs MLAU students that MLAU recently received a B- from the College Sustainability Report Card and enumerates several of the components that contribute to that ranking. This section also inquires about respondents' priorities for environmental improvements on campus.

The third section of the survey contains the green fee contribution question. After explaining what a green fee is, our contribution question is phrased as,

> Suppose a ballot initiative has been drafted to create a mandatory green fee for all students. Also, suppose that all students are given the opportunity to vote. The initiative will pass if it receives more "yes" votes than "no" votes. If passed, the initiative will establish a certain dollar amount per semester that each student will be **required to pay** in the form of a **fee charged to your student account**.
>
> What is the maximum dollar amount per semester for which you would vote "yes" on this referendum for a mandatory green fee? (Select one dollar amount)
>
> Please keep in mind your own personal financial situation and how the proposed fee would affect your personal budget.

Respondents then select a dollar amount from a payment card having fees ranging from $0 to $100 per semester in $5 increments.

We randomly assign our sample into four groups (a control and three treatment groups). The control group receives no information about peer institutions. Treatment 1

(Dollar Value Treatment) describes the range of green fees adopted at peer institutions. The exact wording of the addition to the contribution question compared to the control group is,

> In recent years, students in many schools have voted to pay a certain amount of money along with their tuition to support the campus sustainability movement. The amount of fees charged at other universities ranges between **$1 per credit of class to $80 per year.**

We gathered this information about the range of fees from AASHE. While presenting respondents with varying dollar amounts for the range would have increased the variation in our data and potentially facilitated a more precise estimate of this dollar value effect, we wanted to avoid providing respondents with false information. A certain percentage of students on campus is quite active environmentally and would plausibly know if we were lying to them about green fees at peer institutions. We wanted to limit the study to the effects from true information.

Treatment 2 (Extent of Participation Treatment) describes both the number of institutions that have adopted green fees and the percentage of students at peer institutions that have voted "yes" to the implementation of green fees. The exact wording of the addition to the contribution question compared to the control group is,

> In recent years, students in many schools have voted to pay a certain amount of money along with their tuition to support the campus sustainability movement. Today, there are **more than 70 colleges and universities known** to have student green fees. The number of institutions starting student green funds is steadily increasing.
> When put to a student referendum, on average, **85% of the student body at the known schools voted for passing** the green fee referendum. For example, 85% of students from the College of William and Mary voted for the referendum, 77% of students from University of Illinois voted for "Yes", and 81% from Appalachian State University voted for "Yes".

Again, this information was gathered from (AASHE). As with the previous treatment, we considered varying the number of green fee institutions and the percentage of the student body voting yes. However, we decided that it was preferable to avoid introducing any false information to the survey.

Treatment 3 (Combination Treatment) combines the information from Treatment 1 and Treatment 2. That is, respondents receive information both on the dollar value and the extent of participation at peer institutions.[4]

As a follow-up question to all of the groups, we ask respondents how certain they are that their vote will influence student green fee policy at MLAU. The fourth and final section of the survey collects confidential demographic information.

4 Data and Descriptive Analysis

As previously stated, 559 respondents completed the survey. Summary statistics for all variables are given in Table 1 and a description of all variables is in Appendix A. For comparison, the overall MLAU student population is roughly 46 percent male, ten percent international, and 25 percent varsity athletes. As seen in Table 1, approximately forty percent of the sample completed the control version and twenty percent of the sample completed one of the three treatment versions.[5] As a starting point, we break the sample into the control and three treatment groups to get a sense of how the treatments affect contribution levels. We reject the null that the means of the four groups are jointly equal (p-value = 0.0002). Table 2 reports the results for the t-tests for difference in means between the control and treatment groups. In each case, the relevant treatment group is tested against the control group. We find that Treatment 1 (Dollar Value) has a significantly lower mean contribution than the control group and Treatment 2 (Extent of Participation) has a significantly higher mean contribution that the control group. The mean of Treatment 3 (Combination) is statistically no different from the mean of the control group.

To examine this further, we analyze the distributions of contributions across the groups. Figures 1 through 4 present histograms of the contribution amounts for the control and three treatment groups. As shown in Figure 1, the most frequent contribution amount in the control group is $20, followed closely by $0 and $50 per semester. Relative to the control group, Treatment 1 (Dollar Value) displays a larger percentage of low-level contributions

[4] At the design stage, we expected both Treatment 1 and Treatment 2 to increase mean student contributions, and hence, Treatment 3 to perhaps increase contributions even further. Based on the focus groups, we expected most students in the control group would be willing to contribute $0-$10 a semester. Evidently, we underestimated the number of students who would be much more generous absent peer information.

[5] Students were randomly assigned to one of the 4 groups.

(Figure 2). Recall that the referenced peer contribution range in Treatment 1 is $1 per credit to $80 per year. Thus, individuals would likely infer that the average contribution is somewhere in the $20 per semester range.[6] Concentrating on the upper half of the payment card options, it appears that Treatment 1 is "missing" a percentage of high-level contributors relative to the control group. It seems that many of these individuals move down to match the dollar amounts that are referenced for the peer institutions. There is little change in the $0 contribution frequency, but the $5 to $15 contribution amounts pick up many more individuals in Treatment 1 compared to the control group. In other words, at first glance, it looks like Treatment 1 (Dollar Value) changes the intensity of contributions but not the frequency of positive contributions.

Next, in Figure 3, we see that Treatment 2 (Extent of Participation) has fewer individuals in the lower third of the payment card options relative to the control group. Recall that this extent of participation treatment informs participants that 85 percent of students at known institutions voted for passing a green fee when put to a ballot. Participants receive no information on the dollar amount of the average contribution at other institutions. Interestingly, there is a large reduction in the number of individuals choosing to contribute $0 in Treatment 2 compared to the control group. Students that perhaps previously would have contributed $0 to a green fee may increase their contribution amount after learning of the high participation rates of peers. The upper end of the distribution doesn't seem as different from the control. However, there may be a shift toward $50 and $100 and away from the contributions in the $60 to $80 range.

Treatment 3's (Combination Treatment) histogram looks quite similar to the control group and is shown in Figure 4. There may be a slight shift toward the $50 contribution amount relative to the control, but the overall pattern of contributions in Treatment 3 is visually not much different from the control. It seems that the two pieces of information may be effectively negating each other. Some respondents may be revising up their contributions while others are simultaneously revising down their contributions relative to what they would have done absent any information. Or, it may be that few or none of the respondents are revising their contributions relative to what we would have observed absent the two types of peer information.

[6] Almost 100% of MLAU students are full time students, corresponding to 8-9 credit hours per academic year. Thus, they would likely interpret this range as about $8-$80 per year ($4-$40 per semester).

Table 3 shows the number of individuals in each group that did not contribute anything to the hypothetical green fee. In Treatment 2 (Extent of Participation) there are about half as many individuals that refuse to contribute any dollar amount compared to the other groups. T-tests for differences in the probability of a positive contribution confirm that the probability is statistically different for Treatment 2 (Extent of Participation) compared to the control (p-value=0.027) and Treatment 1 (Dollar Value) (p-value =0.042).

5 Main Regression Results

To further explain differences in contributions between treatments and to explore differences in contributions due to other systematic factors, we next turn to multiple regression analysis. We pool the data and use both individual characteristics and indicator variables representing treatment groups as independent variables for each of the regressions, where the control group is the comparison group. Thus, the regression equation is

$$contribution_i = X_i\beta + \varepsilon_i, \quad (1)$$

where X_i is a vector containing individual characteristics and indicators for the treatments and ε_i is a normal error term for individual *i*. As a baseline, we present OLS results.[7] However, since we collect payment card responses for contribution levels, we have responses that are right-censored at \$100, responses that are left-censored at \$0, and interval observations. Thus, we employ a maximum-likelihood interval regression in addition to the OLS regression.[8] An OLS regression could result in biased regression coefficients and maximum-likelihood interval regression is more efficient than OLS regression for interval data. Nevertheless, it is often informative to present OLS results alongside the interval regression results to see how they compare (Cameron, Huppert 1989). Here, in Table 4, we present only the reduced OLS and MLE regressions.[9] We note that the results are similar for

[7] For OLS regressions, contributions at the endpoints of 0 and 100 are coded at those levels. Other contribution amounts are coded as the mid-point of the payment card intervals.
[8] We utilize Stata's intreg command for the interval regression.
[9] From the full model, we drop *fullloadlaundry, lightingwaste, heatacwaste, drivingtrips, recyclepaper,* and *foodwaste* because these are all variables that measure environmental behaviors and attitudes and all have p-values higher than 0.2 in the full OLS regression. We also drop *age* because this information is already largely captured in *yearinschool*. Finally, we drop *#roommates* because of its high p-value and lack of theoretical relationship with the level of one's contributions to a green fee. A partial F-test and Wald test confirm that the dropped variables are insignificant predictors of green fee contributions. Results for the full model are available upon request.

OLS and for the MLE interval regressions. Treatments 1 and 2 are significantly different from the control group in each regression.[10]

Because the interval regression model is preferred for payment card data, we focus on interpreting those results. We examine the significance of the indicator variables *treatment1, treatment2,* and *treatment3* for evidence of information about social norms affecting behavior. The negative and significant sign on *treatment1* agrees with what we see in Figure 2 compared to Figure 1. Gaining information about the dollar range of contributions at peer institutions causes a decrease in average contributions of about $8.09. This confirms what we find in the t-test for difference in means, as the difference there is $8.50. Again, the average contribution that participants would infer from the dollar value information falls in the bottom portion of the contributions that we see in the control group. So, relative to the control, some participants in Treatment 1 revise down their contributions to be closer to their newly gained perceptions of their peers.

The positive and significant sign on *treatment2* also confirms that pattern we see in Figure 3 compared to Figure 1. Learning about the extent of participation in green fee programs at peer institutions causes an increase in average contributions of about $7.25. This agrees with the t-test from Section 4, where the difference is $7.10. One explanation is that respondents in this treatment are now inferring that the average peer contribution is higher than what they would have expected prior to receiving the participation information. Because the perceived peer contribution exceeds a participant's original contribution amount for at least a portion of the treatment group, some Treatment 2 participants increase their reported contribution.

The environmental behavior variables of *showertime, turnofflight,* and *doubleprint* are statistically and economically significant. They also have the expected signs in that students who report exhibiting green behaviors are willing to contribute more to the green fee program. Respondents that are more certain that their vote will influence green fee policy at MLAU are willing to contribute more to the green fee program. As for demographics, males are willing to contribute a significantly higher amount than are females. The scale of this difference is also quite large, estimated at around $10.51. Previous research has found a larger hypothetical bias in males than females, which could explain at least some of this

[10] We also examine a specification that interacts the treatments with observable characteristics to investigate whether the magnitudes of Treatments 1 and 2 depend on these characteristics. However, none of the interaction terms are significant.

difference (Brown and Taylor, 2000). Interestingly, students with higher GPA's contribute more as well. This may be similar to previous findings that more highly educated individuals are more pro-environmental in their behaviors. It is also interesting that income is not found to be a significant predictor of green fee contribution level. However, over 85 percent of the sample reports their income falls either in the "less than $2000" or "$2000-$5000" categories so there is not a great deal of variation to work with here.

6 Selection Model Results

There is always a concern with survey data that the sample responses may not be representative of the population. Furthermore, respondents who care more about the issues of the survey may be more likely to respond to the survey. In the context at hand, the contribution amounts will be biased upwards if respondents who care more about environmental issues are more likely to respond to the survey and are also more likely to contribute more to the green fee. More troublesome yet for the objectives of this study, students who decide to complete the survey may respond differentially to peer information than students who decide not to complete the survey. This could imply that we are overestimating or underestimating the treatment effects in the population by utilizing this sample. The appropriate response in this situation would be to specify a (Heckman) sample selection model. We typically do not have data that will allow us to do so because we do not typically have information about the people who declined taking the survey. However, fortunately in this case, we are able to gather some information about all MLAU students with the cooperation of the University administration.

We return to the regression model (equation 1) and add a selection condition,

$$Z_i\gamma + \mu_i > 0, \tag{2}$$

where Z_i is the vector of characteristics that explain the participation decision and μ_i is a normal error term. An individual participates in the survey if the selection condition holds true. We observe the dependent variable (contribution amount) only for individuals that participate in the survey. The typical Heckman selection model then stipulates that ε and μ have correlation ρ. If $\rho \neq 0$, estimates of equation (1) that ignore the sample selection will be biased. To produce consistent estimates in the presence of sample selection, one can either

utilize full information maximum likelihood estimation or Heckman's (1979) two-step estimator of the model (Cameron and Trivedi, 2005).[11]

We receive information from university administration about students' official GPA's, recorded gender, races/ethnicities, and home addresses.[12] Given the home address, we create a regional dummy for the student's home state using the Census Region definitions from the U.S. Census Bureau (2013). All states are classified according to West, Midwest, Northeast, and South. We therefore have five geographic regions in total when including international students. Ethnicity is self-identified according to the definitions for race and ethnicity of the Integrated Postsecondary Education Data System (2013). Individuals first designate ethnicity as "Hispanic or Latino" or "Not Hispanic or Latino." Then, individuals indicate one or more races from "American Indian or Alaska Native," "Asian," "Black or African American," "Native Hawaiian or Other Pacific Islander," and "White." Individuals can only fall into one of the race/ethnicity categories in the data that we have from the University administration so we use "White" as our comparison category for the regression analysis.

We assume that the decision to participate in the survey is a function of the variables that the university has provided for all students: geographic region, official GPA, gender, and race/ethnicity. Identification of the Heckman selection model requires at least one variable in the selection equation (2) that does not appear in the regression equation (1); geographic region and race/ethnicity serve this purpose in our application. Significant variables in the selection equation include official GPA, gender, and "Black or African American."[13] We assume that the stated contribution to the green fee is a function of the independent variables from the survey that we use in the reduced regressions in Table 4.

The typical Heckman sample selection model does not accommodate an interval dependent variable. However, Roodman's (2011) cmp framework does accommodate sample selection with an interval dependent variable. The cmp framework is a user-written maximum likelihood estimator for Stata, building on seemingly unrelated regressions (Roodman, 2011). Analogous to Table 4, we once again present two sets of results for the

[11] Heckman's (1979) two-step procedure first estimates a probit model for sample inclusion and then includes the inverse of the Mill's ratio in the regression equation. Stata's maximum likelihood version of the Heckman model supports the Huber/White/sandwich estimator of variance and is hence our model of choice. The two-step results are similar and available upon request.
[12] This information is given to us in a way that does not identify the individual.
[13] First stage results from the selection equation are omitted from the table for readability but available upon request.

sample selection estimates in Table 5; Column I shows the basic MLE sample selection results and Column II shows the interval MLE sample selection results. The magnitudes of the treatment effects for Treatment 1 and Treatment 2 are similar to those from the corresponding columns of Table 4 and both of these treatments remain statistically significant at conventional levels. There is evidence in both columns that the selection equation is correlated with the regression equation, implying that students' contributions are correlated with their probability of completing the survey. However, it does not appear that accounting for this self-selection leads to substantially different conclusions about the population parameters in this application. This is perhaps comforting to other economists who rely on stated preference studies using undergraduate participants.

7 Conclusion

We extend the literature on social norms with a stated preference study concerning contributions to student funded environmental improvement programs in the context of a referendum. These "green fee" programs continue to gain popularity on campuses across the country and are a good example of the types of referenda we see at the voting booth. We analyze effects on students' stated contributions both from t-tests for differences in means between survey groups and maximum likelihood regressions that control for individual characteristics including stated environmental behaviors. Furthermore, these results are robust to models that controls for the self-selection of students into completing the survey.

When soliciting support for a pro-social referendum, one might be wise to reveal only information regarding the participation rate of peers, given the participation rate is high. By revealing information about the dollar value of peer contributions, some individuals that previously might have been much more generous than their peers will potentially revise down their contributions to be more in line with those of their peers. We find that providing information about the range of green fee contributions from students at peer institutions results in a decrease in average contributions of approximately twenty five percent ($8.00) relative to the control group that receives no information about others' contributions. In contrast, providing only information about the number of schools that have green fees and the percentage of students that have voted in favor of such fees results in a similarly scaled increase in average contributions.

These findings motivate several interesting unanswered questions. One important extension would be to establish how total contributions change in response to differential peer participation rates. Another important extension would be to investigate whether revisions in response to peer contribution dollar amounts are asymmetric. That is, for a given absolute divergence in ex ante contribution, perhaps individuals are more likely to revise down their contributions to match their peers than to revise up their contributions to match their peers. Or, perhaps the extent of the revision differs based upon whether the peer reference point is higher or lower than one's ex ante contribution level.

We do not have a survey design that allows us to separate conformity and reciprocity effects. One possible explanation for the observed behavior is that students are conforming to the social norm that has been established at peer institutions regardless of the equity implications. An alternative explanation is that students are concerned about fairness. The bulk of established green fees go toward energy efficiency and renewable energy production that have local, regional, and global impacts. In another context, perhaps the horizontal zone of influence of the pollutant could be helpful in separating out the conformity and reciprocity effects. As it is apparent that reciprocity or conformity or both are present in stated contribution levels, it would be interesting to pose a series of questions to respondents to tease out their motivations for giving. Similarly, it would be interesting to see if students react differently to information about peers at their own institutions versus peers at other places of higher education.

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Table 1: Descriptive Statistics, n=559

Variable	Mean	Std. Dev.	Min	Max
contribution	31.816	27.98	0	100
showertime	12.397	5.703	2.5	25
fullloadlaundry	0.889	0.314	0	1
turnofflight	0.893	0.310	0	1
lightingwaste	6.299	2.088	1	10
heatacwaste	5.637	2.282	1	10
drivingtrips	1.934	3.337	0	13.5
recyclepaper	0.800	0.401	0	1
foodwaste	12.688	12.464	5	87.5
doubleprint	0.274	0.446	0	1
greenwork	0.458	0.499	0	1
certainty	4.018	2.622	0	10
age	19.742	1.294	17	23
male	0.326	0.469	0	1
international	0.088	0.283	0	1
athletic	0.186	0.389	0	1
yearinschool	2.494	1.117	1	4
economics	0.109	0.312	0	1
environmental studies	0.029	0.167	0	1
science	0.360	0.480	0	1
socialscience	0.356	0.479	0	1
humanities	0.150	0.358	0	1
arts	0.068	0.252	0	1
sports management	0.021	0.145	0	1
liveoncampus	0.891	0.312	0	1
#roommates	2.138	1.591	0	5
gpa	3.371	0.429	1.83	3.83
income ($ 1000's)	3.979	9.440	1	100
treatment1	0.193	0.395	0	1
treatment2	0.202	0.402	0	1
treatment3	0.215	0.411	0	1
control	0.390	0.389	0	1

Table 2: T-tests for Differences in Mean Contributions.

	Group			
	Control	Treatment 1 (Dollar Value)	Treatment 2 (Extent of Participation)	Treatment 3 (Combination)
Mean Contribution	31.83	23.33***	38.94**	32.71
Standard Deviation	28.52	24.26	29.14	27.29
Treatment Mean – Control Mean	-	-8.50	7.10	0.873
n	218	108	113	120
t-stat	-	-2.81	2.12	0.277
p-value	-	0.0054	0.0353	0.782

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 3: Prevalence of $0 Contributions

Group	*# of $0 Contributions*	*(% of Group)*
Control	34	(15.6)
Treatment 1 (Dollar Value)	17	(15.74)
Treatment 2 (Extent of Participation)	8	(7.08)**
Treatment 3 (Combination)	14	(11.67)

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 4: Reduced Regression Model Results

	I. OLS		II. MLE	
treatment1 (Dollar Value)	-6.833	**	-8.085	**
	(2.866)		(3.478)	
treatment2 (Extent of Participation)	5.877	*	7.247	*
	(3.252)		(3.803)	
treatment3 (Combination)	1.228		1.428	
	(2.939)		(3.471)	
showertime	-0.408	*	-0.490	*
	(0.213)		(0.259)	
turnofflight	6.167	*	8.008	*
	(3.606)		(4.415)	
doubleprint	8.124	***	9.784	***
	(2.690)		(3.096)	
greenwork	3.929	*	4.414	
	(2.312)		(2.743)	
certainty	2.240	***	2.874	***
	(0.453)		(0.537)	
male	9.625	***	10.507	***
	(2.745)		(3.271)	
international	-7.444	*	-6.737	
	(4.181)		(4.913)	
athlete	-4.267		-5.224	*
	(2.640)		(3.111)	
yearinschool	1.244		1.373	
	(1.125)		(1.276)	
science	8.953	***	10.223	***
	(3.332)		(3.808)	
socialscience	5.129		5.203	
	(3.315)		(3.764)	
sports management	-13.955	***	-17.326	***
	(4.707)		(6.664)	
liveoncampus	-3.841		-3.842	
	(3.818)		(4.488)	
gpa survey	4.812	*	5.570	*
	(2.644)		(3.163)	
income	-0.130		-0.191	
	(0.114)		(0.163)	
constant	-4.032		-10.446	
	(12.570)		(14.494)	
F/W Test Statistic	7.92		142.31	
R-Squared	0.19			
Sigma	25.69		29.64	
AIC	5226.77		3185.05	
n	559		559	
Partial F/W Statistic	0.75		7.13	

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%.
Robust Standard Errors are in Parentheses. Insignificant majors are omitted from the table for readability.

Table 5: Reduced Regression Results, Selection Models

	I. Heckman MLE		II. Interval MLE (CMP)	
treatment1 (Dollar Value)	-6.824	**	-8.080	**
	(2.812)		(3.477)	
treatment2 (Extent of Participation)	5.892	*	7.257	*
	(3.176)		(3.792)	
treatment3 (Combination)	1.269		1.467	
	(2.893)		(3.484)	
showertime	-0.401	*	-0.482	*
	(0.209)		(0.259)	
turnofflight	6.288	*	8.127	*
	(3.520)		(4.401)	
doubleprint	8.235	***	9.907	***
	(2.639)		(3.104)	
greenwork	3.963	*	4.442	
	(2.267)		(2.743)	
certainty	2.241	***	2.871	***
	(0.445)		(0.538)	
male	11.327	***	12.266	***
	(2.862)		(3.590)	
international	-6.650		-5.906	
	(4.086)		(4.884)	
athlete	-4.357	*	-5.298	*
	(2.580)		(3.102)	
yearinschool	1.019		1.137	
	(1.114)		(1.301	
science	9.166	***	10.451	***
	(3.266)		(3.814)	
sports management	-13.911	***	-17.309	***
	(4.652)		(6.674)	
liveoncampus	-4.087		-4.097	
	(3.740)		(4.490)	
gpa survey	2.900		3.578	
	(2.654)		(3.324)	
income	-0.116		-0.178	
	(0.113)		(0.163)	
constant	9.970		4.022	
	(13.161)		(16.669)	
F/W Test Statistic	179.31		245.55	
Sigma	25.85		30.27	
Wald Test for Indep. Eqns. (p-value)	0.0079		0.108	
AIC	7402.821		5348.928	

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%. n=1817.
Robust Standard Errors are in Parentheses. Insignificant majors are omitted from the table for readability.

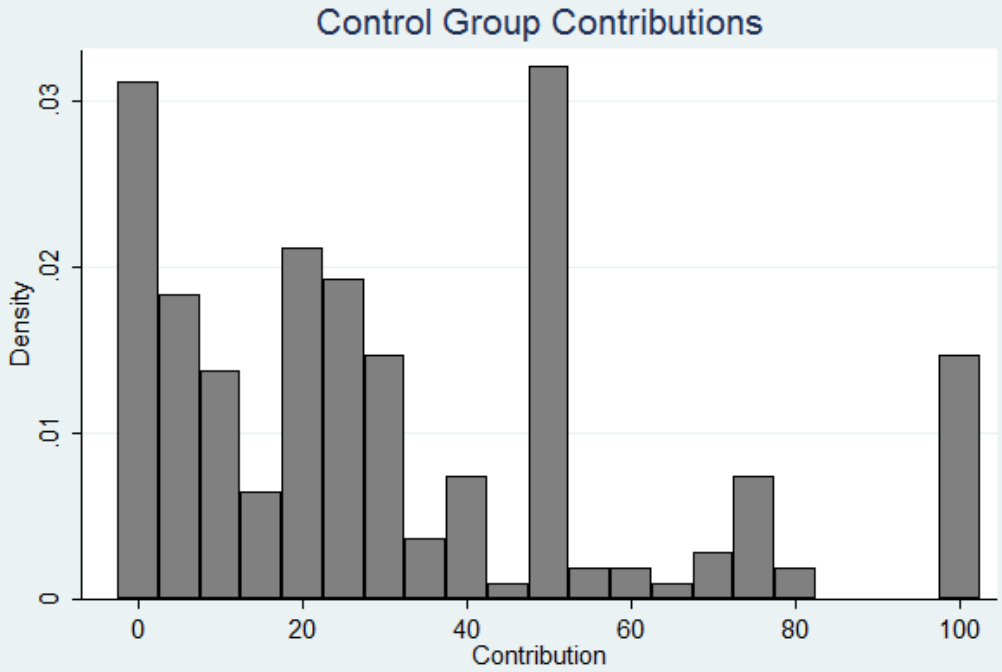

Figure 1

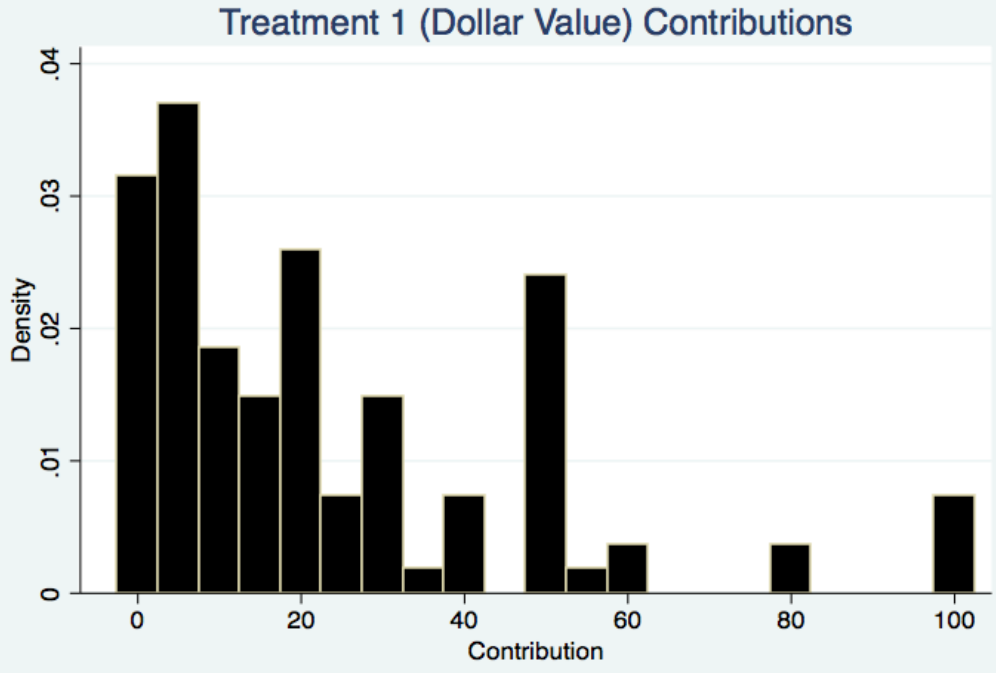

Figure 2

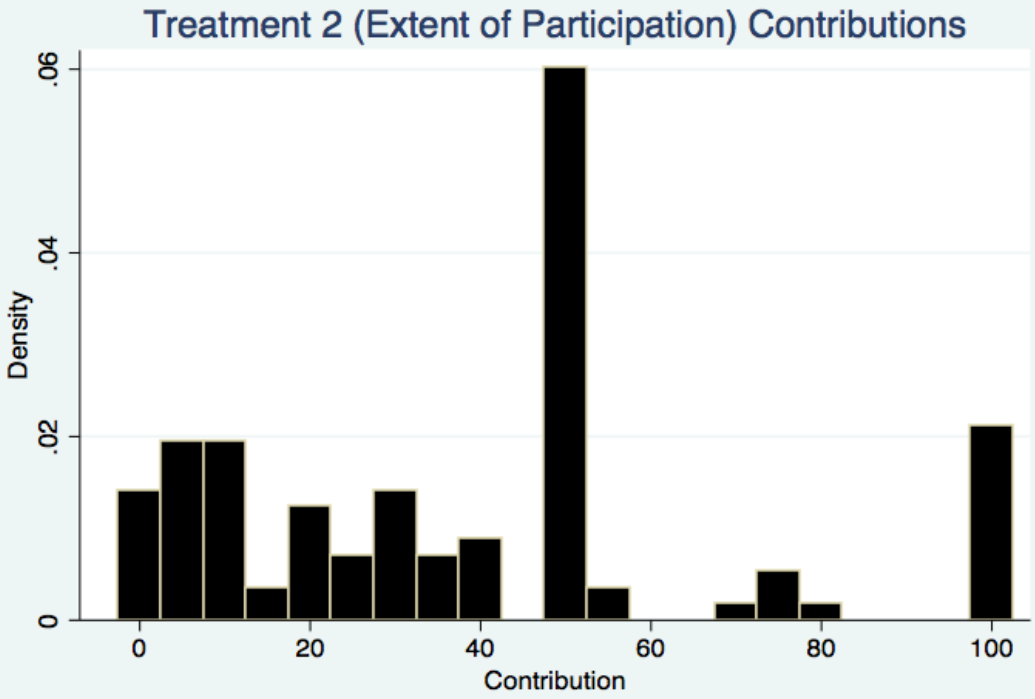

Figure 3

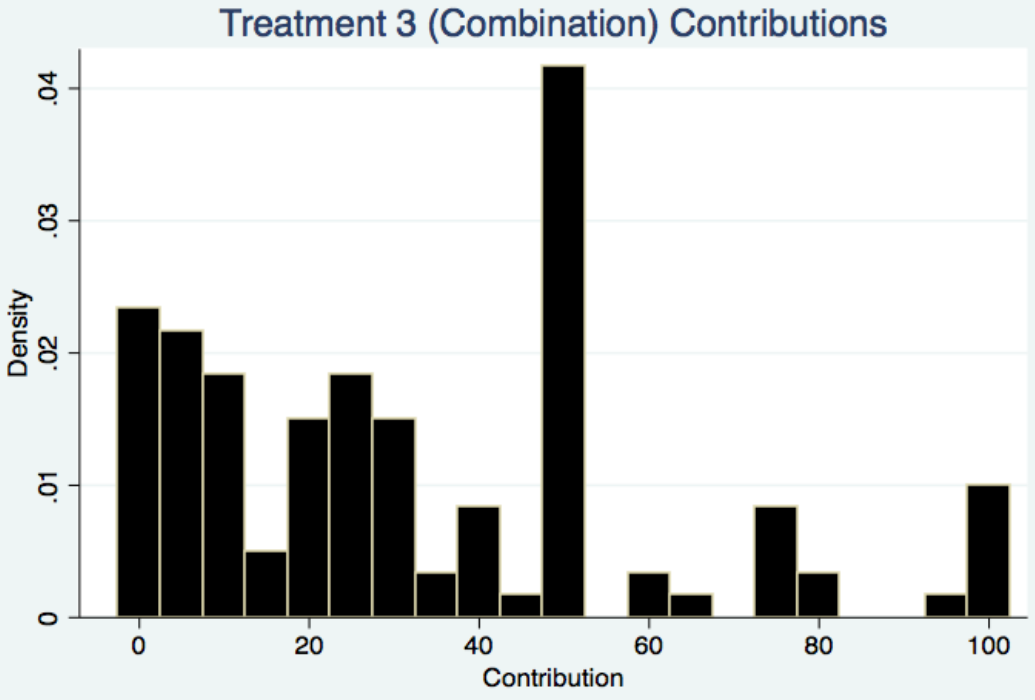

Figure 4

Appendix A

Variables collected in the survey include:

contribution—the dollar amount per semester selected for the green fee referendum
showertime—average shower time in minutes
fullloadlaundry—how full the laundry machine typically is run (1=full, 0=less than full)
turnofflight—turned off light last time you left an empty room (1=yes, 0=no)
lightingwaste—perceived lighting waste at MLAU (1=minimum waste, 10=maximum waste)
heatacwaste—perceived heating and a/c waste at MLAU (1=minimum waste, 10=maximum waste)
drivingtrips—the number of weekly driving trips
recyclepaper—recycle used paper (1=always yes, usually yes, or sometimes yes, 0=no)
foodwaste—from the amount of food taken, what percentage is typically thrown in the garbage
doubleprint—use of double printing option in library (1=yes, 0=no)
greenwork—current or past involvement in environmental groups/volunteer activities (1=yes , 0=no)
certainty—level of certainty that vote will influence green fee policy at MLAU (0=minimum confidence, 10=maximum confidence)
age—age in years
male—gender (male=1, female=0)
international—international student (1=yes, 0=no)
athlete—athlete on an MLAU team (1=yes, 0=no)
yearinschool—academic standing (1=Freshman, 2=Sophomore, 3=Junior, 4=Senior)
major (some students have more than one major)—economics/business; environmental studies; science; social science; humanities; arts/music; sports management
liveoncampus—lives on campus (1=yes, 0=no)
#roommates—number of roommates
GPA survey—grade point average on a 4.0 scale self-reported on survey
income—2011 personal income (including gifts, not including money used for tuition/educational fees)
treatment1—dollar value treatment (1=yes, 0=no)
treatment2—extent of participation treatment (1=yes, 0=no)
treatment3—combination treatment (1=yes, 0=no)