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A FIELD EXPERIMENT IN CHARITABLE CONTRIBUTION: THE IMPACT OF SOCIAL INFORMATION ON THE VOLUNTARY PROVISION OF PUBLIC GOODS

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We study the effect of social information on the voluntary provision of public goods. Competing theories predict that others contributions might be either substitutes or complements to one's own. We demonstrate a positive social information effect on individual contributions, supporting theories of complementarities. We nd the most in uential level of social information is drawn from the 90th to 95th percentile of previous contributions. We furthermore nd the effect to be signi cant for new members but not for renewing members. In the most effective condition, social information increases contributions by 12% ($13). These increased contributions do not crowd out future contributions.

How information about others decisions in uences one's own, is an area of growing interest in economics. In the context of charitable donations and public good provision, social information has been studied by both economists – for reviews, see Andreoni (2006), Davis and Holt (1993), Vesterlund (2006) – and psychologists – for reviews see Cialdini and Goldstein (2004), Penner et al. (2005), Weber et al. (2004).

Two classes of economic theories have been proposed to explain the relationship between what others contribute and an individual's own contribution. The rst class models donations as substitutes while the second class models them as complements. Although there is some empirical evidence on this question (reviewed below), the results are not conclusive. We use the method of eld experiments (Carpenter et al, 2005; Harrison and List, 2004) and collect evidence of the direction of in uence of socialh(T)In this experiment, we manipulate social information and s

information signi cantly increases individual contributions. Further analysis reveals that the effect is signi cant for new members but not for renewing members, consistent with the predictions of theories of complementarities and asymmetric information. Furthermore, we nd that increased contributions do not crowd out future contribution in the following year; if anything offering social information in year t increases expected revenue in year t þ 1.

We begin by introducing previous theoretical and empirical research on public goods provision and social information and discussing how competing models predict that social information might in uence contributions (Section 1). We then describe our setting of public radio fundraising (Section 2) and our eld experiment and its results (Section 3). We conclude with a brief summary, and discussion of implications (Section 4).

1. Previous Literature

1.1. Models

Two classes of models make competing predictions about the in uence of social

1.1.2. Models of complements

In contrast, a second set of models predicts a positive relationship between othersand one's own contribution. For example, Sugden's (1984) model says that individuals optimise their utility subject to a constraint re ected in the

A second source of data is from laboratory experiments. Generally speaking, labor-treatment (low social comparison) contribute to at least one fund. This absolute different of 2.3% between the two conditions is not signi cant, nor is it economically large. The authors hypothesise that this non-signi cant result may be due to the fact do then the social information of what others were doing would not in uence one's own decision. Our environment satis es the ambiguity condition; the multiplicity (and range) of recommended contribution levels means that callers have relatively little idea of what the right contribution might be. Thus social information can have a positive (complementary) effect on one's own contribution. One advantage of our public radio setting is that it provides an opportunity for either class of theory to be supported.

Practically, public radio is a crucial segment of the non-pro t world. There are more than 800 public radio stations in the US, with gross revenue of over $2.5 billion. The public broadcasting industry raised well over $640 million from individual donors in 2005 (CPB, 2005). A better understanding of why and how individuals contribute in this domain would have practical implications as well.

We collaborated with a public radio station to implement these experiments. This station has three on-air fund drives per year. During the drives, DJs on the air ask for donations and suggest multiple contribution levels. Fifty dollars is the suggested level to become a basic member, listeners who give $60 and $75 receive additional gifts. Other gift levels kick in at $120, $180, $240, $360, $600, $840, $1000 and $2500. Listeners call into the station to make contributions in response to appeals.

Previous research found that most donors cannot correctly recall how much they had contributed in the past (Rooney et al.

to make a pledge. Experimenters answered the phone as volunteers for the station, asked the routine questions for the station and implemented the manipulation in the appropriate place in the conversation.

In particular, after answering the phone with the station's identi er: Hello, STATION_NAME member line , experimenters asked: Are you a new member or a renewing member of STATION-NAME? After the caller answered, experimenters read (or did not read in the control condition) the following sentence:

> We had another member, they contributed $75 [$180 or $300]. [4]

The question asked right after the manipulation was: How much would you like to pledge today? The dependent measure, the pledge amount, was then collected. We recorded data only during the hours when the station did not give special discounts or premiums.[5]

We determined the levels of social information to use by analysing past contribution data from the station and considering gift levels and special challenges used by station fundraisers. We examined the distribution of contributions from the previous year's fund drives in June and October 2002 (2003 was the rst year in which the station conducted its fall fund-drive in September instead of October, thus we used October 2002 data as the closest estimate).

The mean contribution to the station in those two drives was $135. The median contribution was $75. As can be seen in Figure 1, the distribution is skewed. This gure also illustrates the spiky-ness of the data, with many contributions at $50, $60, $75, $120, $240 and $360. These spikes represent gift levels that the station uses; as a donor contributes at or above these thresholds (s)he receives additional thank-you gifts. It should be noted that these gifts levels were present, but remained consistent between our treatments.

Next we identi ed the speci c gifts offered for each level. For each level below $360, donors receive only products as gifts, (e.g. CDs, mugs, T-shirts). Starting from $360, donors are invited to social events organised by the station. The station had also started to use labels like Music Lover Circle , CD a Month Club , and Special Producer to categorise donors who contribute above $360. Since we wanted to identify our effect independent of any additional status or prestige that may be carried by our social information manipulation, we concluded that the social information level should be lower than $360. We thus used $75 (the 50th percentile), $180 (the 85th percentile) and $300 (the 90th percentile) for the social information levels.

Other information collected by the station during the phone conversation included callers name, phone number, email address, billing address, city, zip-code, credit card

[4] Although this phrase is not commonly used in fundraising, it was constructed to sound natural, as though the volunteer was communicating about what others had done. No caller objected to this statement.

[5] During special-discount hours for example, the station offered a discount on at least one gift level. For example, it could offer a $10 discount for each $120 contribution that is paid in full on a credit card. That means donors could contribute only $110 to receive thank-you gifts normally awarded only to those who contribute $120. When such special discounts are offered, almost all contributions received during those hours are exactly $110, and unlikely to be responsive to social (or any other) information. During special-premium hours, the station offered unique gifts like concert tickets donated by popular singers or albums signed by famous station DJs. Data from these hours are extremely noisy, so we did not collect any data during those hours either. Callers did not know of our experiment, nor the hours when data were collected, and thus could not select in or out of our treatments.

or check information and the thank-you gifts they would like to receive. However, for

3.2. Results

The distribution of contributions in each experimental condition is provided in Table 1. As can be seen from this Table, the major differences between the control condition and the other conditions are in the proportion of donors giving $75 (12% higher when $75 is mentioned than in the control, and 7% lower when $300 is mentioned than in the control), and in the proportion of donors giving $120 (9% higher when $300 is mentioned than in the control condition).

Furthermore, we find no large differences in the proportion of very high contributions which might be considered outliers (greater than $300) between the treatments. The control condition and the $300 condition both have 5% of contributions in this range, while the $75 and $180 condition have 3% and 2% respectively. We will explore the impact of these treatments statistically below.

Our analysis of existing station data suggested that contributions can be dramatically different depending on the fund-raising theme used in each drive, the thank-you gifts offered each day and hour, whether donors are new or renewing donors, their gender, and whether they pay the entire pledge amount as one payment or as instalments over a period of 12 months. Although not all of these factors significantly explain variance in our data, we include them in our regression analysis as controls, shown in Table 2.

Our primary result is that social information can positively influence contributions. The $300 social information condition yields significantly higher contributions than the control condition (the omitted condition).[7] This result remains when using robust regression which adjusts for outliers (Hamilton, 1991). The same result holds in the same regression methods after we remove outlier contributions (those that are three standard deviations above the mean).

The effect size is relatively large. The average contribution is $119.70 in the $300 social information condition and $106.72 in the control condition. This is a $13

Table 1
Distribution of Contributions in All Conditions

	Control		$75		$180		$300		Total	
Pledge Amount $	N	%	N	%	N	%	N	%	N	%
<50	14	0.11	5	0.05	12	0.06	5	0.04	36	0.06
50	14	0.11	13	0.14	18	0.08	18	0.13	63	0.11
51–74	20	0.16	11	0.11	44	0.20	27	0.20	102	0.18
75	15	0.12	23	0.24	27	0.13	7	0.05	72	0.13
76–119	5	0.04	5	0.05	10	0.05	8	0.06	28	0.05
120	39	0.32	29	0.30	83	0.38	56	0.41	207	0.36
121–179	3	0.02	0	0.00	2	0.01	3	0.02	8	0.01
180	3	0.02	2	0.02	10	0.05	0	0.00	15	0.03
181–299	3	0.02	5	0.05	5	0.02	5	0.04	18	0.03
300	0	0.00	0	0.00	1	0.00	1	0.01	2	0.00
>300	6	0.05	3	0.03	4	0.02	7	0.05	20	0.04
Total	122	1.00	96	1.00	216	1.00	137	1.00	571	1.00

[7] Remember that treatments are randomised within experimenter. As predicted from this design, adding a control for the particular phone-answerer has no effect on the analysis or on any reported below.

Table 2
The Social Information Effect (standard errors in parentheses)

	All data		Without outliers	
	OLS	Robust regression	OLS	Robust regression
Constant	12.305	41.604þ	35.967	41.389þ
	(69.283)	(24.080)	(41.020)	(23.839)
$75	3.017	2.474	0.889	2.521
	(13.337)	(4.635)	(7.972)	(4.633)
$180	4.666	8.502*	7.715	8.419*
	(11.215)	(3.898)	(6.674)	(3.879)
$300	39.599**	10.710*	20.096*	10.579*
	(13.609)	(4.730)	(8.126)	(4.722)
Renewing	36.405**	9.956**	15.319**	9.923**
	(8.516)	(2.960)	(5.102)	(2.965)
Male	15.015þ	0.813	11.558*	0.789
	(8.405)	(2.921)	(5.009)	(2.911)
Instalment	65.415**	44.599**	50.108**	44.719**
	(8.634)	(2.960)	(5.164)	(3.001)
Drive	yes	yes	yes	yes
Day	yes	yes	yes	yes
Hour	yes	yes	yes	yes
N	538	538	530	530
R-Squared	0.180	0.366	0.232	0.370

**$p < 0.01$
*$p < 0.05$
þ $p < 0.10$

difference, and would translate into a 12% increase in revenue for the station had all callers been offered the $300 social information.[8]

As predicted, the $75 social information treatment is not signi cantly different than the control condition. Remember that $75 is the median contribution from the previous years fund-drive. Thus for half of the callers it would represent upward social information and, for the other half, it would represent downward social information. As a result, we did not expect that providing this information would have an effect on contributions in this drive.

The $180 treatment is sporadically signi cant ($p < 0.05$ in the robust regressions with and without outliers but not signi cant in the OLS speci cations). We discuss some reasons for the lack of success for this level of social information in our discussion below.

3.3. Further Tests

We have argued above that the effect of social information is likely to have its main impact precisely in conditions of ambiguity. One might think that new donors are

[8] One concern could be that in our control condition callers neither knew of another member's contribution, nor how much they gave, while in the treatment conditions they knew both. Differences in contributions could be caused by the existence of another contributor, rather than by their actual contribution amount. However, the results reject this explanation, as only the $300 condition is signi cantly different than the control. If simple knowledge of another's contribution were suf cient, we would have seen all three treatments being signi cantly different than the control.

facing a more ambiguous situation than renewing donors and thus that social informadifference of contributions from $300 are $206 in the $300 condition and $215 in the control condition.

To show this result statistically, we calculate, for each donor, the absolute distance between their contribution and the social information levels of $75, $180 and $300. We then regress this absolute distance on the controls from Table 3 and a dummy variable indicating whether an individual was in a treatment condition or not. We nd a sig-ni cant effect of this treatment variable (β ¼ 9.38, se¼ 3.72, t ¼ 2.52, p ¼ 0.012) suggesting that, on average, contributions are $9 closer to the social information level when it is suggested, than when it is not suggested.[10]

3.4. Long-term Impacts

One concern is whether this increased contribution comes at a cost. Are fundraisers simply fooling donors into giving more and will this result in a backlash of lower giving in subsequent years; do higher contributions this year crowd out future contributions? To investigate this question, we went back to the radio station and tracked the con-

Table 5
Probability of Renewal One Year Later

	Logit
Constant	2.111**
	(0.543)
$75	0.750
	(0.507)
$180	0.850*
	(0.413)
$300	1.178**
	(0.428)
Male	0.110
	(0.272)
N	328
Pseudo R-Squared	0.026

**p < 0.01
*p < 0.05

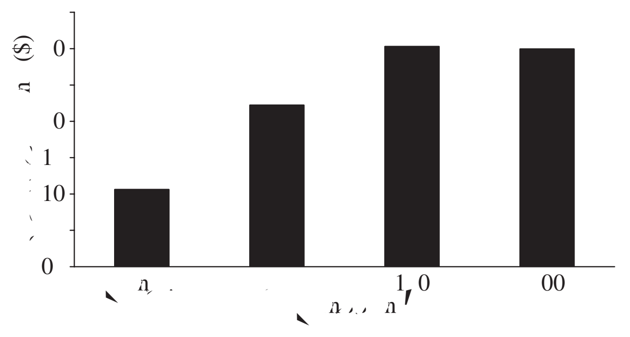

Fig. 2. Expected Revenue One Year Later.

12%; χ^2 ¼ 11.05, $p < 0.001$) and directionally higher amount contributed conditional on contribution (in $300 $93.97, in control $86.11). This treatment thus generates higher expected revenue in the subsequent year (in $300 $29.95, in control $10.62).

4. Overall Discussion, Implications, Limitations and Future Research

The results from this eld experiment distinguish between two classes of theories about donations to public goods; those which predict that others contributions will be substitutes to one's own and those which predict that others contributions will be complements to one's own. Our results provide support for the second class of theories, suggesting that social information about others high contributions positively in uences one's own contributions. The size and signi cance of this effect varied, with the most effective social information level representing the 90th percentile of the distribution of contributions. The result was signi cant for new donors, for whom the contribution situation is the most ambiguous. We also nd that the increase in contributions due to social in uence does not crowd out future contributions among these new donors. In fact, it generates higher expected revenue than the control condition in the subsequent year.

This effect is large. The most effective social in uence condition increased contributions by $13 (12%). This effect is of comparable size to that of manipulating the payoff structure of contributing. List and Lucking-Reiley (2002) report an increase of about $25 when they offer seed money. In Eckel and Grossman (2005) adding matching contributions increases contributions by about $13, from $7.85 to $20.55.

It is not surprising that the $75 treatment was not effective in increasing contributions; $75 was the median contribution from the previous year, thus one might imagine half of the participants would have given more than $75, while the other half would have given less than $75. Thus this level of social information should not have affected average contributions.

The fact that the $180 treatment did not increase contribution robustly was surprising to us. We increased the sample size of the $180 condition strategically to give this treatment the best chance of working. Indeed, we nd a signi cant effect in robust regressions overall and for new donors but not in other speci cations. We believe this sporadic effect is due to the modesty of the contribution level. Previous work in psychology and goal-setting su407.72-465.em6.3(wouldrrd)u407.7-3412itcon2-iv5.32

station and this particular experimental implementation. For example, this manipulation was done via the phone; would the results generalise to mail solicitations? Shang and Croson (2008) examine this question in a mail campaign of the same radio station. We nd that donors are in uenced by social information presented in that setting. The fact that social information in uences contributions in both situations suggests that the effect is at least reasonably general. That said, more work needs to be done to test the generality of the social information effect with different organisations providing public goods, different types of donors and different appeals.

Conformity theory suggests that social information is most likely to be effective in

References

Ajzen, I. (1991). The theory of planned behavior, Organizational Behavior and Human Decision Processes, vol. 50 (2) (December), pp. 179–211.

Akerlof, G. (1982). Labor contracts as partial gift exchange, Quarterly Journal of Economics, vol. 97 (4) (November), pp. 543–69.

Altonji, J., Hayashi, F., and Kotlikoff, L. (1997). Parental altruism and inter-vivos transfers: theory and evidence, Journal of Political Economy, vol. 105 (6) (December), pp. 1121–66.

Andreoni, J. (1989). Giving with impure altruism: applications to charity and Ricardian equivalence, Journal of Political Economy, vol. 97 (6) (January), pp. 1447–58.

Andreoni, J. (1990). Impure altruism and donations to public goods: a theory of warm glow giving, Economic Journal, vol. 100 (401) (June), pp. 464–77.

Andreoni, J. (1998). Toward a theory of charitable fundraising, Journal of Political Economy, vol. 106 (6) (December), pp. 1186–213.

Andreoni, J. (2006). Philanthropy, in (L.-A. Gerar-Varet. S.-C. Kolm and J. Mercier Ythier, eds.), The Handbook of Giving, Reciprocity, and Altruism, Handbooks in Economics, pp. 1201–69. Amsterdam: North-Holland.

Andreoni, J. and Scholz, J.K. (1998). An econometric analysis of charitable giving with interdependent preferences, Economic Inquiry, vol. 36 (3) (July), pp. 410–28.

Bardsley, N. (2000). Control without deception: individual behavior in free-riding experiments revisited, Experimental Economics, vol. 3 (3) (December), pp. 215–40.

Becker, G. (1974). A theory of social interactions, Journal of Political Economy, vol. 82 (6) (November-December), pp. 1063–93.

Bernheim, D. (1994). A theory of conformity, Journal of Political Economy, vol. 102 (5) (October), pp. 841–77.

Bohnet, I. and Zeckhauser, R. (2004). Social comparisons in ultimatum bargaining, Scandinavian Journal of Economics, vol. 106(3) (September), pp. 495–510.

Brooks, A.C. (2004). What do don't know responses really mean in giving surveys?, NonproÞt and Voluntary Sector Quarterly, vol. 33 (3) (September), pp. 423–34.

Carpenter, J, Harrison, G.W. and List, J.A. (2005). Field experiments in economics, in (J. Carpenter, G. W. Harrison and J. List, eds), Research in Experimental Economics, Vol. 10, pp. 1–15, Greenwich and London: JIA Press.

Cason, T. and Mui, V.-L. (1998). Social in uence in the sequential dictator game, Journal of Mathematical Psychology, vol. 42 (2–3) (June), pp. 248–65.

Cialdini, R.B. and Goldstein, N.J. (2004). Social in uence: compliance and conformity, Annual Review Psychology, vol. 55 (February), pp. 591–621.

Cornelli, F. (1996). Optimal selling procedures with xed costs, Journal of Economic Theory, vol. 71 (1) (October), pp. 1–30.

Corporation for Public Broadcasting (2005). Corporation for Public Broadcasting Annual Report 2005, Washington DC.

Croson, R. (2007). Theories of commitment, altruism, and reciprocity: evidence from linear public goods games, Economic Inquiry, vol. 45 (2) (April), pp. 199–216.

Croson, R., Handy, F. and Shang, J. (2008). The relationship between norms, social information, and subsequent giving: results from eld surveys and lab experiments Working Paper, Indiana University.

Crutch eld, R. (1955). Conformity and character, American Psychologist, vol. 10, pp. 191–8.

Davis, D. and Holt, C. (1993). Experimental Economics, Princeton, NJ: Princeton University Press.

Eckel, C. and Grossman, P. (2005). Subsidizing charitable contributions: a eld test comparing matching and rebate subsidies, Working Paper, Virginia Polytechnic Institute and State University.

Falk, A. (2005).

Harbaugh, W. (1998b). The prestige motive for making charitable transfers, American Economic Review, Papers and Proceedings, vol. 88 (2) (May), pp. 277–82.
Harrison, G.W. and List, J.A. (2004). Field experiments, Journal of Economic Literature, vol. 42 (4) (December), pp. 1009–55.
Hollander, H. (1990). A social exchange approach to voluntary contribution, American Economic Review, vol. 80 (5) (December), pp. 1157–67.
Jones, S. (1984). The Economics of Conformism, Oxford: Blackwell.
Kahneman, D., Knetsch, J. and Thaler, R. (1986). Fairness as a constraint on pro t seeking: entitlements in the market, American Economic Review, vol. 76 (4) (September), pp. 728–41.
Keser, C. and van Winden, F. (2000). Conditional cooperation and voluntary contributions to public goods, Scandinavian Journal of Economics, vol. 102 (1) (March), pp. 23–39.
Kingma, B.R. (1989). An accurate measurement of the crowd out effect, and price effect for charitable contributions, Journal of Political Economy, vol. 97 (5) (January), pp. 1197–207.
Kolm, S.C. and Ythier, J.M. (2006). Handbook of Giving and Reciprocity and Altruism, Amsterdam: North Holland.
Levitt, S.D. and List, J.A. (2007). What do laboratory experiments measuring social preferences reveal about the real world?, Journal of Economic Perspectives, vol. 21 (2) (Spring), pp. 153–74.
Lindbeck, A. (199ism

Weimann, J. (1994). 'Individual behaviour in a free riding experiment', *Journal of Public Economics*, vol. 54 (2) (June), pp. 296–300.
Weyant, J. (1996). 'Application of compliance techniques to direct mail request for charitable donation', *Psychology and Marketing*, vol. 13 (2) (February), pp. 157–70.
Wolff, F.-C. (2001). 'Private intergenerational contact in France and the demonstration effect', *Applied Economics*, vol. 33 (2) (February), pp. 143–53.