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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 find the most influential level of social information is drawn from the 90th to 95th percentile of previous contributions. We furthermore find the effect to be significant 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 influences 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 first 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 field experiments (Carpenter *et al.*, 2005; Harrison and List, 2004) and collect evidence of the direction of influence of social information. Our setting is an on-air fundraising campaign for a public radio station. Our results support the second class of models, showing a positive (complementary) relationship between others' contributions and one's own.

In this experiment, we manipulate social information and show that higher social information significantly increases individual contributions. Further analysis reveals that the effect is significant for new members but not for renewing members, consistent with the predictions of theories of complementarities and asymmetric information. Furthermore, we find 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 $t + 1$.

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 influence contributions (Section 1). We then describe our setting of public radio fundraising (Section 2) and our field 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 influence of social information on charitable giving. The first set of models predicts that other's contributions and one's own contribution will be substitutes, and thus negatively related.

1.1.1. *Models of substitutes*

One set of models in this class are models of *altruism*. In the classic model, individuals derive utility from both their own private consumption and the consumption (or utility) of others (Becker, 1974). Later, Warr (1982) and Roberts (1984) independently derived an important consequence of altruism: complete crowding out. As contributions of others (or of a third party like the government) increase, individuals decrease their own contribution dollar-for-dollar. Intuitively, as the level of public goods provided increases, the level of others' utility increases, which decreases the marginal value from additional contribution toward the public good (public goods and private consumption are assumed to be normal). Because the individual's maximisation problem involves equalising the marginal utilities from the public and private goods, the individual allocates more to private consumption and less to fund public goods.

Others have extended the altruism model to incorporate additional factors. For example, Andreoni (1989, 1990) examined the case of *impure altruism*, where an individual receives utility from private consumption, others' consumption (the level of the public good provided) and one's own contribution to the public good. This model can result in incomplete crowding-out; as others' contributions increase, one's own contribution decreases but by less than the dollar-for-dollar change predicted by pure altruism models.[1]

Another manner in which contributions can be substitutes involves *thresholds* or *fixed costs* in the production function of the public good. For example, Andreoni (1998) shows that when the public good requires a minimum contribution level for provision, others' contributions can be substitutes for one's own. Intuitively, if others' contributions are sufficient to reach the threshold (or to overcome fixed costs in providing the public good), then one's own contribution is no longer pivotal and can decrease without much loss in utility. Alternately, if others are not giving, the value from an individual gift is higher.

A similar result has been found in the domain of private goods with fixed costs (Romano, 1991; Cornelli, 1996). Here, when others pay a higher price for the good, they contribute to the fixed costs of the firm and increase the probability that the good will be provided. This lowers the incentive for a given individual to pay a higher price for the good. Again, we see a negative relationship between the price (contribution) of others and one's own.

Taken together, the first class of model predicts Hypothesis 1*a*:

H1*a*: *One's own giving is negatively related to others' giving.*

[1] More recent models of impure altruism, e.g. Steinberg (1987), Ribar and Wilhelm (2002) identify the conditions under which these models generate partial crowding out.

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1.1.2. *Models of complements*

In contrast, a second set of models predicts a positive relationship between others' and one's own contribution. For example, Sugden's (1984) model says that individuals optimise their utility subject to a constraint reflected in the *reciprocity* principle. This principle says that each individual contributes at least as much as the least-generous person is giving. When this constraint binds, and the gift of the least-generous person is unknown, social information can affect individuals' beliefs of this amount, increasing own contributions.

Bernheim's (1994) *conformity* model assumes that individuals care not only about their intrinsic preferences but also about status; how others perceive them. Individuals recognise that behavioural departures from the social norm will impair their status, thus information about others' contributions can influence their beliefs about the norm and thus their own decisions. Other models of conformity assume that deviations from social norms have direct utility consequences (Akerlof, 1982; Jones, 1984) and yield similar results, predicting a positive relationship between others' contributions and one's own.

An additional model, Vesterlund (2003) posits that donors use others' contributions as a signal of the charity's quality. As others give more, individuals' beliefs of the quality of the charity increase and they thus want to give more as well.

In Vesterlund (2006), numerous related concepts are reviewed which also predict positive relationships between others' contributions and one's own (some of these are not formal theories but instead discussions of motivations for giving which have the complementary property). These include giving to achieve social acclaim (Becker, 1974) or to gain social approval (Hollander, 1990), donors feeling they're 'doing their share' (Sen, 1977) or making their 'fair-share contribution' (Rose-Ackerman, 1981), and donations to signal one's wealth (Glazer and Konrad, 1996) or to achieve prestige (Harbaugh, 1998 *a*,*b*). For all these models to predict complementarities, however, we need to add that individuals use the contributions of others as a signal of the appropriate or necessary contribution level in order to achieve the named goals.

This class of models thus predicts, Hypothesis 1*b*:

H1*b*: *One's own giving is positively related to others' giving.*

We are not the first to attempt to distinguish between these competing hypotheses. However, previous empirical evidence and laboratory experimental results have so far been mixed on providing support for each class of the models.

1.2. *Evidence*

A number of empirical approaches have attempted to test these two classes of theories. Observational research uses data from donation surveys or actual giving collected from tax returns; for reviews, see Andreoni (2006), Powell and Steinberg (2006), Kolm and Ythier (2006). Generally speaking, complete crowding out as predicted by models of pure altruism is not observed but the evidence is mixed on whether one observes positive or negative relationships between the giving of others and one's own giving (Kingma, 1989; Posnett and Sandler, 1989; Altonji *et al.*, 1997; Wolff, 2001).

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A second source of data is from laboratory experiments. Generally speaking, laboratory experiments find a positive relationship between others' contributions and one's own (Bardsley, 2000; Croson, 2007; Fischbacher *et al.*, 2001; Keser and van Winden, 2000; Weimann, 1994). However, these studies have important limitations. First, the contributions of others are typically measured rather than manipulated, thus the experiments do not provide a tight test of the theories. Second, there is some concern about the external validity of these experiments; are the relationships observed in the lab also what drives behaviour in the field? (Levitt and List, 2007). This paper addresses both these concerns by manipulating the social information donors receive in a natural (field) setting.

Others have manipulated social information in laboratory situations that do not involve public good provision. For example, Cason and Mui (1998) use a sequential dictator game; individuals act as dictators, learn the dictator decision of another subject (or in the control condition, some irrelevant information about another subject) and then make a second dictator decision. They find that social information indeed influences the second dictator decision; learning what others had done significantly retarded the typical pattern of decreasing generosity relative to the control.

Bohnet and Zeckhauser (2004) examine the impact of social information in ultimatum games. They show that both the size of offer and the probability of rejections are influenced by whether responders are told the average offer received by others. The effect of this social information becomes stronger as the game is repeated. Both these laboratory studies appeal to social norms, and the desire for conformity to them, as an explanation for their results

We follow these studies in manipulating the existence and level of social information available to our subjects. However, we do so in a natural field experiment. Field experiments have recently been introduced as a research tool in studying economics (Carpenter *et al.*, 2005; Harrison and List, 2004). A very few previous papers use field experiments to investigate public goods provision, e.g., List and Lucking-Reiley (2002) (seed money), Eckel and Grossman (2005) (rebates and matching), Falk (2005) (gift exchange).[2]

In the paper most closely related to ours, Frey and Meier (2004) use a mail fundraising campaign run by their university to show that social information influences participation rates in fundraising campaigns. Students are asked to contribute, in addition to the tuition they pay, to one or two charitable funds. Students can make no contribution, simply sending in their tuition, or make contributions of CHF7 (about $4.20) to one fund, CHF5 (about $3.00) to another fund, or CHF12 (about $7.20) to both funds. Some students receive a letter telling them that 64% of other students had previously contributed (this represents the proportion who actually contributed in a recent semester). Other students receive a letter telling them that 46% of other students had previously contributed (this represents the proportion of students who actually contributed over the last 10 years). 77% of students in the 64% treatment (high social comparison) contribute to at least one fund, while 74.7% of students in the 46%

[2] Research in psychology and marketing has long used field experiments in studying charitable giving; for a review, see Weyant (1996). These include classic studies on foot-in-the-door, door-in-the-face, low-ball and legitimisation-of-small-donation techniques.

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treatment (low social comparison) contribute to at least one fund. This absolute different of 2.3% between the two conditions is not significant, nor is it economically large. The authors hypothesise that this non-significant result may be due to the fact that some donors are resilient to the social comparison information; in particular students who have always or have never before contributed may not be influenced by the social information. The authors then use a logit model controlling for the previous contribution history of each respondent and find a statistically significant difference between the two treatments.

While Frey and Meier demonstrate a small but significant effect of social information on *participation*, we study the influence of social information on *contribution amount*. Psychological research (Ajzen, 1991; Brooks, 2004) has shown that decisions about whether to act and about how much to act, although positively correlated, may be caused by different psychological motivations. Similarly, Andreoni (2006) suggested that altruism tells people what causes to give to but that warm-glow tells people how much to give. In our study we communicate to potential donors not *that* another donor has given, but *how much* another donor has given and we examine the influence of this social information not on the *decision* to contribute but instead on the *amount* of contribution received.[3] This latter decision (the amount to contribute) is exactly the one predicted by the models reviewed above.

2. Social Information in Public Radio Fundraising

We sought a naturally-occurring institution that captured the public good structure, where each individual has an incentive to free ride but where the group as a whole is better off when everyone contributes. We identified public radio as one such setting. Each individual has an incentive to free ride, listen to the station and not contribute to its continued functioning. However, the community as a whole is better off when the station is funded. This field setting also offers us the potential to offer social information to contributors in a natural way.

Public radio has a few features that made it a particularly attractive domain. Theoretically, it is an appropriate domain in which to test the theories discussed above. Public radio stations have large fixed costs of producing programming and maintaining services. As described above, goods with fixed costs can show substitutability of contributions. Thus social information can have a negative effect on one's own contribution.

However, according to social influence research in psychology, individuals are more likely to be positively influenced by social information when the situation is (seen as) ambiguous (Crutchfield, 1955); if there were an obvious (correct) thing to

[3] A few empirical studies have attempted to examine the question of social interdependence of giving using survey data. The domain of investigation of these papers differs from this one substantially. In both Feldstein and Clotfelter (1976) and Andreoni and Scholz (1998) the authors examine the impact of others' contributions on total charitable giving, rather than giving to a specific charity. They use self-reported survey data of charitable giving and compare contributions to all charitable sources by individuals of similar income or socioeconomic strata. Feldstein and Clotfelter find no significant effect, while Andreoni and Scholz find a significant interdependent effect (about 0.2). However, there is little or no evidence that individuals know the (self-reported) charitable contributions of others. If this information were not known, one would expect no effect of interdependent giving. In this experiment, we examine contributions to one charitable cause rather than aggregate giving and we use an experimental design to ensure that donors know the contributions of others.

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do then the social information of what others were doing would not influence one's own decision. Our environment satisfies 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-profit 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.*, 2004). Furthermore, in making their current decision they need to evaluate whether what they did in the past is still appropriate, both for the organisation's need and in terms of their own financial or other constraints. We believe that the multiplicity (and range) of recommended contribution levels and the lack of clear recollection mean that potential donors have relatively little idea of what the 'right' contribution might be for them when they call in.

To summarise, past economics research has demonstrated an influence of social information in laboratory settings other than public goods provision. One previous field experiment has demonstrated the influence of social information on the probability of contribution in real world public goods provision. However, a number of economic theories also predict that contribution *levels* will be sensitive to the level of contribution of others, although there are competing predictions of the direction of that sensitivity. This article provides field evidence on the influence of social information on the amount of contribution.

3. The Experiment

3.1. *Design and Implementation*

This field experiment was conducted in an anonymous public radio station on the East coast in June and September 2003 during the station's on-air fund drive. We used a between-subject design with three social information conditions ($75, $180 and $300) and a control condition. In the social information conditions, another member's contribution was mentioned to participants before they made their own pledge; in the control condition no social information was provided.

During the on-air drive, the station DJs interspersed music with appeals for donations. Listeners responded to the on-air appeals during the drive and called the station

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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 identifier: '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 first 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 figure 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 identified the specific 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.

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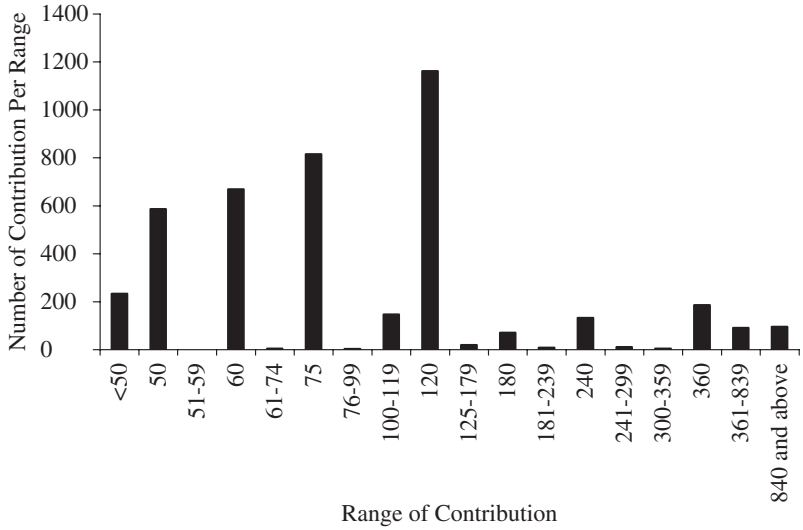

Fig. 1. *Contribution History for June and October 2002 (*by contribution amount*)*

or check information and the thank-you gifts they would like to receive. However, for confidentiality reasons and to conform to human subjects protocols, only research-related information was copied and kept by the researchers.

All experimental conditions were randomised within each experimenter and within each hour. An extra step was also taken to avoid any expectation effect or sales effect from the experimenters. The manipulation sentences were printed on labels, and then attached to each pledge form. These sentences were covered by post-it notes. The experimenter did not remove these covers until they asked the first key question, i.e. what kind of member the callers are. At this point, they removed the post-it note, read the manipulation sentence (or nothing if the control condition) and asked for the pledge amount. Experimenters were thus blind to which condition each caller was in before they read the manipulation, and the dependent measure of pledge was collected right after the manipulation.[6]

Finally we ensured that another member had indeed contributed the amount we suggested, namely $75, $180 and $300, earlier in the fund drive, so that our statements would not constitute deception. Five hundred and seventy one donors called into the station to make a contribution, and randomly received one of the treatments. We have complete information on 538 donors (94.2%). Our analyses will use data from only these donors.

[6] This methodology prevents the phone-answerers from biasing the results, for example, being especially nice to the caller because they know that the caller is in a high-social-information treatment. This high level of control (having the experimenter blind to condition as long as is possible) is stronger than in most economics experiments but is common in psychology experiments (Mitchell and Jolley, 1996; Reis and Judd, 2000).

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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.

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Table 2

The Social Information Effect (standard errors in parentheses)

	All data		Without outliers	
	OLS	Robust regression	OLS	Robust regression
Constant	12.305	41.604+	35.967	41.389+
	(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	15.015+	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
+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 significantly 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 $180 treatment is sporadically significant ($p < 0.05$ in the robust regressions with and without outliers but not significant in the OLS specifications). 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 significantly different than the control. If simple knowledge of another's contribution were sufficient, we would have seen all three treatments being significantly different than the control.

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Table 3

The Social Information Effect is Significant for New Members but Not for Renewing Members

	New Members All data		New Members Without outliers		Renewing Members All Data		Renewing Members Without outliers	
	OLS	Robust Regression	OLS	Robust Regression	OLS	Robust Regression	OLS	Robust Regression
Constant	2.651	22.386	6.800	21.766	−43.169	45.931	56.649	57.176*
	(57.858)	(23.910)	(42.824)	(23.601)	(125.856)	(38.927)	(42.647)	(25.950)
$75	4.769	0.445	6.518	0.613	−2.489	3.296	−13.946	2.735
	(14.931)	(6.170)	(11.045)	(6.087)	(24.729)	(7.649)	(12.281)	(7.473)
$180	12.636	11.744*	15.450+	11.492*	−5.643	0.978	−10.144	0.139
	(11.211)	(4.633)	(8.297)	(4.572)	(23.139)	(7.157)	(11.470)	(6.941)
$300	33.735*	9.001+	23.373*	8.458+	42.935	5.202	2.151	5.132
	(13.531)	(5.592)	(10.030)	(5.528)	(30.010)	(9.282)	(15.017)	(9.138)
Male	14.406+	0.370	14.955*	0.370	12.266	3.419	4.431	3.601
	(8.590)	(3.550)	(6.354)	(3.502)	(17.033)	(5.268)	(8.430)	(5.130)
Instalment	56.469**	50.354**	50.949**	50.705**	83.298**	41.452**	53.491**	40.978**
	(9.051)	(3.74)	(6.752)	(3.721)	(16.903)	(5.228)	(8.409)	(5.117)
Drive	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	317	317	315	315	221	221	215	215
R-Squared	0.194	0.466	0.269	0.476	0.230	0.309	0.284	0.317

**p < 0.01
*p < 0.05
+p < 0.10

facing a more ambiguous situation than renewing donors and thus that social information will affect their contributions more than it affects the contributions of renewing donors.[9] To test this we conducted separate sets of regression analyses for new and renewing members. The results are reported in Table 3.

As predicted, we find that the social information effect of $300 is robust for new members but is never significant for renewing members. As before, $180 social information is intermittently significant for new members. This result thus further supports the second class of models of contributions as complements.

One final analysis we can offer investigating the impact of social information is the spread of contributions around the social information contribution amount. If social information matters, one might expect that contributions in the social information condition would be closer to that information than contributions in the other conditions. To test this, we calculate, for each contribution, the absolute distance between it and the $75, $180 or $300 social information levels in the appropriate treatment conditions. We then compare that distance with the absolute distance between contributions and $75, $180 or $300 respectively in the control condition. We find suggestive evidence in this analysis. The average of the absolute difference of contributions from $75 are $47 in the $75 condition, and $54 in the control condition. Similarly, the average of the absolute difference of contributions from $180 are $91 in the $180 condition and $104 in the control condition. The average of the absolute

[9] We thank an anonymous reviewer for suggesting this idea and analysis.

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difference 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 $300. We then regress this absolute distance on the controls from Table 3 and a dummy variable indicating whether an individual was in a treatment condition or not. We find a significant effect of this treatment variable ($\beta = 9.38$, se $= 3.72$, t $= 2.52$, p $= 0.012$) 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 contributions one year later of participants in our study who were new donors and thus influenced by the social information. We examine three variables of interest; the renewal rate (the likelihood that the donor will renew their membership), the amount they contribute in the second year and the product of these two (the expected revenue from the donor one year hence). Results are shown in Table 4, below.

As can be seen from Table 4, the renewal rate is higher in the three social information conditions (ranging from 23% to 32%) than in the control condition (12%). The difference in renewal rate is significant for the $180 and the $300 condition, according to a logit regression model, shown in Table 5. We conclude that the $180 and $300 conditions significantly increase renewal rates over the control.

The contribution amount one year later is also higher in the social information conditions (ranging from $93.97 to $121.13) than in the control condition ($86.11). While these dollar differences are directionally higher they are not statistically different. When we calculate the expected revenue from donors assigned to the various conditions (shown in Figure 2), again the social information conditions yield higher amounts (ranging from $22.21 to $30.28) than the control condition ($10.62).

A direct comparison of the $300 social information and the control condition is of particular interest, as this social information was the most influential. We find a significantly higher probability of contributing one year hence (in $300 32%, in control

Table 4

New Donors One Year Later

	Renewal rate (%)	Mean contribution ($)	Expected revenue ($)
Control	12	86.11	10.62
$75	23	95.50	22.21
$180	25	121.13	30.28
$300	32	93.97	29.95

[10] Complete regression results are available from the authors.

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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

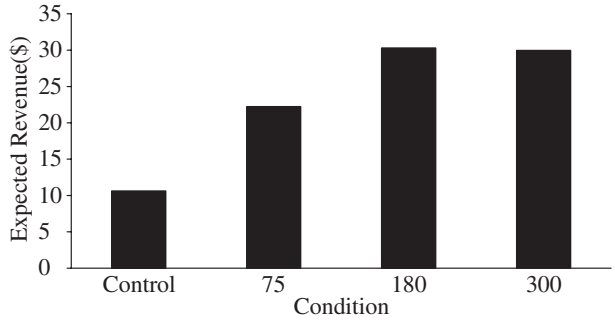

Fig. 2. *Expected Revenue One Year Later.*

12%; $\chi^2 = 11.05$, $p < 0.001$) 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 field 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 influences one's own contributions. The size and significance of this effect varied, with the most effective social information level representing the 90th percentile of the distribution of contributions. The result was significant for new donors, for whom the contribution situation is the most ambiguous. We also find that the increase in contributions due to social influence 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.

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This effect is large. The most effective social influence 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 find a significant effect in robust regressions overall and for new donors but not in other specifications. We believe this sporadic effect is due to the modesty of the contribution level. Previous work in psychology and goal-setting suggest that behavioural goals need to be achievable and inspiring in order to change behaviour effectively (Locke and Latham, 1990). A contribution of $180, although achievable, may not be as inspiring as $300.

Our research is the first to identify longer-term impacts of social influence. We find that new donors who were provided social information were around twice as likely to contribute again one year later (between 23% and 32% compared with 12% in the control condition) and, when they contributed, gave more (between $93.97 and $121.13 compared with $86.11 in the control condition). The expected revenue from donors provided with social information was two to three times that from donors who were not so provided (between $22.21 and $30.28 compared with $10.62 in the control condition).

Field experiments offer a unique opportunity to study the influence of social psychological processes on the voluntary provision to public goods (and charitable contributions more generally) in a natural environment. This experiment demonstrated the influence of social information in the field and provided support for the second class of theories suggesting a positive relationship between others' contribution and one's own. Providing high social information (the 90th percentile of contributions) robustly increases donations. The fact that social information works for new but not renewing members further supports these theories.

However, field experiments have limitations as well. While one can demonstrate that an effect exists, it is much harder to conclude why. In other work, we provide evidence for conformity to social norms as an explanation; we found that social information changes people's perceptions of both what others give to the non-profit organisation and what the appropriate contribution is. These changed perceptions correlate at the individual level with self-reported contribution behaviour; individuals whose perceptions change more, give more than individuals whose perceptions change less (Croson *et al.* 2008). However, more work needs to be done to nail down the underlying psychological mechanism behind these results.

A second limitation of field experiments involves the generalisability of the results. It is possible that our conclusions are sensitive to the choice of this particular public radio

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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 find that donors are influenced by social information presented in that setting. The fact that social information influences 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 ambiguous (or weak) situations. We find some support for this (the effect is significant for new members but not for renewing members). However, future field experiments could classify which situations are and are not ambiguous and provide predictions of when social information is more (or less) likely to influence behaviour.

We believe that social information affects behaviour in a wide variety of economic situations, even though we have demonstrated its effect only in the contribution setting. Others have suggested the importance of norms in actual (Akerlof, 1982) and experimental (Fehr *et al.*, 1998) labour markets, whether to work or live on welfare (Lindbeck *et al.*, 1999), saving and consumption (Lindbeck, 1997) and on profit seeking entitlements (Kahneman *et al.*, 1986). Our article contributes to this literature by providing evidence that social information is impactful in charitable contributions as well.

This impact is not only statistically significant but also economically significant for public radio stations and similar non-profit organisations. For a small radio station of 20,000 members, an average increase of $13 from each member yields an additional $26,000 per year increase in funding. The individual donation revenue for the public broadcasting industry is about 650 million dollars a year (Corporation for Public Broadcasting, 2005). An average increase of 12% would mean an increase of at least 78 million dollars in contributions.

In summary, this research demonstrates the influence of social information on contributions in field experiments using a public radio station's on-air campaign. We find that others' contributions positively influence an individual's contribution (complements), consistent with theories of reciprocity, conformity and norms, but not consistent with theories of altruism (pure or impure) or fixed costs, which predict that contributions will be substitutes. Contemporary and future research explores the same effect in different domains, using different media and different social information levels. This stream of research provides for a deeper understanding of what motivates individuals to contribute toward the funding of public goods and other charitable organisations, and provides a first step in understanding the domains in which social influence is likely to be an important factor to consider in our attempts to improve predictions (and explanations) of economic behaviour.

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