

Promoting Cooperation in the Field

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Abstract

We review the growing literature of field experiments designed to promote cooperative behavior in policy-relevant settings outside the laboratory (e.g. conservation, charitable donations, voting). We focus on four categories of intervention that have been well studied. We find that material rewards and increased efficacy, interventions focused on altering the costs and benefits of giving, have at best mixed success. Social interventions based on observability and descriptive norms, conversely, are consistently highly effective. We then demonstrate how a theoretical framework based on reciprocity and reputation concerns explains why social interventions are typically more effective than cost-benefit interventions, and suggests ways to make cost-benefit interventions more effective. We conclude by discussing other less-studied types of intervention, and promising directions for future research.

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Introduction

Many of society's biggest policy challenges—protecting the environment, providing healthcare, education, and safety, encouraging participation in the democratic process—are social dilemmas. These challenges require individuals to bear personal costs in order to benefit others, a behavior that is typically defined as “cooperation” [1]. There is a long tradition in both the social and natural sciences of studying cooperation theoretically using mathematical models and computer simulations, and of validating the theory empirically using laboratory experiments (for reviews, see Camerer and Fehr [2002] and Rand and Nowak [2013]). These lines of research are particularly exciting because, in addition to advancing scientific understanding, their results have the potential to provide insights into how to solve real-world social dilemmas.

It is often unclear, however, how to translate the findings of this (often abstract) literature to policy-relevant contexts. In particular, cost-effectiveness and practical feasibility are issues that are not typically relevant to (and thus not considered by) theory or lab experiments, but are essential for real-world applications. To bridge this gap, social science researchers have increasingly begun to perform *field* experiments exploring cooperation outside the laboratory. By using random assignment—the central tool of laboratory experiments—in the context of real-world social dilemmas, these studies enable researchers to draw clear conclusions about causality while also providing the external validity critical for policy recommendations.

Here, we provide an overview of this burgeoning literature investigating ways to promote real-world cooperation. We identify four categories of intervention that have been widely studied and summarize each (see Figure 1 for an overview). We then present a synthesis based on our theoretical understanding of the ultimate explanations for human cooperation. We show how this synthesis illuminates why some interventions usually succeed, and how it provides suggestions for ways to increase the effectiveness of others. Finally, we conclude with a discussion of other intervention categories which have been less thoroughly explored, and suggest directions for future work.

Interventions to promote cooperation in the field

Cost-Benefit Interventions

We begin by describing two classes of intervention rooted in a model of decision-making whereby people give because they derive some benefit from the outcomes of others (i.e. are “altruistic”) [3]. From this theoretical perspective based on altruism, the choice of whether to cooperate involves weighing the cost to one's self against the benefit gained by others. Therefore these “Cost-Benefit Interventions” seek to change the (actual or perceived) costs and benefits of cooperation to increase its attractiveness: *material rewards* decrease the cost to the actor, and *increased efficacy* increases the benefits to the recipient.

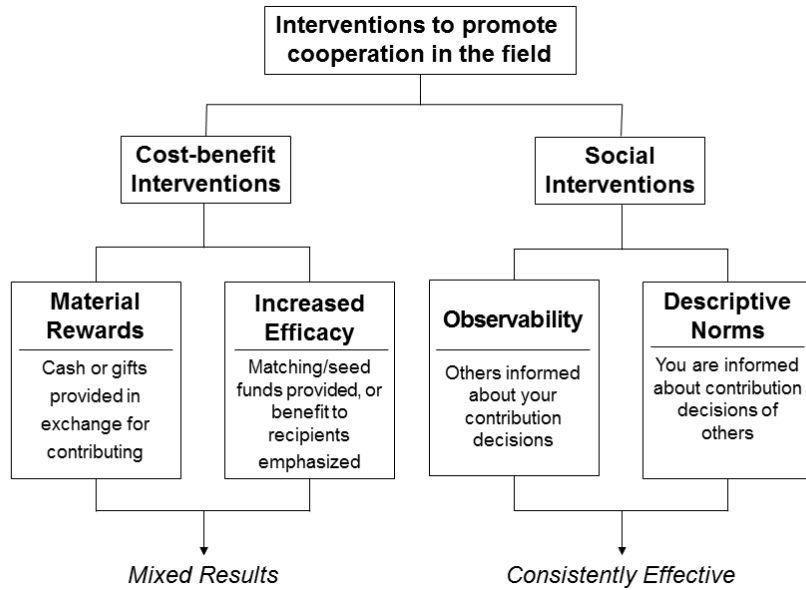


Figure 1. Summary of findings in this review

Material rewards

Some studies sought to decrease cooperation's cost to the self by offering material rewards in exchange for cooperating, such as cash, t-shirts or mugs, with mixed success [4-15]. For example, Landry et al [12] entered people who contributed to a fund-raiser into raffles to win a personal cash prize, and found a 47% increase in the amount of money raised relative to controls with no raffle. Lacetera, Macis and Slonim [2012], on the other hand, explored the effect of providing t-shirts at blood drives run by the Red Cross. They found that participation rates increased by about 25% at locations offering incentives, but that this increase was largely driven by participants that would have donated elsewhere instead traveling to locations that offered the reward. In the domain of energy, Yoeli, Hoffman, Rand and Nowak [2013] found that paying people \$25 to sign up for a blackout prevention program had little effect on participation rates.

Increased efficacy

Other studies aimed to increase the perceived efficacy of contributing (i.e. the benefit created for others) either by supplementing donation amounts using matching or seed funds or by providing information that emphasizes the positive effects of contributing. Such efforts have also met with mixed success [12, 13, 16-24]. For example, Karlan and List [2007] found that offering matching funds increased donations to a charity by 19% compared to no matching funds, but that givers were insensitive to the size of the offered match; but Karlan, List and Shafir [2011] did not find any significant effect of matching grants on average giving. Seed money can increase perceived efficacy of giving by making it more likely that a fundraising goal is reached (a threshold effect), or by signaling an organization's quality (e.g. that the organization has been vetted by large, experienced donors). For example, List [2002] solicited charitable donations to purchase a \$3,000 computer for a non-profit organization, and found that the average donation was more

than 7 times larger when potential donors were told that seed money had already paid for 67% of the goal, compared to 10% of the goal. However, Chen, Li and MacKie-Mason [2006] found that in a fundraising campaign for the Internet Public Library, advertising a seed donation that covered half of the fundraising goal (\$10,000 out of \$20,000) did not significantly increase contributions compared to a standard voluntary contribution mechanism (simply announcing a goal of \$20,000). (Note that seed money may also have some element of descriptive norm information; see below.)

Thus, overall, the results are mixed. While Cost-Benefit Interventions may sometimes increase cooperation, they have been found to be ineffective in a number of cases. Therefore, it would be useful for policymakers to have other forms of intervention at their disposal.

Social Interventions

We now turn to two classes of intervention which rely on social factors rather than material factors: *observability* makes the actor's behavior observable to others and *descriptive norms* provide information about others' behavior to the actor. While the simple economic model of decision-making described above (where people weigh material costs and benefits) would not predict these interventions to be effective, theoretical and experimental work from biology, psychology and behavioral economics suggests that they have promise (for a review, see Rand, Yoeli and Hoffman [2014]). An additional attractive feature of these "Social Interventions," relative to most Cost-Benefit Interventions, is that they are typically very inexpensive and easy to implement.

Observability

Making one's contribution decision observable by others has consistently been found to increase cooperation [4, 6, 27-40]. For example, Yoeli, Hoffman, Rand and Nowak [2013] found that subjects were three times more likely to participate in a blackout prevention program when they enrolled by writing their names and apartment numbers on a publicly posted signup sheet, rather than just an anonymous ID number. Even subtle manipulations that only give the *impression* of being observed can increase cooperation. For example, posters of eyes have been found to increase honor-system payments for coffee in a university office by 276% (compared to images of flowers) [38], reduce the amount of litter left on university dining hall tables by 69% (compared to posters of flowers) [32], and increase money donated to charity collection buckets in a supermarket by 48% (compared to images of stars) [40].

Descriptive norms

People are more likely to cooperate when they are told that others have cooperated, implying that cooperation is the social norm [10, 20, 23, 24, 35, 39, 41-58]. (Note that this type of intervention is the converse of observability: here you are informed about the behavior of others, rather than others being informed about your behavior.) For example, Frey and Meier [2004] increased the number of students contributing to a campus charity by 2.3% by informing them that 64% of students had contributed in the past (compared to informing them that 46% of students had contributed in the past). Goldstein, Cialdini and Griskevicius [2008] increased towel reuse by 9% in hotels by informing guests that 75% of previous

guests had reused their towels, compared to a standard environmental appeal (i.e. “Help Save the Environment”). This approach has been successfully applied in the energy domain by companies such as OPower and Enertiv, improving conservation by comparing customers’ consumption to that of their peers (e.g., Allcott [2011], Ayres, Raseman and Shih [2012]). However, descriptive norms can also have perverse effects for some people: Bhanot [in prep] found that ranking consumers’ water use relative to their neighbors may decrease conservation among those who conserved more than the norm. There is some evidence that this “backsliding” to the norm (known as the “boomerang effect”) may be prevented by framing the rank ordering as a competition [53], or by messages about cooperating being the appropriate behavior (i.e. injunctive norms, as in Schultz, Nolan, Cialdini, Goldstein and Griskevicius [2007]).

Synthesis: Reciprocity shapes human cooperation

What explains why Social Interventions seem to be more effective than Cost-Benefit Interventions? And to what extent will the results of these specific field experiments generalize to other field settings? A theoretical understanding of human cooperation helps to answer these applied questions (and the patterns observed in these applications help to validate and extend our theoretical understanding) [26]. While there are many explanations for why people cooperate, we argue that the concept of reciprocity is particularly useful for organizing the literature on promoting cooperation in the field.

A key feature of human behavior is that future consequences often exist for your choices today. When interactions are repeated or reputations are at stake, cooperation can be in your long-run self-interest: it is worth paying the cost of cooperating today in order to earn the benefits of others’ reciprocal cooperation with you in the future [1, 59, 60]. As a result, our preferences are shaped by reciprocity, and we typically develop reciprocally cooperative intuitions or “social heuristics” [1, 61-64]. Thus, although people may not always explicitly *deliberate* over the impact of their actions on their reputations, reciprocal concerns are deeply rooted in human psychology and influence our intuitive, gut responses.

This theoretical account of human prosociality makes predictions regarding which interventions will work better than others: those interventions that best engage people’s sense of reciprocity should be most effective. Indeed, the field experiments reviewed here fit this pattern. The highly effective Social Interventions strongly invoke reciprocity. *Observability* engages subjects’ reputational concerns by allowing others to better observe—and thus reciprocate—their good deeds. And *Descriptive norms* engage reciprocal concerns by providing information about how others have acted, and therefore what others are likely to expect of you (i.e. which of your actions will be rewarded and punished).

Conversely, the Cost-Benefit Interventions that met with only mixed success do not engage reciprocity and reputation, or even worse, sometimes undercut these concerns. *Material rewards* for being cooperative can “crowd out” the reputational benefits that typically come with contributing [7, 65, 66]: they make it unclear whether contributions were made because you are actually a cooperative person (and thus deserving of a good reputation, both in the eyes of others and of yourself), or just for the selfish purpose of receiving the material reward [67]. This perspective suggests that material rewards that benefit other people as well as the cooperator might be more effective, because they may seem less indicative of

a self-interested motive; for example, a party for the team that raises the most money in a fundraiser, or the suite that uses the least electricity in a dorm. *Increased efficacy* has two issues from a reciprocity perspective. First, the cost of one's cooperation is typically much easier for others to observe than the beneficial effects, as those benefits typically occur later, and are more diffuse and are harder to quantify. Second, increased efficacy of your contribution arising from donation matching may not feel attributable to you, but instead to those who contributed the match money. For both of these reasons, increased efficacy may not bring greater reputational gains (or lead to one feeling like a better person for having contributed). This perspective offers a potential solution: make efficacy of contributions publicly observable to others. For example, when listing the amount people donated to a cause, include the match amount in each individual's donation total.

This reciprocity framework also sheds light on whether, and when, these interventions will be effective in contexts beyond those in which they were tested. Reciprocity and reputation are dominant features of human social interaction across settings [68]. Thus we expect interventions based on these principles to be widely effective. This is particularly true in settings where reputational concerns are greatest, that is, when we have particularly valuable relationships with those who can observe our behavior. For example, the blackout reduction study of Yoeli, Hoffman, Rand and Nowak [2013] found that observability had a much bigger effect among apartment owners (who typically have long-term relationships with their neighbors) than among renters (who are more transient).

Further implications arise from the fact that reciprocity and reputation concerns may often be operating at an intuitive, rather than explicitly conscious, level [1, 61-64, 69, 70]: interventions that more heavily engage intuitive, emotional processes may be more effective in promoting cooperation. Consistent with this prediction, Small, Loewenstein and Slovic [2007] found that people were more willing to donate to emotional salient "identifiable victims" than to causes described with rationally compelling statistics. Furthermore, subjects in their experiments donated more to identifiable victims when primed to make their decision emotionally or "go with their gut," and subjects in the economic cooperation games experiments of Rand, Greene and Nowak [2012] and Rand, Peysakhovich, Kraft-Todd, Newman, Wurzbacher, Nowak and Greene [2014] contributed more to the public good when forced to decide more intuitively. Such results provide another reason Cost-Benefit Interventions may sometimes be ineffective: these interventions typically aim to change the results of conscious, deliberative calculations regarding costs and benefits, rather than appealing to donors' intuitions.

Our theoretical framework also suggests important limitations to the Social Interventions. One must beware not to "crowd out" cooperation by making reputational rewards too explicit: in the same way that material rewards can suggest selfish motives for cooperation, so too can explicit reputational rewards [69]. Additionally, reciprocity and reputation concerns will only motivate cooperation if cooperating is typically perceived as desirable: in communities which disparage cooperation in a particular domain, many of these interventions are unlikely to work (e.g. fund raising for the National Rifle Association in politically liberal communities, or for environmental sustainability in politically conservative communities) [27, 50, 73].

Future directions

In addition to the four categories of intervention we have discussed here, numerous other approaches to promoting cooperation have been explored in the field. These include non-contingent gifts to induce reciprocal feelings of obligation [22, 39, 74-78]; setting defaults such that non-cooperation requires actively opting out [16, 42, 79]; solicitations explicitly asking people to cooperate [15, 80-83]; the framing of such solicitations [84]; variation of the characteristics of the people making such solicitations [13, 35, 37]; participatory decision-making, whereby cooperators get to give input on what public goods are produced [36, 37]; and instrumental information enabling cooperation (e.g. real-time feedback on home energy use) [10, 12, 48-51, 57, 58, 85]. Expanding the policymaker's toolkit via further exploration of these and other potential interventions is a critical direction for future research on human cooperation. In doing so, the theoretical perspective we present here can help to illuminate which approaches are particularly promising, and provide guidance on how to optimize their effectiveness.

Finally, we end by suggesting one additional avenue for further investigation. A topic that has received little attention in the context of field experiments on cooperation is the formation and modification of habits. Rather than one-time actions, the solutions to many real-world public goods require long-term behavior modification [86]. A large body of evidence from social and cognitive psychology suggests that we internalize behaviors that are typically successful, and adopt them as intuitive default responses [87-89]. Thus particularly successful interventions will help to overcome habitual inertia, further increasing the initial gains. Understanding which interventions most effectively build cooperative habits, and what factors contribute to treatment persistence more generally, is of great importance for effecting real-world change.

Conflict of interest statement

Nothing declared.

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References

1. D. G. Rand, M. A. Nowak, Human Cooperation. *Trends in Cognitive Sciences* **17**, 413 (2013).
2. C. F. Camerer, E. Fehr, Measuring social norms and preferences using experimental games: A guide for social scientists. (2002).
3. G. S. Becker, Altruism, Egoism, and Genetic Fitness: Economics and Sociobiology. *Journal of Economic Literature* **14**, 817 (1976).

4. N. Ashraf, O. Bandiera, K. Jack, *No Margin, No Mission?: A Field Experiment on Incentives for Pro-social Tasks*. (Centre for Economic Policy Research, 2012).
5. C. Noussair, D. van Soest, J. Stoop, Punishment, reward, and cooperation in a framed field experiment. (2011).
6. E. Yoeli, M. Hoffman, D. G. Rand, M. A. Nowak, Powering up with indirect reciprocity in a large-scale field experiment. *Proceedings of the National Academy of Sciences* **110**, 10424 (2013).

**The authors explore the role of observability in increasing sign-ups for a voluntary demand response program (where energy companies are able to moderate power availability during peak use times). In an intervention of 2400 subjects, they find that including participants' names on the sign-up sheet (in addition to a subject ID number) increases sign-ups threefold. This is especially for those whose living arrangements imply greater reputational concerns, i.e. owners (rather than renters) and residents of apartment buildings (rather than row houses or individual homes).

7. U. Gneezy, A. Rustichini, Pay Enough or Don't Pay at All. *Quarterly Journal of Economics* **115**, 791 (2000).
8. B. Uri Gneezy, Aldo Rustichini, A Fine Is a Price. *The Journal of Legal Studies* **29**, 1 (2000).
9. L. Goette, A. Stutzer, "Blood donations and incentives: Evidence from a field experiment" (IZA Discussion Papers, 2008).
10. P. Dolan, R. Metcalfe, Neighbors, knowledge, and nuggets: two natural field experiments on the role of incentives on energy conservation. (2013).
11. N. Lacetera, M. Macis, R. Slonim, Will There Be Blood? Incentives and Displacement Effects in Pro-social Behavior. *American Economic Journal: Economic Policy* **4**, 186 (2012).
- **This paper reports on a field experiment of 72 blood drives (and aggregate data from close to 14,000) showing that material incentives (e.g. t-shirts, mugs) increase the number of blood donors at a drive by about 25%. They also find, however, that drives that have incentives displace participation in nearby and proximately-timed drives. They conclude that while material incentives increase blood donations, the effect may often be over-estimated.
12. C. Landry, A. Lange, J. A. List, M. K. Price, N. G. Rupp, "Toward an understanding of the economics of charity: Evidence from a field experiment" (National Bureau of Economic Research, 2005).
13. J. A. List, M. K. Price, The role of social connections in charitable fundraising: Evidence from a natural field experiment. *Journal of Economic Behavior & Organization* **69**, 160 (2009).
14. E. Xiao, D. Houser, "Sign Me Up! A Model and Field Experiment on Volunteering" (2014).
15. K. I. Ito, Takanori; Tanaka, Makoto, The Persistence of Intrinsic and Extrinsic Motivation: Experimental Evidence from Energy Demand. Available at: http://www.abef.jp/event/2014/pdf_abst/PR0005.pdf. (working paper).

16. D. Karlan, J. A. List, Does Price Matter in Charitable Giving? Evidence from a Large-Scale Natural Field Experiment. *American Economic Review* **97**, 1774 (2007).

**Using over 50,000 subjects in a direct-mail fundraising campaign for a non-profit, the authors test the effect of different matching grant ratios (\$1:\$1, \$2:\$1, \$3:\$1) on charitable giving. They find that while a matching grant does increase donations (about 15% per solicitation), the size of the match does not significantly increase giving.

17. D. Rondeau, J. List, Matching and challenge gifts to charity: evidence from laboratory and natural field experiments. *Exp Econ* **11**, 253 (2008).

18. S. Meier, Do subsidies increase charitable giving in the long run? Matching donations in a field experiment. *Journal of the European Economic Association* 5, 1203 (2007).
19. U. Gneezy, E. A. Keenan, A. Gneezy, Avoiding overhead aversion in charity. *Science* 346, 632 (2014).
- **This paper tests a novel intervention in charitable fundraising, examining the effect of informing prospective donors that their money will go directly to charitable programs rather than overhead costs. They find that using this intervention in a direct-mail campaign to 40,000 potential donors raises 75% more money than a standard seed donation treatment and 89% more than a match treatment.
20. C. E. Cryder, G. Loewenstein, H. Seltman, Goal gradient in helping behavior. *Journal of Experimental Social Psychology* 49, 1078 (2013).
21. D. Karlan, J. A. List, E. Shafir, Small matches and charitable giving: Evidence from a natural field experiment. *Journal of Public Economics* 95, 344 (2011).
22. Y. Chen, X. Li, J. K. MacKie-Mason, Online fund-raising mechanisms: A field experiment. *Contributions in Economic Analysis & Policy* 5, (2006).
23. R. a. M. Koning, Jacob, Social Influence Mechanisms in Crowdfunding Cascades: When Nothing is Better than Something. Available at SSRN: <http://ssrn.com/abstract=2308161>, (2013).
24. R. Martin, J. Randal, How is donation behaviour affected by the donations of others? *Journal of Economic Behavior & Organization* 67, 228 (2008).
25. J. List, Lucking-Reiley, David, The Effects of Seed Money and Refunds on Charitable Giving: Experimental Evidence from a University Capital Campaign. *Journal of Political Economy* 110, 215 (2002).
26. D. G. Rand, E. Yoeli, M. Hoffman, Harnessing Reciprocity to Promote Cooperation and the Provisioning of Public Goods. *Policy Insights from the Behavioral and Brain Sciences* 1, 263 (2014).
- ***This paper reviews studies in which manipulations of reciprocity are used to increase cooperation. The authors explain the theoretical background of these interventions in game theory and review five interventions relevant to policy-makers: making behavior observable, focusing on effectiveness, not letting people 'avoid the ask', projecting a norm of cooperation, and creating habits of cooperation.
27. D. Ariely, A. Bracha, S. Meier, Doing Good or Doing Well? Image Motivation and Monetary Incentives in Behaving Prosocially. *American Economic Review* 99, 544 (2009).
28. M. Ekström, Do watching eyes affect charitable giving? Evidence from a field experiment. *Exp Econ* 15, 530 (2012).
29. A. R. Soetevent, Anonymity in giving in a natural context—a field experiment in 30 churches. *Journal of Public Economics* 89, 2301 (2005).
30. N. Lacetera, M. Macis, Social image concerns and prosocial behavior: Field evidence from a nonlinear incentive scheme. *Journal of Economic Behavior & Organization* 76, 225 (2010).
31. D. Karlan, M. A. McConnell, "Hey look at me: The effect of giving circles on giving" (National Bureau of Economic Research, 2012).

32. M. Ernest-Jones, D. Nettle, M. Bateson, Effects of eye images on everyday cooperative behavior: a field experiment. *Evolution and Human Behavior* **32**, 172 (2011).
33. D. Francey, R. Bergmüller, Images of Eyes Enhance Investments in a Real-Life Public Good. *PLoS ONE* **7**, e37397 (2012).
34. P. Funk, Social incentives and voter turnout: evidence from the swiss mail ballot system. *Journal of the European Economic Association* **8**, 1077 (2010).
35. G. D'Adda, "Leadership and influence: Evidence from an artefactual field experiment on local public good provision" (Working Paper Series, Department of Economics, University of Zurich, 2011).
36. B. A. Olken, Direct Democracy and Local Public Goods: Evidence from a Field Experiment in Indonesia. *The American Political Science Review* **104**, 243 (2010).
37. C. Cavalcanti, F. Schläpfer, B. Schmid, Public participation and willingness to cooperate in common-pool resource management: A field experiment with fishing communities in Brazil. *Ecological Economics* **69**, 613 (2010).
38. M. Bateson, D. Nettle, G. Roberts, *Cues of being watched enhance cooperation in a real-world setting*. (2006), vol. 2, pp. 412-414.
39. F. Alpizar, F. Carlsson, O. Johansson-Stenman, Anonymity, reciprocity, and conformity: Evidence from voluntary contributions to a national park in Costa Rica. *Journal of Public Economics* **92**, 1047 (2008).
40. K. L. Powell, G. Roberts, D. Nettle, L. Fusani, Eye Images Increase Charitable Donations: Evidence From an Opportunistic Field Experiment in a Supermarket. *Ethology* **118**, 1096 (2012).
41. R. Martin, J. Randal, Voluntary contributions to a public good: a natural field experiment. *Unpublished manuscript, Victoria University, New Zealand*, (2005).
42. F. Carlsson, O. Johansson-Stenman, N. Pham Khanh, Funding a new bridge in rural Vietnam: A field experiment on conditional cooperation and default contributions. (2011).
43. R. Croson, J. Shang, The impact of downward social information on contribution decisions. *Exp Econ* **11**, 221 (2008).
44. R. Croson, F. Handy, J. Shang, Keeping up with the Joneses: The relationship of perceived descriptive social norms, social information, and charitable giving. *Nonprofit Management and Leadership* **19**, 467 (2009).
45. J. Shang, R. Croson, A Field Experiment in Charitable Contribution: The Impact of Social Information on the Voluntary Provision of Public Goods. *Economic Journal* **119**, 1422 (2009).
46. B. S. Frey, S. Meier, Social Comparisons and Pro-Social Behavior: Testing "Conditional Cooperation" in a Field Experiment. *The American Economic Review* **94**, 1717 (2004).
47. N. J. Goldstein, R. B. Cialdini, V. Griskevicius, A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels. *Journal of Consumer Research* **35**, 472 (2008).

- **The authors test the effect of descriptive norm information on hotel towel reuse in 190 rooms over 80 days. They find that a door hanger that asks guests to reuse their towels which includes information about others' compliance (e.g. "Almost 75% of guests who are asked to participate in our new resource savings program do help by using their towels more than once.") increases towel reuse by 9% over a generic message to "Help save the environment."
48. H. Allcott, Social norms and energy conservation. *Journal of Public Economics* **95**, 1082 (2011).
 - **This paper reports the result of home energy score mailers on reducing home energy use in over 600,000 homes. The home energy report includes information comparing the resident's energy use to their neighbors and tips to conserve energy. This experiment resulted in a small but robust decrease in energy use for homes receiving home energy scores.
 49. I. Ayres, S. Raseman, A. Shih, Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage. *Journal of Law, Economics, and Organization*, (2012).
 50. D. L. Costa, M. E. Kahn, ENERGY CONSERVATION "NUDGES" AND ENVIRONMENTALIST IDEOLOGY: EVIDENCE FROM A RANDOMIZED RESIDENTIAL ELECTRICITY FIELD EXPERIMENT. *Journal of the European Economic Association* **11**, 680 (2013).
 51. D. A. Brent, J. H. Cook, S. Olsen, Norms and Water Conservation: How Do Effects Vary Across and Within Utilities? , (2014).
 52. A. S. Gerber, T. Rogers, Descriptive Social Norms and Motivation to Vote: Everybody's Voting and so Should You. *The Journal of Politics* **71**, 178 (2009).
 53. S. Bhanot, Rank and Response: A Field Experiment on Peer Information and Water Use Behavior. Available at: <http://goo.gl/AlWbex>, (in prep).
 - **This paper reports the result of an experiment of mailers comparing residents' water use to their neighbors in over 5000 households. Though cooperative and competitively-framed messages do not demonstrate treatment effects different than control messages, the competitive conditions resulted in interesting heterogeneities: high users reduced their water use while low users increased their water use.
 54. P. W. Schultz, J. M. Nolan, R. B. Cialdini, N. J. Goldstein, V. Griskevicius, The Constructive, Destructive, and Reconstructive Power of Social Norms. *Psychological Science (Wiley-Blackwell)* **18**, 429 (2007).
 55. E. L. Paluck, Reducing intergroup prejudice and conflict using the media: a field experiment in Rwanda. *Journal of personality and social psychology* **96**, 574 (2009).
 56. E. L. Paluck, H. Shepherd, The salience of social referents: A field experiment on collective norms and harassment behavior in a school social network. *Journal of personality and social psychology* **103**, 899 (2012).
 57. P. J. Ferraro, M. K. Price, Using Nonpecuniary Strategies to Influence Behavior: Evidence from a Large-Scale Field Experiment. *Review of Economics and Statistics* **95**, 64 (2013).
 58. H. Allcott, T. Rogers, The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation. *American Economic Review* **104**, 3003 (2014).
 59. M. A. Nowak, K. Sigmund, Evolution of indirect reciprocity. *Nature* **437**, 1291 (2005).

60. D. Fudenberg, E. S. Maskin, The Folk Theorem in Repeated Games with Discounting or with Incomplete Information. *Econometrica* **54**, 533 (1986).
61. D. G. Rand, J. D. Greene, M. A. Nowak, Spontaneous giving and calculated greed. *Nature* **489**, 427 (2012).
62. D. G. Rand *et al.*, Social Heuristics Shape Intuitive Cooperation. *Nature Communications* **5**, 3677 (2014).
63. V. Grimm, F. Mengel, Let me sleep on it: Delay reduces rejection rates in ultimatum games. *Economics Letters* **111**, 113 (2011).
64. M. Sutter, M. Kocher, S. Straub, Bargaining under time pressure in an experimental ultimatum game. *Economics Letters* **81**, 341 (2003).
65. B. S. Frey, F. Oberholzer-Gee, The Cost of Price Incentives: An Empirical Analysis of Motivation Crowding-Out. *American Economic Review* **87**, 746 (1997).
66. G. E. Newman, D. M. Cain, Tainted Altruism: When Doing Some Good Is Evaluated as Worse Than Doing No Good at All. *Psychological Science* **25**, 648 (2014).
67. R. BÉNabou, J. Tirole, Incentives and Prosocial Behavior. *American Economic Review* **96**, 1652 (2006).
68. E. Ostrom, Toward a behavioral theory linking trust, reciprocity, and reputation. (2003).
69. M. H. Hoffman, Christian; Nowak, Martin, Modesty. (Working Paper).
70. M. Hoffman, E. Yoeli, M. A. Nowak, Cooperate without looking: Why we care what people think and not just what they do. *Proceedings of the National Academy of Sciences* **112**, 1727 (2015).
71. D. A. Small, G. Loewenstein, P. Slovic, Sympathy and callousness: The impact of deliberative thought on donations to identifiable and statistical victims. *Organizational Behavior and Human Decision Processes* **102**, 143 (2007).
72. D. G. Rand *et al.*, Social Heuristics Shape Intuitive Cooperation. *Nature Communications* **5**, (2014).
73. T. Ellingsen, B. Herrmann, M. A. Nowak, D. G. Rand, C. E. Tarnita, "Civic capital in two cultures: the nature of cooperation in Romania and USA" (CESifo Working Paper: Behavioural Economics, 2012).
74. A. J. Caplan, D. Jackson-Smith, S. Marquart-Pyatt, Does 'free-sampling' enhance the value of public goods? *Applied Economics Letters* **17**, 335 (2010).
75. T. de Hoop, L. van Kempen, R. Fort, Do Cash Transfers Crowd Out Community Investment in Public Goods? Lessons from a Field Experiment on Health Education. *Nonprofit and Voluntary Sector Quarterly* **41**, 232 (2012).
76. A. Falk, Gift Exchange in the Field. *Econometrica* **75**, 1501 (2007).

77. U. Gneezy, J. A. List, Putting Behavioral Economics to Work: Testing for Gift Exchange in Labor Markets Using Field Experiments. *Econometrica* **74**, 1365 (2006).
78. A. Gneezy, U. Gneezy, L. D. Nelson, A. Brown, Shared Social Responsibility: A Field Experiment in Pay-What-You-Want Pricing and Charitable Giving. *Science* **329**, 325 (2010).
79. D. Pichert, K. V. Katsikopoulos, Green defaults: Information presentation and pro-environmental behaviour. *Journal of Environmental Psychology* **28**, 63 (2008).
80. J. Andreoni, J. M. Rao, H. Trachtman, "Avoiding the ask: a field experiment on altruism, empathy, and charitable giving" (National Bureau of Economic Research, 2011).
81. M. Knutsson, P. Martinsson, C. Wollbrant, Do people avoid opportunities to donate?: A natural field experiment on recycling and charitable giving. *Journal of Economic Behavior & Organization* **93**, 71 (2013).
82. N. Malhotra, M. R. Michelson, T. Rogers, A. A. Valenzuela, Text Messages as Mobilization Tools: The Conditional Effect of Habitual Voting and Election Salience. *American Politics Research* **39**, 664 (2011).
83. D. W. Nickerson, T. Rogers, Do You Have a Voting Plan?: Implementation Intentions, Voter Turnout, and Organic Plan Making. *Psychological Science* **21**, 194 (2010).
84. C. J. Bryan, G. M. Walton, T. Rogers, C. S. Dweck, Motivating voter turnout by invoking the self. *Proceedings of the National Academy of Sciences* **108**, 12653 (2011).
85. S. Houde, A. Todd, A. Sudarshan, J. A. Flora, K. C. Armel, Real-time Feedback and Electricity Consumption. *Economics* **95**, 1082 (2013).
86. E. Frey, T. Rogers, Persistence How Treatment Effects Persist After Interventions Stop. *Policy Insights from the Behavioral and Brain Sciences* **1**, 172 (2014).
87. G. Gigerenzer, D. G. Goldstein, Reasoning the fast and frugal way: models of bounded rationality. *Psychological review* **103**, 650 (1996).
88. D. Kahneman, A perspective on judgment and choice: mapping bounded rationality. *American psychologist* **58**, 697 (2003).
89. A. Peysakhovich, D. G. Rand, Habits of virtue: creating norms of cooperation and defection in the laboratory. *Management Science*, (in press).