Changing Norms to Change Behavior

Dale T. Miller[1] and Deborah A. Prentice[2]

[1]Graduate School of Business, Stanford University, Stanford, California 94305; email: dtmiller@stanford.edu

[2]Department of Psychology, Princeton University, Princeton, New Jersey 08540

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Abstract

Providing people with information about the behavior and attitudes of their peers is a strategy commonly employed by those seeking to reduce behavior deemed harmful either to individuals (e.g., high alcohol consumption) or the collective (e.g., high energy consumption). We review norm-based interventions, detailing the logic behind them and the various forms they can take. We give special attention to interventions designed to decrease college students' drinking and increase environment-friendly behaviors. We identify the conditions under which norm information has the highest likelihood of changing the targeted behavior and discuss why this is the case.

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INTRODUCTION

People's behavior is greatly influenced by what they see or hear of others doing (Cialdini & Goldstein 2004, Miller & Prentice 1996). Although the powerful effect of social norms has long been known by psychologists (e.g., Asch 1955, Lewin 1943, Sherif 1937), it is only recently that interventions seeking to modify individually or collectively pernicious behavior have started to leverage normative information. This shift reflects a growing disillusionment with the capacity of factual information and economic inducements to reduce such behavior. For example, informing college students of the dangers of heavy alcohol consumption does little to reduce their drinking levels (Blane & Hewitt 1977), and providing homeowners with financial incentives for energy conservation does little to reduce home energy consumption (Epsey & Epsey 2004).

Two assumptions underlie the strategy of providing people with information about their peers in order to modify their behavior: First, accurate information about what peers or relevant others think, feel, or do is not always known or salient to people; and second, providing people with this information has the potential to alter their understanding of group norms, their own standing in the group, and the evaluative significance of the behavior in question. This altered understanding may, in turn, lead them to act differently.

TARGETING SOCIAL NORMS

The term social norm has two meanings in the context of interventions. It can refer to a common behavior or practice, as in "Most members in this community donate money to charity." It can also refer to an average outcome or output standard, as in "The median annual amount donated to charity by members of this community is $2,500." These two meanings suggest two ways that

people can be more or less in step with their peers. First, people can conform to a common practice (donate to charity) or deviate from it (not donate). Second, even if people do conform to the practice, they can do so in a manner that places them nearer or further from the central tendency of their group (a high, low, or average donator). Traditional discussions of norms tend to assume that people are aware of the norm of their group and where they are in relation to it. The assumption of norm-based interventions is that people often do not know what the norm is or are mistaken about it and their relation to it. Receiving feedback as to where their actions put them in the distribution of their peers (e.g., above or below the 50th percentile) or in relation to the most common actions of their peers (e.g., in the majority or in the minority) shapes their representation of their peer group and the evaluative significance of their behavior.

Social norms marketing (SNM): a means of correcting norm misperceptions that involves publicizing (marketing) the actual rate of the misperceived behavior via the media, posters, emails, etc.

Personalized normative feedback (PNF): a means of correcting norm misperceptions that involves collecting participants' self-reported incidence of some behavior and their perception of the incidence of this behavior among their peers and then providing them with the actual incidence of the behavior

INTERVENTION STRATEGIES

Researchers and practitioners have experimented with different strategies to convey distributional information in a meaningful, believable, and memorable way. These strategies fall into three main categories that vary in their commonness as a function of the behavior targeted.

Social Norms Marketing

One intervention strategy is known as social norms marketing (SNM) and has been used most commonly in attempts to reduce risky behavior, in particular college students' drinking (Burchell et al. 2013, Perkins 2014). The hallmark of this approach is the dissemination of a single factual message documenting the (high) incidence of some desirable behavior to all or at least many members of a group (e.g., college campus or neighborhood). This message can be conveyed via publicity events, t-shirts, posters, student newspapers, doorhangers, and email. An example of such a message targeting drinking among college students is "Eighty-five percent of students on our campus drink 0, 1, 2, 3 or at most 4 drinks when they party." An example of such a message that targets energy conservation is "Seventy-seven percent of your neighbors report taking shorter showers to conserve energy." This strategy is appealing in that it has the potential to disseminate the distributional information to a large number of people cheaply and efficiently. The downside is that it is scattershot and subject to misinterpretation and suspicion. Another restriction is that its effectiveness presupposes that the behavior it seeks to encourage is already highly common.

Personalized Normative Feedback

The second approach is one that aims its message at individuals, providing them with information about themselves as well as their peers. In interventions targeting alcohol consumption and other risky behavior, these interventions are termed personalized feedback interventions or personalized normative feedback (PNF) (Lewis & Neighbors 2006a, Miller et al. 2013). An alcohol-based intervention of this type first asks the members of a group or community (e.g., students at a particular college), via email or web-based means, to identify both how much they drink and how much they think their peers (more or less broadly defined) drink. As a next step, it provides members of the group with the discrepancies both between their estimates of the norm and the actual norm and between their reported level of drinking and the actual norm. An example of the feedback a student might receive is the following: "You said you drink 10 drinks per week and that you think the typical student drinks 15. The actual average is 4.6 drinks. You drink more than 80% of other college students" (Neighbors et al. 2011). This is a labor-intensive approach, but it does a better job than SNM of highlighting the implications of the distributional information for the self.

PNF interventions targeting environmental conservation behaviors typically do not collect perceptions of others from intervention participants. First, they collect each participant's rate of energy consumption, often from a utility company, and then, as a second step, present this information to the participants by mail or email along with the average usage of their peers, more or less broadly defined. An example of the feedback a homeowner might receive is "You consume more water than 60% of your ___ County neighbors" (Ferraro & Price 2013).

Focus Group Discussion

The third approach, used primarily in interventions focused on risky behavior, uses facilitator-led, live interaction groups to discuss both the misperceptions that exist about the risky practices and the cause and consequences of these misperceptions (Barnett et al. 1996, Far & Miller 2003, LaBrie et al. 2008, Reilly & Wood 2008, Schroeder & Prentice 1998, Steffian 1999). Focus group discussion (FGD) is the most labor-intensive approach of all and relies on skilled facilitators to draw out people's true attitudes and behaviors.

One challenge for norm-based interventions is ensuring that participants attend to and comprehend the information embedded in the intervention (Thombs et al. 2005). One of the rationales for using the PNF approach over the SNM approach is that the former is more likely to ensure that participants process the message of the intervention. A second challenge of norm-based intervention is perceived credibility. For example, college students are not surprisingly distrustful of an anti-drinking message that is distributed by the college administration and that contradicts their experience (Granfield 2002). The PNF approach is thought to better convince participants that the information is credible because it includes information about the source of the data it provides. The focus group approach is also able to allay credibility concerns by helping participants understand why their perceptions were incorrect.

INTERVENTIONS TO REDUCE RISKY BEHAVIOR

Norm-based interventions were developed originally to reduce the prevalence of risky behavior in situations in which people held biased perceptions of the attitudes of their peers toward this behavior. The delivery of valid information about peer attitudes and behaviors was aimed at correcting these biased perceptions. The behavior targeted most extensively by this type of intervention—and the one we focus on here—is college students' drinking behavior.

Focus group discussion (FGD): a means of correcting norm misperceptions that involves group members discussing one another's perception of the incidence of some risky behavior and reasons it might be overestimated

Theory of Norm-Based Interventions to Reduce College Students' Drinking

The theory of norm-based interventions is that students' drinking behavior is correlated with, and at least somewhat caused by, an exaggerated estimate of the drinking norms and that correcting students' misperceptions will curb their drinking behavior (Perkins 2003). But how influential are misperceptions, and will changing them produce an impact on behavior?

To examine the logic of norm-based interventions, consider a college where the data indicate that 7 of 10 students don't drink on most nights, yet the collective perception of students is that 7 of 10 students do drink on most nights. Why might publicizing the factual message "Seven of 10 students don't drink most nights" be expected to lower drinking? Let us begin by positing two determinants of a student's drinking level: (*a*) his or her preferred consumption rate and (*b*) his or her perception of the average consumption rate. From the fact that students generally perceive

the consumption norm to be higher than their consumption level, we can assume that many moderate drinkers are not influenced by what they perceive to be the norm and instead consume at their preferred level. Correcting their perceptions of the norm and thereby showing them that their consumption level is more in step with the actual norm than they previously thought may make them feel more comfortable with their consumption level but seems unlikely to change it. The exceptions might be those moderate drinkers who, although drinking less than what they mistakenly perceived to be the norm, are still drinking more than they would like to be.

The focal participants in the intervention (in our example, the 30% of the population who are heavy drinkers) fall into two groups that vary in their potential to be influenced by a downward shift in the perception of the norm. The most receptive to change would be those who were drinking more than they wanted to because of a desire to be socially accepted. For them, learning of the actual norm should be disinhibiting and should liberate them to act on their preference to consume less. These individuals are the low-hanging fruit for norm-based interventions, and the more of them there are in the population, the more successful such interventions will be. Those heavy drinkers whose actual consumption rate is their preferred consumption rate and who previously thought that this was closer to the median rate than it is might also respond to the intervention by drinking less, but they would require more of a push. Specifically, the intervention would have to be strong enough to induce them to drink less than they would like to drink and were accustomed to drinking. Moreover, it is highly likely that these individuals would respond to such an intervention by rationalizing the meaning and relevance of the normative information and possibly by increasing their social contact with other students whose preference for alcohol consumption is similar to their own (Blanton et al. 2008). All of these responses would mute the behavioral effects of the intervention.

In summary, the potential success of a norm-based intervention depends on how norm-misperceiving students are distributed across two distinct psychological profiles. The potential for success is better the greater the number of students whose drinking behavior is preference inconsistent but is perceived to be norm consistent (i.e., students drink more than they would prefer to because they mistakenly think the behavior makes them similar to their peers).

Pluralistic ignorance. When the misperceived norm is sufficiently powerful to overcome students' more moderate drinking preferences, drinking is characterized by pluralistic ignorance (Miller et al. 2000, Prentice & Miller 1993, Suls & Green 2003): a circumstance in which most people drink heavily but assume everyone else, unlike them, is comfortable with this consumption level. When pluralistic ignorance exists, the most appropriate intervention is one that focuses not on behavioral norms but rather on attitudinal norms—that is, reports of how (un)comfortable students feel with their drinking practices, not what those practices are (Prince & Carey 2010, Schroeder & Prentice 1998). One indication that pluralistic ignorance routinely arises around drinking practices on campus is that self-other differences that emerge on measures of attitudes toward drinking tend to be larger than those that arise on measures of behavior (Borsari & Carey 2003). Students may think that their behavior differs from that of their peers, but they think that their comfort with their behavior differs much more. Of course, the fact that studies routinely find a discrepancy between perceived and actual drinking behavior suggests that situations of total pluralistic ignorance are rare on campuses.

Changing perceptions of the norm. Despite the challenges, efforts to change perceived norms often report success. This is true whether the intervention takes the form of SNM (Borsari & Carey 2003, DeJong et al. 2006, Glider et al. 2001, Gomberg et al. 2001, Haines & Spear 1996), PNF (Agostinelli et al. 1995; Collins et al. 2002; Larimer et al. 2007; Mattern & Neighbors 2004;

Neighbors et al. 2004, 2006; Walters et al. 2000), or FGD (LaBrie et al. 2008). Importantly, the test of an intervention's effectiveness in changing perceived norms is relative, not absolute. The general test is whether the perceived norm moves closer to the actual norm following the intervention and not the more conservative test of whether it converges on the actual norm. It is unclear whether this movement represents total convergence for some participants and no effect for others or partial convergence for many. It seems reasonable that for most people, their postintervention norm estimate represents a compromise between what they previously believed and what they were told was actually the case. LaBrie et al. (2008), for example, found that perceptions converged on the publicized norms but did not fully accept them.

Of course, changing norms does not necessarily change behavior. For a norm-based intervention to be successful at changing drinking behavior, the norm targeted must have evaluative significance for students. This consideration often requires a trade-off between the scope of an intervention and its impact. For example, changing the perception of the consumption level of the typical student may have little resonance with students who strongly identify with narrower groups (e.g., same-gender students, dorm mates, fellow athletes). Many investigators have targeted local norms rather than more global ones. The assumption here is that people care about some groups more than others and that it is the drinking norms of those groups about which they care most that provide the most appropriate metric for them.

Considerable research indicates that feedback on close referents has the strongest effects on behavior (Baer et al. 1991; Borsari & Carey 2003; Cho 2006; LaBrie et al. 2008; Lewis & Neighbors 2004, 2006b). For example, Lewis & Neighbors (2004) found that same-sex norms were more strongly related to personal drinking behavior than were other-sex norms. In a subsequent study, these researchers found that women who scored high on female-gender identity were especially influenced by their perceptions of female drinking norms (Lewis & Neighbors 2007). Not all evidence supports the greater influence of close referents, however. In one study using interactive PNF, LaBrie et al. (2013) found that heavy-drinking Asian male students and Greek (sorority)-affiliated female students reduced their drinking more when they were compared with typical students than with the typical Asian male or typical Greek female student.

In short, changing perceptions of the norm will not change behavior for all of the people all of the time. However, it will work for some of the people some of the time, so it is important to determine when this strategy is successful.

Effectiveness of the Norm-Based Approach to Reducing Drinking

Estimating the percentage of norm-based interventions that succeed in changing behavior is difficult because these programs are rarely evaluated in a systematic and rigorous way. Moreover, there is little consistency in the execution of the interventions, leading to disputes about which studies should and should not be included in any assessment (Perkins 2003, Wechsler et al. 2003). Restricting the focus to studies of SNM and PNF interventions that use random assignment, meaningful controls, and appear in peer-reviewed journals does not clarify the situation greatly. Some of these studies are successful (Agostinelli et al. 1995, Borsari & Carey 2003, Collins et al. 2002, DeJong et al. 2006, Glider et al. 2001, Gomberg et al. 2001, Miller et al. 2013, Neighbors et al. 2004), and others are not (Clapp et al. 2003, DeJong et al. 2009, Moreira et al. 2010, Thombs & Hamilton 2002, Werch et al. 2000).

In general, the likelihood of both Type 1 and Type 2 errors is high in these studies. On the one hand, there is no way to know that failed interventions were designed and executed effectively enough to provide the theory with a fair test. On the other hand, there is often no way to know that successful interventions succeeded because they provided normative information, as interventions

typically include multiple components (Barnett et al. 2007, Carey et al. 2006). Regarding this last point, it is common for PNF interventions, in addition to highlighting normative discrepancies, to provide didactic information and encourage consideration of personal, social, financial, and even caloric costs of alcohol use (Walters & Neighbors 2005).

Mediation of behavior change by change in the normative level of consumption. Despite these challenges, a sizable body of evidence from published reports of alcohol interventions now enables us to assess the relation of changes in the perceived normative level of consumption to changes in drinking behavior. Many of these studies document that interventions produce downward changes in both perceived norms and alcohol consumption (Barnett et al. 1996, Haines & Spear 1996, Steffian 1999, Turner et al. 2008, Walters et al. 2000). Interventions that employ media campaigns are able to show parallel changes on measures of perceived norms and behaviors but typically are unable to assess what causal role norm change played in the observed behavior change. Interventions that use face-to-face or web-based interactive PNF formats, by contrast, can often conduct mediational analyses, and many of these have documented the mediational role of perceived norm change in behavior change (Borsari & Carey 2000; Carey et al. 2010; Doumas et al. 2009; LaBrie et al. 2008; Lewis & Neighbors 2007; Neighbors et al. 2004, 2006; O'Grady et al. 2011). Additional evidence that the norm-behavior link is driven by a change in the evaluative significance of the drinking norm comes from research showing that this type of intervention is particularly effective for those who report drinking for social reasons (Lee et al. 2007, Neighbors et al. 2004) and those who perceive drinking to be an integral part of student life (Crawford & Novak 2010).

Behavior change without change in the normative level of consumption. There are also cases in which norm-based interventions reduced drinking behaviors but not norm perceptions (Schroeder & Prentice 1998). One potential reason for this outcome, suggested by Nolan (2011), is that reported norm change may be constrained by the anchoring and adjustment bias. Specifically, following the intervention, people's experience might be that the norm is lower than they previously thought, but their estimate of what the new norm is may nevertheless be constrained by their previous estimate. Another possibility pertains to what the norm intervention does. Rather than relocating the norm, the effect of the intervention may be to weaken the power of the norm (Prentice 2008). The way that students code the information that others drink less than they thought may simply be that the pressure to drink is less than they thought. The perceived weakening of the norm will be especially influential for those who have been drinking more than they would like to because of their fear of social rejection (Schroeder & Prentice 1998).

Norm change without behavior change. In some cases, interventions changed perceived norms but not behavior (Bewick et al. 2000). There are various possible reasons for this outcome. First, as noted previously, many students might already have been acting independently of what they perceived to be the norm by drinking less than it prescribes. These students would have little motivation to change when they learn that the actual norm is even closer to their preferred behavior. Second, students who learn from the intervention that their preferred behavior is much more discrepant from the actual norm than they thought (i.e., they drink more) may question whether the norm carries evaluative significance for them (Blanton et al. 2008). They might, for example, accept that they were wrong about what the typical student drank but believe that they remained correct in their estimate of what those who matter drink. A third reason is that the evaluative significance of behavior may change with the change in perceived norm, but the situational presses operating on students may overwhelm these. For example, interventions that

feature norms pertaining to special events such as 21st birthdays and spring breaks very often change norm perceptions but not behavior (Patrick et al. 2014, Stamper et al. 2004). It may be that social and institutional pressures to drink on these occasions are so strong (e.g., free drinks at bars on 21st birthdays) that they overwhelm the impact of the normative information. As another example of a strong situational press, DeJong et al. (2009) surmised that norm change produced by intervention is more likely to translate into behavioral changes the fewer the number of liquor stores near campus, suggesting that easy availability may dominate perceptions of drinking rates in determining drinking behavior.

Indirect effects. Thus far, we have analyzed drinking as an individual decision made by an actor who has preferences both about drinking alcohol and his or her social reputation. This analysis has neglected the impact that norm debiasing has on the behavior of those in the social environment of the at-risk individual. In fact, norm-based interventions can influence an individual's behavior directly, through their effects on his or her thoughts and perceptions, but also indirectly, through their effects on the behavior of friends, bystanders, and others in their social world.

These indirect effects stem from the fact that students drink in social settings and are supported or inhibited by the actions of others. Friends offer them drinks, tell them to slow down, encourage or discourage them to call it a night, and so on. These social behaviors, like drinking itself, depend on perceptions of the norm and therefore can be influenced by norm-based interventions. Consider, for example, the act of driving drunk, which often occurs in a social context and thus implicates bystanders who allow or encourage the individual to drive. The actions of bystanders depend, in turn, on their beliefs about the perceived commonness and appropriateness of intervening when someone is drunk. The more support people feel there is for looking out for someone who is drunk, the more willing they will be to do so (Turner et al. 2008). Indeed, studies find that students underestimate their peers' support for intervening with their drinking friends and that providing students with accurate information about the supportive actions of others increases students' willingness to undertake those actions themselves (Kenney et al. 2013, Mollen et al. 2013).

Changing the collective perception of a community of individuals can also lead to social action that, in turn, will affect individual behavior. For example, students might be more willing to support alcohol-free events on campus if their misperceptions about peer support for drinking were corrected. One example of how an SNM campaign can affect the broader social climate around alcohol use is provided by an intervention designed to reduce drinking and driving in Montana (Perkins et al. 2010). The project found that residents of the state did overestimate the prevalence of drinking and driving and mounted a campaign, using television, radio, print, and theater ads, to market accurate norms [e.g., "Most of us (4 out of 5) don't drink and drive"]. The campaign was successful in reducing norm misperception and reported prevalence of drinking and driving. Most relevant to the present discussion, the intervention increased by 16% the number of residents willing to support reducing the blood alcohol content (BAC) legal limit for drinking to 0.08, a measure that quite likely would reduce drinking-related deaths and injuries.

Beyond Drinking on Campus

As this example illustrates, alcohol use on college campuses is not the only behavioral domain in which we find systematic misperceptions of social norms. Other populations also overestimate the prevalence of drinking (Chan et al. 2007), and college students and others misperceive the prevalence of many other behaviors, including the use of tobacco (Hansen & Graham 1991) and illicit drugs (Perkins 2003), the wearing of seatbelts (Linkenbach & Perkins 2003), the practicing

of safe sex (Lynch et al. 2004), bullying (Sandstrom et al. 2013), and sexual aggression (Paluck & Ball 2010). In many of these contexts, norm-based interventions have had success. Moreover, studies in these other behavioral domains provide additional insight into the dynamic nature of the behavior-change process that norm debiasing can trigger.

Consider, for example, an SNM intervention focused on seat belt use, again in Montana (Linkenbach & Perkins 2003). This three-year campaign established that although 85% of Montana drivers reported that they had buckled their seat belt the last time they drove, they estimated that only 60% of other drivers did. This campaign disseminated messages such as "Most Montanans—3 out of 4—wear seat belts" via radio, print, and public service announcements. Over the three years of the intervention, the perceptions of the actual norm became more accurate, and the number of drivers reporting wearing seat belts increased.

How might the minority (approximately 15%) of delinquent drivers have been induced to wear seat belts by the campaign? It is unlikely that prior to the campaign these non-seat-belt wearers were inhibited from wearing seat belts due to evaluative concern and that the SNM campaign was successful because it dispelled this concern. All drivers before the campaign acknowledged that the majority of drivers already wore seat belts, so it is difficult to believe anyone felt pressured into *not* wearing one. More likely, non-seat-belt wearers were simply people who preferred not to wear seat belts but who required a minimum level of perceived support to feel comfortable doing so. When these individuals saw that they were even more isolated than they thought, their increased reputational concern then dominated their preference not to wear a seat belt, and they buckled up. Alternatively, seeing the actual norm may have changed the behavior of those who already wore seat belts by making them more insistent that others (drivers and passengers) also wear seat belts. This latter, indirect effect may have been even more influential than the direct effect on the non-seat-belt wearers. In other words, it was not so much that publicizing the correct norm increased the perceived social cost that non-seat-belt wearers thought they bore, but rather that it increased the actual social cost they bore.

Correcting misperceptions about risky sexual behavior provides further insight into the role that indirect effects can have on interpersonal dynamics. Decisions about safe-sex practices are made in relationship contexts and often involve negotiations. Once individuals discover that safe-sex practices are more common than they believed, it changes the negotiation power of those who advocate for and against safe-sex practices. The ones whose preference is for unsafe sex are in a weaker position once they and their partners know that safe sex is the norm. Moreover, people are more likely to share disapproving information about a partner who refused to practice safe sex and to support authorities who advocate safe-sex practices when they recognize the support such practices have. Similarly, when college men and women learn that "Nine of 10 men stop when their partner first says no" (Bruce 2002), it may have a direct effect on the 1 man in 10 who does not stop by revealing his isolation and deviance to him. At the same time, it may have an indirect effect on his behavior by empowering women to say no to him more emphatically or to report him if he fails to take no for an answer.

Some SNM interventions explicitly target bystanders in an effort to reduce high-risk behavior indirectly by encouraging intervention (Banyard et al. 2007, Loh et al. 2005). Consider a study by Perkins et al. (2011) aimed at reducing bullying in middle schools. These researchers first assessed students' estimates of the prevalence of bullying and victimization and attitudinal support for bullying. Estimates of peer norm support for bullying behavior were found to be three to four times higher than the actual norm, which was based on self-report. The subsequent SNM campaign used posters that contained messages such as "Ninety-five percent of _____ Middle School students say students should NOT tease in a mean way, call others hurtful names, or spread unkind stories about other students" and "Most ____Middle School students (8 out of 10)

think that students should tell a teacher or counselor if they or someone else are being bullied at school." The postintervention assessment showed that perceptions had become more accurate and that personal attitudes had become more anti-bullying and more pro-intervention.

In short, bystanders' willingness to intervene, whether in risky dating situations (Gidycz et al. 2011), ones involving homophobic taunts (Bowen & Bourgeois 2001), or ones involving sexist actions (Fabiano et al. 2003, Loh et al. 2005, Stein 2007), depends on their perceptions of their peers' support for such actions, support that they systematically underestimate. SNM campaigns designed to correct these misperceptions show promising results (Berkowitz 2010, Fabiano et al. 2003, Perkins 2014, Stein 2007). Moreover, research suggests that the effectiveness of these campaigns resides less in their ability to change the social costs that would-be perpetrators perceive and more in their ability to change the social costs that emboldened bystanders actually impose on perpetrators.

Summary

The verdict on the empirical effects of norm-based interventions designed to change risky behaviors is still pending. Despite the popularity of these interventions, only a small subset includes the requisite controls to permit rigorous evaluation. Examples of successful programs, including many reviewed here, provide compelling, suggestive evidence of the social-psychological processes through which this approach can be effective. However, systematic reviews of the actual effectiveness of these interventions have reached inconsistent conclusions. Tempering enthusiasm further, most of the supportive evidence rests on self-report data (for exceptions, see Johnson 2012, Neighbors et al. 2011).

INTERVENTIONS TO REDUCE CONSUMPTION OF PUBLIC GOODS

Norm-based interventions have also been deployed in an effort to reduce consumption of public goods. When it comes to public goods, perceived norms tend to be unclear or absent, rather than biased, and thus the interventions work primarily by making people more aware of their own behavior and where it falls in the distribution. To produce directional behavior change, these interventions rely on (and cultivate) people wanting to be on one side of the median more than the other. This approach has been used most extensively in interventions designed to reduce environmental harm (Abrahamse & Steg 2013, Harries et al. 2013, Iyer et al. 2006, McKenzie-Mohr et al. 2012).

Theory of Norm-Based Interventions to Reduce Environmental Harm

Norm-based interventions aimed at reducing environmental harm differ from those aimed at reducing risky behaviors in a number of important respects. For one, these interventions do not assume that there is a biased collective misperception about behavior—an overestimation or underestimation of people's environmental-conservation activities. Indeed, the information provided to people in environmental interventions tends to focus not on behavior (cf. Goldstein et al. 2008, Schultz et al. 2007) but rather on the output of behavior (e.g., kilowatt-hour use), a metric about which few people could be expected to make confident population estimates. The feedback in environmental interventions also takes a different form, focusing on people's relative standing on a consumption measure (e.g., how their weekly kilowatt use compares to that of their neighbors) rather than on their absolute discrepancy from a behavioral norm (e.g., how the number of drinks they consume per week compares to others).

If not by correcting misperceptions, how might providing people with personalized normative feedback produce aggregate behavior change? At a minimum, it must induce high users to use less. This turns out to be an elusive goal. High energy users are notoriously insensitive to other types of interventions designed to reduce their consumption, such as information campaigns, persuasive messages, and economic inducements (Abrahamse et al. 2005, Katzev & Johnson 1987). Moreover, although social pressure can change even sticky habits, the circumstances most optimal for such change to occur—specifically, high visibility of the target behavior and close contact among members of the participating group—are typically not present in the context of environmental interventions.

The theory of norm-based interventions begins with the observation that energy and other environmental resources are public goods; that is, resources from which all people benefit, whether or not they contribute (Alcott 2011). In public-goods domains, an individual's behavior has consequences not just for him- or herself, but for everyone else in the group as well, and this fact shapes the meaning of the normative information. For example, consider two individuals, one of whom learns that she uses more energy than others and another who learns that he drinks more alcohol than others. Both of these individuals have learned that they are out of step with their peers, an uncomfortable realization. However, the high energy consumer has also learned something even more threatening: She is not doing her share for the environment. She is violating not just a behavioral norm but also a good-citizenship norm. Even if she is not deeply troubled by being behaviorally out of step with others, the pressure to reciprocate the cooperativeness of her peers and do her part may be a powerful inducement to reduce her energy consumption (Alpizar et al. 2008, Bolsen 2013, Carlson 2001, Frey & Meier 2004, Shang & Crosson 2009, Strahilevitz 2003).

There is a second mechanism through which normative feedback might affect energy consumption: informational influence (Deutsch & Gerard 1955). Specifically, informing people that their neighbors use less energy will convey to people that it is possible to use less energy. As using less energy means saving money, this knowledge could conceivably increase high users' resolve to do so out of a sense of increased efficacy rather than guilt or shame. But there are a couple of reasons to doubt that the normative feedback plays a large informational role for recipients. First, research shows that providing normative information reduces energy consumption by high users more effectively when the information is presented publicly than when it is presented privately (Delmas & Lessem 2014); this finding suggests that concern with social standing is at the root of its effects. Second, as noted previously, high users have been found to be the least sensitive to variations in the cost of energy (Dolan & Metcalfe 2012), suggesting that doing the rational thing is not a high priority for them. Consistent with this evidence, normative feedback reduces the energy usage of high users even when they are not paying for their energy use (Young 2013).

The success of norm-based environmental interventions depends not just on their effectiveness with high users; they must also reinforce the behavior of low users. This, too, is a challenge, for there are at least two reasons why normative information might lead low users to increase their consumption. First, low users might simply feel uncomfortable being out of step with the behavior of their peers and wish to conform to standard practices. Although such conformity is possible in theory, it seems unlikely in practice: The behavior of low users is not conspicuously out of step, and because their actions qualify them as good—not bad—actors, low users might be motivated to maintain their status. A second, more compelling reason why feedback might induce low users to increase their consumption resides in the bivalent psychology of doing more than one's share. That is, although it is possible to see low users as good actors, it is also possible to see them as suckers, whose pro-environment actions are being exploited by free-riding neighbors (Kahan 1997). The well-documented tendency of those who discover that they are high contributors to public goods (e.g., low energy users) to reduce their contribution is known as the boomerang effect

(Mollen et al. 2013, Nolan et al. 2008). Given how powerful the fairness motive is in public-goods situations, the risk of a boomerang effect of norm-based interventions is very real. Indeed, Fischer (2008) attributed her finding of a null effect of PNF interventions on household energy use to the opposing effects of normative feedback on high and low users.

How might high contributors to a public good be made to feel less like suckers and more like good actors? Nolan et al. (2008) created one clever means to accomplish this goal: They accompanied the energy reports of low users with a positive emoticon. The presence of this happy face presumably framed low users' performance as a source of pride rather than resentment. Although there is some debate about how long this framing manipulation lasts, most large-scale interventions continue to use some means of signaling to low users that their behavior is something to feel good rather than bad about (Alcott 2011, Loock et al. 2012).

Effectiveness of the Norm-Based Approach to Reduce Environmental Harm

Current efforts to reduce environmental harm by providing normative feedback originated in a series of small field studies that used SNM and PNF (e.g., Goldstein et al. 2008, Nolan et al. 2008, Schultz et al. 2007). One study targeted towel reuse in 190 rooms of a midsize hotel in the southwestern United States (Goldstein et al. 2008). Along with encouragement to do the environmentally responsible thing ("Help save the environment") and reuse their towels, guests in one treatment condition were provided with a card that said, "Join your fellow guests in helping to save the environment. Almost 75% of our guests who are asked to participate in our new resource saving program do help by using their towels more than once." The guests receiving this normative information were 28% more likely to recycle one or more towels (an effect replicated by Schultz et al. 2008).

A second study targeted energy usage among 371 households in a California community (Nolan et al. 2008). Once a week for four weeks, participants received doorhangers that contained factual information about their neighbors' high rate (ranging from 77% to 99%) of various energy-conserving behaviors, such as taking shorter showers, turning off unnecessary lights, turning off the air conditioner at night, and using fans instead of air conditioners, along with general appeals to conserve energy. Compared to participants who did not receive the normative information, participants in the treatment condition showed a 10% decrease in kilowatt-hours used, and even after eight weeks showed a rate 7% less than control households.

The study that became the model for most of the larger-scale interventions to follow was a PNF intervention that targeted household energy usage (Schultz et al. 2007). The context for this intervention was 290 California households with visible utility meters. Researchers provided these households with various types of normative information and messages, again on doorhangers over a two-week period, and observed the effect on utility usage. In the comparative information condition, participants received information indicating where they stood (higher than average versus lower than average) in energy usage compared to their neighbors. Those who learned that they used more energy than most of their neighbors reduced their energy usage, and those who learned that they used less energy than most of their neighbors increased their energy use unless their feedback was accompanied by a smiley-face emoticon and the word "good." This information signaling approval seems to have framed their standing as an accomplishment, something to be proud of, rather than something that made them a sucker.

The success, ease, and scalability of the Schultz et al. (2007) study inspired a series of large-scale interventions that delivered personalized normative feedback about energy consumption to householders via their monthly energy bill. The first was sponsored by Opower, a publicly held company that partners with utilities around the world to promote energy efficiency. Opower

began its work in 2008 by mailing home energy reports to approximately 35,000 households within the Sacramento Municipal Utility District. Twenty-five thousand ratepayers were randomly selected to receive a monthly energy report comparing their electricity consumption to the average consumption of similar homes in their community, another 10,000 households received such reports quarterly, and 50,000 served as a control group (Alcott 2011). The comparative information pointed to the average energy usage among approximately 100 neighbors with similarly sized homes that used the same energy sources (electricity only or electricity and natural gas). A further level of comparison was provided by comparing individual households to "Efficient Neighbors," defined as the lowest 20% of consumers. Households above average in consumption received a message conveying disapproval, whereas those below average in consumption received a happy face and a "good" or "great" depending on whether they fell below the 50th percentile or the 20th percentile.

The effects of the intervention were impressive. Households that had received energy reports for six months consumed 2.5% less electricity than control households. Households receiving monthly reports conserved more than those receiving quarterly reports, and high-consuming households achieved greater reduction in usage than low-consuming households. Subsequent analyses of follow-up data showed that the difference in energy consumption between treatment and control groups persisted for more than one year (Ayres et al. 2013). A comprehensive analysis of Opower interventions, encompassing 22 million utility bills from nearly 600,000 households across 12 different utility companies, determined that the implementation of Opower's home energy reports yields average energy savings of 2% (Alcott 2011, Alcott & Mullainathan 2010).

Similar studies conducted in partnership with other utility companies have reported parallel effects (Dolan & Metcalfe 2012, Ferraro & Price 2013, Loock et al. 2012). In one example, Ferraro & Price (2013) targeted 100,000 households that contracted with a water utility company in Georgia. These researchers provided ratepayers in the social comparison condition with their quarterly water usage rate and that of their neighbors. They observed a significant decrease in water usage in this condition equivalent to the decrease expected if average prices were to increase 12% to 15% per month. Ferraro et al. (2012) followed up this sample and found that those in the social comparison condition were still using less water two years later.

In summary, the evidence from norm-based interventions designed to reduce environmental harm is encouraging. Numerous small- and large-scale interventions show that providing people with information about the scope and degree of their peers' energy-related behavior can reduce their energy consumption. The magnitudes of effects vary across interventions and individual consumers, but the low cost and simple mechanics of these types of interventions make them attractive. Finding ways to strengthen the feedback and increase its salience to consumers will make norm-based interventions an even more cost-effective means of reducing energy consumption.

Whose norm is most effective? All norm-based interventions have to select a reference group to feature in the feedback. Risky behavior interventions have typically grounded their selections in social identity considerations (e.g., same-gender friends, teammates, sorority sisters). Public-goods interventions, by contrast, have focused on physical or geographical similarity—nearby residents, fellow hotel guests, etc. To use Goldstein et al.'s (2008) phrase, the greatest impact is expected to be produced by behaviors and outputs of others who share the same immediate circumstances. More generally, the question of which comparison groups have the greatest impact has generated much less attention in environmental interventions than in alcohol interventions. Studies that have manipulated the reference group generally find that the more physically or geographically close those represented in the norm are to participants, the more influence they have (Goldstein et al. 2008, Loock et al. 2012, Schultz 1999, Young 2013).

Which norm is most effective? All norm-based interventions also must select a norm to communicate. Following Cialdini et al. (1990), many researchers have distinguished between injunctive norms that characterize the prevalence of approval or disapproval of a behavior and descriptive norms that characterize the prevalence of the behavior itself. Despite much discussion in the literature about these two types of norms and their relative impact on behavior, the inconsistent operationalization of these two concepts permits few meaningful comparisons (Smith & Louis 2008). For present purposes, the most useful comparison to consider is between feedback that specifies (*a*) the commonness of particular environmental behaviors among group members and (*b*) the degree of approval among group members for those same behaviors.

One complication that arises in comparing the impact of these two types of normative feedback is that they convey information about one other (Blanton et al. 2008). That is, when interventions emphasize the high frequency of behaviors, they also imply high approval for those same behaviors, as the following examples suggest: (*a*) "Join your fellow guests in helping to save the environment. Almost 75% of guests who are asked to participate in our new resource savings program do help by using their towels more than once. You can join your fellow guests in this program to help save the environment by reusing your towels during your stay" (Goldstein et al. 2008). (*b*) "Following a recent university-wide survey, your university is pleased to report that over 65% of current students are actively reducing their consumption of bottled water" (Van der Linden 2013).

Likewise, when interventions emphasize high approval for behaviors, they also imply the high frequency of those same behaviors, as the following examples suggest: (*a*) "The vast majority of Illinois residents support energy conservation and over 90% agree that it is important for 'all Americans to make energy efficient consumption decisions'" (Bolsen 2013). (*b*) "Shoppers in this store believe that reusing shopping bags is a worthwhile way to help the environment" (De Groot et al. 2013).

Given the implicit relationship between these two types of information, it is not surprising that they are both successful at changing behavior (Abrahamse & Steg 2013, Bolsen 2013, De Groot et al. 2013, Jacobson et al. 2011). At the same time, providing both types of information can be more effective than providing either alone (Schultz et al. 2008).

The most interesting comparisons come from studies that provide information of both types and vary their consistency with one another. For example, what happens when one learns that one's peers preach one thing but practice something else? Not surprisingly, inconsistency between others' actions and expressed support produces less behavior change than does consistency (Göckeritz et al. 2010, Schultz et al. 2008, Smith & Louis 2008, Smith et al. 2012). Inconsistent information, however, does have a more positive impact than does information suggesting that peers neither support nor engage in pro-environmental activity and more impact than the absence of either type of information.

Whether it is necessary that descriptive evidence accompany injunctive evidence for behavior change to occur likely depends on the behavioral preference of the audience. If the recipient of the message is disposed to take the action, learning that others support that action—even if they don't behaviorally demonstrate that support—can be liberating (Reid & Aiken 2013, Smith & Louis 2008). For example, learning that one's peers support conservation efforts will enable one to turn down the heat without fearing social disapproval, even if no one else does the same. On the other hand, an explicitly unsupportive descriptive norm will likely undermine the effects of a supportive injunctive norm if the recipient's willingness to take the action is conditional upon the reciprocity of others (Smith et al. 2012). That others express their approval of contributing to a public good that they themselves do not contribute to is a recipe for resentment and resistance, not compliance.

When information backfires. Various types of boomerang effects are discussed in the literature. In one, conveying that a particular behavior is bad and common leads to increases in the behavior. This can happen for two different reasons. First, the reported commonness of the behavior can make it seem less inherently bad (Mollen et al. 2013). Consider an intervention that seeks to reduce premarital sex by emphasizing both its undesirability and its statistical commonness. This message could actually increase the incidence of premarital sex because the evidence that everybody is doing it undermines the credibility of the claim that it is undesirable. For this version of the boomerang effect to occur it is not necessary that the normative data compel premarital sex among those not so disposed; it is sufficient that it liberate those so disposed but previously inhibited.

Evidence of commonness can also trump evidence of undesirability in public-goods contexts. Here, people might be persuaded of the direness of the situation (e.g., pilfering petrified wood is destroying a national park, overfishing is destroying fish stocks) but nevertheless feel compelled by learning of the extent of free riding among others to free ride themselves and thereby avoid being suckers. Learning of the commonness of free riding can also liberate good actors to start free riding, as they now know that any negativity incurred by such behavior will be widely diffused (McAdams 1997). One way to address this problem is to frame the performance of low consumers as a source of pride rather than resentment. A second way to address the problem is to provide normative feedback only to high consumers.

The foregoing examples of boomerang effects emerge when people learn that an undesirable behavior is more common than they thought. These effects are most likely to occur in public-goods contexts, where free riding often leads the majority of people to engage in bad behavior. They are least likely to occur in risky-behavior contexts, where bad (risky) behavior is typically less common than people think.

Summary

In public-goods situations, people often find themselves with the unappealing choice between behaving like a fool (by failing to exploit the public good) and behaving like a knave (by exploiting it). By highlighting the commonness and desirability of nonexploitative behavior, norm-based interventions can turn fools into good actors and knaves into bad actors. The key to the success of these interventions lies in their ability to destigmatize collectively beneficial behavior by linking it to shared values. This requires not just that individuals see their own behavior as motivated by shared values but also that they see others' behavior as similarly motivated.

TOWARD A MODEL OF NORM-BASED INTERVENTIONS

The growing popularity of norm-based interventions to reduce collectively (and sometimes personally) costly behavior is a response to the failure of other intervention efforts. Programs that educate people about the riskiness of behavior through information and persuasion campaigns are stunningly ineffective (Abrahamse et al. 2005, Stern 1999). Programs that modify risky behavior through conventional carrots and sticks have also proven less than effective. For those seeking to move behavior in a positive direction, norm-based interventions are a promising alternative.

Although norm-based feedback works differently in different contexts and different populations, the goal in all cases is to change the perceived norm and therefore the evaluative significance of behavior, making a current behavior undesirable or a counterfactual behavior desirable. When feedback of this type is effective, it is because learning what others do or think makes people evaluate their own actions differently. Much of the current research on norm-based interventions

focuses on how best to deliver or present the feedback. These practical considerations are undoubtedly important to the success of the interventions, but we have chosen in this review to address the more basic theoretical questions of when and why such interventions can be expected to work.

From Peer Information to Norm Change

Peer information pertaining to risky behavior is designed primarily to make people more comfortable with nonrisky behavior by establishing support for this behavior among peers. The information seeks to show people that the social pressure they feel to undertake risky behavior is illusory and that the fear they have that they will incur disapproval if they do not fully embrace risky action is unwarranted. Its goal, thus, is liberation. Most people overestimate their peers' support for risky behavior; correcting their estimates frees them to act on their less risky preferences. Even if the peer information is not fully incorporated into perceptions of the norm, perhaps because it conflicts with what people observe, the revelation that they have more allies or kindred spirits than they thought can still weaken the norm's power over them (Prentice 2008).

Peer information will have much less influence on those comfortable with high-risk behavior, for the simple reason that it is more difficult to make people feel uncomfortable doing something that they enjoy and feel comfortable doing than it is to make people feel comfortable doing something they actually want to do but don't do because of their mistaken belief that they lack peer support. For those comfortable with high-risk behavior, their comfort may owe nothing to their mistaken perception that others approve of it. Moreover, even if it does, correcting this misperception is no guarantee that the evaluative significance of the behavior will change greatly for them. The cues that supported their misperception will still exist, which, given people's resistance to viewing their own behavior as problematic, could well be sufficient for them to remain comfortable continuing doing what they have been doing. A shift in their behavior may require minimally a shift in what they actually see others do, not just in what they are told others do.

The goal of providing peer information pertaining to collectively harmful, as opposed to individually harmful, behavior is different. Here, the intervention seeks to make high consumers of public goods uncomfortable with their actions by showing them that they are not doing their fair share. In addition to this primary goal, a secondary goal is to avoid making good actors—those who are doing their share—feel like suckers. Interventions in the SNM tradition provide behavioral and/or approval information designed to change the evaluative significance of a particular discrete action, such as using a fan, reusing towels, or recycling. Although there are multiple ways this information could work, the most effective way is to establish a connection in people's minds between a value they embrace (e.g., being pro-environment, doing one's fair share) and a concrete action (e.g., reusing hotel towels) they previously had not tied to that value (McAdams 1997, Vandenbergh 2005). Establishing this connection is important because even people who care about doing their share to preserve the environment might not tie that value to taking particular actions (e.g., reusing hotel towels, using fans). The knowledge that most others engage in a behavior will have its greatest impact on those who already embrace the value that guides the action but simply had not recognized that their peers perceive the targeted action as a concrete desideratum of that value.

Interventions in the PNF tradition seek to do this and more: They use behavioral and approval information to establish the evaluative significance of particular actions and personalized feedback to motivate people to improve their own standing. The success of these interventions again rests on establishing a link between an accepted value and the target behavior; without that link, the personalized feedback loses its power. For example, if people do not see high energy use as something inconsistent with a value they care about or that others expect them to care about,

showing them that they rank behind their peers on this dimension will not motivate them. It will simply signal that others are currently outperforming them on this metric.

From Norm Change to Behavior Change

Even if peer information changes the evaluative significance of behavior, will behavior change follow? Our review shows there is no guarantee, though behavior change is more likely under some conditions than others. The most fertile ground exists among those who are currently acting inconsistent with their preference due to some form of social inhibition, such as the fear that acting on their preference will make them look like a nerd or a sucker. By showing them that their preference is widely shared, the restraining force that has kept these individuals from acting on their preference is removed, and their behavior will fall in line with their preference. Thus, the more people there are who drink to excess because of a mistaken sense that others will disapprove of them if they drink more moderately, the more effective will be an intervention that highlights approval of moderate consumption. Similarly, the more people there are who resist turning down their heat for fear that doing so will make them suckers, the more effective will be an intervention that shows the commonness of this behavior.

It is a bigger challenge to induce people to act contrary to their preferences, but norm-based interventions can be effective here as well. When the context is a public-goods situation, for example, many free riders will simply be acting on their (self-interested) preference. Highlighting their lack of contribution relative to others can induce guilt or shame and thereby motivate greater contributions. The desire not to be seen as a free rider is likely more powerful than any motivation that will arise in heavy drinkers who learn that, contrary to their belief, others drink less than they do. But even here, some movement is possible.

One reason that even those comfortable with their high-risk behavior might be motivated to change stems from the fact that norm-based interventions occur in the context of broader intervention efforts. School and health authorities repeatedly tell college students about the dangers of heavy drinking, unsafe-sex practices, and any number of other risky behaviors. The principal reason these messages are ineffective is that they lack credibility: Students are distrustful of claims that behaviors that they find identity affirming (and enjoyable) are harmful, or at least as harmful as antagonistic authorities suggest they are. Discovering that their peers' behaviors are more in line with these messages than they thought serves to corroborate the authorities' message. For example, learning that most of their peers use condoms implies that their peers accept the arguments made by authorities about the importance of safe sex. Similarly, learning that most other hotel guests recycle their towels means that these other guests find the arguments for this practice made by the hotel management to be legitimate and not simply a manipulative effort to save money. Those who learn that they consume more energy than their neighbors can reasonably assume that their neighbors find the pro-environmental case to be persuasive. At the very least, the fact that there seems to be common cause between so many of their peers and authorities will increase their sense of isolation.

The process described above may seem like conventional informational influence (Deutsch & Gerard 1955), but it is importantly different. To illustrate, consider a study by Van der Linden (2013). The goal in this study was to reduce Dutch students' bottled water use, which averaged about 10 bottles per month. Participants in the experimental conditions of this study received either (*a*) descriptive norm information that suggested that most students were trying to reduce their bottled water usage, (*b*) a persuasive message that emphasized the environmental costs of bottled water and the safety of tap water, or (*c*) both descriptive norm information and a persuasive message. Notably, neither the descriptive norm information nor the persuasive message reduced intentions

to consume bottled water when presented alone. Only when these two pieces of information were combined was there a significant decrease in behavioral intentions. What is instructive here is that if intentions were driven by informational influence, the descriptive norm alone would have been effective. The reason it was not effective is that recipients apparently knew little about the environmental argument against bottled water and therefore had difficulty knowing what significance to attach to their peers' behavior. Those who received the persuasive message making the environmental case saw the descriptive information as a referendum on that case and modified their behavior in line with the apparent coalition of fellow students and environmental authorities.

Norm-based interventions are more effective in some contexts than in others. Contexts in which there is attitudinal support but not behavioral support for the goal of the intervention will typically prove more promising than contexts in which there is neither attitudinal nor behavioral support. Highly cohesive groups or groups sharing a salient social identity also appear to be more susceptible to influence by norm-based feedback (Neighbors et al. 2004).

A final condition that boosts the effectiveness of norm-based interventions is the presence of channel factors that allow the modified psychological states of participants to convert into behavior. For example, learning that one's peers regularly use condoms may increase one's motivation to follow suit, but the ready availability of condoms will increase the likelihood that this motivation will translate into behavior. Similarly, an intention to drink less following an intervention will be more likely to translate into behavior if conditions such as alcohol-free events are in place to make that possible. Especially valuable in the context of energy conservation is ready access to capital stock, such as solar panels and energy-efficient light bulbs. Equally valuable is knowledge about steps to take or habits to form so that an increased commitment to conserve energy can translate into actual behavior (Dolan & Metcalfe 2012).

CONCLUSION

Providing people with information about the behaviors and attitudes of their peers is an increasingly common strategy for reducing behavior that is harmful to the individual or the collective. The present article has analyzed the psychological theory behind different versions of this intervention strategy and reviewed the empirical findings generated by norm-based interventions, particularly those aimed at reducing alcohol abuse and energy consumption. We expect the popularity of this intervention strategy to continue to increase and hope that consideration of the issues raised in this review will increase the sophistication and success of these interventions as well.

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