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ANALYSIS & COMMENTARY

Behavioral Economics Holds Potential To Deliver Better Results For Patients, Insurers, And Employers

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ABSTRACT Many programs being implemented by US employers, insurers, and health care providers use incentives to encourage patients to take better care of themselves. We critically review a range of these efforts and show that many programs, although well-meaning, are unlikely to have much impact because they require information, expertise, and self-control that few patients possess. As a result, benefits are likely to accrue disproportionately to patients who already are taking adequate care of their health. We show how these programs could be made more effective through the use of insights from behavioral economics. For example, incentive programs that offer patients small and frequent payments for behavior that would benefit the patients, such as medication adherence, can be more effective than programs with incentives that are far less visible because they are folded into a paycheck or used to reduce a monthly premium. Deploying more-nuanced insights from behavioral economics can lead to policies with the potential to increase patient engagement and deliver dividends for patients and favorable cost-effectiveness ratios for insurers, employers, and other relevant commercial entities.

As highlighted by a recent issue of *Health Affairs* devoted to the topic,¹ patient engagement has increasingly become a focus of efforts to reform the US health care system. Patient engagement is especially important for people with chronic conditions, who account for a disproportionate share of overall health care expenditures but often have a hard time managing their own care.²

The need for better patient engagement was recognized in a recent survey of employers, in which 61 percent of respondents identified “employees’ poor health habits” as the top challenge to maintaining affordable benefits, while 30 percent cited “underuse of preventive services.”³

The importance of patient engagement has also been recognized in new health care financing arrangements, such as accountable care organizations, that turn patients from sources of revenue into sources of cost if patients’ behavior leading to poor outcomes isn’t changed. Patient engagement was incorporated into Affordable Care Act provisions that put provider organizations at financial risk for some hospital readmissions. These trends have increased providers’ interest in helping patients manage their health.

Reflecting this confluence of interests, increasing numbers of insurers, employers, and providers are implementing wellness programs and incentives intended to promote healthy

behavior. In this article we show, however, that many of these well-meaning policy approaches require information, expertise, and self-control on the part of patients that few possess. Programs built on the assumption that patients are the perfectly rational decision makers envisioned by traditional economics often have minimal impacts or produce unintended consequences. In contrast, acknowledging and leveraging common decision errors that make people predictably irrational could make many such programs more effective.

Value-Based Insurance Design

A surprising and unfortunate feature of many health insurance plans is that they require patients to pay for, and hence discourage the use of, a number of high-value elements of care, such as the treatment of hypertension or the use of statins by patients with diabetes—care that is widely seen as worth its cost. By requiring consumers to pay “first dollar” for initial health expenses, high-deductible (also known as consumer-driven) insurance plans are intended to make consumers more cost-conscious and better shoppers for health care services. However—as the RAND Health Insurance Experiment famously showed,⁴ and more recent research also concludes,⁵ high-deductible health plans are as likely to discourage the use of high-value services as the use of low-value services. Because patients lack expertise about what tests or services are of high or low value, as well as information about the relationship between price and quality, such plans discourage spending on all tests and services, including those of high value. In effect, the baby is thrown out with the bathwater.

Value-based insurance design (VBID)—which involves discounting, or making free, services that are deemed to be high in value—is an attempt to fine-tune the blunt incentives inherent in deductibles and copayments. It was inspired by research that showed the use of higher copayments significantly reduced the use of services such as prescriptions but ultimately raised costs, because lower rates of medication nonadherence led to higher rates of emergency department visits and adverse outcomes.⁵ Extrapolating from these results, it was natural to conclude that lowering cost sharing for high-value activities, such as taking medications for chronic conditions, would increase adherence and reduce long-term costs. The Affordable Care Act incorporates a kind of value-based insurance design in its requirement that preventive services be offered to patients at no charge.

Unfortunately, VBID has not lived up to its promise. Its economic impact depends on

whether it can make adherent enough people who were previously nonadherent—and on the health and cost consequences of that improved adherence—to offset the loss of the copayments from those who were already adherent.⁶ Although some experimental tests of value-based insurance design have found that copayment reductions increase adherence, those effects have typically been small—in the range of 3–6 percentage points.^{7–9} We believe that one reason for these disappointing results is what we call the “dog that didn’t bark” problem:¹⁰ People who are nonadherent don’t notice that their copays have been reduced because they aren’t using (and thus aren’t paying for) the service.

Indeed, one of the valuable lessons learned from efforts to introduce VBID has been a reminder of the asymmetry of the forces that surround patient engagement. Based on conventional economic reasoning, it might seem reasonable to assume that decreasing copayments would create effects equal and opposite to those of increasing copayments. If we build on understanding developed from behavioral economics research, however, we realize that framing matters and that losses (in this case, higher copayments intended to reduce use) loom larger in patients’ minds than gains (lowered copayments).

We also need to recognize that the people who would be deterred by higher copayments are different from people who might become adherent with lower copayments: The first group consists of those who take their medications, while the second group consists of those who do not. Those two groups may differ in all sorts of ways beside their tolerance of copayments. In addition, some underuse of high-value services may be unrelated to cost—for example, a patient may choose not to continue taking a drug because it has undesirable side effects—in which case a reduction of copays is unlikely to have much effect. Behavioral economic thinking, therefore, helps explain what in fact has been observed: Increasing and decreasing copayments do not have opposite effects that are similar in magnitude.

Value-based insurance design is an appealing idea. It makes sense to decrease impediments to obtaining high-value care that is in the best interest of both patient and insurer. But VBID’s benefits could be increased through the application of ideas from behavioral economics, such as simple changes in reward delivery to increase salience (for example, retaining the copay but sending a rebate) and communications from insurers to patients so that even those who are nonadherent are aware of the benefit.

Connecting Insurance Premiums To Health Behaviors

Yet another strategy for encouraging healthy behavior that has gained traction among policy makers involves connecting health insurance premiums to health behaviors or outcomes. Smoking status is the health behavior most commonly targeted by such policies, but premiums can also be adjusted for factors such as body mass index, blood pressure, and low-density lipoprotein (LDL) cholesterol. Section 2705 of the Affordable Care Act increases the ability of employers, starting in 2014, to provide incentives for employees to improve health behaviors—such as exercising, quitting smoking, losing weight, eating more healthful food, and lowering cholesterol and blood pressure. Employers will be able to increase financial rewards and penalties for workers for these contingent or outcome-based incentives from the current limit of 20 percent up to 30 percent of their premiums. This ceiling was recently increased to 50 percent if such programs include smoking, as allowed by the act.¹¹

Whether this provision turns out to be beneficial hinges on two factors.¹² The first is the degree to which premium reduction actually leads people to improve their health behaviors—for example, motivating smokers to quit smoking and obese people to lose weight. To the extent that these efforts succeed, the Affordable Care Act will benefit people with unhealthy behaviors and have the largest effects on populations with the highest concentrations of those behaviors and the diseases that result from them. In essence, if effective, the provision could ameliorate some health disparities.

However, if the act has only modest impacts on behavior, a second, adverse, factor may come into play. Premium reductions for engaging in healthy behaviors will almost surely lead to direct or indirect premium increases for engaging in unhealthy behaviors, leading lower-income people—who are generally in poorer health and engage in more of the adverse health behaviors that the incentives seek to discourage—to pay more for health insurance, compared to people with higher incomes. In that case, the regressive nature of the act's VBID provisions is likely to dominate its overall impact.

At present, there is little direct evidence suggesting that connecting premium costs to health outcomes, otherwise known as “conditioning,” will greatly improve health behavior. However, premium adjustments of the magnitude that will be allowed have never been tested, and providing these rewards or penalties using insights from behavioral economics could make them much more effective in changing behavior than

approaches typically implemented by employers in the past. As discussed above in connection with value-based insurance design, how incentives are implemented will likely have a critical impact on their success or failure.¹²

Although it is convenient for employers to bundle incentives or penalties into paychecks and insurance premiums, even much smaller levels of incentives might be more potent if they were delivered outside of paychecks, perhaps in the form of gift cards or lottery tickets, which would increase their salience to employees. Creative implementation could dramatically increase the likelihood that connecting premiums to health behavior will lead to improvements in health and offset any regressive effects of policies that increase the cost burden on disadvantaged groups.

Wellness Programs

An increasingly common approach to patient engagement is through incentive-based wellness programs offered by employers. These programs, some of which are administered by an insurance company or vendor, offer rewards for engaging in health behaviors such as going to the gym. A survey conducted jointly by the National Business Group on Health and Towers Watson³ estimated that 87 percent of large employers offer such programs. However, many employers also report very low (for example, 5–10 percent) rates of participation, particularly in programs targeted at problems such as smoking and obesity.¹³

As is true for value-based insurance design and connecting premiums to health behavior, engagement rates are key to the cost-effectiveness of wellness programs. Inevitably, some fraction of the money spent on these programs ends up going to people who would have engaged in the rewarded health behaviors even without incentives. With low engagement rates, it is likely that a high percentage of the limited numbers of participants will fit this description. Thus, the money spent on incentives is essentially lost; it would be better to use it to change the cost-benefit calculation of people who are non-adherent or not engaged.

One major reason for the low take-up and success rates of such programs is their failure to take into account the most basic insights of behavioral economics. For example, an insurer we recently advised offered beneficiaries a \$150 reward for going to the gym 120 times or more in a year—a reward received at the end of the year. The program has a single threshold (you get the reward if you go to the gym 120 times, but not, say, 110 times) and a high one (if you are

87%

Offer wellness program

Survey data suggest that 87 percent of large employers offer an employee wellness program, but participation rates are often in the range of 5–10 percent.

A key lesson from behavioral economics is that to affect a person's behavior that occurs frequently, you need to engage the person at nearly the same frequency.

someone who doesn't go to the gym at all, how are you going to feel about the prospect of going 120 times in a year?), while the incentive is relatively small (if your alternative to going to the gym is sitting on the couch, is \$1.25 going to make you get up and go?) and is paid far in the future. This program might well appeal to people who are already going to the gym 100 times a year or more and see the goal of 120 times as within reach. However, it is unlikely to motivate people who would most benefit from increasing their gym usage.

It is not hard to think of alternative designs that would involve larger and more frequent incentives and that would replace the single—and high—fixed threshold with intermediate targets or that would reward any improvement from baseline.¹⁴ Such designs would be more likely to encourage everyone—not just people who are already close to a certain threshold—to become more physically active.

Other approaches might further wellness goals at essentially no cost. For example, in one recent study by our team, veterans who had managed to overcome their own poor control of diabetes served as peer mentors for veterans with poor diabetes control. Peer mentoring was not only inexpensive to implement but highly successful: Veterans with mentors reduced their average hemoglobin A1c levels by 1.08 percent (from 9.8 percent to 8.7 percent), compared to an average reduction of 0.01 percent by veterans in a control group—an improvement in glycemic control that exceeds that produced by many medications.¹⁵

In another study, Katherine Milkman and colleagues randomly assigned workers at a large employer to one of three groups and mailed the workers information about influenza

vaccination.¹⁶ Members of one group were encouraged to get vaccinated and were informed about the locations, dates, and times of vaccination availability. Members of the second group received the same information and an additional suggestion: to write down the date they planned to get vaccinated. Members of the third group received the same information as the second group, along with a suggestion to write down the time as well as the date of the planned vaccination. The third group had a 4.2-percentage-point higher vaccination rate than the first group. The results suggest that simply encouraging people to make a plan may motivate them to change their behavior.¹⁶

Automated Hovering

Even patients with chronic illnesses may spend only a few hours a year with a doctor or nurse, but they spend about 5,000 waking hours a year doing just about everything else.¹⁷ Those 5,000 hours are when they live their lives and make choices about what to eat and whether to exercise, smoke, take their medications, or visit the doctor.

Although what people do in those hours almost certainly affects their health outcomes, the hours are typically ignored by the US health care system. They are ignored in part because current approaches to US health care financing support health care during visits to the doctor, not between them, and because “hovering over” people during the hours between visits is personnel-intensive, often requiring nurses to call or visit patients or to staff telemedicine programs. Providers' hovering also requires a fair amount of the very kind of engagement in patients' own health and health care that is so often missing in the patients these interventions aim to reach. As a result, many of the most promising efforts in telemedicine and home health care have produced disappointing results.^{18–21}

If some form of hovering is required to engage people who are otherwise hard to engage during those 5,000 hours a year, it almost certainly has to become much more automated—both because providers must reduce the need for expensive personnel and because many patients have already revealed limits to their willingness to exert themselves to improve their health. Nevertheless, there is reason for optimism based on the increasing use of cell phones and other wireless devices. It may be a cliché to acknowledge that we live in a more connected world, but the expanded reach of both sophisticated and simple technology helps connect people who were much harder to contact only a decade ago.

A key lesson from behavioral economics is that

if you want to affect a person's behavior that occurs frequently (such as taking a medication), you need to engage the person at nearly the same frequency. That degree of engagement would have been impossible or prohibitively expensive before people became accustomed to using their cell phones and other devices regularly. Available now are an increasing number of pill bottles, glucometers, scales, and other devices that transmit information that can be used to provide feedback to patients and providers.

However, the technology alone is unlikely to change behavior. A patient who is nonadherent to medication is likely also to be nonadherent to using a new electronic device, unless the provision of the device is accompanied by behavioral economic engagement strategies.

Increasing Patient Engagement

Value-based insurance design and connecting the cost of premiums to behavior are well-intentioned efforts to increase patient engagement. Nonetheless, their effectiveness has been limited—probably at least in part because they are based on concepts grounded in traditional economics that now have been recognized to be outmoded but that have not yet been replaced in practice by programs designed with insights from behavioral economics. The conclusion should not be, however, that these approaches can't work, but rather that they are much more likely to work if grounded in a more nuanced understanding of human motivation and psychology.

In several recent essays we have proposed that in many situations it is possible to implement interventions that exploit the same decision errors that usually contribute to harmful outcomes (and that are exploited by many commercial entities to increase their own profits) to help people achieve their own health goals.^{22,23} For example, incentive programs that offer people small, frequent payments for behaviors of benefit to them—such as medication adherence—can, as a result of people's overweighting of immediate costs and benefits, have a disproportionate impact on behavior. This is the case even when the much larger benefits that the behavior would confer (for example, preventing a stroke or heart attack) are insufficient by themselves to motivate people to change what they do.^{24,25}

Separating incentive payments from other, larger sums of money (paychecks, for example) can make the incentives more effective, because being more visible to recipients helps make the reward payments more salient. Psychological constructs such as anticipated regret, overweighting of probabilities (from prospect

theory), and loss aversion can all be used to further augment motivation and increase the “bang for the buck” from scarce incentive dollars.

A recent study we completed highlights how a behavioral economic approach can achieve higher degrees of engagement for the same expenditure. An employer who was paying \$25 incentives for health risk assessment completion was achieving participation rates of about 40 percent and wanted to take the economically rational approach of increasing the incentive to \$50: The expectation was that such a change would also increase participation. We convinced the employer to conduct an experiment in which worksites were randomly assigned to different incentives.

Employees at some worksites received an incentive of \$50 for completing a health risk assessment. Employees at other worksites were entered into a “regret” lottery (also called a “Dutch” lottery): The workforce was divided into groups of 4–8 employees, and each week over a four-week period one group's number was chosen at random.¹² Anyone in the winning group who had completed a health risk assessment would receive \$100, and if more than 80 percent of the group's members had completed an assessment, everyone who had completed one would receive an extra \$25. Thus, the total possible incentive was \$125—an amount that, given the probability of winning, was designed to have the same actuarial value as the \$50 incentive.

At the end of the four-week experiment, participation rates at the worksites where employees were offered a \$50 incentive did increase, but only from 40 percent to 44 percent. However, participation rates at the worksites with a regret lottery increased to 64 percent, providing a much higher rate of return. The use of the lottery was designed to leverage or take advantage of anticipated regret theory, social norms, and the entertainment value of being in a lottery.

In another intervention, we proposed and tested an approach that we call “enhanced active choice” to increase medication adherence in a population of people with CVS Caremark prescription drug coverage who were receiving ongoing medications.²⁶ CVS Caremark was interested in increasing uptake of an automatic refill program but was reluctant to use the standard tool in the behavioral economics toolbox to default customers to receiving such refills. CVS Caremark worried that such an approach would cause many people to receive automatic refills who didn't want them. Enhanced active choice instead gave customers a choice and required them to make a decision. This approach also

Many approaches that fall under the umbrella of patient engagement are unlikely to be cost-effective.

highlighted the salient advantages of automatic refills in terms of convenience by, for example, wording the choice as: “Press 1 if you prefer to refill your prescriptions by yourself each time.” “Press 2 if you would prefer for us to do it for you automatically.” The enhanced active choice approach led to an increase of more than 100 percent in the rate at which members signed up for the automatic refill program. Using this approach instead of an “opt out” default had the advantage of making joining the program reflect a conscious choice on the part of members, not just something they didn’t opt out of—which will probably result in higher rates of engagement in the future.

Beyond innovation in program design, we also need substantial changes in the degree to which such programs are evaluated. To date, there have been few rigorous evaluations of the impact of connecting incentives to health behavior, both because employers have tended to be reluctant to experiment, and because many vendors have not submitted their programs to third-party evaluation. Furthermore, in cases where relatively formal evaluations have been done, given the limitations of study designs, it has often been difficult to draw clear inferences about the magnitudes of effects.

Previous studies have provided proof of the concept that behavioral economic incentives (the use of standard economic incentives in combination with psychological factors such as probability weighting or regret aversion) can promote healthy behaviors such as smoking cessation, engaging in brain exercises, and weight loss.^{27–29} For example, in work done by our team, an incentive of \$750 that was administered separately from the premium structure led to a tripling of long-term smoking cessation

rates among employees at General Electric.³⁰ However, differences in designs and subject pools across studies make it difficult to compare the relative effectiveness of different approaches. Within each study, financial incentives and several behavioral economic approaches have typically been combined into a single intervention (for example, financial rewards, regret feedback, and probability weighting might be used simultaneously) and compared to a control group that received no incentive, making it unclear which factors were essential. Furthermore, economic incentives combined with psychological levers have typically not been compared to incentives alone. As a result, systematic testing of the incremental effectiveness of different psychological factors would be of great value as a new generation of programs based on a combination of standard economics and psychology are designed and implemented.

Conclusion

There are unprecedented opportunities for innovation in incentives and health benefit design given the provision of the Affordable Care Act that permits the introduction of incentives for healthy behavior worth up to 50 percent of total premiums. The provision could be a game changer in facilitating employers’ efforts to use incentives to affect employees’ health behavior. However, policies that are not informed by data or that assume patients always behave in ways that are economically rational without accounting for pervasive decision errors are unlikely to increase patient engagement or make health care more cost-effective. Many approaches that fall under the umbrella of patient engagement are unlikely to be cost-effective. Furthermore, if they are not well designed, they run the risk of producing perverse effects such as greater regressivity, which would impose a greater burden of cost or illness on the people who can least afford it. Such effects are not inevitable, however.

Rigorous data on the comparative effectiveness of financial and social incentives, either in comparison or in conjunction with other types of interventions, would provide useful guidance to employers, insurers, benefit design consultants, and policy makers going forward. Better designed policies have the potential to increase patient engagement with very favorable cost-effectiveness ratios for insurers, employers, and other relevant commercial entities, as well as providing big dividends for patients. ■

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Weight Watchers. The opinions expressed are those of the authors and not the Department of Veterans Affairs.

NOTES

- 1 Special issue: new era of patient engagement. *Health Aff (Millwood)*. 2013;32(2).
- 2 Bodenheimer T, Chen E, Bennett HD. Confronting the growing burden of chronic disease: can the U.S. health care workforce do the job? *Health Aff (Millwood)*. 2009; 28(1):64–74.
- 3 Towers Watson. Performance in an era of uncertainty: 2012, 17th annual Towers Watson/National Business Group on Health employer survey on purchasing value in health care [Internet]. New York (NY): Towers Watson; 2012 [cited 2013 Jun 12]. Available for download from: <http://www.towerswatson.com/en/Insights/IC-Types/Survey-Research-Results/2012/03/Towers-Watson-NBGH-Employer-Survey-on-Value-in-Purchasing-Health-Care>
- 4 Newhouse JP, Insurance Experiment Group. Free for all? Lessons from the RAND Health Insurance Experiment. Cambridge (MA): Harvard University Press; 1993.
- 5 Hsu J, Price M, Huang J, Brand R, Fung V, Hui R, et al. Unintended consequences of caps on Medicare drug benefits. *N Engl J Med*. 2006;354(22):2349–59.
- 6 Baicker K, Mullainathan S, Schwartzstein J. Behavioral hazard in health insurance [Internet]. Cambridge (MA): National Bureau of Economic Research; 2012 Oct [cited 2013 May 28]. (NBER Working Paper No. 18468). Available from: <http://www.nber.org/papers/w18468.pdf>
- 7 Chernew ME, Shah MR, Wegh A, Rosenberg SN, Juster IA, Rosen AB, et al. Impact of decreasing copayments on medication adherence within a disease management environment. *Health Aff (Millwood)*. 2008;27(1):103–12.
- 8 Choudhry NK, Fischer MA, Avorn J, Schneeweiss S, Solomon DH, Berman C, et al. At Pitney Bowes, value-based insurance design cut copayments and increased drug adherence. *Health Aff (Millwood)*. 2010;29(11):1995–2001.
- 9 Choudhry NK, Avorn J, Glynn RJ, Antman EM, Schneeweiss S, Toscano M, et al. Full coverage for preventive medications after myocardial infarction. *N Engl J Med*. 2011;365(22):2088–97.
- 10 Volpp KG, Loewenstein G, Asch DA. Choosing wisely: low value services, utilization, and patient cost sharing. *JAMA*. 2012;308(16):1635–36.
- 11 Pear R. Employers get leeway on health incentives. *New York Times*. 2013 May 29.
- 12 Volpp KG, Asch DA, Galvin R, Loewenstein G. Redesigning employee health incentives—lessons from behavioral economics. *N Engl J Med*. 2011;365(5):388–90.
- 13 Nyce S. Boosting employee wellness without breaking the bank. *New York (NY): Towers Watson*; 2010 Jul.
- 14 Stitzer ML, Bigelow GE. Contingent reinforcement for carbon monoxide reduction: within-subject effects of pay amount. *J Appl Behav Anal*. 1984;17(4):477–83.
- 15 Long JA, Jahnle EC, Richardson DM, Loewenstein G, Volpp KG. Peer mentoring and financial incentive to improve glucose control in African American veterans: a randomized trial. *Ann Intern Med*. 2012; 156(6):416–24.
- 16 Milkman KL, Beshears J, Choi JJ, Laibson D, Madrian BC. Using implementation intentions prompts to enhance influenza vaccination rates. *Proc Natl Acad Sci U S A*. 2011; 108(26):10415–20.
- 17 Asch DA, Muller RW, Volpp KG. Automated hovering in health care: watching over the 5,000 hours. *N Engl J Med*. 2012;367(1):1–3.
- 18 Chaudhry SI, Matterna JA, Curtis JP, Spertus JA, Herrin J, Lin Z, et al. Telemonitoring in patients with heart failure. *N Engl J Med*. 2010;363(24):2301–9.
- 19 Naylor MD, Broton D, Campbell R, Jacobsen BS, Mezey MD, Pauly MV, et al. Comprehensive discharge planning and home follow-up of hospitalized elders: a randomized clinical trial. *JAMA*. 1999;281(7): 613–20.
- 20 Welch HG, Wennberg DE, Welch WP. The use of Medicare home health care services. *N Engl J Med*. 1996;335(5):324–9.
- 21 Weinberger M, Oddone EZ, Henderson W. Does increased access to primary care reduce hospital readmissions? *N Engl J Med*. 1996; 334(22):1441–7.
- 22 Volpp KG, Pauly MV, Loewenstein G, Bangsberg D. P4P4P: an agenda for research on pay-for-performance for patients. *Health Aff (Millwood)*. 2009;28(1):206–14.
- 23 Loewenstein G, John LK, Volpp KG. Using decision errors to help people help themselves. Chap. 21 in: Shafir E, editor. *The behavioral foundations of public policy*. Princeton (NJ): Princeton University Press; 2013. p. 361–79.
- 24 Heil SH, Higgins ST, Bernstein IM, Solomon LJ, Rogers RE, Thomas CS, et al. Effects of voucher-based incentives on abstinence from cigarette smoking and fetal growth among pregnant women. *Addiction*. 2008;103(6):1009–18.
- 25 Volpp KG, Loewenstein G, Troxel AB, Doshi J, Price M, Laskin M, et al. A test of financial incentives to improve warfarin adherence. *BMC Health Serv Res*. 2008;8:272.
- 26 Keller PA, Harlam B, Loewenstein G, Volpp KG. Enhanced active choice: a new method to motivate behavior change. *J Consum Psychol*. 2011; 21(4):376–83.
- 27 Volpp KG, Gurmankin Levy A, Asch DA, Berlin JA, Murphy JJ, Gomez A, et al. A randomized controlled trial of financial incentives for smoking cessation. *Cancer Epidemiol Biomarkers Prev*. 2006;15(1):12–8.
- 28 Schofield H, Kopsic J, Loewenstein G. Comparing the effectiveness of individualistic, altruistic, and competitive incentives in motivating completion of mental exercises. 2012. Unpublished manuscript.
- 29 Volpp KG, John LK, Troxel AB, Norton L, Fassbender J, Loewenstein G. Financial incentive-based approaches for weight loss: a randomized trial. *JAMA*. 2008; 300(22):2631–7.
- 30 Volpp KG, Troxel AB, Pauly MV, Glick HA, Puig A, Asch DA, et al. A randomized, controlled trial of financial incentives for smoking cessation. *N Engl J Med*. 2009; 360(7):699–709.