

Planning Prompts as a Means of Increasing Rates of Immunization and Preventive Screening

Hengchen Dai • Katherine L. Milkman • John Beshears
James J. Choi • David Laibson • Brigitte C. Madrian

Building on psychological insights about the way people make decisions, behavioral scientists have proposed various methods to increase behaviors that promote welfare without limiting freedom of choice (Thaler & Sunstein, 2008). Recently, researchers have begun exploring the power of such methods for encouraging people to engage in beneficial health-related behaviors, particularly those that are often put off or forgotten (Loewenstein, Brennan, & Volpp, 2007). For example, motivated by evidence of substantial inertia at the status quo, researchers have demonstrated that if people are automatically assigned an appointment to receive a flu shot (while retaining the right to change or cancel the appointment, or even to not show up), immunization rates increase by 12 percentage points from a baseline of 33 percent (Chapman, Li, Colby, & Yoon, 2010).

In this report, we highlight one powerful yet under-exploited behavioral intervention that helps people follow through on beneficial intentions without restricting their autonomy. We review two studies showing that *planning prompts* not only increase healthy behaviors but also are easy and inexpensive to implement.

The Psychology of Planning Prompts

People often have trouble engaging in behaviors with benefits that arrive with a delay, such as exercising, scheduling and attending physical exams, and getting vaccinated (Milkman, Rogers, & Bazerman, 2008). Because the cost of exerting immediate effort to achieve such goals is more salient than the anticipated long-term benefits, individuals often procrastinate at the time when action is required (O'Donoghue & Rabin, 1999). Forgetfulness also reduces follow-through on good intentions (Schacter, 1999). People mean to act at some point in the future but then fail to recall that intention at a moment when action is possible.

Creating a plan can reduce the likelihood of both procrastination and forgetfulness. Plans require people to form associations between anticipated future moments (e.g., a given date and time) and specific actions required to attain their goal. As a result, when a given future moment arises, it cues the individual who has made a plan to follow a predetermined course of action, thus reducing the likelihood of forgetting to act. In addition, simply having a plan makes procrastination more difficult because delay then requires breaking a commitment. Finally, planning prompts encourage people to generate solutions to logistical challenges

before facing them, a strategy that can remove other impediments to goal attainment.

Past research has demonstrated that prompting people to form a concrete plan about when, where, and how they will fulfill a goal increases goal attainment (Gollwitzer, 1999). In short, by associating a specific future cue with a desired behavior (e.g., "When situation *x* arises, I will do *y*"), plan-making helps people overcome several psychological barriers to follow through.

Past Research on Planning Prompts and Flu Shots

The first study that we review examines the impact of planning prompts on influenza vaccination rates. An estimated 12,047 deaths and 316,588 hospitalizations occurred in the United States due to seasonal influenza and associated complications during the 2000–2001 influenza season (Thompson et al., 2010; Thompson et al., 2004). People ages 65 and over account for nearly 90 percent of all influenza-associated deaths, and people ages 85 and over are at highest risk of influenza-related hospitalizations (Thompson et al., 2010; Thompson et al., 2004). The number of hospitalizations and deaths associated with influenza has increased substantially over the past 3 decades due to the increasing average age of the population (Thompson et al., 2010). The influenza vaccine, which is widely available at low cost, has been shown to reduce flu mortality rates, morbidity rates, and healthcare costs (Gross, Hermogenes, Sacks, Lau, & Levandowski, 1995; Nichol, Margolis, Wuorenma, & Von Sternberg, 1994; Wilde et al., 1999). However, many people who, according to guidelines from the Centers for Disease Control and Prevention, would benefit from receiving an

annual flu shot fail to do so (Centers for Disease Control and Prevention, 2003). If procrastination or forgetfulness, rather than a rational cost-benefit calculation, leads people to miss immunization opportunities, planning prompts could be a cost-effective means of increasing vaccination rates and improving public health.

To evaluate the efficacy of planning prompts as a means of increasing vaccination rates, researchers conducted a three-arm randomized controlled trial in collaboration with Evive Health, a personalized healthcare communications provider, and a large Midwestern company (Milkman, Beshears, Choi, Laibson, & Madrian, 2011). The researchers randomly assigned 3,272 employees who were ages 50 and older or diagnosed with chronic health conditions that increase the risk of influenza-related complications to receive one of three mailings.¹ All of the mailings encouraged employees to receive free flu shots and provided personalized details about the dates, times, and locations of available clinics at their worksite. In addition, two versions of the mailings prompted recipients to privately make a plan by writing down either (a) the date or (b) both the date and the time when they planned to receive a flu shot. It is important to note that employees were not asked to return the mailing, to share their private plan with anyone, or to schedule an appointment. They could simply visit the free flu shot clinic at their worksite to be immunized at any of the specified times.

Influenza vaccination rates increased with the specificity of the planning prompt in the mailing. The baseline vaccination rate in the control group that received a reminder mailing without a planning prompt was 33.1 percent. A reminder containing a prompt to write down the date when the employee planned to receive a shot increased the vaccination rate by 1.5 percentage points to 34.6 percent, an increase that is not statistically significant. Finally, the vaccination rate among employees whose reminder mailing included the more specific prompt to write down both the date and the time when they planned to receive a shot was 37.3 percent, corresponding to a statistically significant increase of 4.2 percentage points relative to the control group.

Interestingly, the impact of the planning prompt was larger at worksites where clinics were offered on only 1 day ($N = 44$ sites), as opposed to on 3 or 5 days ($N = 18$ sites). At 1-day sites, prompts to write down the date and the time when the employee planned to receive an injection increased the vaccination rate from 30 percent to 38 percent. This outcome suggests that planning prompts may be most effective in settings where opportunities for goal attainment are limited, making procrastination and forgetfulness particularly costly.

The aforementioned research was the first large-scale field study to successfully isolate the efficacy of planning prompts using a confound-free experimental design. The intervention in this study was sent by mail, so there was no social pressure caused by face-to-face or phone interaction. The planning prompts did not contain any extra

Prompting people to form a concrete plan increases goal attainment.

information about flu vaccination that might encourage behavior uptake. Instead of relying on subject self-reports, the researchers measured outcomes using administrative data without the awareness of participants, removing both self-reporting bias and experimenter-demand effects. Finally, the sample size was large and attrition from the data was negligible, allowing for a precise estimate of the planning prompt effect on flu shot take-up.

Past Research on Planning Prompts and Colonoscopies

The flu shot study demonstrated the effectiveness of planning prompts at encouraging uptake of a fairly easy and innocuous behavior that can be completed with a single action, at most several weeks after the prompt to form a plan. However, many important health behaviors must be executed many weeks or months after a reminder is received, require multiple steps (e.g., scheduling and attending an appointment), and involve discomfort. Thus, the same research team conducted a second field study to examine the efficacy of planning prompts as a means of increasing follow-through on an unpleasant but potentially lifesaving behavior: obtaining a colonoscopy (Milkman, Beshears, Choi, Laibson, & Madrian, 2012).

In this study, all 11,918 employees at four large corporations who were due for a colonoscopy according to standards set by the U.S. Preventive Services Task Force (2008) received a mailed reminder (from Evive Health) that they were due for the procedure. Employees were informed how to schedule an appointment and how much it would cost. All mailings also highlighted the power of using a sticky note as a reminder to follow through on plans. Approximately half of employees were randomly assigned to receive a control mailing, to which a blank, yellow sticky note was affixed on the upper right-hand corner. The other

half of employees were assigned to receive a planning prompt in their mailing. These mailings also contained a yellow sticky note affixed to the upper right-hand corner, but these sticky notes contained a prompt to write down *the date of a colonoscopy appointment and the name of the doctor* who would perform the colonoscopy.

The outcome of interest was whether an employee received a colonoscopy within approximately 7 months of receiving the reminder mailing. The treatment-reminder mailing significantly increased the percentage of people who obtained colonoscopies during this follow-up period, from 6.2 percent in the control group, which received a reminder without a planning prompt, to 7.2 percent in the planning prompt group. For every 100,000 people who should be screened according to national guidelines, an increase of 1 percentage point in follow-through is associated with an expected 271 life-years saved (Zauber et al., 2008). Demographic groups judged by a panel of survey respondents to be at the highest risk of forgetfulness, such as older adults and those with children, benefited from the planning prompt more than others. This finding is consistent with the hypothesis that planning prompts are effective in part because they reduce forgetfulness.

Colon cancer has the second highest mortality rate among cancers in the United States. If adults ages 50 to 75 sought colorectal screenings at regular intervals as national guidelines have advised, 38 percent of the approximately 50,000 U.S. colon cancer fatalities per year could be prevented (U.S. Preventive Services Task Force, 2008). The aforementioned study demonstrates the potential of planning prompts to improve public health in an important domain that involves far more advance planning and discomfort than receiving an immunization.

Conclusions

We summarize the results presented in two recent academic papers describing large-scale field experiments, both of which show that planning prompts can effectively increase follow-through on important health behaviors. In the context of a simple, relatively painless procedure such as a flu shot, a reminder mailing encouraging employees to write down the date and time when they planned to get vaccinated increased the vaccination rate at free workplace clinics by 13 percent relative to a reminder with no such planning prompt. Similarly, the rate of obtaining a colonoscopy was 16 percent higher among employees prompted to write down when and from whom they would receive an exam than among those in a control group.

Past research has demonstrated that sending reminder letters increases patient immunization rates by an

average of 8 percentage points (Briss et al., 2000; Szilagyi et al., 2000). The two studies reviewed here show that compliance rates can be further improved if the reminder mailing includes a prompt to form a specific plan. This intervention requires no additional printing or mailing costs and can easily be implemented. Thus, planning prompts are a potentially cost-effective tool to help people follow through on a wide range of beneficial behaviors that often are delayed or forgotten—such as receiving an immunization, obtaining a health assessment, or refilling a prescription.

Older adults are biologically more prone to forgetfulness (Burns & Zaudig, 2002; Jeong, 2004; O'Brien & Levy, 1992), as well as more likely to believe that they are forgetful due to old age (Commissaris, Ponds, & Jolles, 1998). In addition, older adults often forget to perform actions at a specified time (for a review, see Einstein & McDaniel, 1996), a problem that can be mitigated by generating retrieval cues in advance (Schachter, 1999). Because planning prompts help create retrieval cues, planning prompts could be a particularly valuable technique for helping older adults overcome forgetfulness and engage in beneficial health behaviors.

Hengchen Dai is a doctoral candidate in the Operations and Information Management Department and Katherine L. Milkman, PhD, is an assistant professor of operations and information management at the Wharton School, University of Pennsylvania. John Beshears, PhD, is an assistant professor of finance at the Stanford Graduate School of Business, Stanford University. James J. Choi, PhD, is an associate professor of finance at the Yale School of Management, Yale University. David Laibson, PhD, is the Robert I. Goldman Professor of Economics at Harvard University. Brigitte C. Madrian, PhD, is the Aetna Professor of Public Policy and Corporate Management at the Harvard Kennedy School, Harvard University.

Acknowledgments

We thank Prashant Srivastava, Jennifer Lindner, and our other contacts at Evive Health for conducting the field experiments reviewed in this article and providing the data. We acknowledge individual and collective financial support from the National Institute on Aging (grants P01AG005842 and P30AG034532). See the authors' Web sites for lists of their outside activities.

Notes

¹ This study was conducted prior to February 24, 2010, when the Centers for Disease Control and Prevention (2012) changed its guidelines to recommend that everyone over the age of 6 months receive a yearly flu vaccine.

References

- Briss, P., Rodewald, L., Hinman, A., Shefer, A., Strikas, R., Bernier, R., . . . Williams, S. M. (2000). Reviews of evidence regarding interventions to improve vaccination coverage in children, adolescents, and adults. *American Journal of Preventive Medicine*, *18*, 97–140.
- Burns, A., & Zaudig, M. (2002). Mild cognitive impairment in older people. *The Lancet*, *360*, 1963–1965.
- Centers for Disease Control and Prevention. (2003). Public health and aging: Influenza vaccination coverage among adults aged > or = 50 years and pneumococcal vaccination coverage among adults aged > or = 65 years—United States, 2002. *Morbidity and Mortality Weekly Report*, *52*, 987–992.
- Centers for Disease Control and Prevention. (2012). Key facts about influenza (flu) & flu vaccine: Who should get vaccinated? Retrieved from <http://www.cdc.gov/flu/keyfacts.htm#whoshould1>
- Chapman, G. B., Li, M., Colby, H., & Yoon, H. (2010). Opting in vs. opting out of influenza vaccination. *Journal of the American Medical Association*, *304*, 43–44.
- Commissaris, C. J. A. M., Ponds, R. W. H. M., & Jolles, J. (1998). Subjective forgetfulness in a normal Dutch population: Possibilities for health education and other interventions. *Patient Education and Counseling*, *34*, 25–32.
- Einstein, G. O., & McDaniel, M. A. (1996). Retrieval processes in prospective memory: Theoretical approaches and some new empirical findings. In M. Brandimonte, G. O. Einstein, & M. A. McDaniel (Eds.), *Prospective Memory: Theory and Applications* (pp. 115–142). Mahwah, NJ: Erlbaum.
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, *54*, 493–503.
- Gross, P. A., Hermogenes, A. W., Sacks, H. S., Lau, J., & Levandowski, R. A. (1995). The efficacy of influenza vaccine in elderly persons—A meta-analysis and review of the literature. *Annals of Internal Medicine*, *123*, 518–527.
- Jeong, J. S. (2004). EEG dynamics in patients with Alzheimer's disease. *Clinical Neurophysiology*, *115*, 1490–1505.
- Loewenstein, G., Brennan, T., & Volpp, K. G. (2007). Asymmetric paternalism to improve health behaviors. *Journal of the American Medical Association*, *298*, 2415–2417.
- Milkman, K. L., Beshears, J., Choi, J. J., Laibson, D., & Madrian, B. C. (2011). Using implementation intentions prompts to enhance influenza vaccination rates. *Proceedings of the National Academy of Sciences*, *108*, 10415–10420.
- Milkman, K. L., Beshears, J., Choi, J. J., Laibson, D., & Madrian, B. C. (2012). *Following through on good intentions: The power of planning prompts* (NBER Working Paper No. 17995). Cambridge, MA: National Bureau of Economic Research.
- Milkman, K. L., Rogers, T., & Bazerman, M. H. (2008). Harnessing our inner angels and demons: What we have learned about want/should conflicts and how that knowledge can help us reduce short-sighted decision making. *Perspectives on Psychological Science*, *3*, 324–338.
- Nichol, K. L., Margolis, K. L., Wuorenma, J., & Von Sternberg, T. (1994). The efficacy and cost-effectiveness of vaccination against influenza among elderly persons living in the community. *New England Journal of Medicine*, *331*, 778–784.
- O'Brien, J. T., & Levy, R. (1992). Age associated memory impairment. *British Medical Journal*, *304*(6818), 5–6.
- O'Donoghue, T., & Rabin, M. (1999). Doing it now or later. *The American Economic Review*, *89*, 103–124.
- Schacter, D. L. (1999). The seven sins of memory: Insights from psychology and cognitive neuroscience. *American Psychologist*, *54*, 182–203.
- Szilagyi, P., Bordley, C., Vann, J., Chelminski, A., Kraus, R., Margolis, P., & Rodewald, L. (2000). Effect of patient reminder/recall interventions on immunization rates—A review. *Journal of the American Medical Association*, *284*, 1820–1827.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, CT: Yale University Press.
- Thompson, M. G., Shay, D. K., Zhou, H., Bridges, C. B., Cheng, P. Y., Burns, E., . . . Cox, N. J. (2010). Estimates of deaths associated with seasonal influenza—United States, 1976–2007. *Morbidity and Mortality Weekly Report*, *59*, 1057–1062.
- Thompson, W. W., Shay, D. K., Weintraub, E., Brammer, L., Bridges, C. B., Cox, N. J., & Fukuda, K. (2004). Influenza-associated hospitalizations in the United States. *Journal of the American Medical Association*, *292*, 1333–1340.
- U.S. Preventive Services Task Force. (2008). Screening for colorectal cancer: U.S. Preventive Services Task Force recommendation statement. Retrieved from <http://www.uspreventiveservicestaskforce.org/uspstf/uspcolo.htm>
- Wilde, J., McMillan, J., Serwint, J., Butta, J., O'Riordan, M., & Steinhoff, M. (1999). Effectiveness of influenza vaccine in health care professionals—A randomized trial. *Journal of the American Medical Association*, *281*, 908–913.
- Zauber, A. G., Lansdorp-Vogelaar, I., Knudsen, A. B., Wilschut, J., van Ballegooijen, M., & Kuntz, K. M. (2008). Evaluating test strategies for colorectal cancer screening: A decision analysis for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, *149*, 659–669.