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Nudges at the dentist

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ABSTRACT

We implement a field experiment to study the impact of reminder messages on dental health prevention. Patients who are due to schedule a check-up receive no reminder, a neutral reminder postcard, or reminders including additional information on the benefits of prevention. Our results document a strong impact of reminders. Within one month after receiving a reminder, the fraction of patients who make a check-up appointment more than doubles. The effect declines slightly over time, but remains economically and statistically significant. Including additional information in the reminders does not significantly increase response rates relative to the neutral reminder. Finally, our data indicates that applying reminders repeatedly neither strengthens nor weakens their effects.

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1. Introduction

A vast body of evidence documents that limitations in self-control, memory, and attention may lead people to act against their long-run self interest (see [Rabin, 1999](#); [DellaVigna, 2009](#) for comprehensive reviews of the literature). These findings have spurred the interest in how subtle changes in choice architectures can improve 'Decisions About Health, Wealth, and Happiness' ([Thaler and Sunstein, 2008](#)). Choice-preserving changes in seemingly minor institutional details – nudges – hold the promise to help some people avoid making mistakes without distorting choices of others. Examples of nudges that have been shown to strongly affect decisions include the specification of default options, information disclosure policies, or the framing and labeling of policy interventions (e.g., [Johnson and Goldstein, 2003](#); [Wisdom et al., 2010](#); [Abeler and Marklein, 2010](#)).

In this paper, we study whether simple reminder messages can be used as a nudge to encourage dental health prevention. Preventive health care constitutes a potential hot spot for biases in people's decisions. Activities such as screenings and routine check-ups should be conducted regularly but at a relatively low frequency. As a consequence, these key elements of effective health prevention are vulnerable to limitations in memory and attention: people may simply forget about scheduling the next check-up. Moreover, investments in prevention typically entail short-run costs but yield benefits only in the long-run. Present-biased preferences may thus lead people to procrastinate their next check-up. Finally,

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people might under-invest in preventive health care because they are not fully aware of its future benefits. Reminders about preventive activities represent a low-cost and unobtrusive intervention in that they let people schedule their check-ups whenever they want to. A person who rationally postpones a check-up can thus just ignore the reminder message. Someone who would otherwise delay a check-up due to memory limitations or other biases, however, might benefit from receiving a reminder.

In cooperation with a German dentist, we implemented a field experiment to examine the impact of reminders on the frequency of dental check-ups. Regular check-ups are associated with improved periodontal health and ensure that oral diseases are discovered early – which typically makes treatment less painful and less costly (e.g., [Lang et al., 1994](#)). In addition, healthy teeth yield economic returns ([Glied and Neidell, 2010](#)). To identify the causal effect of reminders, we exogenously vary whether people are reminded to schedule a new check-up appointment. Within the group of people who receive a reminder, we additionally randomize the content of the reminder messages. In particular, we vary whether the reminder includes a paragraph that informs patients about the benefits of prevention. We also randomize whether this information is framed positively or negatively, as it is predominantly the case with health warning messages for tobacco and other potentially harmful products.

We find that reminders cause a substantial increase in the number of check-ups. Within one month after receiving a reminder, the fraction of people who contact the dentist and schedule a check-up appointment is more than twice as high as in our control group (19.3% vs. 8.9%). Similarly, the fraction of patients who visit the dentist and have a check-up is more than 10 percentage points higher in the treated group. The magnitude of the reminder effect is remarkably persistent over time. Even 100 days after the intervention, the fraction of patients who scheduled a check-up is roughly 8 percentage points higher in the treated group (33.8% vs. 26.0%). Reminders thus encourage people to engage more strongly in dental health prevention.

In contrast to the strong overall impact of being reminded, the specific type and content of the reminder seems to matter relatively little. In particular, adding information about the benefits of prevention does not significantly increase patients' response rates relative to a neutral reminder. We also find no systematic differences in responses to a positive or negative framing of the reminders' content. These results hold for a broad range of patient subgroups and are robust, for instance, to controlling for individual differences in age, gender, and check-up history.

We also analyze how people behave when they are repeatedly exposed to reminders. Over the course of our experiment, several patients are treated twice as they are due for a further check-up. Our randomization procedure ensures that we obtain random treatment sequences, in terms of whether and how a person is reminded the first and second time she is up for a check-up. Our data show that patients who receive multiple reminders exhibit similar response patterns as patients who receive the first reminder in our experiment. At the same time, we find no detrimental effects if one stops sending a reminder at the second check-up date.

A number of previous studies used field experiments to analyze the effects of reminders in the context of health decisions (e.g., [McDowell et al., 1989](#); [Macharia et al., 1992](#); [O'Keefe and Jensen, 2009](#); [Milkman et al., 2011](#); [Calzolari and Nardotto, 2014](#)), as well as in other economically relevant settings such as loan repayment (e.g., [Cadena and Schoar, 2011](#); [Karlan et al., 2012](#)), saving (e.g., [Kast et al., 2012](#); [Karlan et al., 2013](#)), or rule compliance (e.g., [Apestequia et al., 2013](#)). [Table A1](#) in the appendix provides an overview of the setup and key results of these studies. Our paper contributes to the existing literature in several dimensions. First, by varying the content and framing of reminder messages, we provide new insights on the mechanisms through which reminders affect behavior. Overall, our results indicate that reminders increase the number of check-ups primarily because they raise patients' attention and attenuate potential delays due to memory limitations. In contrast, limited awareness about the benefits of prevention seems to matter relatively little, as providing information on these benefits does not increase response rates relative to a neutral reminder. These results augment the evidence from other studies that have explored alternative channels through which reminders might affect behavior, such as habit formation ([Calzolari and Nardotto, 2014](#)), monitoring ([Kast et al., 2012](#); [Karlan et al., 2012](#)), or the provision of precisely defined goals, rules, and incentives ([Karlan et al., 2013](#); [Apestequia et al., 2013](#)).

Second, for the domain of dental health, the existing randomized trials have exclusively focused on the question whether reminders influence patients' attendance at pre-arranged appointments for orthodontic surgery and related treatments ([Reekie and Devlin, 1998](#); [Can et al., 2003](#); [Bos et al., 2005](#)). These studies have found mixed evidence on the effectiveness of reminders in reducing the frequency of broken appointments. In contrast, we show that reminders significantly increase patients' responses and check-up rates in a preventive-health setting where people are reminded about the need to schedule new dental check-ups.

Third, our extensive set of sociodemographic characteristics allows us to derive nuanced insights on whether certain groups of people are especially responsive to reminders, and whether particular types of reminders have stronger effects for some subgroups. This is of high practical relevance from a public policy perspective and might shed further light on why particular groups of people respond to reminders. Our analysis shows that simple nudges tend to work best for a wide range of people: the neutral reminder message triggers the highest response rate among almost all groups of patients. In fact, a uniform neutral reminder might be preferable to the costly targeting of specific groups with different reminder nudges. This is the case, as framed reminders sometimes backfire and erode the positive reminder effect in certain subgroups (e.g., for patients with painful treatment experiences in the past). At the same time, our evidence points to a potentially important role of personal costs in explaining differential responses to reminders. For instance, patients with private health insurance plans, who typically face higher costs of making check-ups, hardly respond to any of the reminders. This complements

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