



U.S. TREASURY

The role of choice architecture in promoting saving at tax time: Evidence from a large-scale field experiment

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abstract

Tax refunds give many low- and moderate-income (LMI) households a rare opportunity to save for unexpected expenses. We conducted three experiments aimed at increasing tax-time savings by LMI consumers. In a large field experiment, the most effective intervention increased the average savings deposits by about 50%. Delivered as people filed taxes online, this treatment consisted of a choice architecture intervention (a presentation of action choices that emphasized options for putting money into savings), combined with a message highlighting the need to save for emergencies. Two follow-up experiments simulated the tax-time situation and parsed components of the intervention. The first showed that the choice architecture and messaging interventions increased savings deposits independently. The second, assessing individual elements of the choice architecture intervention, showed that the mention of a savings option did not increase allocations by itself, but a heavy emphasis on savings or the ability to easily put money into savings did increase allocations.

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A large fraction of American households live close to a financial cliff, lacking the savings to cover unforeseen expenses.

Nationally representative data from the Pew Charitable Trusts¹ show that 41% of U.S. households do not have liquid savings to cover a \$2,000 expense in an emergency; for low-income families, that rate increases to 78%.²⁻⁴ Yet financial emergencies occur frequently: 60% of American households report experiencing a financial shock within the past year.² For consumers with low or moderate income (LMI), having savings can make the difference between meeting and failing to meet basic needs. When a job loss, a divorce, or some other crisis strikes,^{5,6} savings can be tapped to cover such expenses as food, housing, and health care.^{7,8} We define LMI households as having annual incomes below \$35,000.

Tax refunds offer potential relief. A substantial percentage of LMI households are eligible for them,⁹ and the refunds can constitute a sizeable portion of annual household income, often equaling an entire month of pay.¹⁰ Tax refund time has, therefore, been identified as a “savable” moment for LMI consumers.¹¹ Indeed, it is the only time of the year when many can reasonably afford to divert money into savings.^{12,13} Furthermore, households that deposit tax refunds into savings accounts have a reduced risk of material hardship—experiencing difficulty in meeting basic needs—in the six months following tax filing.¹⁴

For these reasons, policies that encourage LMI consumers to set aside some or all of their tax refunds into savings accounts could mitigate the risk of hardship.¹⁵ Several such policies have been proposed, among them being the Refund to Rainy Day Savings Act of 2016^{16,17} and the Financial Security Credit Act of 2015.¹⁸ Reducing the risk of material hardship is an important policy goal given that difficulty in meeting basic needs too often goes hand in hand with child maltreatment,¹⁹ impaired development,²⁰ parental mental health problems,²¹ housing instability,²² intimate partner violence,²³ and family stress.²⁴

In the research described in this article, we assessed whether behavioral interventions that are low cost and low touch (easy to implement and receive) could increase tax-time savings by LMI consumers. Historically, interventions meant to increase savings by this group have not succeeded, perhaps because these individuals tend to have definite, preset plans for how to spend their refunds and such plans leave little leeway for efforts to influence their savings decisions.^{25,26} Because devising interventions, or *treatments*, that increase savings for LMI consumers is so challenging, we tested a multi-pronged approach.

One element of our approach relies on increasing the salience of the savings deposit option via choice architecture. Broadly, *choice architecture* refers to any presentation of options; here, however, we define *choice architecture* as the presentation of options in a way that is meant to influence the choices made, typically without altering the actual options that are available.²⁷ Choice architecture has been shown to influence decisions as consequential as what energy-efficient car to drive,²⁸ how much money to allocate to retirement savings,²⁹ and whether to volunteer for organ donation.³⁰

Increasing the salience of specific options—that is, increasing a decisionmaker’s awareness of them—has also been shown to influence outcomes.³¹ Previous research has identified salience as a primary driver of savings behavior.³² For example, increasing the salience of saving by sending mail and text-message reminders can increase savings deposits.³³ In our research, we increased the salience of depositing tax refunds to savings accounts by using a choice architecture intervention that presented the savings deposit as an explicit option and put that option at the top of a list of available choices. (See the Appendices for the conditions and the screens the participants saw.)

A second element of our approach is *persuasive messaging*: communications crafted to change attitudes, opinions, or behaviors.^{34,35} Persuasive messaging is ubiquitous in both commercial marketing and public policy campaigns and can influence behavior substantially.^{36,37} Some

Core Findings

What is the issue?

When designing interventions to encourage low- and moderate-income (LMI) households to save their tax refunds, choice architects cannot simply rely on offering a choice to save. While a choice architecture approach can increase average savings deposits by as much as 50%, it does so only when coupled with a heavy emphasis on the need to save or the ability to do so easily.

How can you act?

Selected recommendations include:

- 1) Enhancing the salience of and motivational messaging for a savings option in tax refund interfaces
- 2) Examining the long-term financial and psychological health outcomes of interventions that increase tax-time savings deposits

Who should take the lead?

Behavioral science researchers, and policymakers in taxation, economics, and finance.

previous attempts to use persuasive messaging to increase savings among LMI consumers have failed.²⁵ In the work described here, however, we heightened the urgency of the messaging, seeking to improve on those earlier attempts by, for example, explicitly describing the need for emergency savings rather than simply highlighting the necessity of a rainy day fund.¹³

Finally, the third element of our approach is increasing participants' involvement, or interaction, with savings messaging. Heightened involvement can influence responsiveness to persuasion attempts,³⁸ but only in some circumstances (such as when people are processing information carefully).³⁹ Here, we tested whether offering LMI consumers the opportunity to become more involved with persuasive messaging about savings increased the percentage who made savings deposits as well as the average amount of money deposited to savings accounts; specifically, we suggested various ways people might use their tax refunds and asked them to indicate the options that appealed to them most.

We report findings from three experiments. Experiment 1, with more than 600,000 participants, tested the combined effects of choice architecture, persuasive messaging, and involvement on real savings account deposits at tax refund time. On the basis of the results from Experiment 1, which suggested a positive influence of choice architecture and some forms of persuasive messaging, we designed Experiment 2. This experiment, with about 550 volunteers, was a simulation that isolated the choice architecture and persuasive messaging components from Experiment 1 to gauge the unique influence of each. Finally, on the basis of the collective results of Experiments 1 and 2—which both suggested that using choice architecture to heighten the salience of savings can be beneficial—we designed Experiment 3. This experiment, also with about 550 participants, was another simulation of the situation in Experiment 1; this time, we isolated individual components of the choice architecture intervention and determined which features were essential for increasing savings account deposits.

Experiment 1: Tax Refund Field Experiment

Experiment 1 was a large-scale field experiment that tested whether three different interventions that incorporated persuasive messaging, choice architecture, and involvement with messaging could increase the amount of refund money allocated by LMI consumers to savings accounts at tax time. The experiment was part of the Refund to Savings (R2S) Initiative, an ongoing collaboration between researchers at Washington University in St. Louis, Duke University, and Intuit, Inc. The experiment was embedded inside the TurboTax Freedom Edition (TTFE) tax preparation software offered free to qualified LMI tax filers as a part of the IRS Free File Program.⁴⁰ During the 2015 tax season, filers qualified for the TTFE if they had an adjusted gross income (AGI) of under \$31,000, if they qualified for the Earned Income Tax Credit, or if a member of the household was on active military duty and the household had an AGI of under \$60,000. The experiment ran from January 16 through June 7 of 2015. Intuit shared anonymous, aggregated tax data with the researchers in accordance with 26 U.S. Code § 7216.

Method

Participants. In the Method sections and appendices for each experiment discussed in this article and in the Supplemental Material, we report how we determined our sample sizes and any data exclusions and manipulations that were tested.⁴¹

See Table 1 for characteristics of the sample. The 646,116 participants were individuals who used TTFE and received a federal tax refund when filing in 2015. Their mean age was 35 years, and the mean AGI per household was \$15,055, which is close to the 2015 poverty-line threshold for households with two members (\$15,930);⁴² the average number of dependents reported was 1.7. A greater percentage of Experiment 1 participants filed as single compared with all U.S. filers with income below the poverty line (67% versus 43%)⁴³ and compared with U.S. tax filers overall (47%).⁴⁰

Compared with the general tax-filing population, Experiment 1 participants had lower

Table 1. Characteristics of participants in Experiment 1 (N = 646,116)

| Characteristic | Value |
|---|--------------------|
| Group assignment | |
| Control (<i>n</i>) | 161,952 |
| Choice Architecture + Emergency Savings Message (<i>n</i>) | 161,011 |
| Choice Architecture + Future Message + Involvement (<i>n</i>) | 161,936 |
| Choice Architecture + Retirement Message + Involvement (<i>n</i>) | 161,217 |
| Demographics | |
| Mean age ^a in years (<i>SD</i>) | 35.25 (15.47) |
| Filing status | |
| Single | 66.84% |
| Head of household | 22.85% |
| Married, filing jointly, widow(er) | 9.39% |
| Married, filing separately | 0.92% |
| Any dependents | 31.37% |
| Mean number of dependents, excluding none (<i>SD</i>) | 1.71 (0.89) |
| Mean gross annual income ^b (<i>SD</i>) | \$15,055 (\$9,941) |
| Mean amount of federal tax refund (<i>SD</i>) | \$2,030 (\$2,379) |
| Active duty military | 1.86% |
| Dividend income | 5.77% |
| Unemployment benefits | 5.97% |
| Interest income | 12.71% |
| Retirement income | 13.35% |
| Social Security benefits received | 8.22% |
| Student loan tax credit | 7.06% |
| Mortgage interest paid | 6.34% |
| Real estate taxes paid (proxy for homeownership) | 8.90% |
| American Opportunity Tax Credit (proxy for current students) | 10.26% |
| Health insurance, full year | 58.41% |

Note. Means are weighted across groups. *SD* = standard deviation.

^aAge is calculated on the basis of the difference between the weighted means of birth date at tax filing and filing date.

^bIncome is shown as the annual gross income for the household.

incomes; most (75%) had an annual income under \$30,000, compared with 45% of all 2015 tax filers in the United States.⁴⁰ One third of Experiment 1 participants were younger than 25 years of age, compared with only 17% of all tax filers.

Procedure. Participants were randomly assigned to a control condition or one of three intervention conditions. (See Appendix A for screenshots of the choice architectures seen in all experimental conditions.) The TTFE software itself made the assignments after participants completed their federal income tax returns and learned they would receive a federal tax refund.

Participants randomly assigned to the control group received the standard TTFE screen, which prompted them to indicate how they wished to receive their refund. Control group participants had three options: (a) have the refund directly deposited into a bank account, (b) receive the refund via a paper check, or (c) split the money between multiple accounts. (This third option also included the ability to put the money into a U.S. Series I Savings Bond.) If participants chose to receive their refund via direct deposit, a subsequent screen prompted them to enter a bank account routing number, which could be for either a checking account or a savings account. The refund amount deposited to bank

savings accounts serves as our operationalization of savings in this experiment and is our primary outcome of interest.

Participants in all three intervention groups viewed a savings-salient choice architecture screen showing four options. The two options at the top explicitly listed depositing refund money into a savings account—either all of it (listed first) or some of it (listed second). The third option was to directly deposit the entire refund into a checking or some other bank account, and the final option was to receive a paper check.

In addition, participants in the three intervention groups were randomly assigned to receive one of three messages: (a) a message highlighting the need for emergency savings,⁴⁴⁻⁴⁶ (b) a message that mentioned saving for one's future and included an optional involvement component encouraging participants to interact with the messaging by selecting specific future financial goals, or (c) a message about retirement savings that also included an optional involvement component encouraging participants to select specific retirement savings goals (see the last three screenshots in Appendix A for the exact messaging). We labeled these interventions, respectively, Choice Architecture + Emergency Savings Message, Choice Architecture + Future Message + Involvement, and Choice Architecture + Retirement Message + Involvement.

We obtained our results through an intention-to-treat analysis,^{47,48} meaning that we analyzed the effect of our manipulation on savings outcomes among all participants, whether or not they actually had savings accounts into which they could deposit tax refunds. The intention-to-treat approach is conservative and suggests that any observed effects are even stronger when looking only at individuals with savings accounts.

Results

Sample Balance. Sample balance was assessed across the four experimental groups to be sure that imbalances in participant characteristics did not confound the results. We evaluated balance for the following participant demographic

characteristics: age, 2014 AGI, filing status, number of dependents, health insurance status, military status, and refund amount. In addition, we assessed sample balance with several additional variables that served as proxies for the financial characteristics and circumstances of participants. These included any income from the following sources: dividends or distributions, bank account interest, certain government payments (for example, unemployment benefits), retirement plan distributions, and Social Security benefits. Additionally, sample balance was assessed for child, student loan, and higher education expense-related (that is, American Opportunity and Lifetime Learning) tax credits; deductions for mortgage interest, real-estate tax, medical expenses, moving expenses, and health insurance expenditures for self-employed individuals; and tax filing date. We found no significant differences in any of these characteristics across our four groups. (We used aggregate data bivariate testing for covariates.) The lack of statistically significant differences across the four experimental groups indicates that randomization was effective and that the four groups did not differ in any systematic way on characteristics that might explain the differences in savings outcomes. In other words, differences in groups' savings outcomes may be attributed to the effects of the intervention, not to differences in the characteristics of participants.

Main Results. Table 2 shows the results from Experiment 1. As noted, the refund amount deposited to savings accounts served as our primary outcome of interest. Although a savings bond purchase was an option in all conditions, we excluded this form of savings because we were most interested in finding ways to increase the liquid financial assets accessible to LMI households for meeting household needs. Furthermore, the overall rate of savings bond purchases was extremely low (less than 0.1% in each condition); incorporating savings bond uptake into the outcome measure did not meaningfully influence the results.

Participants in each of the three intervention groups were significantly more likely to deposit some or all of their refunds into savings

41%

Households that do not have liquid savings to meet a \$2,000 emergency expense

78%

Low-income households that do not have liquid savings to meet a \$2,000 emergency expense

60%

Households that reported experiencing a financial shock in the previous year

Table 2. Effects of interventions in Experiment 1 (N = 646,116)

| Condition | Amount deposited to savings account (M) | Deposited any of refund to savings account | Deposited entire refund to savings account |
|---|---|--|--|
| Control Choice Options + No Message | \$160.25 | 8.44% | 7.92% |
| Choice Architecture + Emergency Savings Message | \$243.76*** | 13.34%*** | 12.54%*** |
| Choice Architecture + Future Message + Involvement (the interactive future message) | \$229.52*** | 12.60%*** | 11.83%*** |
| Choice Architecture + Retirement Message + Involvement (the interactive retirement message) | \$228.26*** | 12.40%*** | 11.63%*** |

Note. The p values were calculated in comparison to the control condition.

*** $p < .001$

accounts than were participants in the control group. For example, 13.34% of participants who received the Choice Architecture + Emergency Savings Message intervention (hereinafter the *emergency savings message intervention*) allocated all or a portion of their refunds to a savings account, compared with 8.44% of control group participants, $\chi^2(1, n = 358,097) = 1,600$, Cohen's $h = 0.16$, $p < .001$. (For more information about the statistics reported in this article, see note A.) In total, the treatment conditions led to an additional 20,916 tax filers depositing some or all of their refunds into savings accounts.

Within treatment groups, participants who received the emergency savings message intervention were significantly more likely to deposit refund money into savings accounts than were participants who received the Choice Architecture + Future Message + Involvement treatment (hereinafter called the *interactive future message intervention*), $\chi^2(1, n = 364,815) = 30.14$, Cohen's $h = 0.02$, $p < .001$, or the Choice Architecture + Retirement Message + Involvement treatment (hereinafter called the *interactive retirement message intervention*), $\chi^2(1, n = 363,689) = 48.56$, Cohen's $h = 0.03$, $p < .001$. A greater percentage of recipients of the interactive future message intervention put money into savings than did recipients of the interactive retirement message intervention, but the finding only approached statistical significance ($p = .09$).

Examining the average amount saved revealed similar patterns. Participants in each intervention group deposited significantly more money

into savings accounts than did participants in the control group. For example, participants who received the interactive retirement message intervention deposited an average of \$68 more into savings accounts than control group participants did, $t(315,104) = 20.74$, Cohen's $d = 0.07$, $p < .001$. In total, the net increase in the refund saved due to treatments was \$35,625,127, or an average of \$73.59 per participant.

Some statistically significant differences in savings deposits were observed between treatment groups as well. On average, participants who received the emergency savings message intervention deposited \$14 more to savings than did participants who received the interactive future message intervention, $t(322,593) = 3.97$, Cohen's $d = 0.01$, $p < .001$, and \$16 more than did those who received the interactive retirement message intervention, $t(321,896) = 4.33$, Cohen's $d = 0.02$, $p < .001$. There was no statistically significant difference between the average savings deposits of filers shown the interactive future and interactive retirement messages, $t(323,151) = 0.36$, $p = .72$.

Subgroup Outcomes. The interventions also showed an impact when we stratified subjects by filing status and age. For each subgroup, we compared savings deposit rates and average deposits for the control group with those for the collected intervention groups (see Table 3). For example, participants who identified their tax filing status as single and received any one of the interventions deposited \$43 more to savings than did their control group counterparts ($p < .001$), whereas intervention group participants

who filed as head of household deposited \$138 more to savings than did their control group counterparts ($p < .001$). One reason the 110,559 head of household filers in the intervention group deposited more on average than did the 323,679 single filers was because they received bigger refunds—an average of \$4,796.15, compared with the single filers' average of \$860.08.

Discussion

Experiment 1 demonstrated that choice architecture and messaging can substantially increase the percentage of LMI consumers who allocate tax refund money to savings accounts and can also increase the amount of money deposited. One particular intervention—choice architecture with an emergency savings message—appears somewhat more successful than the other treatments. It is possible that the heightened urgency of the emergency savings message played a role in this savings boost. The most notable effect, however, was that all versions of the treatment (choice architecture with some form of messaging) increased savings allocations compared with the control condition. Our experimental design did not allow for a direct assessment of whether having an involvement component in the messaging (selection of specific goals) affects savings decisions; we did not detect any clear benefit, however. In fact, the superiority of the emergency message

“Participants in each of the three intervention groups were significantly more likely to deposit some or all of their refunds into savings accounts”

intervention, which was not interactive, suggests that inviting involvement might have dampened the benefits of the other two treatments.

Although the intervention combining choice architecture with the emergency savings message performed better than all other treatments, the relative effects of choice architecture versus emergency messaging remained unclear. In Experiment 2, we isolated and compared the effects of the choice architecture and emergency savings messaging components through a simulated tax refund decision exercise.

Experiment 2: Choice Architecture Versus Messaging

In Experiment 2, we tested the choice architecture and emergency savings message interventions separately in an online tax refund decision simulation, gauging the unique

Table 3. Treatment effects by subgroup in Experiment 1

| Characteristic | Savings rate | | Amount saved (\$) | |
|-------------------------------------|--------------|--------------|--------------------------|-------------------------------|
| | Control | Intervention | Control <i>M (SD)</i> | Intervention <i>M (SD)</i> |
| Filing status | | | | |
| Single ($n = 431,879$) | 8.26% | 12.93%*** | 65.61 (338.85) | 108.81*** (448.65) |
| Head of household ($n = 147,646$) | 7.47% | 9.88%*** | 390.84 (1,448.35) | 529.08*** (1,670.77) |
| Age range (in years) | | | | |
| 15–24 ($n = 211,605$) | 10.37% | 15.24%*** | 81.19 (462.23) | 119.13*** (543.55) |
| 25–34 ($n = 180,352$) | 6.52% | 11.41%*** | 179.79 (930.89) | 284.46*** (1,134.25) |
| 35–44 ($n = 90,747$) | 6.90% | 9.67%*** | 286.36 (1,259.17) | 402.80*** (1,481.16) |
| 45–54 ($n = 69,544$) | 6.99% | 9.61%*** | 226.31 (1,055.81) | 300.03*** (1,193.77) |
| 55–64 ($n = 57,833$) | 6.79% | 9.83%*** | 153.80 (809.61) | 214.53*** (931.48) |
| 65+ ($n = 36,035$) | 6.77% | 9.78%*** | 89.99 (500.67) | 132.99*** (622.13) |

Note. *SD* = standard deviation.

*** $p < .001$.

“Presenting the choice architecture manipulation alone or with the emergency savings message significantly increased the amount allocated to savings”

influence of each. We also tested whether the effects from Experiment 1 generalized to a new participant sample.

Method

Participants. Six hundred participants were recruited from Amazon Mechanical Turk and received \$0.50 each for participating. We planned to have 150 participants in each of four conditions—sample sizes comparable to, yet still larger than, typical social science laboratory and survey experiments.⁴⁹ However, for both Experiments 2 and 3, which were conducted online via Amazon Mechanical Turk, we analyzed data only from those participants who passed an attention check test designed to weed out inattentive participants.^{50,51} For Experiment 2, this procedure resulted in a total of 569 analyzed responses (median age = 34 years; 55% female, 45% male). Fifty-three percent of participants ($n = 304$) reported a tax filing status of single, and 33% ($n = 188$) reported a status of married, filing jointly. Seventy percent of participants reported having one or more savings accounts, and 97% reported having one or more checking accounts. Median annual household income within this sample fell in the range of \$45,000 to \$50,000; in the Results section, we report differences in patterns based on LMI ($n = 207$) versus non-LMI status ($n = 360$; two participants did not report household income).

Procedure. Participants were asked to imagine they had just filed their federal income tax returns and expected to receive a \$1,000 refund (this approximates the median refund amounts in Experiment 1, which were \$991 and \$984 for treatment and control group participants, respectively). Participants were randomly assigned to one of four conditions (see Appendix B): (a) viewing only refund allocation options like those used in the control condition in the field experiment; (b) viewing refund options like those in the choice architecture condition in the field experiment, without any added messaging;

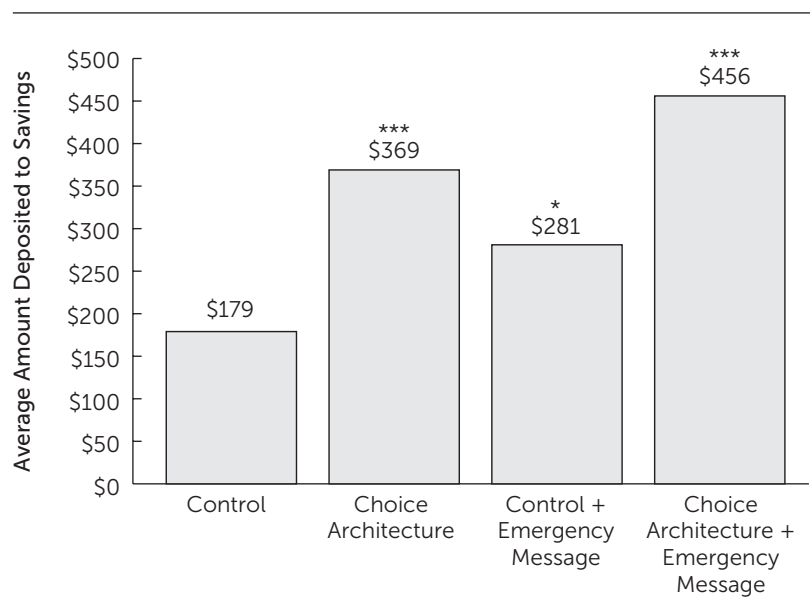
(c) viewing the control refund allocation options with an emergency savings message added; or (d) viewing the choice architecture with an emergency savings message added. This was a 2 (control, choice architecture) \times 2 (no message, emergency savings message) between-subjects experimental design.

After participants made initial allocation decisions on the experimental screens, subsequent screens guided them through follow-up actions, including, for example, indicating exactly how much money to allocate to savings versus checking accounts. Here and in Experiment 3, the amount allocated to savings served as the operationalization of savings for the purposes of the experiment.

Results

Figure 1 shows the results. (See the Supplemental Material for more details.) Presenting the choice architecture manipulation alone or

Figure 1. Amount saved: Choice architecture & messaging interventions in Experiment 2



Note. The p values were calculated in comparison to the control condition, which did not contain an emergency message.

* $p < .05$. *** $p < .001$.

Table 4. Savings outcomes based on choice architecture & messaging interventions in Experiment 2

| Message | Amount deposited to savings account (<i>M</i>) | Deposited any of refund to savings account | Deposited entire refund to savings account |
|---|--|--|--|
| Control, no message | \$178.57 | 18% | 18% |
| Choice architecture, no message | \$369.39*** | 41%*** | 31%* |
| Control + Emergency Savings Message | \$280.64* | 30%* | 27% [†] |
| Choice Architecture + Emergency Savings Message | \$456.07*** | 56%*** | 37%*** |

Note. The *p* values were calculated in comparison to the control condition.

[†]*p* < .10. **p* < .05. ****p* < .001.

with the emergency savings message significantly increased the amount allocated to savings compared with the amount allocated in the control condition, $F(1, 565) = 24.72, p < .001$. Adding the emergency savings message to either the control screen or the choice architecture screen also increased savings, $F(1, 565) = 6.57, p = .011$. The two treatments did not influence or interact with each other (that is, there was no statistically significant interaction between the two treatments). These results derive from a 2×2 analysis of variance. A different approach—a binary logistic regression—found a similar pattern. The patterns of statistical significance did not change when participants who failed the attention check were included in the analyses.

We also analyzed participants' responses on the basis of their income category. We found that the LMI consumers and non-LMI consumers responded in essentially the same way: they saved more when shown the choice architecture screen with no messaging, the control screen with the emergency savings message, or the choice architecture screen with the emergency savings message than they did when they viewed the control screen with no message. A different statistical analysis (a binary logistic regression) confirmed these patterns and suggested, albeit inconclusively, that the magnitude of the effects of choice architecture and of emergency messaging is similar for LMI and non-LMI individuals.

Discussion

In Experiment 2, we tested the choice architecture and the messaging manipulations separately, and each showed an independent

effect on savings intentions; the combination of choice architecture and emergency messaging was more powerful than either manipulation alone because the effects were additive. Average savings were notably higher in this experiment than in the field experiment, probably because the participants were more affluent, on average, and were responding hypothetically. Nevertheless, the same manipulation that enhanced savings in the field experiment also increased savings intentions in a different population studied in a new context. In addition, the patterns held for both LMI and non-LMI participants, suggesting that these interventions may be effective across income groups.

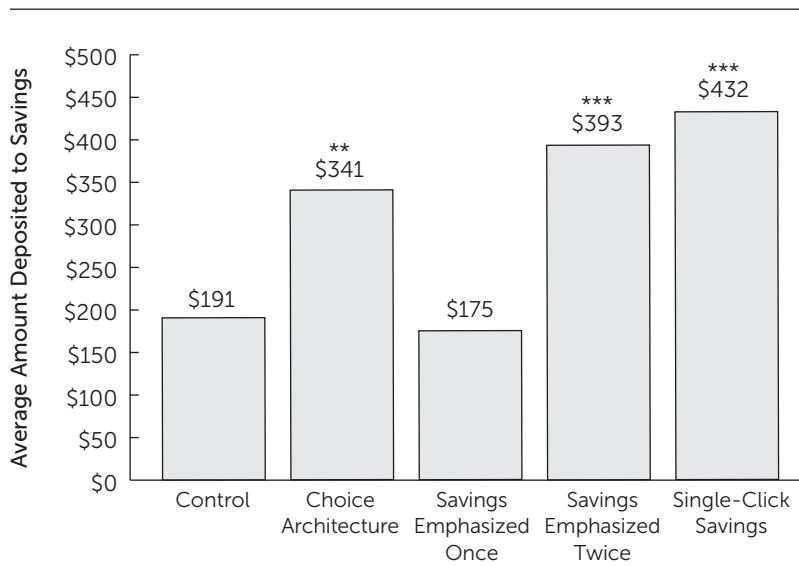
Experiment 3: Effective Choice Architecture Components

In Experiment 3, we tested which elements of the choice architecture manipulation are essential to increasing deposits to savings accounts. We also once again tested whether any effects hold for both LMI and non-LMI participants.

Method

Participants. Six hundred participants were recruited from Amazon Mechanical Turk and received \$0.50 for their participation. Following the procedures from Experiment 2, we analyzed data only from those participants who passed an exercise designed to identify and exclude inattentive participants, resulting in analyzed responses from a total of 554 participants (*M* age = 35 years; 56% female, 44% male). Of these, 54% (*n* = 300) reported a tax filing status of single, and 35% (*n* = 191) reported a status of married, filing jointly. Eighty percent of participants reported having one or more savings

Figure 2. Amount saved on the basis of choice architecture components in Experiment 3



Note. The *p* values were calculated in comparison to the control condition
 p* < .01. *p* < .001.

accounts, and 98% reported having one or more checking accounts. Median annual household income in this sample fell in the range of \$40,000–\$45,000; in the Results section, we report differences in patterns based on LMI (*n* = 221) versus non-LMI (*n* = 328) status (five participants did not report household income).

Procedure. Participants were asked to imagine that they had just filed their federal income tax returns and expected to receive a \$1,000 refund. Participants were randomly assigned to one of five experimental conditions that varied choice option descriptions. (See Appendix C.)

The first two conditions, control and choice architecture, replicated the control and choice

architecture conditions from Experiment 2; neither included the messaging component. The three remaining conditions altered the choice architecture intervention slightly to evaluate which presentations of the savings option might be most effective. A *savings emphasized* condition listed a savings account option once; this option referred to putting “my entire refund or some of my refund” into a savings account. A *savings emphasized twice* condition included an option for depositing the entire refund into one or more savings accounts as well as an option for depositing some of the refund into savings. A *single-click savings* condition included a simple single-decision option that allowed participants to click once to allocate their entire refund to savings. After participants made the initial allocation decision on the experimental screens, subsequent screens guided them through detailed aspects of their choice (such as exactly how much money they wished to allocate to savings versus checking).

Results

Figure 2 and Table 5 display the results from Experiment 3, which replicate the pattern observed in results from Experiments 1 and 2: Participants in the choice architecture condition allocated significantly more money to savings accounts compared with counterparts in the control condition. (See Supplemental Material for more details.) Subjects in the choice architecture condition allocated an average of \$340.68 to savings, whereas those in the control condition allocated an average of \$190.91 to savings, *t*(549) = 2.63, Cohen’s *d* = 0.22, *p* = .009.

Table 5. Savings outcomes based on choice architecture components in Experiment 3

| Condition | Amount deposited to savings account (<i>M</i>) | Deposited any of refund to savings account | Deposited entire refund to savings account |
|--------------------------|--|--|--|
| Control | \$190.91 | 19% | 19% |
| Choice architecture | \$340.68** | 39%*** | 30%* |
| Savings emphasized | \$174.76 | 21% | 14% |
| Savings emphasized twice | \$392.73*** | 44%*** | 35%** |
| Single-click savings | \$431.86*** | 54%*** | 34%** |

Note. The *p* values were calculated in comparison to the control condition.
 p* < .05. *p* < .01. ****p* < .001.

Participants in the savings emphasized condition did not, however, allocate more to savings than did participants in the control condition (\$174.76 and \$190.91, respectively; $p > .25$), suggesting that merely emphasizing savings one time is not sufficient to influence refund allocations. A greater amount was allocated to savings by participants in both the savings emphasized twice condition ($M = \$392.73$), $t(549) = 3.45$, Cohen's $d = 0.29$, $p < .001$, and the single-click savings condition ($M = \$431.86$), $t(549) = 4.26$, Cohen's $d = 0.36$, $p < .001$, than by counterparts in the control condition. These patterns of significance did not change when participants who failed the attention check were included in analyses.

As in Experiment 1, we found that the savings allocation patterns held for both LMI and non-LMI consumers. We also again conducted further analyses, finding the results to be consistent with those reported above.

Discussion

In Experiment 3, we tested individual components of the choice architecture manipulation, demonstrating that heavily emphasizing saving and making saving a simple one-click decision both increased savings; however, simply including an explicit savings option among other options (the savings emphasized approach), even at the top of the list of choices, was not enough to increase savings deposits. The latter finding suggests that the increased savings seen in Experiments 1 and 2 were not achieved solely by reminding consumers that allocating money to a savings account is an option at tax time. Rather, it is important to put extra emphasis on deposits to savings, to increase the ease of making such deposits, or both. Once again, the observed effects held for both LMI and non-LMI participants, suggesting that choice architecture manipulations may be effective across income groups.

General Discussion

Although some previous researchers have struggled to find interventions that effectively increase savings deposits among consumers with low or moderate incomes,²⁵

“it is important to put extra emphasis on deposits to savings, to increase the ease of making such deposits, or both”

in this article, we describe a choice architecture and messaging intervention that results in considerably higher savings by this financially vulnerable group. Further, this kind of intervention could feasibly be implemented on a large scale, because it is both low cost and low touch. Specifically, the use of a choice architecture and messaging that both emphasize savings could routinely be incorporated into online tax preparation software used by members of the IRS Free File Alliance to reach millions of LMI tax filers.

Experiment 1, a large-scale field experiment conducted with LMI consumers as part of the R2S Initiative, documents a choice architecture and messaging intervention (focused on saving for emergencies) that increased real deposits to savings accounts during tax refund time by approximately 50%. Experiment 2, a follow-up simulation experiment, separated the choice architecture and messaging manipulations, finding that each uniquely increased savings intentions. Experiment 3, another follow-up simulation experiment, tested individual features of the choice architecture intervention, finding that heavily emphasizing savings and making saving frictionless via the choice architecture each increased the intention to save; however, just mentioning savings once within choice options did not.

Although our primary focus in the research described in this article was developing interventions that increase savings deposits among LMI consumers, the results from Experiments 2 and 3 lead us to conclude that the intervention from Experiment 1—a choice architecture emphasizing savings combined with a message relating to the need to save for emergencies—is likely to increase savings for not only LMI consumers but other consumers as well. Our confidence that the approach described in

this article can be effective is strengthened by previous findings. A similar project from tax year 2012 also showed that enhancing the salience of a savings option for tax refunds and providing messaging about the benefits can increase savings account deposits by LMI consumers.¹³

In that field experiment ($N = 107,362$), two manipulations that made savings salient were each tested alone and in combination with one of three accompanying messages. The two salience manipulations encouraged people to save either (a) 25% of the refund or (b) 75% of the refund. Two of the messages were motivational: one encouraged saving for retirement and one encouraged saving for a rainy day. The third message was a general one. The results for each of these eight conditions were compared with those from a control condition, consisting of the standard screen in TTFE software prompting tax filers to choose how they would like to receive their expected tax refund. All eight treatments increased savings account deposits relative to the deposits of participants in the control condition (overall treatment Cohen's $h = 0.09$), although the 75% allocation target with no additional messaging condition was slightly more effective than the others (Cohen's $h = 0.13$).¹³ The current project—which increased savings salience via choice architecture and persuasive messaging—shows comparable although slightly larger effects (overall Cohen's $h = 0.14$; for the most successful treatment, the Choice Architecture + Emergency Savings Message, Cohen's $h = 0.16$).

Taken together, these projects suggest that altering the interface of tax-time filing software can increase savings account deposits among LMI consumers. The interventions most likely to succeed would include a choice architecture that makes savings salient together with motivational messaging that describes the need to put money into savings for emergencies.

Some may question whether one-time savings deposits are a meaningful measure of saving or even whether saving is the most beneficial use of tax refunds. Some recent research⁵² has found that low-income tax filers often use refunds to reduce high-interest unsecured

debt—an important financial priority that we do not capture in the current investigation. It may be better for low-income tax filers carrying high-interest-rate credit card debt to pay down some or all of this debt rather than to save, as the reduced interest costs will far exceed the paltry interest rate a conventional savings account will likely offer. Further, additional research finds that when consumers allocate money to savings, they may be unwilling to subsequently use those funds to cover nondiscretionary expenses⁵³ and may take on expensive debt to make ends meet.⁵⁴ Future research could track all of these outcomes, as well as survey measures of financial stress, to determine the optimal use of tax refund money for consumer well-being.

Nevertheless, tax-time refunds for LMI consumers do seem to provide a benefit, even though we cannot be certain that savings account deposits are the optimal use of the refunds. When consumers do not have emergency savings, they may be more likely to use high-cost financial services such as payday loans⁵⁵ to cope with emergency expenses and are at elevated risk for material hardship.^{2,3} Further, previous research suggests that saving at tax time has benefits that persist: in a previous iteration of R2S, households that put money into savings vehicles at tax time were less likely to report material hardships six months after filing their taxes than were households that did not make savings deposits at tax time, and the result holds even after adjustments are made for observable differences between groups.¹⁴ Options that enable people to deposit tax refunds into savings accounts easily when they file their tax forms may thus serve as “commitment mechanisms”⁵⁶—ways for people to put money psychologically out of reach until it is truly needed.

Saved refunds can help people weather sudden losses of income or unanticipated expenses. We would like to see additional research explore the long-term financial and psychological health outcomes of interventions that increase tax-time savings deposits. The results of such work should help researchers develop interventions that yield the largest possible benefit to consumers' financial well-being.

endnote

A. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the t test, or the F test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. The p value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming there are no true differences between the groups under study (the null hypothesis). Researchers traditionally view $p < .05$ as statistically significant, with lower values indicating a stronger basis for rejecting the null hypothesis. In addition to the chance question, researchers consider the size of the observed effects, using such measures as Cohen's d or Cohen's h . Cohen's d or h values of 0.2, 0.5, and 0.8 typically indicate small, medium, and large effect sizes, respectively.

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author note

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Disclaimer: Statistical compilations disclosed in this document relate directly to the bona fide research of and public policy discussions concerning savings behavior as it relates to tax compliance. Compilations are anonymous and do not disclose information containing data from fewer than 10 tax returns or reflect taxpayer-level data without the prior explicit consent from taxpayers. Compilations follow Intuit's protocols to help ensure the privacy and confidentiality of customer tax data.

supplemental material


- <https://behavioralpolicy.org/publications/>
- Additional Analysis

Appendix A. Screens viewed in Experiment 1

Control

How would you like to get your federal refund?

Direct deposited to my bank account

 *The fastest ways to get your refund!*

To a paper check

Split into multiple accounts (or on U.S. Series I Savings Bonds)

Choice Architecture + Retirement Message + Involvement

Choose how you'd like your federal refund

Saving some or all of your refund is an excellent way to set aside money to achieve your goals.

Direct deposit my entire refund into my savings account
Don't have a savings account? We can help.

Direct deposit some of my refund into my savings account, and put some into another bank account or onto U.S. Series I Savings Bonds

Direct deposit my entire refund into a checking or other bank account

Mail me a paper check

Imagine a brighter future today
Then select which goals you'd like to save for most:

- car/vehicle
- house
- education
- retirement
- emergencies
- other

Back Continue

Choice Architecture + Emergency Savings Message

Choose how you'd like your federal refund

No one knows what life has in store. In fact, 2 out of 3 people will have an unexpected financial emergency in 6 months or less. It pays to save!

Direct deposit my entire refund into my savings account
Don't have a savings account? We can help.

Direct deposit some of my refund into my savings account, and put some into another bank account or onto U.S. Series I Savings Bonds

Direct deposit my entire refund into a checking or other bank account

Mail me a paper check

Be prepared
Don't let life catch you by surprise. Save something today and have cash on hand when it's needed down the road.

Back Continue

Choice Architecture + Future Message + Involvement

Choose how you'd like your federal refund

Your refund can go a long way towards saving money for your retirement.

Direct deposit my entire refund into my savings account
Don't have a savings account? We can help.

Direct deposit some of my refund into my savings account, and put some into another bank account or onto U.S. Series I Savings Bonds

Direct deposit my entire refund into a checking or other bank account

Mail me a paper check

Imagine yourself at retirement
Then select what you'd like to be doing and start saving for it today!

- family time
- traveling
- volunteering
- RVing
- fishing
- relaxing

Back Continue

Note. The screenshots are from TurboTax Freedom Edition [Software], 2015, Mountain View, CA: Intuit. Copyright 2015 by Intuit. Reprinted with permission. All rights reserved.

Appendix B. The four conditions in Experiment 2

Control, No Message

Imagine that you just filed your federal taxes for the year and are eligible for a \$1000 refund from the government.

How would you like to get your federal refund?

- Direct deposit to my bank account
- Mail me a paper check
- Split into multiple accounts.

Control + Emergency Savings Message

Imagine that you just filed your federal taxes for the year and are eligible for a \$1000 refund from the government.

No one knows what life has in store. In fact, 2 out of 3 people will have an unexpected financial emergency in 6 months or less. It pays to save!

BE PREPARED: Don't let life catch you by surprise. Save something today and have cash on hand when it's needed down the road.

How would you like to get your federal refund?

- Direct deposit to my bank account
- Mail me a paper check
- Split into multiple accounts.

Choice Architecture, No Message

Imagine that you just filed your federal taxes for the year and are eligible for a \$1000 refund from the government.

How would you like to get your federal refund?

- Direct deposit my entire refund into a savings account
- Direct deposit some of my refund into a savings account, and put some into another bank account
- Direct deposit my entire refund into a checking account
- Mail me a paper check

Choice Architecture + Emergency Savings Message

Imagine that you just filed your federal taxes for the year and are eligible for a \$1000 refund from the government.

No one knows what life has in store. In fact, 2 out of 3 people will have an unexpected financial emergency in 6 months or less. It pays to save!

BE PREPARED: Don't let life catch you by surprise. Save something today and have cash on hand when it's needed down the road.

How would you like to get your federal refund?

- Direct deposit my entire refund into a savings account
- Direct deposit some of my refund into a savings account, and put some into another bank account
- Direct deposit my entire refund into a checking account
- Mail me a paper check

Appendix C. The five conditions in Experiment 3

| CONTROL | CHOICE ARCHITECTURE |
|--|---|
| <p>How would you like to get your federal refund?</p> <ul style="list-style-type: none"> ○ Direct deposit to my bank account ○ Mail me a paper check ○ Split into multiple accounts | <p>How would you like to get your federal refund?</p> <ul style="list-style-type: none"> ○ Direct deposit my entire refund into a savings account ○ Direct deposit some of my refund into a savings account, and put some into another bank account ○ Direct deposit my entire refund into a checking account ○ Mail me a paper check |

| Savings Emphasized Once | Savings Emphasized Twice | Single-Click Savings |
|---|--|---|
| <p>How would you like to get your federal refund?</p> <ul style="list-style-type: none"> ○ Direct deposit my entire refund or some of my refund into a savings account ○ Direct deposit my entire refund into a checking account ○ Mail me a paper check | <p>How would you like to get your federal refund?</p> <ul style="list-style-type: none"> ○ Direct deposit my entire refund into one or more savings accounts ○ Direct deposit some of my refund into a savings account, and put some into another bank account ○ Direct deposit my entire refund into a checking account ○ Mail me a paper check | <p>How would you like to get your federal refund?</p> <ul style="list-style-type: none"> ○ Direct deposit my entire refund into a savings account ○ Direct deposit my entire refund or some of my refund into a checking account ○ Mail me a paper check |

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