



Communicating amounts in terms of commonly used budgeting periods increases intentions to claim government benefits

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Millions of eligible families did not claim their 2021 expanded child tax credit (CTC), collectively forgoing billions of dollars. To address this problem, many policymakers focused on increasing awareness of the CTC by highlighting that families could receive up to \$3,600 a year per child. However, people rarely budget on a yearly basis. We propose that communicating the CTC benefit amount in terms of commonly used budgeting periods (e.g., \$300 a month) instead of uncommonly used budgeting periods (e.g., \$3,600 a year) could increase interest in claiming the CTC. Two large-scale field experiments ($n = 16,696$) among low-income individuals support this account. Using common (vs. uncommon) budgeting periods to describe CTC benefit amounts increased CTC claiming intentions by 16 to 26%. A third large-scale field experiment ($n = 14,178$) demonstrated that encouraging people to consider different budgeting periods moderated these effects. These results suggest that communicating amounts in terms of common budgeting periods is a simple, cost-effective way to stimulate interest in claiming government benefits.

budgeting | income | government benefits | public policy

Child poverty in the United States increased from 15.7 to 17.5%, resulting in 1.2 million more children living in poverty from 2019 to 2020 (1). In response to this worrying trend, the Biden administration expanded the child tax credit (CTC), automatically sending most families with children direct unrestricted cash transfers. As a result, the CTC is credited with helping more than 65 million children (2).

However, as of December 2021, an estimated four million children and their families had not received their CTC (3). These were primarily low-income families who were not required to file taxes due to their low incomes. Therefore, the Internal Revenue Service (IRS) did not have the required information to send these families their payments automatically. Thus, the families who would benefit the most from the CTC payments were the least likely to receive them. Instead, these low-income families had to actively claim their CTC with the IRS.

Policymakers tried to persuade this low-income population to claim their CTC by increasing awareness of the program. Messaging campaigns often highlighted that families could receive up to \$3,600 a year per child. For example, a post from the White House Instagram page (Fig. 1) described the benefit amount on a yearly basis.

Prior research suggests that communicating amounts on a yearly basis might be an effective strategy for increasing interest in claiming the CTC. Expenses described on a yearly basis tend to be perceived as larger than the same amounts expressed across shorter time frames (4). Consistent with this prior finding, a recent examination of annuity payments shows that large lump sum payments are often perceived as larger than their monthly equivalents (5).

However, we propose that describing CTC amounts on a yearly basis might not be optimal. Instead, people may be more interested in income streams described in terms that match their budgeting periods. Therefore, we hypothesize that describing the CTC benefit amount in terms of commonly used budgeting periods (e.g., \$300 a month) instead of uncommonly used budgeting periods (e.g., \$3,600 a year) will increase interest in claiming the CTC.

Budgeting is a fundamental part of how people organize their financial lives. Over 65% of Americans report using a budget to help manage their finances (6). However, fewer than 9% of individuals in a nationally representative study of US households reported budgeting on a yearly basis (6). In contrast, over 85% report budgeting on a weekly or monthly basis. Consistent with the general population, lower-income populations also do not budget annually. Indeed, in a pre-registered pilot study we conducted among government benefit recipients ($n = 499$), only 0.6% reported budgeting on a yearly basis. Instead, most people reported budgeting on a weekly or monthly basis (28.3% and 39.5%, respectively) (see *SI Appendix* for more details).

Significance

In response to rising child poverty, in 2021, the Biden administration sent direct cash transfers to families through the expanded child tax credit (CTC). However, millions of low-income families did not automatically receive their CTC and needed to actively claim it. Policymakers have tried to reach out to this low-income population, highlighting that they could receive up to \$3,600 per year for each child. The current work demonstrates that this messaging strategy may be suboptimal. Using common budgeting periods (e.g., \$300 a month) to describe the CTC benefit amounts increased CTC claiming intentions relative to the status quo.

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Fig. 1. Instagram post advertising the CTC benefit amount on a yearly basis. Posted on the White House Instagram page (@whitehouse) on June 21, 2021.

Two related factors, the ease of budget creation and the timing of expenses, may help explain individuals' distaste for yearly budgeting. First, people have more difficulty creating yearly (vs. monthly) budgets (7). As a result, individuals have lower confidence in their yearly budget estimates than their monthly budget estimates. Second, people incur expenses on a frequent basis, with the average person incurring 70 expenses per month (8). The tendency to create budgets across relatively short periods (e.g., weekly or monthly vs. yearly) may reflect the complexity of people's financial lives.

We propose that people prefer income streams when they are described in terms that match their common budgeting periods, because this match may help them simplify, plan, and effectively manage their resources. In line with this notion, De La Rosa and Tully (9) demonstrated that matching the timing of people's income and expenses led people to report greater ease and confidence in predicting their resource sufficiency. In contrast, standard economic theory would suggest that people should prefer to receive their income upfront, regardless of their commonly used budgeting period.

As an initial exploration of these competing hypotheses, in the same pilot study mentioned above, participants were asked to think about earning \$60,000 a year. Participants were then asked whether they would prefer to receive \$60,000 on January 1 or \$5,000 on the first of every month for a year. Consistent with our theorizing, the vast majority of participants (84.8%) preferred to receive the monthly income stream (*SI Appendix*).

One explanation of this result could be that people perceive monthly income streams as larger than yearly income streams or large lump sums. Indeed, the perceived relative size of objective amounts can differ as a function of how they are described (4, 5). However, because all participants read that they were earning a \$60,000 a year salary in the experiment's instructions, differences in perceptions of the salary amount were unlikely to drive these preferences. Instead, consistent with the budgeting tendencies described above, 71.4% of those who preferred a monthly income stream noted that they chose the monthly income stream because it would help them budget better (*SI Appendix*).

We build on these insights to develop an intervention to increase applicants' interest in the CTC. Specifically, we hypothesize that describing the CTC benefit amount in terms of commonly used budgeting periods (e.g., \$300 a month) instead of the currently used uncommon budgeting period (\$3,600 a year) will increase people's intentions to claim the CTC.

We test this proposition across three large-scale field experiments among government benefit applicants. In these experiments, Code for America, a nonprofit aimed at improving how the government serves the public, randomly selected participants from an internal list of individuals likely to be eligible for the CTC. CTC eligibility was estimated based on participants' household income and composition as reported on a prior government benefit application. Participants received a personalized text message from Code for America, including their name, their expected CTC benefit amount, and a link to a Code for America website created to help their clients go through the CTC claiming process. These participants were used to receiving text messages from Code for America, as they had all previously applied for the Supplemental Nutrition Assistance Program using Code for America's services. Participants could start the CTC claiming process immediately after receiving the text message or contact Code for America with any questions. Thus, participants received helpful, targeted, and personalized text messages. We examine participants' CTC claiming intentions as measured by their likelihood of clicking on the CTC claims website link included in the text message. We compare the click-through rates when benefits are described using common budgeting periods (i.e., weekly or monthly) to the status quo in which benefits are described on a yearly basis (an uncommon budgeting period).

We first report two large-scale field experiments ($n = 16,696$), which find that describing benefit amounts in terms of common (vs. uncommon) budgeting periods increases CTC claiming intentions. Experiment 1 provides an initial demonstration of the main effect by comparing the efficacy of messages describing the CTC in terms of a common budgeting period (weekly) versus an uncommon budgeting period (yearly). Experiment 2 examines the generalizability of the effect found in experiment 1 by comparing a different common budgeting period, monthly, to the yearly control. Finally, experiment 3 ($n = 14,178$) provides evidence for the proposed conceptual model. It demonstrates that actively prompting people to consider less common budgeting periods moderates these effects. Taken together, these results suggest that describing government benefit amounts in terms that map onto commonly used budgeting periods is a simple, cost-effective way to stimulate interest in claiming government benefits.

Results

We pre-registered our hypotheses, study designs, and planned analyses for all studies in the paper. All data and pre-registrations are available on ResearchBox (ResearchBox 530; <https://researchbox.org/530>).

Experiment 1. Experiment 1 serves as an initial test of our hypothesis that describing benefit amounts in terms of common budgeting periods (vs. the uncommon yearly control) increases CTC claiming intentions. Participants were randomly assigned to one of two budgeting period conditions (common vs. control). In the common budgeting period condition, the benefit amount was described on a weekly basis (e.g., \$69 a week). In the control condition, the benefit amount was described on a yearly basis (e.g., \$3,600 a year). The specific amounts displayed varied as a function of the number and ages of children in each household. Messages

were successfully sent via text to a random sample of 8,448 US residents from Code for America's user base that were likely CTC eligible.

As predicted, binary logistic regressions revealed that participants were more likely to visit the website (common: 34.9% vs. control: 27.6%; $B = 0.34$, $SE = 0.05$, $z = 7.18$, $P < 0.001$) and click "File your simplified return now" (common: 16.6% vs. control: 12.2%; $B = 0.36$, $SE = 0.06$, $z = 5.76$, $P < 0.001$) in the common budgeting period condition compared to the control.

Experiment 2. Experiment 1 demonstrated that describing benefit amounts on a weekly basis (a common budgeting period) increased CTC claiming intentions compared to the control. Experiment 2 aims to expand the generalizability of this effect to another common budgeting period (monthly). Experiment 2 also examines whether the effects found in experiment 1 were a result of the specificity of the amount shown, instead of the budgeting period. For example, translating the yearly amounts into weekly amounts often resulted in nonround numbers (e.g., \$3,600 a year vs. \$69 a week). Prior research has demonstrated that people react differently to round vs. nonround numbers (10, 11). To account for this alternative explanation, in experiment 2, we compare responses to descriptions of the CTC amount communicated on a monthly basis, which always resulted in round numbers ending in zero (e.g., \$300 a month, \$550 a month).

Participants were randomly assigned to one of two budgeting period conditions (common vs. control). In the common budgeting period condition, the benefit amount was described on a monthly basis. In the control condition, the benefit amount was described on a yearly basis. Messages were successfully sent to 8,248 participants via text using the same sampling methodology as in experiment 1.

We replicated the findings from experiment 1. Binary logistic regressions revealed that participants were more likely to visit the website (common: 31.7% vs. control: 27.4%; $B = 0.21$, $SE = 0.05$, $z = 4.29$, $P < 0.001$) and click "File your simplified return now" (common: 14.8% vs. control: 11.9%; $B = 0.25$, $SE = 0.07$, $z = 3.82$, $P < 0.001$) in the common budgeting period condition compared to the control.

Experiment 3. Experiment 3 provides an additional test of the proposed conceptual model, which specifies that people are more responsive to income streams that match the budgeting period they are considering. Most people naturally consider budgets in weekly or monthly terms (6). Thus, describing the CTC benefit amount in these terms should increase their intentions to claim the CTC, as we found in experiments 1 and 2. This theorizing would further suggest that prompting individuals to actively consider the budgeting period that matches the description of the CTC benefit amount should moderate these effects. This moderation would provide additional evidence that people seek out income streams that help them budget effectively. Additionally, this moderation would make a number of alternative explanations less plausible.

Experiment 3 tests this conceptual model directly. The messages varied across two factors. First, we varied whether participants were encouraged to think about their budgets on a monthly or yearly basis (the budget period prompt). Second, we varied whether the CTC benefit amount was described on a monthly or yearly basis (the benefit amount description).

Participants were randomly assigned to one of four conditions in this 2×2 between-subject experiment design ("Hi [First Name], this is Gwen from GetCalFresh. Think about your [monthly/yearly] budget. You may have a child tax credit for up to \$[amount] per [month/year], which can go towards your

[monthly/yearly] budget. Visit [Link] to claim your tax credit."). The text in brackets varied as a function of the person receiving the message (name and amount) and their experimental condition (monthly vs. yearly). Messages were successfully sent to 14,178 participants via text.

As pre-registered, we analyzed participants' likelihood of clicking on the link to the website. Consistent with our theoretical model, logistic regressions revealed a significant interaction between the two factors (budget period prompt and benefit amount description) ($B = -0.07$, $SE = 0.02$, $z = -3.59$, $P < 0.001$). Specifically, when people were encouraged to think about their monthly budgets, describing the CTC on a monthly basis outperformed the yearly control (common: 25.5% vs. control: 22.0%; $B = 0.19$, $SE = 0.05$, $z = 3.52$, $P < 0.001$). This was not the case when people were encouraged to think about their yearly budgets (common: 19.4% vs. control: 21.0%; $B = -0.10$, $SE = 0.06$, $z = -1.66$, $P = 0.097$; Fig. 2).*

While there was no main effect of amount description ($B = 0.02$, $SE = 0.02$, $z = 1.13$, $P = 0.257$), there was a main effect of budget period prompt ($B = -0.10$, $SE = 0.02$, $z = -5.08$, $P < 0.001$). Prompting yearly budgets decreased CTC claiming intentions relative to prompting monthly budgets. Although this result is not central to our theorizing, it is consistent with the premise that people do not naturally think about their budgets on a yearly basis. Consequently, prompting individuals to consider an uncommon budgeting period may have led to disfluency, which, in turn, reduced their likelihood of clicking on the message link.

Discussion

This large-scale field investigation systematically examined the effect of describing benefit amounts across different budgeting periods on people's interest in claiming government benefits. Specifically, this work demonstrates that describing the CTC benefit amount in terms of common (vs. uncommon) budgeting periods increases interest in claiming the CTC. These findings suggest that describing benefit amounts in terms that match people's budgeting periods is a cheap and simple intervention that can be rapidly deployed to help low-income families.

These text-based interventions focused on encouraging people to visit the claiming website and ended once they clicked on the message link. Thus, the primary dependent variables focused on people's likelihood of visiting the website. Future research should examine whether this initial message intervention would lead more people to receive government benefits. In addition, an intervention that includes ongoing descriptions of the benefit amounts throughout the claiming process should also be tested.

The experiments in this work focused on varying income descriptions across weekly, monthly, and yearly budgeting periods. Future research should explore reactions to amounts described across other budgeting periods. For example, construal level theory would suggest that shorter time horizons would outperform longer time horizons since shorter periods are perceived as more concrete and less abstract (12). However, our theorizing would suggest that common budgeting periods like weekly or monthly would outperform uncommon budgeting periods such as daily or yearly. We encourage future researchers to explore these accounts further.

*In addition to our pre-registered analysis, we also explored how these factors impacted people's likelihood of clicking the "File your simplified return now" button. The pattern of results is consistent with moderation, although the interaction term did not reach statistical significance ($B = -0.03$, $SE = 0.03$, $z = -0.88$, $P = 0.381$).

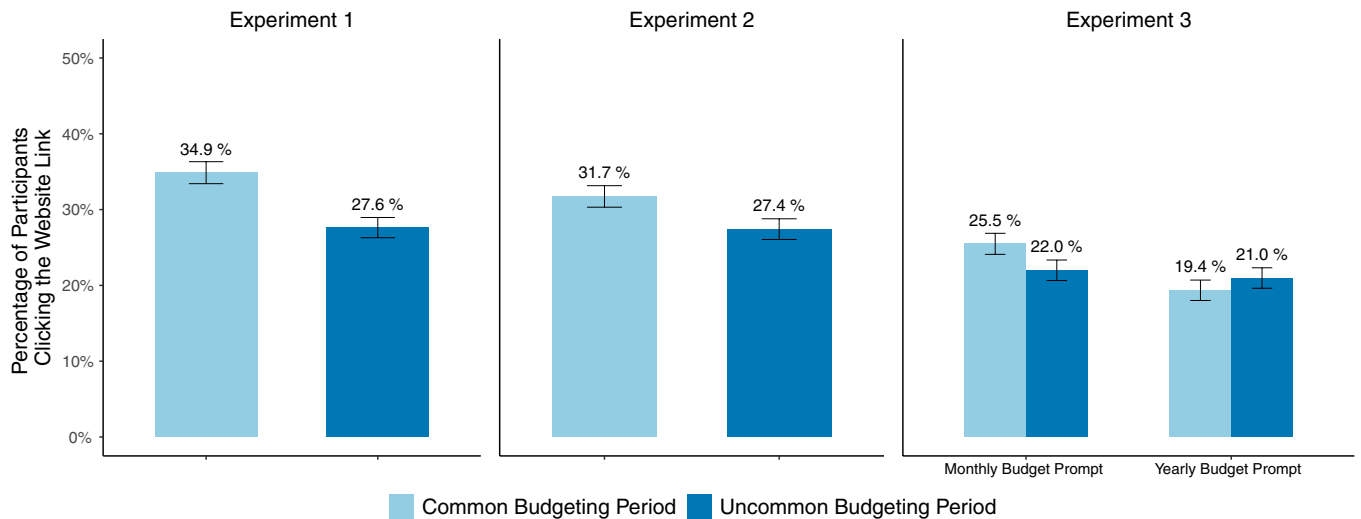


Fig. 2. Results from experiments 1 through 3. The graphs depict participants' likelihood, by condition, of clicking the website link. Experiment 1 operationalized common budgeting periods by describing the CTC in weekly terms. Experiments 2 and 3 operationalized common budgeting periods by describing the CTC in monthly terms. Experiments 1 through 3 operationalized uncommon budgeting periods by describing the CTC in annual terms. Errors bars represent the 95% CIs.

In addition to investigating a wider range of budgeting periods, it would be worthwhile to examine whether the dollar amounts of the CTC payments considered alter the effects demonstrated in this work. While we did not find evidence for this moderation across the three field studies, these effects may be moderated at certain amounts. Our theorizing rests on the premise that people prefer income streams that can help them budget and plan their financial resources effectively. Thus, there may be floor or ceiling effects such that, at extremely low or high amounts, people's budgeting concerns maybe too small or too large for similar interventions to have an impact.

All of the field experiments in this paper focused on measuring people's intentions to claim the CTC, a specific government benefit. This research may also be extended to analyze other types of government benefits. For example, roughly 20% of eligible individuals do not claim the Earned Income Tax Credit (EITC), one of the largest poverty alleviation programs in the United States (13). Researchers and policymakers have focused on increasing interest in claiming the EITC by raising awareness, highlighting a sense of urgency, or increasing the psychological ownership of these benefits (14, 15). Given that the EITC is currently described in annual terms, our work suggests an additional path to help increase take-up.

Beyond government benefits, communicating amounts in terms of common and uncommon budgeting periods might impact other important income streams. To gain insight into this possibility, we conducted a pre-registered follow-up study with 600 government benefit recipients. Participants were asked to think about \$15,000 either as a salary (i.e., regular income), government benefit, or lottery winning (i.e., windfall). Participants then selected whether they would want to receive the income on a yearly basis (\$15,000 on January 1) or on a monthly basis (\$1,250 on the first of every month for a year). Consistent with the pilot study, the majority of participants in each condition preferred to receive their income on a monthly versus a yearly basis. However, people's payment frequency preferences varied as a function of the type of income considered. The strong preference for a monthly income stream was the same across the salary and benefits conditions (81.1% vs. 81.3%, $B = 0.01$, $SE = 0.26$, $z = 0.06$, $P = 0.955$) but was significantly lower among those in the lottery condition (59.2%,

$B = -1.08$, $SE = 0.23$, $z = -4.71$, $P < 0.001$) (SI Appendix). The similarity in preferences for payment streams across the government benefits and salary conditions suggests that people may mentally account for government benefits as regular income rather than as a windfall gain. We encourage researchers to build on this work to understand how payment descriptions might impact other important financial decisions like retirement contributions and withdrawals from retirement accounts.

A core insight of this work is demonstrating the impact of helping people map income streams onto their budgets. Future research should examine alternative paths to facilitate this mapping. For example, researchers could explore communicating amounts in terms of expenses people frequently budget for, like rent or groceries (6). To the extent that rent and groceries are salient budget categories for most people, communicating amounts in terms of these commonly budgeted expenses might have similar effects to communicating amounts in terms of commonly used budgeting periods. Beyond income descriptions, an alternative path would be to analyze the impact of the actual payment frequency on people's consumption. Recent research has highlighted how payment frequency impacts people's overall spending and consumption patterns (9, 16). While the CTC is often described on a yearly basis, it is typically distributed on a monthly basis. As our pilot study showed, participants overwhelmingly preferred a monthly (vs. a yearly) payment frequency because they believed it would help them budget better. Thus, participants actively chose a more distributed income stream as a self-control mechanism to help them spend less and stick to their budgeting goals. Future research should explore how payment schedules impact people's adherence to their budgets.

This work demonstrates that describing income in terms of common (vs. uncommon) budgeting periods increases claiming intentions. However, the optimal income description may vary depending on a communicator's goal. For example, instead of aiming to increase claiming interest in a program, a policy maker might aim to increase perceptions of the size of the program to garner broad public support. To examine this possibility, we conducted a second pre-registered follow-up study ($n = 195$) where participants considered whether to describe a new benefits program as giving recipients \$300 a month or \$3,600 a year. Participants were randomly assigned to report either which income

description would increase their interest in claiming the benefit or which income description would make it seem like the government was giving away more money. Consistent with our theorizing and the results from the field experiments, 78.1% of participants responded that the monthly (vs. yearly) income description would increase their interest in claiming the benefit. In contrast, only 42.4% of participants responded that the monthly (vs. yearly) income description would make it seem as though the government was giving away more money (78.1% vs. 42.4%, $B = -1.58$, $SE = 0.32$, $z = -4.94$, $P < 0.001$) (*SI Appendix*). This finding suggests that policymakers should consider leveraging different messaging strategies when targeting different goals and audiences.

In conclusion, three large-scale field experiments demonstrated that using common (vs. uncommon) budgeting periods to describe government benefit amounts increased intentions to claim these benefits by 16 to 26%. The results from this simple and nearly costless intervention suggest that policymakers and researchers should consider how people naturally manage their finances when designing interventions to improve financial well-being.

Materials and Methods

All of the field experiments (experiments 1 through 3) were launched in October 2021. We collected click-through rates for a period of 7 d after the messages were sent. Anonymized data and pre-registrations for all experiments are available on ResearchBox (ResearchBox 530; <https://researchbox.org/530>).

Human Subject Protections. Before this project commenced, the field experiments were reviewed by the institutional review board (IRB) of the University of Chicago. This IRB determined that these experiments were exempt from the regulations at 45 CFR 46. All other experiments were approved by the IRB of the University of Chicago, and all subjects provided informed consent. No identifying information about experiment participants was ever shared with the researchers.

Experiment 1. Code for America randomly generated a pool of 10,000 participants from an internal list of likely CTC-eligible individuals who had recently used Code for America's GetCalFresh website. These participants had previously opted to receive text messages from Code for America and noted that English was their preferred language. Eligibility was estimated using participants' household income and composition. Specifically, selected participants had annual household incomes lower than \$12,000 and had at least one child in the household under the age of 6 y and no children above the age of 12 y. We focused on participants with annual incomes lower than \$12,000, as these households are typically not required to file taxes. Thus, it was likely that the IRS would not have the required information to automatically send CTC payments to these individuals. This eligibility criterion was applied across experiments 1 and 2. Due to bounced text messages, a total of 8,448 individuals received a message. Specifically, participants received one of two messages that were tailored to include their names and Code for America's dollar estimates of their CTC: 1) control message: "Hi [First Name], this is Gwen from GetCalFresh. You may have a child tax credit for up to \$[amount] per year, which can be used to pay for any expenses, including childcare. Visit [Link] to claim your tax credit of up to \$[amount] per year" or 2) common budgeting period message: "Hi [First Name], this is Gwen from GetCalFresh. You may have a child tax credit for up to \$[amount] per week, which can be used to pay for any expenses, including childcare. Visit [Link] to claim your tax credit of up to \$[amount] per

week." The expected CTC amount for each person was calculated based on the number and age of the children in the household. The expected CTC amounts ranged from \$3,600 to \$27,600 a year (95% of participants had an expected CTC amount of less than or equal to \$10,800). One week after the messages were sent, we compared, by condition, participants' likelihood of visiting the website and clicking the "File your simplified return now" button on the website. We focused on these two dependent variables, as these were the two dependent variables for which Code for America had the most reliable tracking measures. For this and all other experiments, Code for America could not track final IRS filing data.

Experiment 2. Code for America randomly generated a pool of 10,000 participants based on the same sampling methodology used in experiment 1. Due to bounced text messages, a total of 8,248 individuals received a message. Specifically, participants received one of two messages that were tailored to include their names and Code for America's dollar estimates of their CTC: 1) control message: "Hi [First Name], this is Gwen from GetCalFresh. You may have a child tax credit for up to \$[amount] per year, which can be used to pay for any expenses, including childcare. Visit [Link] to claim your tax credit of up to \$[amount] per year" or 2) common budgeting period message: "Hi [First Name], this is Gwen from GetCalFresh. You may have a child tax credit for up to \$[amount] per month, which can be used to pay for any expenses, including childcare. Visit [Link] to claim your tax credit of up to \$[amount] per month." The expected CTC amount for each person was calculated based on the number and age of the children in the household. The expected CTC amounts ranged from \$3,600 to \$36,600 a year (95% of participants had an expected CTC amount less than or equal to \$12,600). One week after the messages were sent, we compared, by condition, participants' likelihood of visiting the website and clicking the "File your simplified return now" button on the website.

Experiment 3. Code for America randomly generated a pool of 40,000 participants using a broader sampling frame than in experiments 1 and 2. In experiment 3, the sample consisted of those who preferred English and had at least one child in the household under 18 y of age, regardless of income. A total of 14,178 individuals received a message, due to a new spam filter implemented by cellphone carriers which blocked some of the messages. The messages varied two factors: 1) whether participants were encouraged to think about their budgets on a monthly or yearly basis and 2) whether the benefit amount was shown on a monthly or yearly basis. Specifically, participants received one of four messages that were tailored to include their names and Code for America's dollar estimates of their CTC: "Hi [First Name], this is Gwen from GetCalFresh. Think about your [monthly/yearly] budget. You may have a child tax credit for up to \$[amount] per [month/year], which can go towards your [monthly/yearly] budget. Visit [Link] to claim your tax credit." The expected CTC amount for each person was calculated based on the number and age of the children in the household. The expected CTC amounts ranged from \$3,000 to \$29,400 a year (95% of participants had an expected CTC amount of less than or equal to \$13,200). One week after the messages were sent, we compared, by condition, participants' likelihood of visiting the website. Due to an implementation error, 2,153 participants in this experiment were also messaged in prior experiments. These participants were randomized and counter balanced across the four conditions.

Data, Materials, and Software Availability. Anonymized data and pre-registrations for all experiments are available on ResearchBox (ResearchBox 530; <https://researchbox.org/530>) (17).

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