

Communicating the Implications of
How Long to Work and When to Claim Social Security Benefits

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Abstract

The decision of when to begin claiming SSA retirement benefits is part of an interconnected set of choices including how to draw down individual retirement savings and when to exit the workforce. Because the decision to begin claiming is often irrevocable, for retirees who begin claiming but then continue working or decide to return to work, an understanding of the applicable rules is extremely important. Retirees who claim before full retirement age and earn more than a specified (relatively low) income threshold receive reduced benefits prior to full retirement age (FRA) and increased benefits after FRA. Prior attempts to enhance understanding of the policy that results in these tradeoffs, termed the Retirement Earnings Test (RET), have not generally been successful. In four studies, we aim to increase understanding via visualizations. Study 1 assesses how well prospective retirees understand the impact on SSA benefits of continuing to work. Studies 2A, 2B, and 3 are randomized experiments that test whether alternative graphical ways to present these tradeoffs enhance understanding or affect labor decisions, using situations analogous to those of the RET (2A, 2B) or the RET itself (3). We find that a visualization that more clearly displays the tradeoff is able to improve understanding and application of RET policies. Prior research suggests that improvements in understanding of the social security system can generate large welfare gains; we would argue that improving understanding of RET can have similarly large effects. These tests of alternative visual presentations of the tradeoffs, informed by psychological research on how individuals understand income flows, can provide insight into how to improve RET communication.

A prospective retiree's choice of when to claim Social Security retirement benefits is part of an interconnected set of decisions including how to draw down individual retirement savings and when to exit the workforce. The joint decision of when to exit the workforce, thereby ending one source of income, and when to claim Social Security retirement benefits, thereby beginning a second source of income, is psychologically complicated in and of itself due to the intermingled nature of the two components. On top of that, the retirement earnings test (RET) adds an additional layer of complication. Retirees who claim before full retirement age and earn more than a specified (relatively low) income threshold receive reduced benefits prior to full retirement age (FRA) and increased benefits after FRA.

This general concept is currently conveyed in a mailing sent to prospective retirees¹, and a set of online resources detailing the tradeoffs between when to stop working and when to claim benefits to convey how these decisions are interconnected^{2,3}. However, many prospective retirees do not fully understand the implications of these joint decisions, given the relatively complex formulas and all of the uncertain factors related to this decision-making process (Brown 2012, Brown et al. 2013; Collins et al. 2016; Liebman & Luttmer 2015; Rabinovich & Perez-Arce 2019). Across those surveys, between 25% and 50% of prospective retirees are unaware that working after claiming prior to FRA would lower monthly benefits (temporarily). Of those who *are* aware that benefits (temporarily) decrease, only 30% to 40% recognize that benefits after FRA increase to account for that temporary decrease (vs. simply being a tax). Even if one understands that benefits decrease now and increase later, there remains ample room for misinterpreting the implications. The per-period decrease in benefits prior to FRA, for example,

¹ <https://www.ssa.gov/osss/prd/pdf/en/55-plus-insert.pdf>

² <https://www.ssa.gov/benefits/retirement/matrix.html>

³ <https://www.ssa.gov/policy/docs/program-explainers/retirement-earnings-test.html>

is typically larger than the per-period increase in benefits after FRA. In a variety of domains, it is difficult for people to comprehend the cumulative implications of varying resource flows (e.g., Booth Sweeney & Sterman 2000; Cronin, Gonzalez, & Sterman 2007; Goldstein, Herschfield, & Benartzi 2016; Shu, Zeithammer, & Payne 2016; Spiller, Reinholtz, & Maglio 2020).

Prior attempts to enhance understanding of the retirement earnings test have not been successful. Liebman and Luttmer (2015) found that a mailed brochure plus an online webinar, containing explanations of the RET plus vignettes describing real examples, had little effect on comprehension. They did not affect the proportion of potential retirees who knew that benefits would temporarily decrease, and they only marginally significantly increased the proportion of those who did know who also knew that benefits would later increase (by 6 percentage points). Brown et al. (2013) examined how providing information about the temporary decrease and subsequent increase, either as annuities or as lump sums, affected intended earnings streams. There were some slight differences in average intended annual earnings between 62 and FRA (\$200 total) and a slight delay in intended claiming age (under a month), but as the authors put it: “our efforts to find informational frames that can help individuals make more informed decisions have proved disappointing” (p21). Rabinovich and Perez-Arce (2019) considered different informational interventions, the least of which was simply “a short, simple description of the RET, with text based on language found in the Social Security Administration’s website.” Though these treatments showed some modest success (e.g., an increase from 69% to >75% using a measure from Brown et al. 2013 assessing a minimal level of understanding), the more in-depth treatments were no more successful than the brief description based on the website. While this prior work has focused on objective understanding, confidence and subjective feelings of understanding are only weakly to moderately correlated with objective understanding but are

important drivers of behavior and outcomes in their own right (Hadar, Sood, & Fox 2013; Parker et al. 2012). Thus, measuring subjective understanding is also important when measuring efficacy of financial communications.

In this paper, we seek to understand differences in both objective and subjective understanding based on existing SSA communications and aim to increase objective and subjective understanding via graphical information. Prior research has attempted to enhance objective understanding by providing numerical information about current and future streams of payments or by using descriptive concrete vignettes to portray changes in benefits. We focus on graphical interventions designed to enhance objective and subjective understanding of the RET.

First, we assess how well prospective retirees understand the impact on social security benefits of continuing to work and their confidence in understanding this issue. We then test whether alternative ways to present these tradeoffs can enhance objective or subjective understanding, using a set of randomized experiments. We focus on a number approaches to presenting these tradeoffs. In addition to the baseline text, these include (a) simple graphical presentation of sample benefit streams; (b) graphical presentation relative to a non-working base case, as presented in current SSA materials; (c) graphical presentation highlighting their actuarially fair properties (e.g., as shifted payments, rather than reduced and subsequently increased payments); and (d) as streams of total income (earned income + social security benefits) rather than SSA benefits in isolation. To the extent that many working-aged adults have a difficult time understanding basic mathematical concepts (e.g., compound interest; Peters et al., 2006), it is possible that these displays – which rely on visual analogies rather than the communication of numerical information – may more successfully communicate information to consumers.

Background on the Retirement Earnings Test

The Retirement Earnings Test (RET) has been part of Social Security's old age benefits (OASI) since the original design of the social security system in 1935. The test originally applied to income earned at any age after claiming, but was modified to only apply to earnings before age 75 (in 1950), and then before age 72 (in 1954), and then before age 70 (in 1983), and finally to its current structure of income earned before the retiree's full retirement age (enacted in 2000). The RET is often described as having both a tax feature, under which current benefits are reduced according to the earnings threshold and the withholding rate, and a transfer feature, under which future benefits are increased to offset the difference (Song & Manchester 2007). The impact of the RET has been studied extensively for its impact on labor supply (including hours worked and benefits claimed) of both retirees and pre-retirees (for example, Haider & Loughran 2006; Friedberg 2000; Song & Manchester 2007). The general perspective of much of this work is that if the RET is actuarially fair (i.e., current reductions are compensated by future increases at appropriate discount rates) and workers understand the rules, then labor supply should be unaffected by changes to the RET (Song & Manchester 2007; Gruber & Orszag 1999). However, the empirical evidence from prior changes in RET rules suggests that lowering the age at which the RET applies (for example, from 70 to 66 in 2000) does lead to higher labor force participation and higher earnings among higher income older workers, which then carries forward to long-term effects on labor force participation by retirees (Song & Manchester 2007). Extending this idea, Gustman and Steinmeier (2004) suggest that complete elimination of the RET would lead to an overall increase in the employment of older workers.

An important assumption in the predicted impact of changes to RET, as noted above, is that workers and retirees understand the system. In particular, it requires that they understand the

tradeoff between lower current benefits (the tax feature) and higher future benefits (the transfer feature). Some research has been done to investigate workers' understanding of the RET and the findings suggest that many workers do not understand these tradeoffs. For example, Rabinovich and Perez-Arce (2019) run an online experiment to test knowledge of the RET. They test several alternative presentation formats to see whether more complete information and/or visual tools can increase understanding, and they find that the simplest explanation of the RET had the biggest impact on knowledge; neither providing additional detail nor providing a visual tool increased comprehension. Liebman and Luttmer (2015) also test an intervention (including a web tutorial) to improve understanding of overall understanding of the social security system with the goal of reducing personally suboptimal labor supply decisions (defined here as early withdrawal from the labor force). Their intervention (1) highlights the respondent's longevity likelihoods, (2) provides a vignette about another retiree, and (3) highlights returns to delayed claiming.⁴ In a follow-up survey of the information recipients they find that those who received the extra information are more likely to continue working than those in the control condition, but they recognize that the effect may be the result of social norms ("delaying claiming is beneficial") rather than higher understanding. In fact, follow-up questions about the earnings test specifically found no increase in understanding among the intervention recipients.

What are the impacts of a lack of understanding about the RET? Gruber and Orszag (1999) consider this question, and generate a list of costs and benefits for removing the RET entirely. While an entirely rational approach to the RET suggests that retiree labor supply should remain unchanged if the RET is removed, and empirical results might suggest that removal would lead to higher work force participation by older workers (e.g., Gustman & Steinmeier

⁴ Note that, unlike the current project, they do not provide any additional explanation of the RET.

2004), Gruber and Orszag (1999) argue that workers are better off by retaining the RET at the current full retirement age (also see Olsen & Romig 2013). The rationale is that removing the RET might encourage vulnerable workers to leave the labor force and begin claiming SSA benefits even earlier than they currently do, which could lead to more extreme poverty in old age due to the permanently lower benefit amounts. In any case, helping retirees to better understand the tradeoffs inherent in the RET is crucial to helping them make more informed decisions about how much to continue working while also starting to collect retirement benefits.

Individuals' Understanding of Resource Flows Over Time

Among the difficulty of understanding aspects of the rules underlying the RET, one of the aspects most likely to affect workers' understanding is the tradeoff between decreased current benefits and increased future benefits. From a psychological perspective, understanding this type of temporal tradeoff can be difficult for a variety of reasons. One issue is based on a combination of temporal discounting and loss aversion; future income gains are often discounted more heavily than current income losses (e.g., Thaler & Benartzi 2004). Another issue is in the aggregation of the different types of impacts. For example, the per-period decrease in benefits prior to the full retirement age as a result of the RET, which persists for only a few years, is often larger than the per-period increase in benefits that come later, which persist for a longer period. Because individuals can struggle to convert per-period outcomes into a cumulative total, the actual differences between the decreases and increases may not be clear.

Even if one understands that benefits decrease now and increase later, there remains ample room for misinterpreting the implications. The per-period decrease in benefits prior to FRA, for example, is typically larger than the per-period increase in benefits after FRA. In a variety of domains, it is difficult for people to comprehend the cumulative implications of

varying resource flows. For example, even highly trained business school students have difficulty understanding complex systems that involve both inflows and outflows, usually due to a failure to appreciate how inflows can accumulate over time (Booth Sweeney & Sterman 2000; Cronin, Gonzalez, & Sterman 2007). This difficulty in understanding how an income flow translates to a cumulative total is especially problematic in retirement-related decisions, where income levels can accumulate over decades. Individuals, for instance, cannot easily translate a lump-sum retirement balance into an equivalent stream of monthly income (Goldstein, Hershfield, & Benartzi, 2016). This difficulty in translating between monthly sums and cumulative amounts can lead to overvaluation of lump sums (and undervaluation of monthly amounts) in some conditions. Similarly, participants evaluating annuity income streams also tend to undervalue the cumulative impact of a long stream of monthly income payments (Shu, Zeithammer, & Payne 2016). Such undervaluation only begins to improve when individuals are shown tables that clearly state the cumulative amounts over various timeframes. Finally, Spiller, Reinholtz, and Maglio (2020) show that the same information presented as either a flow (e.g., monthly income amounts) or a stock (e.g., cumulative total wealth) can lead to significantly different judgments as well as wide differences in future forecasts.

Given that presentation of resource flow data, such as decreases and increase in benefits over time, can lead to very different judgments and predictions, we sought out to test how different visual presentations of RET-driven changes might affect both understanding and perception of the RET itself. We begin by collecting baseline information about workers' awareness and understanding of RET (objective knowledge, applied knowledge, and subjective knowledge) in Study 1 using standard textual materials. The results of this study offer some early insight into which elements of the descriptions improve understanding. In our next studies, we

step outside of the Social Security benefits domain to test labor decisions in a scenario designed to closely mimic the tradeoffs of the RET. In these studies, we provide participants with an income tradeoff scenario presented under a variety of visual information formats and then measure as our dependent variables either how long (Study 2A) or how much (Study 2B) they would want to work according to those tradeoffs. We do find that different types of visual depictions of the tradeoff between sooner and later benefits can affect these labor decisions. Finally, in Study 3, we apply these same visuals to the RET scenario and again find that a visual that more clearly displays the tradeoff is able to improve understanding and application of RET policies.

Studies

Prior to conducting the quantitative studies covered in detail below, we began by conducting ten qualitative interviews with people close to retirement age who had varying levels of familiarity with the RET policy. Though we do not present formal results from those interviews in this paper, insights gleaned from that process shaped our approach to subsequent study designs and data collection by illuminating which aspects of the policy people found most important, most confusing, or most relevant to their retirement decision making. Building on these interviews, we conducted a total of four quantitative studies. Study 1 measured knowledge of RET before and after exposure to written policy descriptions. Studies 2A and 2B explored how graphical presentation of information about tradeoffs between earning and benefits payments influenced choices and understanding of RET-like scenarios. Study 3 tested the impact of graphical presentation of RET-specific information.

Study 1: RET understanding survey

The first quantitative study aimed to measure current levels of awareness and understanding of the RET policy, capture the impact of current written descriptions of the policy on both objective and applied knowledge, and explore the role of reported subjective understanding.

Method and Procedure

We recruited 503 participants from Amazon's Mechanical Turk (AMT). Using CloudResearch targeted sampling capabilities, we only made the survey available to workers between the ages of 40 and 67 with ten or more years of work experience (based on CloudResearch panel data)⁵.

The full set of relevant measures is available in Appendix 2. The first part of the survey included measures to capture prospective retirees' general knowledge of retirement policies and specific knowledge about RET, using a set of questions loosely based on Liebman and Luttmer (2012) that assessed awareness of whether a person is allowed to work and claim, the earnings limit rules and numbers when a person is above or below FRA, and the impact on benefits when a beneficiary earns over the limit, including whether any lost benefits are recovered later (this will be referred to as *pre-test objective knowledge*).

Next, participants were randomized to see one of five descriptions that explained the details of RET, including specifics about the earnings limits and details about how benefits are reduced before FRA and recovered later (see Appendix 2 for full descriptions). Three of these

⁵ Note: this targeted sampling method is not 100% accurate. In our final sample, 5 participants who completed the survey were not in the age range of 40-67 (or didn't type in their birth year correctly). We also asked participants about how many years they had worked and paid Social Security taxes, and 20 participants indicated less than 10 years of eligible working years (note, however, that this question is likely more specific than the question used by CloudResearch for targeting).

descriptions were pulled directly from SSA webpages or materials: the “How Work Affects Your Benefits” pamphlet (*HWAB* condition), the “Program Explainer” webpage for RET (*Program Explainer* condition), and the “Exempt Amounts Under The Earnings Test” webpage (*Exempt Amounts* condition). The fourth condition was based on an AARP webpage about working and claiming (*AARP* condition). The final description was written by the authors (*UCLA* condition). Importantly, all conditions were informationally equivalent and covered the main aspects of RET⁶. We then captured participants’ self-reported awareness of the policy topic and/or its name, asked if they had any specific questions or points of confusion about the description, and gathered reactions to the name of the policy (see Appendix 1 for analysis of the questions about the policy’s name).

Next, to measure the impact of each description, participants answered a series of applied knowledge questions about a hypothetical retiree (based on questions included in Brown et al. (2013); moving forward, we refer to results from this section as *applied knowledge*). This section included questions about what would happen to the retiree’s benefits while working, whether there was an amount he could earn without his benefits being affected, and how his benefits at 68 would compare to his original benefits before he began working and to his benefits at 65 after he stopped working. After this, participants answered additional question about their confidence in answering these questions (*scenario-specific understanding*). This section was followed by the same series of objective knowledge questions as asked at the beginning of the survey (*post-test objective knowledge*) and a set of four questions assessing participants’ confidence in understanding the rules and trade-offs of RET (*subjective understanding*).

⁶ The AARP and UCLA materials contained a small typo regarding the amount of the earnings limit in the year that a person reaches FRA (\$50,250 instead of \$50,520). Participants in these conditions received a follow-up message through CloudResearch with a correction.

The final section of the survey captured information about participants' own retirement benefits claiming situations and demographics before providing participants with links to SSA materials they could use to learn more about RET.

Analyses

The pre-test objective knowledge, applied knowledge, and post-test objective knowledge questions all had objectively correct answers. The survey design included branching logic that ensured participants who answered a given question incorrectly would not be asked any related follow-up questions in that section. As specified in our preregistration⁷, each question in these three sections was scored for accuracy, where participants who answered correctly received a 1, those who answered incorrectly received a 0, and those who either did not answer or who were not shown the question were marked as missing. In the sections that follow, reported percentages of correct answers are calculated using the entire sample as the base (i.e., 503), though as noted above, this base includes participants who were not shown some questions based on incorrect answers earlier in the flow of questions. For each of the three knowledge sections, we created a composite measure that assigned each participant a total score based on the number of correct answers for that section (out of 7 for pre- and post-test objective knowledge; out of 5 for applied knowledge). Finally, we averaged together the four subjective understanding measures ($\alpha = .92$).

Results

Awareness. At the beginning of the survey, 23% of participants reported awareness of the RET policy in a question that only mentioned it by name and did not provide any context. A later question tells a slightly different story: after reading a description of the policy, participants were asked about whether they were (a) aware of the policy but not its specific name (10%), (b)

⁷ https://aspredicted.org/DS2_GMC

aware of the policy and its name (58%), or (c) not aware of the policy or the name (31%). Thus, after exposure to an in-depth description of RET, few participants indicated specific awareness of both the policy's name and its details, although most reported knowing that such a policy existed but were not aware of the name. It is possible the drop-off in specific name-recognition between these two questions may be partly due to participants thinking of a different policy or rule when asked about the "retirement earnings test." Given confusion about the policy effects reported below and evaluations of the policy name as reported in Appendix 1, future studies might examine what inferences people make about the policy based on its label.

Knowledge. The following sections focus mostly on the composite measures of objective and applied knowledge. Full results of the number and percentage of participants who answered each individual question correctly as well as composite scores can be found in Tables 1, 2, and 3 below.

Objective Knowledge. Before participants received any information on the details of RET, the average score on the objective knowledge section was 2.91 out of 7 ($SD = 1.51$). A large majority (92%) recognized that it is allowed for a person to earn income while claiming retirement benefits from Social Security. 71% recognized that there is a limit to the amount a person can earn when younger than full retirement age before benefits are affected; however, only 3% wrote in an exactly-correct answer when asked about the specifics of this limit; an additional 12% wrote in a limit amount within \$1,000 of the correct answer. Two-thirds (67%) knew that benefits would be reduced for a person earning over the limit, but only 17% knew the exact dollar amount calculation for this reduction. Finally, only 14% recognized that any benefit reductions are recovered later. Overall, while many participants are aware that Social Security allows beneficiaries to work while claiming and that benefits are reduced if the beneficiary earns

over a limit, very few are aware of the specifics of the policy. Most importantly, a large majority of participants do not realize that lost benefits are recouped.

Scores on the objective knowledge questions generally improved after participants were shown a description of the policy: the average score in the post-test was 4.83 out of 7 ($SD = 1.61$). 78% of participants improved at least one point on this composite measure, and proportions of correct answers increased for all seven individual questions, most by more than 20% (see Table 1). The increase in objective knowledge from pre- to post-test was significant ($b = 1.91$, $t(502) = 23.67$, $p < .001$). Of note, even after receiving the policy description, only two-thirds (66%) of participants correctly answered the question about whether benefits are recovered later. This aspect of the policy is very important, as it ensures that any reduction in benefits is actuarially fair, and these results suggest that written descriptions in general, or at least those currently used in several real contexts, may not be effectively communicating this point.

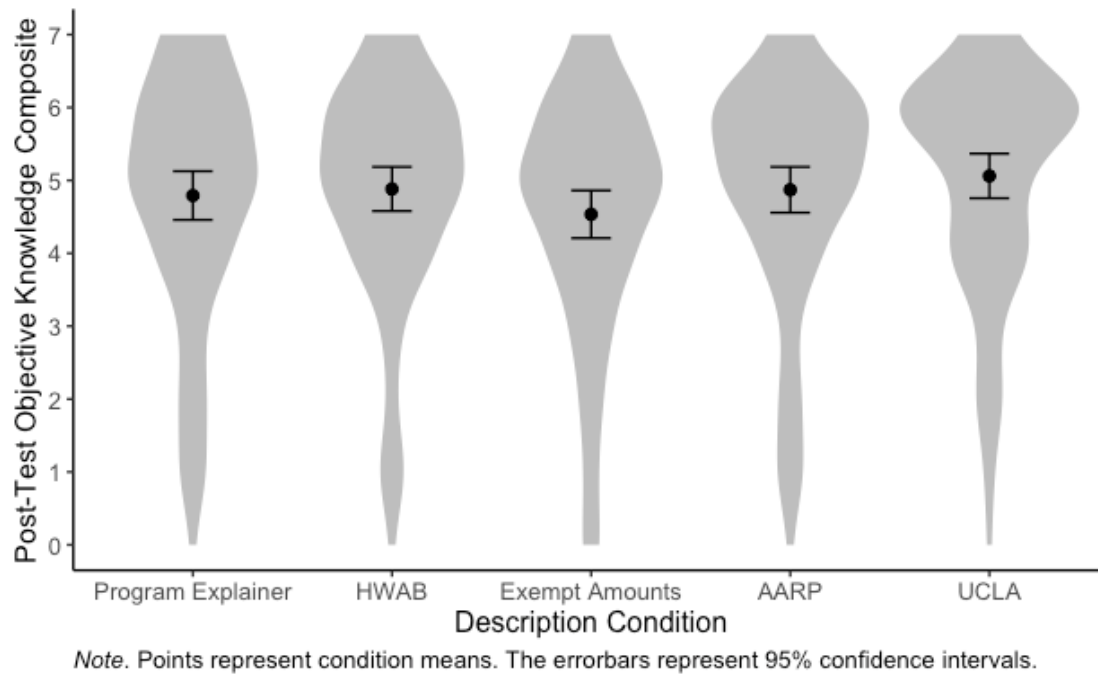
An omnibus F-test revealed no statistically significant differences across description conditions on composite scores in the post-test objective knowledge section ($F(4, 498) = 1.423$, $p = .225$). This indicates the different descriptions did not lead to significantly different levels of knowledge after viewing the information. A similar omnibus test that analyzed the *change* in objective knowledge scores from pre- to post- was marginally significant ($F(4, 498) = 2.383$, $p = .051$). Together, these results suggest that while providing a description improved knowledge scores, there was no evidence of reliable differences across the specific materials used.

Table 1*Objective Knowledge Questions, Pre- and Post-test*

Question	Pre-test						Post-test					
	Correct		Incorrect		Missing		Correct		Incorrect		Missing	
	%	n	%	n	%	n	%	n	%	n	%	n
Working and Claiming Limit	92%	461	9%	42	-	-	98%	495	2%	8	-	-
Past FRA Limit	30%	151	62%	310	8%	42	47%	236	51%	259	2%	8
Under FRA Limit	71%	355	21%	106	8%	42	91%	456	8%	39	2%	8
Amount	2%	10	69%	345	29%	148	22%	112	68%	343	10%	48
Defer	67%	337	4%	18	29%	148	88%	443	3%	13	9%	47
Defer Amount	17%	84	50%	253	33%	166	70%	354	18%	89	12%	60
Recoup	14%	68	53%	269	33%	166	66%	332	22%	111	12%	60

Table 2*Objective Knowledge composite scores, pre-to-post*

Composite Score	Pre-Test		Post-Test	
	%	n	%	n
0	8%	42	2%	8
1	11%	55	5%	23
2	13%	64	5%	24
3	34%	173	5%	25
4	20%	102	17%	83
5	10%	49	27%	137
6	3%	15	31%	156
7	1%	3	10%	47

Figure 1*Objective Knowledge composite scores, by condition*

Applied Knowledge. The average composite score for the applied knowledge section was 2.92 out of 5 ($SD = 1.36$). These questions followed the description of the policy and asked participants about details of the application of RET to a hypothetical scenario involving “Nate.” Nate was a beneficiary with \$1,000 monthly benefits who decided to go back to work for a year while age 63, earning \$30,000. Most (80%) recognized that Nate’s benefits would be reduced during the year that he worked, and about three-fourths (76%) correctly answered that there was a certain level of income where this reduction would not happen. 22% were able to exactly reproduce this earnings limit; 42% were able to reproduce it within \$1,000. Finally, a majority of participants identified that Nate’s benefits at age 68 would be higher than his original benefit of \$1,000 (65%) and about half (49%) recognized that his benefits at 68 would be higher than his benefits at 65 (after he stopped working, but before he reached FRA). See Table 3.

Table 3*Applied Knowledge Questions*

Applied Knowledge Questions	Correct		Incorrect		Missing	
	%	n	%	n	%	n
Working Benefits	79.7%	401	20.1%	101	0.2%	1
Threshold	76.1%	383	11.9%	60	11.9%	60
Threshold Amount	21.7%	109	54.1%	272	24.3%	122
After FRA vs. Original Amount	65.4%	329	34.6%	174	-	-
After FRA vs. Benefit at 65	49.3%	248	16.1%	81	34.6%	174

An omnibus F-test revealed statistically significant differences across conditions on the applied knowledge composite ($F(4, 498) = 3.46, p < .01$). A post-hoc Scheffe's test (to conservatively account for multiple comparisons; see Klockars & Sax, 1986; Scheffe, 1953) revealed a single significant difference between two conditions based on existing SSA materials: participants in the Program Explainer condition had a higher score on this composite than those in the Exempt Amounts condition (adjusted $p = .035$). See Figure 2.

Subjective Understanding. The following sections detail findings related to the four-question composite of subjective understanding and the single-question measure of confidence in applied knowledge answers.

Subjective Understanding Composite. Using the four-question composite, average reported subjective understanding of RET was 3.43 on a scale of 1–5 ($SD = 0.92$). We conducted regression analyses to explore whether subjective understanding predicted post-test objective knowledge and applied knowledge. We found that higher subjective understanding was significantly associated with higher scores on the post-test objective knowledge composite ($b = 0.51, t(501) = 6.76, p < .001$) as well as the applied knowledge composite ($b = 0.34, t(501) = 5.21, p < .001$).

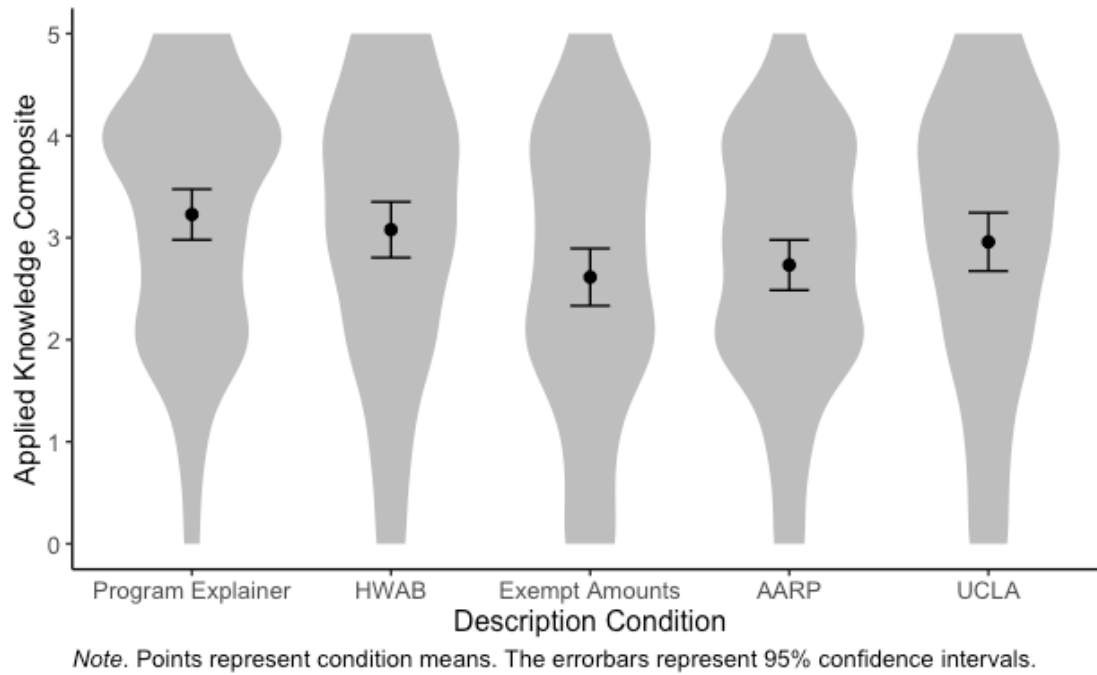
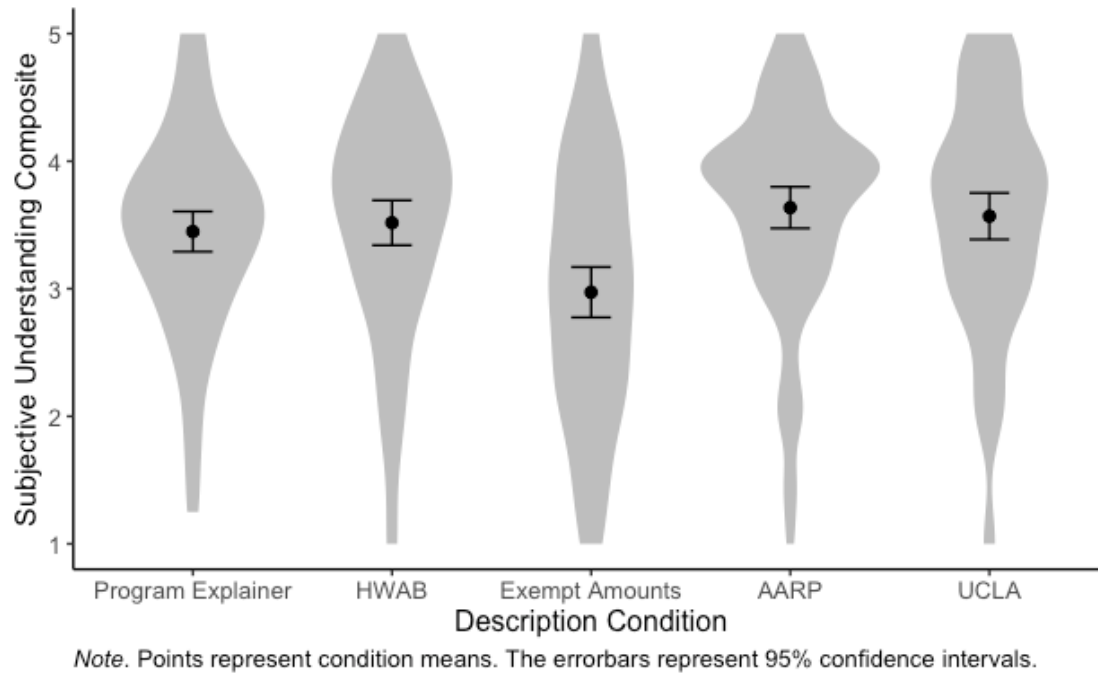
Figure 2*Applied Knowledge Composite by Condition*

Figure 3 provides the mean values on this composite for each description condition. An omnibus F-test revealed statistically significant differences in subjective understanding across conditions ($F(4, 498) = 8.9, p < .001$). A follow-up Scheffe's Test revealed that participants in the Exempt Amounts condition reported significantly lower subjective understanding than participants in each of the other conditions (all adjusted $ps < .01$).

Figure 3*Subjective Understanding by Condition*

Scenario-Specific Subjective Understanding. Results from the specific question that asked participants about their confidence in answering the applied knowledge questions are similar to results for the more general subjective understanding composite. The average rating on this specific question was 3.82 ($SD = 1.07$) on a scale from 1–5, and higher ratings on this measure significantly predicted higher composite scores on the applied knowledge section ($b = 0.28$, $t(501) = 5.09$, $p < .001$). As with the composite, an omnibus F-test analyzing whether ratings on this measure differed by description condition was significant ($F(4, 498) = 3.31$, $p = .01$). A follow-up Scheffe’s test indicated that ratings from those in the Exempt Amounts condition were significantly lower than ratings from those in the UCLA condition (adjusted $p = .03$).

Discussion

In Study 1, we found that while there are generally low levels of unaided awareness and understanding of RET, written descriptions that include details about the policy are effective in increasing objective knowledge. In addition, we found that participants' reported subjective understanding of the details of RET was a significant predictor of performance on knowledge questions. This hints that clarity of communication may be an issue, suggesting that informational interventions designed with this in mind may be especially effective. Finally, while the slight variation in these written descriptions did not produce many significant differences across conditions, the Exempt Amounts version, based on existing SSA materials, emerged as one where participants reliably reported lower levels of subjective understanding. Of note, this was the only condition that used the terminology "normal retirement age" (or "NRA") to refer to the age at which a beneficiary is eligible for their full benefit. Though we cannot definitively conclude that this factor contributed to the observed differences, this suggests that consistency in terminology (e.g., consistently using "full retirement age" rather than sometimes "full" and sometimes "normal") may aid subjective understanding.

Studies 2A and 2B: Income Distribution Surveys

Study 1 revealed an opportunity to enhance prospective retirees' understanding of the implications of the RET. Studies 2A and 2B were designed to aid our understanding of how various descriptions and visuals impacted people's understanding and choices in a context with changes in income and benefits over time. The scenarios presented to participants in these studies were designed to mimic many of the important aspects of RET, including trade-offs between continuing to work and collecting temporarily reduced benefits, complexities in how lost benefits are recovered in the future, and choices about how long and how much to continue

working. The two studies had similar experimental designs, though they differed in terms of the specific dependent variable of interest, as is outlined in the sections that follow.

Study 2A: Income Distribution and Work Duration Decisions

Study 2A was designed to test how the presentation of information about a situation that involves working and collecting benefits impacted participants' decisions about how *long* to continue working.

Methods and Procedure

We recruited $N = 609$ participants from AMT, using CloudResearch to target sampling to non-students (meaning those who were currently employed, retired, or unemployed were eligible)⁸. We crafted a hypothetical situation designed to mimic important aspects of the RET, presenting participants with the following description:

We'd like you to imagine that you currently work in the fossil fuels industry, earning \$3,500 per month (after taxes) while working full-time (40 hours per week). As the government pushes for a switch to clean energy, the company that you work for will be closing down at the end of 2021. The government is offering a program to train all affected employees for a new job in the clean energy industry. The government plans to offer a stipend and benefits for those participating in the program and will guarantee a job for all those who complete it. The training program will be taking place in 2022, but the government will begin providing stipend payments and benefits next month.

On the following page, participants read about how they had been given the option to stop working immediately or work part-time for any number of the remaining months in 2021 (the survey was run at the end of June 2021, meaning there were 6 months remaining in the

⁸ Our final sample included 3 participants who reported being students.

year). If they chose not to work, participants were told they would receive \$3,250 in benefits per month. However, during any months they chose to work part-time, participants were informed that benefits would be reduced by 40% and that any reduction in payments would be made up for in 2022.

The study included six conditions that manipulated the structure and content of information provided about the benefits deferral due to working (see Appendix 3A for full wording/display of each condition). In the *control* condition, participants were given details about the work options available, how benefits would be reduced due to working, and how benefits would be repaid later (text-only). In the *emphasis* condition, participants read the same text as the control condition, just with the two sentences about benefits repayment pulled into a separate paragraph and formatted in bold text.

There were four additional graph conditions, in which participants saw the same text as the emphasis condition with a set of graphs that showed the monthly benefit amounts under three example scenarios: not working at all, working part-time for three of the six months, and working the maximum possible amount (i.e., part-time for all six months). The *plain bar graph* condition simply showed participants graphs with bars that corresponded to monthly benefit amounts under each scenario. The *line graph* condition showed the same information as lines rather than bars. The *shifted bar graph* condition was like the plain bar graph condition, except it included shading that emphasized how reductions in benefits from working months were deferred to later months. Finally, the *income bar graph* condition showed bar graphs that included monthly payment amounts in addition to any income that would be made in working months. Thus, all the conditions provided the same information about benefits amounts, but it was displayed differently.

After viewing the information about the situation, participants were asked to indicate whether they would choose to work part-time or not work at all for each of the remaining six months in 2021. The dependent variable of interest was the number of months participants chose to work part-time (on a scale of 0–6).

After making their choice, participants were then asked to imagine that they had two coworkers who made different decisions: one who decided to quit working as early as possible and another who decided to work part-time all six months. Based on this set-up, participants were asked for their perceptions regarding which coworker would receive a larger total payout from the government (using a five-point scale where the middle answer was correct; see Appendix 3A for the full question and answer options). This measure was used to capture the proportion of correct answers (i.e., how many people understood that the two coworkers get the same total amount). However, because this measure was on a five-point scale, it can also be analyzed as a continuous measure where deviation from the midpoint indicates that misunderstandings were systematically skewed in a specific direction (in terms of thinking one specific coworker would get a larger total payout). We also included questions to assess subjective numeracy, objective numeracy, and financial well-being (using the Consumer Financial Protection Bureau’s scale⁹).

Analyses

We preregistered our main analyses prior to beginning data collection¹⁰. In the preregistration, we specified five pairwise comparisons of interest across experimental conditions: control vs. emphasis, emphasis vs. plain bar graph, plain bar graph vs. shifted bar

⁹ Exploratory analyses indicated that none of these scales qualified any results in important ways, so for purposes of clearer exposition, we exclude them from further discussion.

¹⁰ https://aspredicted.org/T45_G6X

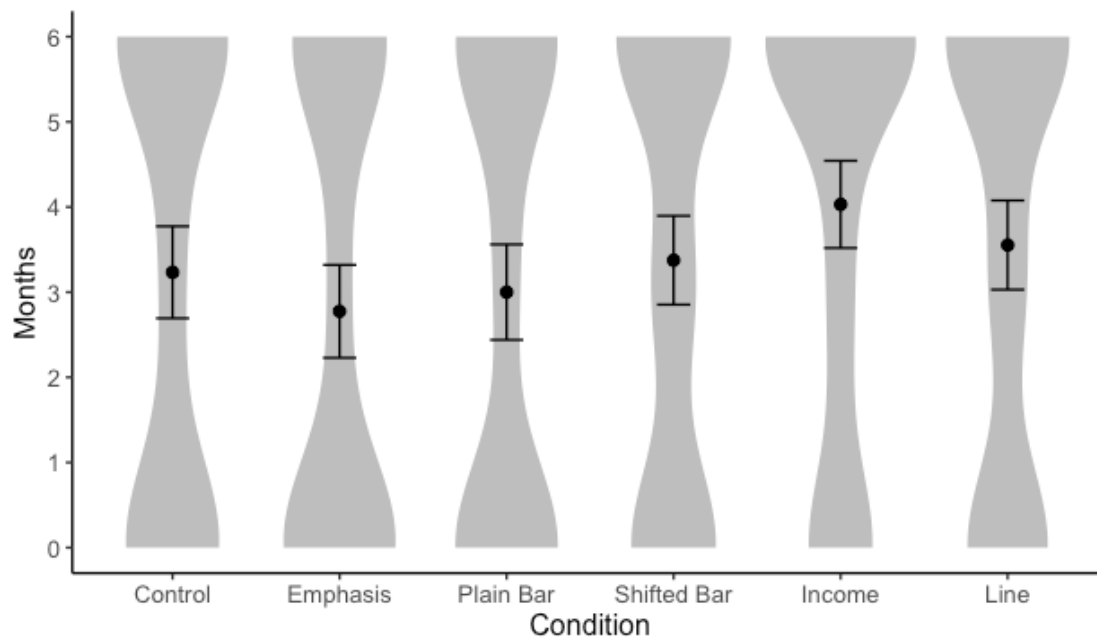
graph, plain bar graph vs. line graph, and plain bar graph vs. income bar graph. To reiterate, there were three main dependent variables of interest: the choice that participants made regarding how many months to work, the proportion of correct answers about which of two friends would collect more benefits (where correct answers were coded as 1 and incorrect answers were coded as 0), and the direction of misunderstanding in terms of thinking one coworker would receive more than the other (where we recoded the variable such that positive numbers correspond with thinking that quitting leads to a larger payout, and negative numbers correspond with thinking that working leads to a larger payout).

Results

Work Choice. On average, participants chose to work part-time for 3.33 months out of 6 ($SD = 2.73$), though a majority of participants chose to work either zero months (36%) or six months (46%). Table 4 provides the full distribution of choices and Figure 4 provides details on the means (and 95% confidence intervals) for this variable by experimental condition: those in the income condition chose to work the most while those in the emphasis condition chose to work the least. In a regression that utilized contrast codes to test our planned pairwise comparisons, the omnibus F-test indicated that the conditions significantly differed from one another ($F(5, 603) = 2.63, p = .023$). However, among the preregistered contrasts, only the comparison between the plain bar graph condition and the income bar graph condition was significant: those in the income condition (who saw a depiction of their earned income along with their benefits) chose to work more than those who saw the plain bar chart ($b = 1.03, t(603) = 2.67, p = .008$). A post-hoc Scheffe's test also revealed that the difference between the income condition and the emphasis condition was marginally significant after adjustment (adjusted $p = .059$).

Table 4*Months of work chosen across all conditions*

Months	%	n
0	36%	218
1	2%	11
2	2%	10
3	9%	57
4	3%	20
5	2%	15
6	46%	278

Figure 4*Months of work chosen, by condition*

Note. Points represent condition means. The errorbars represent 95% confidence intervals.

Understanding (accuracy). Across all conditions, only 22% gave the correct answer when asked about which coworker would collect more in total benefits. An omnibus test did not reveal significant differences across conditions ($\chi^2(5) = 7.81, p = .167$). Somewhat suggestively as can be seen in Table 5, those in the shifted bar graph condition were most likely to get this

question correct, with 31% answering correctly; our planned contrast of shifted bar vs. plain bar indicated this difference was marginally statistically significant ($b = 0.56, z = 1.71, p = .087$).

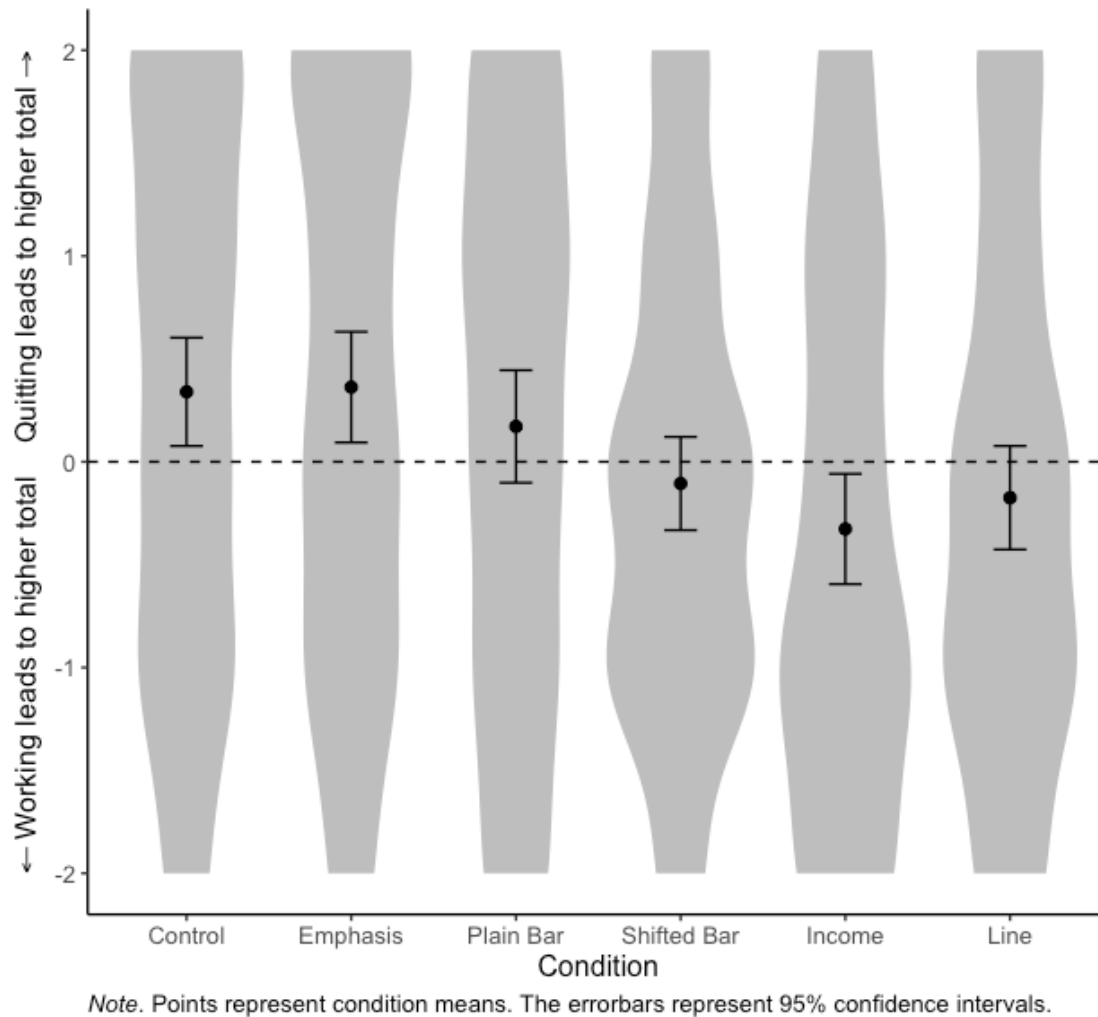
Table 5

Understanding accuracy, by condition

Description Condition	Correct		Incorrect	
	%	n	%	n
Control	19%	20	81%	83
Emphasis	22%	22	78%	80
Plain Bar	20%	20	80%	79
Shifted Bar	31%	32	69%	72
Income	16%	16	84%	82
Line	26%	27	74%	76

Understanding (directional). Across all conditions, the average directional response was 0.05 ($SD = 1.33$). Although this response is close to 0 on average, such a result could be the result of having relatively equal numbers of participants providing incorrect answers on either side of zero. Thus, for the analyses that follow, we focus on comparing results across conditions to see if some have a higher or lower mean than others.

As is evident in Figure 5, beliefs in some conditions were positive on average while others were negative (omnibus $F(5, 603) = 4.83, p < .001$). A regression that tested the preregistered comparisons of interest revealed that relative to participants who saw the plain bar graph, participants who saw the income bar graph were more likely to think that working led to greater total benefits from the government ($b = 0.50, t(603) = 2.66, p = .008$). Post-hoc Scheffe's tests revealed that means in the income bar graph condition were also significantly greater than the control ($M = 0.34; p = .025$) and emphasis conditions ($M = 0.36; p = .018$).

Figure 5*Understanding direction, by condition*

In an exploratory analysis, we examined the correlation of this variable with the number of months that people chose to work. This correlation was negative and significant ($r = -.35$, $t(607) = -9.11$, $p < .001$), indicating that participants who thought that quitting would lead to a larger payout tended to work less while those who thought that working would lead to a larger payout tended to work more. These results suggest that people's choices for themselves may have been influenced by (mis)perceptions about which route would lead to a larger total benefit amount, though as noted, this analysis was exploratory and correlational.

Study 2B: Income Distribution and Work Intensity Decisions

Study 2B was designed to be almost identical to Study 2A. Rather than participants deciding how *long* to work at a fixed rate as in Study 2A, in Study 2B participants decided how *much* to work over a fixed period of time. Both decision margins are relevant for beneficiaries who may be subject to the RET.

Methods and Procedure

We recruited 603 participants from AMT, as in Study 2A using CloudResearch to recruit non-students and ensure that no participants who completed Study 2A could complete Study 2B¹¹. The introduction to the hypothetical scenario in this study was identical to what was used in Study 2A, as was the starting benefits amount (\$3,250). On the following page, however, participants faced a different set of options. They were told that they had the choice of whether they wanted to quit work or continue working at a fixed rate for the next six months (ranging from 10 hours per week up to 40 hours per week in 10-hour increments). In this situation, the amount that benefits would be reduced while working depended on the amount of work: working 10, 20, 30, or 40 hours per week meant a 20%, 40%, 60%, or 80% reduction in benefits, respectively. In this study, participants' choices for their desired work intensity were held constant across the six-month period.

Study 2B used the same presentation formats as Study 2A (control, emphasis, plain bar graph, shifted bar graph, line graph, and income graph). As in Study 2A, all graph conditions included three graphs, though with some differences due to different structure of the situation: one graph showed the benefits amount if the person chose to quit, the second showed the benefits amounts if the person chose to work 20 hours per week (the middle option), and the third showed

¹¹ Our final sample included 4 participants who indicated student status.

the benefits amounts if the person chose to work the maximum amount per week (40 hours per week).

The dependent variable of interest was the intensity of work that participants selected (recoded such that the variable captured the number of hours per week the participants chose: 0, 10, 20, 30, or 40). After participants indicated what they would choose, they read a scenario about two coworkers very similar to the question used in Study 2A. The question asked about whether one of two coworkers who made opposite choices would receive more benefits in total than the other (where one chose to quit and the other chose to work 40 hours per week). As in Study 2A, this measure captures both accuracy of understanding (that the two coworkers end up with the same amount of money) and the direction of misunderstanding (if answers are skewed towards thinking one coworker would end up with more).

Analyses

The preregistration for this study was very similar to that of Study 2A, as were the analyses¹². We focused the preregistration and our main analyses on the same five pairwise comparisons of interest (control vs. emphasis, emphasis vs. plain bar graph, plain bar graph vs. shifted bar graph, plain bar graph vs. line graph, and plain bar graph vs. income bar graph). We also conducted Scheffé's tests as follow-up exploratory analyses to look for other significant differences across conditions. As in Study 2A, we had three dependent variables of interest: the intensity of work that participants chose, the proportion of correct answers to the question about the two imaginary coworkers, and the direction of misunderstanding about which coworker would collect more in total from the government. These latter two outcomes were recoded in the same way as in Study 2A.

¹² https://aspredicted.org/LPQ_5TG

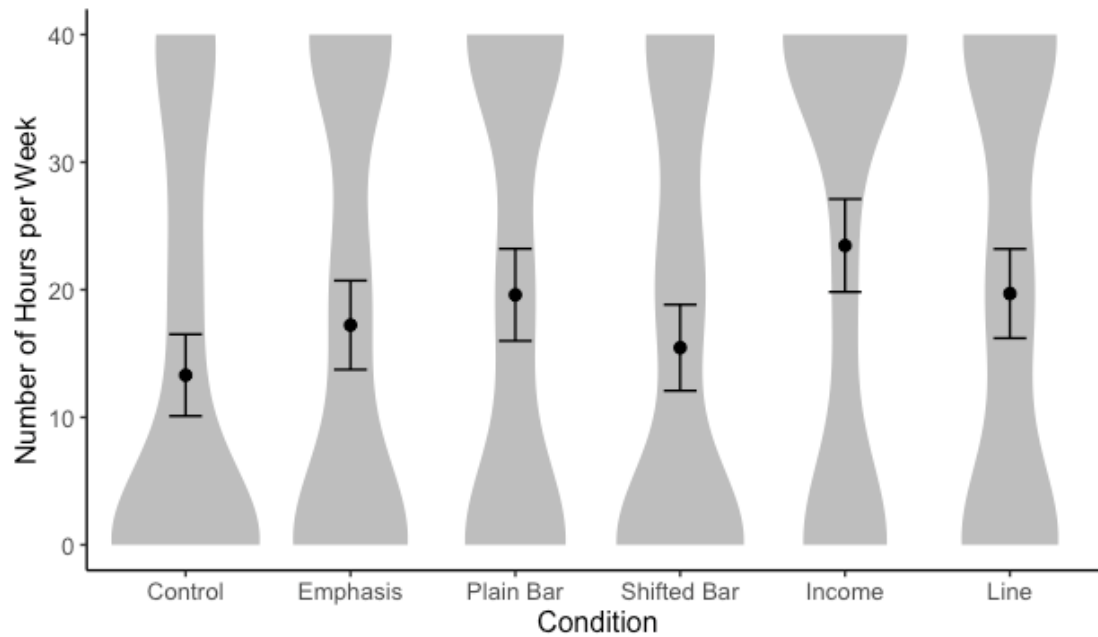
Results

Work choice. The average work intensity was 18 hours per week ($SD = 18$), though as in Study 2A, the majority were at either of the extremes: 43% chose to quit work completely, and 34% chose to work 40 hours per week. The proportion of choices are given in Table 6 and the means for each experimental condition are displayed in Figure 6. Those in the control condition chose to work the least, and similar to Study 2A, those in the income bar graph chose to work the most. None of the contrasts in a regression testing our planned comparisons were significant; however, an omnibus F-test was significant ($F(5, 597) = 4.24, p < .001$) indicating there were differences across conditions. A follow-up Scheffe's test revealed that those in the income condition chose to work at a significantly higher intensity than those in the control condition (adjusted $p = .005$). The difference between the shifted bar graph and income bar graph conditions was marginally significant (adjusted $p = .066$), where those who saw the income bar graphs chose to work more.

Table 6

Work Intensity

Work Intensity	%	n
0 hours per week	43%	261
10 hours per week	5%	29
20 hours per week	14%	83
30 hours per week	4%	23
40 hours per week	34%	207

Figure 6*Work Intensity, by condition*

Note. Points represent condition means. The errorbars represent 95% confidence intervals.

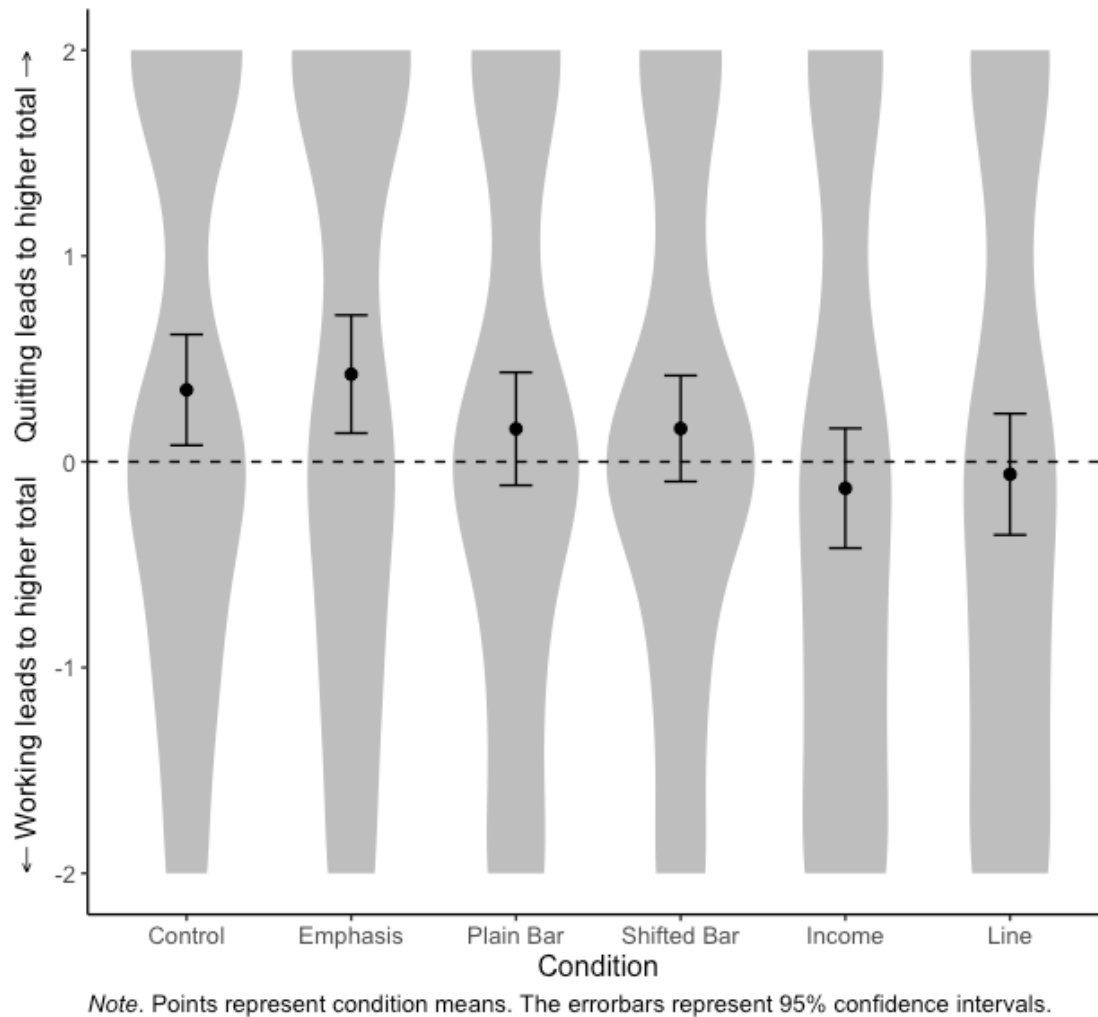
Understanding (accuracy). Similar to Study 2A, not many people correctly answered the comprehension question about two imaginary coworkers: across all conditions, only 32% correctly identified that the two coworkers would receive the same total amount. Table 7 shows the proportion correct by condition. The six conditions statistically significantly differed from one another ($\chi^2(5) = 11.09, p = .050$). Again, those in the shifted bar graph condition were most likely to get the question correct, but a logistic regression model reveals that none of the planned comparisons are significant at the $p < .05$ threshold. The differences in proportions between the plain bar graph condition and the emphasis condition ($b = -0.58, z = -1.87, p = .062$) as well as the plain bar graph condition and the income condition ($b = -0.53, z = -1.71, p = .087$) are each marginally significant.

Table 7*Understanding accuracy, by condition*

Description Condition	Correct		Incorrect	
	%	n	%	n
Control	34%	35	66%	68
Emphasis	25%	25	75%	76
Plain Bar	37%	37	63%	63
Shifted Bar	41%	41	59%	58
Income	26%	26	74%	75
Line	26%	26	74%	73

Understanding (direction). The average response on this variable was 0.15 (SD = 1.42) across all conditions. As in Study 2A, values closer to zero may not necessarily reflect greater accuracy, so the following analyses focus on differences across conditions. Figure 7 provides the means on this variable for each condition. In this experiment, none of the comparisons of interest that we preregistered are significant. While an omnibus F-test indicates a significant difference between conditions ($F(5,597) = 2.42, p = 0.035$), a follow-up Scheffé's test does not highlight any significant pairwise comparisons after correction. The general trend across conditions is notably consistent with that in Study 2A.

As in Study 2A, we conducted an exploratory correlational analysis to investigate the relationship of this variable with the participants' chosen work intensity. This correlation was negative and significant ($r = -.24, t(601) = -6.13, p < .001$), where those who chose to work more also tended to think working more would lead to a larger payout. Again, this suggests that participants' own decisions about the work intensity they would choose may have been related to their understanding of which option would lead to the larger total benefits amount.

Figure 7*Understanding direction, by condition***Discussion**

In Studies 2A and 2B, we explored how different types of graphical displays of deferring benefits impacted people's choices and understanding of a situation modeled to be very similar to RET. In general, results from both studies suggest that graphs that included the income a person would earn from continuing to work led participants to prefer working more and to (erroneously) think that doing so would mean a larger total payout from the government (compared to some other conditions). In addition, those who saw graphs that emphasized the

shift from now to later were most likely to correctly answer a question about the equivalence of the payout regardless of work in both studies, though the differences were not statistically significant.

Study 3: Graphical Depictions of RET

Study 3 tested the different types of visualizations used in Studies 2A and 2B in the RET context, allowing us to test the impact of these graphical displays on knowledge and understanding of the policy.

Methods and Procedure

We recruited 1,006 participants from AMT, using CloudResearch sampling capabilities to target individuals between 40 and 67 years of age¹³. The survey began by asking the same general knowledge questions about Social Security retirement policies as used in Study 1. Next, participants were asked to indicate their Social Security eligibility and current claiming situations, and those who were either already claiming or would be eligible were asked about approximately how much income they would expect to be earning in the 3 years around claiming (with three options: less than \$30,000, between \$30,000 and \$50,000, and more than \$50,000). These coarse estimates were then used to roughly tailor which set of examples participants would see in the following section of the survey, where they were shown a written description of the RET (using the same wording from the *How Work Affects Your Benefits* condition in Study 1) and a set of examples.

The manipulation in this study centered on the dollar amounts and display of examples that participants were shown along with the written description of RET. There were five display conditions, including four conditions analogous to those in Studies 2A and 2B, but excluding the

¹³ It was not feasible to recruit a unique sample of this size using the work experience filter in addition to the age filter. 93 participants in our final sample indicated an age in the survey that was outside of the targeted range.

line graph and emphasis conditions. Study 3 included a *control* condition, in which participants were given a written-out example of a hypothetical beneficiary's benefits if she chose to claim without working (no RET) vs. if she chose to claim while working and earning a specified income (with RET), and four graph conditions that were numerically identical to the control condition but used different types of graphs to visualize benefits under the two scenarios.

Three of these graph conditions were similar to stimuli used in Studies 2A and 2B: a *plain bar graph* condition showed participants two bar graphs with the benefits amounts for the two situations (i.e., claiming while not working, or claiming while working with a specified income), a *shifted bar graph* condition emphasized the shift of benefits from pre-FRA years to post-FRA years under the RET in the second graph, and an *income bar graph* condition included income in the second graph. The final graph condition, which we will call the *SSA* condition, included one graph designed to mimic the visual included on the SSA Program Explainer webpage¹⁴ along with text boxes next to the graph explaining key concepts as appear on the webpage. In addition to these conditions, we also used participants' answers to the expected income question to roughly tailor the examples provided, creating three versions of each visual condition (low income/low benefits amount, middle income/middle benefits amount, and high income/high benefits amount). Participants who indicated they would not be eligible to receive SSA retirement benefits were randomized into one of these three income conditions. Appendix 4 contains more details on each of these experimental conditions.

After viewing the description and examples, participants were asked about their prior awareness of the policy and its topic and about whether they had any questions based on the

¹⁴ <https://www.ssa.gov/policy/docs/program-explainers/retirement-earnings-test.html>. This graph, a version of what is sometimes referred to a "lollipop chart", depicts benefits while working relative to benefits while not working in a single chart.

description. Next, they responded to six of the *objective knowledge* questions from Study 1. We chose to not include the first question from our first study about whether a person can work and claim at the same time as nearly everyone (98%) answered this correctly in the post-test of Study 1. After this, we asked a set of three *scenario knowledge* questions about two hypothetical friends with similar work histories and benefits amounts, where one friend decided to work while claiming for a few years while under FRA and the other did not. These questions asked participants about whose benefits would be larger while one friend was working, whose benefits would be larger after the friends reached FRA, and who would receive more in total from SSA in the long term.

After these questions, participants answered the same four *subjective knowledge* questions as used in Study 1. The final sections of the survey contained questions to capture participants' retirement situations and demographic information. As in Study 1, the survey ended with a page that provided participants with links to a number of SSA materials on the RET.

Analyses

We preregistered main analyses on AsPredicted.org before we began collecting data¹⁵. In line with the preregistered plan, we collapsed results across all income versions and focused our analyses on differences between description conditions. As in Study 1, we scored each objective knowledge and applied knowledge question for accuracy (1 = correct, 0 = incorrect, NA = missing due to non-response or survey branching logic resulting from an incorrect answer from a previous related question; for logistic regression, we treat missing responses as incorrect, as the vast majority were due to survey branching logic resulting from a previous related question that implies an incorrect answer to the target question). We also created composite scores for each

¹⁵ https://aspredicted.org/NYZ_3R8

knowledge section (out of 6 for objective knowledge and out of 3 for scenario knowledge, where missing scores were counted as incorrect). The third scenario knowledge question that we asked addressed whether one friend would receive more from SSA in the long-term. This question did not include all the details necessary for exact calculations (e.g., how long each friend lived). While we have coded as correct the option specifying that both friends would get roughly the same amount, it is important to note that the question may not have been fine-grained enough to accurately capture understanding of this aspect of RET. We also calculated average subjective understanding for each participant ($\alpha = .91$).

Results

Awareness. Awareness results were similar to those of Study 1. 27% of participants indicated that they were aware of the retirement earnings test when asked at the beginning of the survey. After reading through the description and examples, 13% reported awareness of the policy and name, while an additional 57% said they were aware of the policy's concept but did not know the specific name. As in Study 1, there are generally high levels of awareness that Social Security has rules about earning and claiming, but lower levels of recognition when the policy is only mentioned by name.

Knowledge. The sections that follow detail the results for the objective knowledge, scenario knowledge, and subjective knowledge sections of the survey, all of which came after participants read through the RET description and examples.

Objective Knowledge. The first objective knowledge question asked participants about whether there was an earnings limit for beneficiaries above FRA, and slightly less than half of participants (46%) chose the right answer. However, a large majority of participants (90%) correctly identified that there was an earnings limit for those earning and claiming while under

FRA, though only 8% could reproduce this dollar amount exactly. Further analyses of the amounts that participants wrote in for this question reveal that an additional 35% of participants wrote in a number within \$1,000 of the correct answer of \$18,960. 84% recognized that a person's benefits would be reduced if they earned over the limit, and half (50%) correctly wrote in the dollar amount (\$2) used by Social Security in the benefits reduction calculation. Finally, 57% of the total sample identified that lost benefits are recovered later. Details regarding proportions correct, incorrect, and missing are given in Table 8. Exploratory analyses of this final question – regarding whether lost benefits are recovered later – revealed that a significantly smaller proportion of participants in the plain bar graph condition correctly answered this question as compared to the shifted bar graph ($b = 0.67, z = 3.31, p < .001$) and SSA graph conditions ($b = 0.41, z = 2.03, p = .042$).

The average composite score was 3.36 out of 6 ($SD = 1.58$). As shown in Figure 8, those in the shifted bar graph condition earned the highest composite scores while those in the plain bar condition earned the lowest. This difference was statistically significant ($b = 0.34, t(1001) = 2.17, p = .030$). An omnibus F-test was not significant ($F(4, 1001) = 1.22, p = .300$), so we did not explore any further comparisons across conditions.

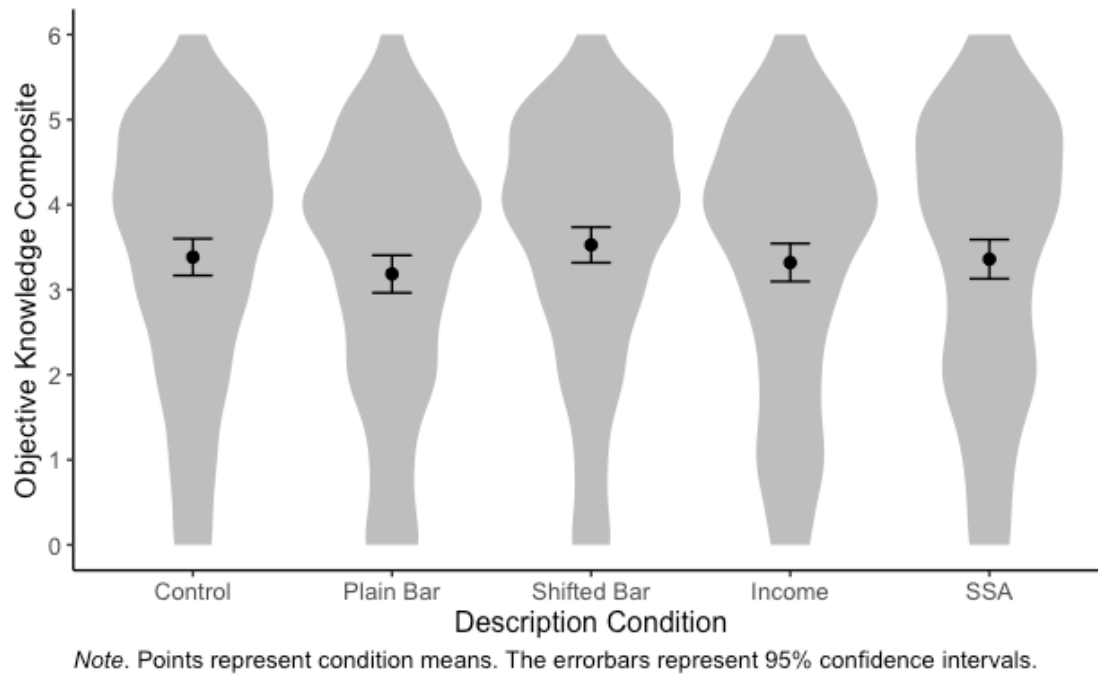
Table 8

Objective knowledge questions

Question	Correct		Incorrect		Missing	
	%	n	%	n	%	n
Limit Past FRA	45.7%	460	54.2%	545	0.1%	1
Limit Under FRA	90.1%	906	9.8%	99	0.1%	1
Limit Amount	8.3%	84	81.7%	822	9.9%	100
Defer	83.8%	843	6.3%	63	9.9%	100
Defer Amount	50.4%	507	33.4%	336	16.2%	163
Recoup	57.3%	576	26.5%	267	16.2%	163

Figure 8

Objective knowledge composite, by condition



Scenario Knowledge. Three-fourths of participants (74%) correctly identified that while one hypothetical friend was working and claiming, the other hypothetical friend would be receiving higher retirement benefits from SSA. 59% recognized that the friend who worked would receive higher benefits from SSA after reaching FRA. Only 40% answered that the two friends' total amount of benefits received would be roughly equal in the long-term. Further analysis of the answers to this question revealed that the plurality of participants (45%) thought that the friend who worked would receive more in total over his lifetime. A logistic regression revealed that a significantly larger proportion of participants in the shifted bar graph condition answered this final question correctly when compared to the plain bar graph condition ($b = 0.41$, $z = 2.02$, $p = .044$).

The average composite score for the scenario knowledge questions was 1.73 out of 3 ($SD = 0.89$), and Figure 9 shows the means and 95% confidence intervals for each experimental

condition. The omnibus F-test indicated the conditions differed from one another ($F(4, 1001) = 2.39, p = .049$). Based on our preregistered contrasts, the difference between the plain bar graph and shifted bar graph conditions was significant ($b = 0.20, t(1001) = 2.26, p = .024$).

Additionally, the difference between the plain bar graph and SSA conditions was marginally significant ($b = 0.15, t(1001) = 1.74, p = .08$).

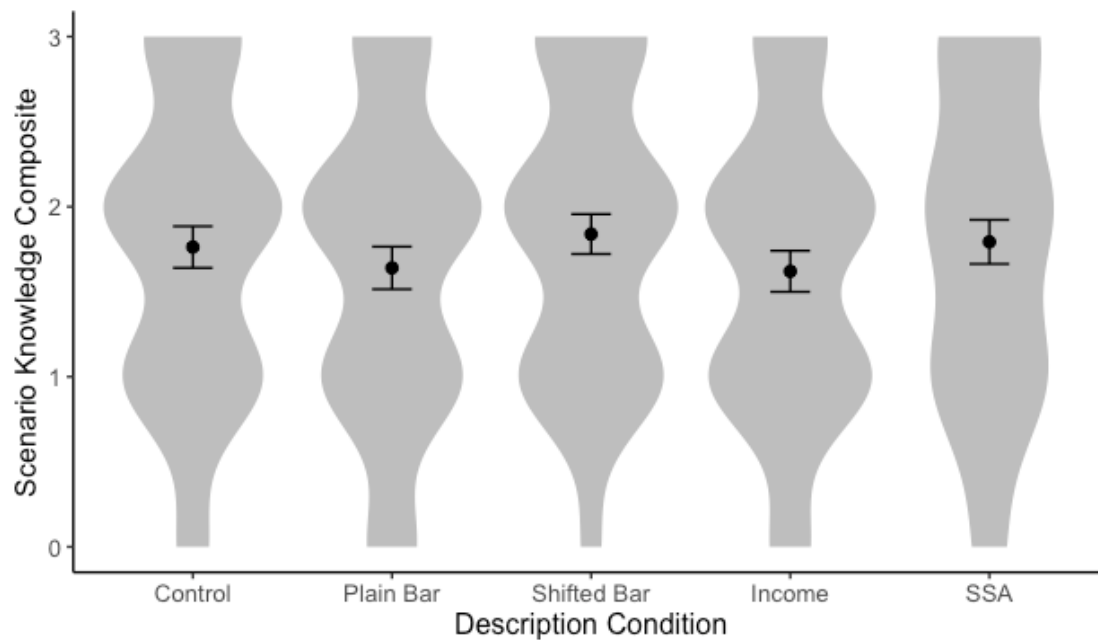
Table 9

Scenario knowledge questions

Question	Correct		Incorrect	
	%	n	%	n
Who gets higher benefits while working?	74%	743	26%	263
Who gets higher benefits after FRA?	59%	591	41%	415
Who gets more in the long-term?	41%	408	59%	598

Figure 9

Scenario knowledge composite, by condition

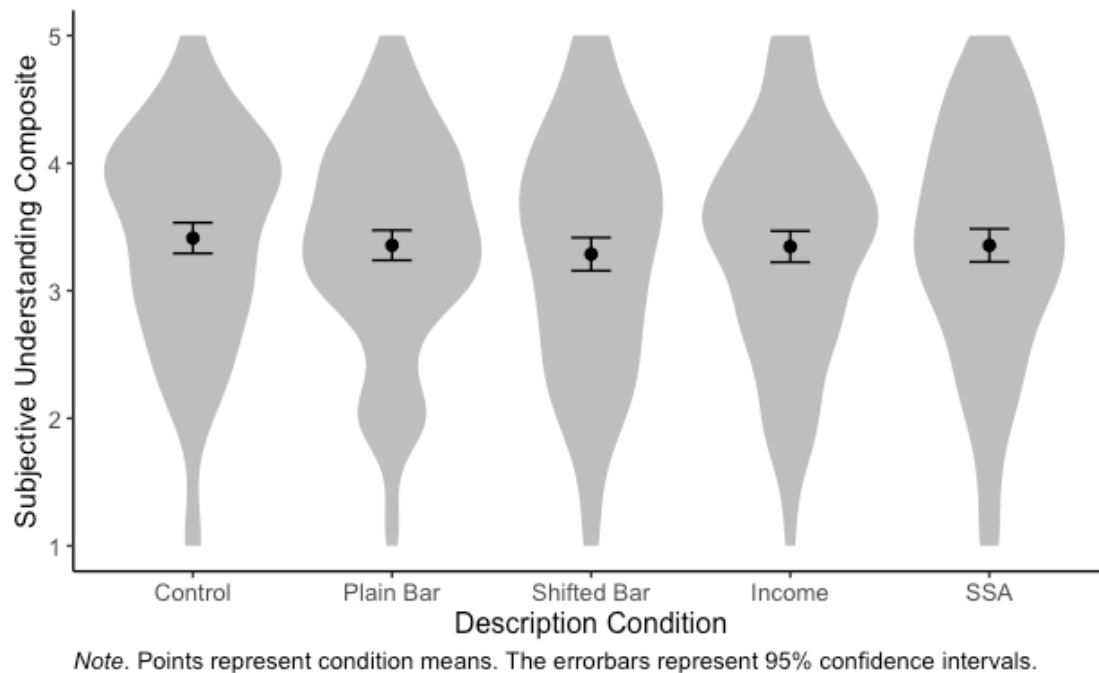


Note. Points represent condition means. The errorbars represent 95% confidence intervals.

Subjective Understanding. As in Study 1, we averaged together the four subjective understanding questions. The mean for this new composite variable was 3.35 on a scale of 1–5 ($SD = 0.89$). As shown in Figure 10, none of the planned comparisons for this outcome measure were significant, nor was the omnibus F-test ($F(4, 1001) = 0.051, p = .729$). These results suggest that the differences in the display of examples (in text or in graphical form) did not contribute to any significant differences in subjective understanding. Similar to Study 1, subjective understanding was a significant predictor of objective knowledge composite scores ($b = 0.18, t(1004) = 3.30, p < .001$). It was marginally significant as a predictor of applied knowledge composite scores ($b = 0.06, t(1004) = 1.95, p = .052$).

Figure 10

Subjective Understanding composite, by condition



Discussion

Results from Study 3 were in line with those of Studies 2A and 2B, where a visual emphasizing the shift of benefits from sooner to later under the RET improved accuracy and

application of the policy relative to a plain bar graph that merely showed the level of benefits over time. The SSA condition in this experiment, modeled after an actual SSA webpage with a visual about RET, also outperformed the plain bar graph in some cases, though the inclusion of text boxes explaining key aspects of RET in the SSA condition means we are unable to conclude whether it was specifically the visual depiction that led to this advantage. Interestingly, in this experiment the control condition did not perform significantly worse than any of the experimental conditions. One possible reason for this was that the control condition included *specific* dollar amounts for the benefits under each scenario, while most of the other graph conditions (except the SSA condition) did not provide these exact numbers. In follow-up research, we plan to examine the extent to which the visuals themselves drive these effects as well as the relative contribution of specific numbers and/or labels to meaningful differences in comprehension.

General Discussion

Decisions surrounding the age at which to retire and how best to decumulate assets are among the most complicated that American consumers must face. To optimize such plans, a consumer must make some rough assessment of what their accumulated assets will be worth upon retirement, as well as their future life expectancy and ideal spending patterns in retirement. Each calculation is clearly made under a high degree of uncertainty. To add to the difficulty of this exercise, the timing of when to start claiming Social Security benefits has a complicated and not always straightforward impact on the benefits one can receive. In this project, we focused on one specific aspect of this calculation, namely, that benefits are temporarily lowered before full retirement age if a consumer continues to work while claiming them. Termed the Retirement Earnings Test (RET), the general concept is that if a worker claims SSA benefits while they

continue to earn a certain amount of income, their benefits are reduced for a temporary period of time but then increased once they surpass the full retirement age.

We approached this project with two questions regarding the RET. First, do consumers understand the RET? And, second, can we enhance understanding of the RET as well as decisions that flow from that understanding using communications that differ from the status quo ones that are currently employed by the Social Security Administration? While the answer to the first appears to be “not well,” the answer to the second seems, at this stage, to be “perhaps.”

In Study 1, we found that understanding of the RET – both objective and subjective – was quite low. Namely, although research participants were generally aware that one could continue earning an income while receiving SSA benefits, they scored quite poorly on objective knowledge of the specifics of the RET. In fact, most did not realize that they would eventually recoup lost benefits once they did retire. Nonetheless, written descriptions aimed at enhancing objective understanding of the RET did seem to produce the intended gains in knowledge, though a significant portion of participants (33%) still did not understand a key aspect of the RET: that lost benefits would be recouped upon retirement. Study 1 also resulted in an important observation: subjective understanding of the RET was positively related to the ability to apply knowledge about the RET to subsequent decisions.

These observations led to the question addressed by our subsequent studies: can different forms of communication enhance objective and subjective understanding and subsequent application of the RET? In Studies 2A and 2B, we used a context analogous to the RET, but not identical to the RET, in which we asked participants to consider an opportunity where they could take benefits from their employer if they stopped working, but would have such benefits reduced if they continued to work. Across the two studies, we examined whether different graphical

presentations would alter how much longer participants would want to work and how many hours per week a participant would want to work.

Results from Studies 2A and 2B indicated that the graphical displays that we employed were not necessarily helpful at changing RET-like decisions. If anything, one of the graphs we tested – one that included the income a person would earn from continuing to work in addition to the benefits they would receive – led to participants preferring to work for a longer period of time (likely because they assumed incorrectly that they would earn more in total over time). Nonetheless, we saw preliminary evidence that a graph emphasizing the *shift* in benefits from sooner to later, rather a mere *difference* in benefits sooner and later, did improve accuracy in understanding the hypothetical policy.

In Study 3, we sought to examine whether similar graphical depictions that we used in Studies 2A and 2B could be applied to decisions in the RET context, rather than ones merely analogous to it. As in Studies 2A and 2B, the graphical display that emphasized the shift in benefits under the RET improved both objective knowledge and accurate application of the RET policy. This graphical display has some commonalities with a graph used in one version of existing SSA materials, suggesting the “active ingredient” in that chart may be the insight that benefits sooner are shifted to later and highlighting the potential benefits of relying on such charts rather than text alone in other SSA materials. Indeed, one theme noted with some frequency in Study 1 was that a chart, graphic, or visualization would help to make sense of the intricate policy. Such visualizations were not consistently included in the SSA materials we gathered from various sources.

These results point to a number of promising directions. First, in both Studies 2 and 3, the visual that depicted a shift from sooner benefits to later benefits was the one that improved

understanding and application of RET policies. This graph shared some commonalities with the SSA “lollipop” chart with similar performance. As noted previously, both in our Study 3 and in SSA materials, this lollipop chart is coupled with language about the RET, leaving an open question regarding the contributions from the visual itself or the language and numerical labels accompanying it.

Second, to the extent that many communications about the RET are conducted online, there is a possibility that these visuals could be enhanced to lead to greater understanding and application. In particular, would versions of the shifted graph that are animated prove even more effective? Animated data visualizations have proven effective in other contexts (e.g., Hullman, Resnick, & Adar 2015). Being able to observe how future benefits increase as current earned income increases and current benefits decrease might provide powerful intuitive insight for prospective retirees into how the different parts of the test interrelate in ways that are mathematically somewhat difficult but conceptually sensible. Relatedly, greater personalization of those animations may enable prospective retirees to consider the consequences for more relevant inputs; this may be particularly important when the inputs combine in such complex manners.

Third, our findings in Studies 2A and 2B suggest that graphically including earned income in the same chart as benefits affected understanding and decisions of how much or how long to work. This is despite the fact that the income was segmented and therefore separable in the income chart and known to be present in the other conditions. Together, these results suggest that prospective retirees may come to hold different beliefs or preferences depending on how multiple incomes (e.g., earnings and benefits) are bracketed together (e.g., Read, Loewenstein, & Rabin 1999).

There are limitations of the current design that are important to note. First, the decisions we examined in Studies 2 and 3 were clearly hypothetical in nature, highlighting the need to test the most promising interventions in field settings. Second, although we were careful to recruit online participants who were roughly representative in terms of the age at which many workers must start considering SSA decisions, our samples were nonetheless confined to Amazon's Mechanical Turk platform. Although evidence is accumulating that suggests effects of interventions in such population are similar to those in probability samples (e.g., Coppock, Leeper, & Mullinix 2018; Mullinix, Leeper, Druckman, & Freese, 2015; Snowberg & Yariv 2021), further work in this space should attempt to recruit larger samples aimed at being as representative as possible of American workers. It is possible that with much larger samples, researchers could detect heterogeneous treatment effects not present in the current project. For example, would certain consumers – those with lower *or* higher levels of numeracy – be more impacted by different graphical displays related to the RET?

The decision of when to claim SSA retirement benefits, and the related decision of whether to continue working and earning income after those benefits begin, is a challenging issue for many pre-retirees and retirees. The decision to begin claiming benefits is often irrevocable; for retirees who begin claiming but then continue working or decide to return to work, an understanding of the rules and tradeoffs inherent in the retirement earnings test is extremely important. Not understanding that decreases in current benefits under the RET are compensated by future benefit increases may cause workers to stay out of the labor force more than is necessary, which can then significantly impact their long-term earnings (Song & Manchester 2007). Simulations of lifecycle decisions suggest that improvements in understanding of the social security system can generate large welfare gains (Benítez-Silva,

Demiralp, and Liu 2009); we would argue that improving understanding of RET has similarly large effects. We hope that these tests of alternative visual presentations of the tradeoffs, informed by psychological research on how individuals understand income flows, can provide insight into how to improve RET communication.

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Appendices for NBER Working paper

Appendix 1: Extra Results from Study 1

The survey for Study 1 included a section that gathered participants' reactions to the name "retirement earnings test" as well as a list of other potential names generated by the research team. The question asked participants to rate the real name and each alternate in terms of how well each name captured the participant's understanding of RET using a 5-point scale ranging from "does not capture at all" to "captures very well" (recoded for analyses such that the midpoint of this scale is zero and the extremes -1 and 2, respectively). As can be seen in Table A1 below, participants did not think the policy's actual name, the retirement earnings test, captured the concept very well and thought names like "Rules for Earning While Claiming" and "Retirement Earnings Limit" did so more effectively, providing some insight into what prospective retirees think about the nature of the RET policy.

Table A1

Ratings of RET policy name and alternatives

Policy Names	Mean	SD
Retirement Earnings Test	0.08	1.34
Retirement Earnings Calculation	0.83	1.14
Rules for Earning While Claiming	1.02	1.14
Retirement Earnings Limit	1.1	0.99
Retirement Earnings Deferral	-0.13	1.24

Appendix 2: Relevant Measures from Study 1 Survey Instrument

Question text and answer options are in normal text, preceded by a bolded descriptive name for the question. Notes related to survey programming and analyses are bracketed and in bold text.

Introduction.

We are interested in understanding retirement decision making and existing levels of knowledge about Social Security benefits and policies.

In this survey, there may be some questions that are hard to answer exactly. Please take time to think about the questions and give us your best guess, even if you do not know the exact answer. Your best guess will be very helpful to us in this research. There may also be some questions that seem repetitive, but please make sure to read each question carefully.

Additionally, please assume for the remainder of this survey that Social Security will be around when you start claiming benefits.

Thank you for your help!

Introduction to knowledge questions.

The first set of questions is about your knowledge of Social Security Administration benefits and policies.

RET unaided awareness.

Are you aware of Social Security's "retirement earnings test"?

1. Yes
2. No
3. Not sure

Early claiming age.

The Social Security Administration determines the monthly amount of a person's retirement benefits based on a number of factors, including the age at which they decide to begin claiming benefits.

What is the earliest age at which a person can begin to claim Social Security retirement benefits?
[text box]

Full retirement age.

Social Security dictates a "full retirement age" or "normal retirement age." A person who retires at this age is entitled to their full monthly benefit amount. To the best of your knowledge, what is your full retirement age? In other words, what age do you need to be in order to claim your full benefit amount?

Use the two boxes below to indicate your full retirement age in years and months.

[text box] years

[text box] months

Later vs. earlier claiming.

If a person decides to begin claiming Social Security benefits at 63 years old, how would their monthly benefit amount compare to the amount they would get if they began claiming at 67 years old?

1. The monthly amount they would get if they claimed at 63 would be less than the amount they would get if they claimed at 67
2. The monthly amount they would get if they claimed at 63 would be the same as the amount they would get if they claimed at 67
3. The monthly amount they would get if they claimed at 63 would be more than the amount they would get if they claimed at 67

Working and claiming.

Can a person earn income from a job while also claiming Social Security retirement benefits?

1. No, Social Security does not allow a person to earn income from a job while also claiming retirement benefits
2. Yes, Social Security does allow a person to earn income from a job while also claiming retirement benefits

Introduction to RET follow-up questions.

[the following questions were only asked of participants who correctly answered the question about working and claiming. Else, participants skipped ahead to the description]

You indicated that a person can earn income from a job while also claiming Social Security retirement benefits. We want to ask a few more questions about the specifics of this situation.

Limit Past FRA.

When a person is past their full retirement age and receiving benefits from Social Security, is there a limit to the amount of income they can earn at a job before their monthly benefit amount is affected?

For this question, please think about a situation in which a person is older than their full retirement age for the entire year (for example, when they are 68-69 years old).

1. Yes, there is a limit on how much a person can earn when older than full retirement age (i.e., if they earn over a certain amount, their benefits for that year might be affected)
2. No, there is not a limit on how much a person can earn when older than full retirement age (i.e., they can earn any amount of money and their benefits for that year will remain unaffected)

Limit amount past FRA.

[only asked of participants who indicated “Yes” to previous question, even though there is no limit on earnings past FRA]

What is the limit on how much a person can earn during a year when they are past their full retirement age before their benefits are affected?

Even if you don't know the exact amount, please provide your best guess.

Once a person earns more than \$[text box].00 per year when younger than full retirement age, Social Security benefits payments would be affected.

Limit under FRA.

When a person is under their full retirement age and receiving benefits from Social Security, is there a limit to the amount of income they can earn at a job before their monthly benefit amount is affected?

For this question, please think about a situation in which a person is younger than their full retirement age for the entire year (for example, when they are 63-64 years old).

1. Yes, there is a limit on how much a person can earn when younger than full retirement age (i.e., if they earn over a certain amount, their benefits for that year might be affected)
2. No, there is not a limit on how much a person can earn when younger than full retirement age (i.e., they can earn any amount of money and their benefits for that year will remain unaffected)

Limit amount.

[only asked of participants who answered previous question correctly]

What is the limit on how much a person can earn during a year when they are younger than full retirement age before their benefits are affected?

Even if you don't know the exact amount, please provide your best guess.

Once a person earns more than \$[text box].00 per year when older than full retirement age, Social Security benefits payments would be affected.

Defer.

[only asked of participants who correctly answered Limit under FRA question]

What happens to a person's benefits if they earned above the limit during the year when they are younger than their full retirement age and claiming benefits from Social Security?

1. Their benefits would be reduced during the year they were earning above the limit
2. Their benefits would stay the same during the year they were earning above the limit
3. Their benefits would be increased during the year they were earning above the limit

Defer amount.

[only asked of participants who correctly answered previous question]

You indicated that a person's benefits would be reduced if they earned above the limit during a year when they are younger than their full retirement age and claiming benefits from Social Security.

Social Security decreases benefits by a specific amount based on how much income a person earns above the limit. Please fill in the statement below to reflect the calculation that Social Security performs to determine the amount that a person's benefits are decreased.

Even if you don't know the exact amount, please provide your best guess.

For every \$[text box].00 that a person earns above the limit during a year when they are younger than their full retirement age, Social Security will deduct \$1 from their benefits amount.

Recoup.**[only asked of participants who correctly answered Defer question]**

You indicated that a person's benefits would be reduced if they earned above the limit during a year when they are younger than their full retirement age and claiming benefits from Social Security.

Which of the below situations best characterizes what happens to the person's benefits in the long term?

1. The reduction in benefits due to earning over the limit is never recovered (in other words, the person will never be repaid for the amount lost while earning and claiming)
2. The reduction in benefits due to earning over the limit is recovered later (in other words, the person is repaid for the amount lost while earning and claiming)

Introduction to RET description.

On the next page, we're going to show you some information about a Social Security Administration policy called the Retirement Earnings Test (RET). Even if this is something you have heard of before, please read the information carefully. As a reminder, the earliest a person can begin claiming benefits from Social Security is 62 years old. For people born 1960 or later, the "full retirement age" (or the age at which a person is entitled to their full monthly benefit amount) is 67.

Early claiming age attention check.

What is the earliest age at which a person can begin to claim Social Security retirement benefits?
[text box]

FRA attention check.

For people born 1960 or later, what is their "full retirement age" (the age at which a person is entitled to their full monthly benefit amount)?
[text box]

Description conditions.

[all descriptions appeared with the header "Description of Social Security Administration's Retirement Earnings Test (RET)"].

Program Explainer.

Information adapted from Social Security Administration (SSA)

When you claim Social Security benefits before reaching full retirement age (FRA) and continue working and earning above a certain threshold, you are subject to the retirement earnings test (RET). The RET reduces Social Security benefits before you reach FRA, and then increases benefits for the remainder of your life when you reach FRA. Benefits withheld while you continue to work are not lost; they are added to your monthly benefit once you reach FRA. If you're younger than FRA during all of 2021, Social Security must deduct \$1 from your benefits for each \$2 you earn above \$18,960. If you reach FRA during 2021, Social Security must deduct \$1 from your benefits for each \$3 you earn above \$50,520 until the month you reach full retirement age.

How Work Affects Your Benefits (HWAB).

Information adapted from Social Security Administration (SSA)

You can get Social Security retirement or survivors benefits and work at the same time. But, if you're younger than full retirement age, and earn more than certain amounts, your benefits will be reduced. The amount that your benefits are reduced, however, isn't truly lost. Your benefit will increase at your full retirement age to account for benefits withheld due to earlier earnings. If you're younger than full retirement age during all of 2021, Social Security must deduct \$1 from your benefits for each \$2 you earn above \$18,960. If you reach full retirement age during 2021, Social Security must deduct \$1 from your benefits for each \$3 you earn above \$50,520 until the month you reach full retirement age.

Exempt Amounts.

Information adapted from Social Security Administration (SSA)

The retirement earnings test applies only to people below normal retirement age (NRA). Social Security withholds benefits if your earnings exceed a certain level, called a retirement earnings test exempt amount, and if you are under your NRA. One of two different exempt amounts apply — a lower amount in years before the year you attain NRA and a higher amount in the year you attain NRA. These exempt amounts generally increase annually with increases in the national average wage index. It is important to note that any benefits withheld while you continue to work are not "lost". Once you reach NRA, your monthly benefit will be increased permanently to account for the months in which benefits were withheld. For people attaining NRA after 2021, the annual exempt amount in 2021 is \$18,960. For people attaining NRA in 2021, the annual exempt amount is \$50,520. This higher exempt amount applies only to earnings made in months prior to the month of NRA attainment. Social Security withholds \$1 in benefits for every \$2 of earnings in excess of the lower exempt amount. Social Security withholds \$1 in benefits for every \$3 of earnings in excess of the higher exempt amount. Earnings in or after the month you reach NRA do not count toward the retirement test.

AARP.

Information adapted from American Association of Retired Persons (AARP)

Can I Collect Social Security While I'm Working?

Yes, but your income might reduce the amount of your benefit if you start receiving Social Security before you reach full retirement age (FRA), the age when you qualify to collect 100 percent of the maximum benefit allowed from your earnings history. Until then, Social Security doesn't consider you fully "retired" if you make more than a certain amount from work, and it will deduct a portion of your benefits if your earnings exceed that limit. Once you reach FRA, there is no cap on how much you can earn and still receive your full Social Security benefit. Benefits you lose by working before you reach full retirement age can be recouped later: When you reach FRA, Social Security increases your monthly benefit to account for the prior withholding. In 2021, you lose \$1 in benefits for every \$2 earned over \$18,960. Suppose you reach full retirement age this year. In that case, the earnings limit is \$50,250, with \$1 in benefits withheld for every \$3 earned over the limit. That applies until you actually hit your FRA; past that, there is no earnings limit.

UCLA.

The retirement earnings test is used by the Social Security Administration to calculate the amount of benefits you can receive if you choose to claim retirement benefits while you are still working but before you reach “full retirement age.” If you are earning above a certain level of income at your job, Social Security will hold back a portion of your monthly benefit until you reach your full retirement age. Once you do reach that age, the Social Security Administration then permanently increases your retirement benefits to make up for any months where benefits were held back because your earnings exceeded the limit. In other words, if you claim your Social Security benefits while you’re still working and before you hit your full retirement age, your monthly Social Security retirement payments will be decreased until you stop working or until you reach your full retirement age, and then will increase later to make up for “lost” benefits from before. If you are below your full retirement age in 2021, the income threshold is \$18,960. For every \$2 that you earn above this limit, Social Security will deduct \$1 from your benefit amount. If you are reaching your full retirement age in 2021, the income threshold is \$50,250. For every \$3 you earn above this limit, Social Security will deduct \$1 from your benefit amount. Once you reach FRA, there is no limit on the amount you can earn.

Prior knowledge of RET.

Please choose the answer below that best reflects your prior knowledge about the retirement earnings test. Before reading the information on the previous page:

1. I was not aware that Social Security had rules about how much a person who is younger than their full retirement age could earn while collecting benefits
2. I was aware that Social Security had rules about how much a person who is younger than their full retirement age could earn while collecting benefits but did not know that this was called the retirement earnings test
3. I was aware that Social Security had rules about how much a person who is younger than their full retirement age could earn while collecting benefits and did know that this was called the retirement earnings test

Questions about the description.

After reading this description, do you have any specific questions, points of confusion, or comments related to the retirement earnings test?

We have pasted the description again below for you to refer to, if needed.

[description]

RET name.

Based on what you now know about the rules for earning income while claiming benefits when under full retirement age, we're interested in your thoughts about the name of this policy – the "retirement earnings test."

Using the scale provided, please rate how well you think each name captures what this policy is about.

[rows]

1. Retirement Earnings Test

2. Retirement Earnings Calculation
3. Rules for Earning While Claiming
4. Retirement Earnings Limit
5. Retirement Earnings Deferral
6. Something else: If you have a suggestion for a better name, please write it in the box below. If you don't have any suggestions, please leave the box and the row blank.

[columns]

-2 Does not capture at all

-1

9

1

2 Captures very well

Introduction to applied knowledge section.

The next few pages will consist of questions about an imaginary scenario related to retirement benefits. Please read the scenario information carefully and respond to the questions according to your understanding of the situation. For the purpose of these questions, please assume there is no inflation and thus no cost-of-living adjustments that will be made.

Working benefits.

Nate is currently age 63. He stopped working and began claiming retirement benefits from Social Security when he turned 62 and has been receiving \$1,000 per month. Therefore, if Nate were to continue not working, his Social Security benefit would be \$1,000 for the rest of his life.

Next year, while he is 64 years old, Nate is planning to start working at a job where he will earn an annual income of \$30,000. We want to ask you some questions about how you think Nate's decision to go back to work might affect his Social Security benefits at different ages.

Let's start with the year that Nate is 64 and works for an annual salary of \$30,000. While he is working that year, what do you think would happen to his Social Security benefits for that year?

1. The benefits would go away completely
2. The benefits would decrease (i.e., the amount would get smaller)
3. The benefits would stay the same
4. The benefits would increase (i.e., the amount would get larger)

Threshold.

[only asked if participant answered that benefits would decrease or go away completely in previous question]

In the previous question, you indicated that Nate's benefits would decrease because he returned to work that year. Is there any amount that Nate could earn during the year that he is 64 without reducing his Social Security benefits that year?

1. Yes
2. No, the Social Security benefits he will be entitled to for that year will be reduced no matter how much he earned

Threshold amount.

[only asked of participants who answered the previous question correctly]

You indicated that there is some amount that a person can earn without reducing the Social Security benefits he is entitled to for that year. What is this amount?

Even if you don't know the exact amount, please give us your best guess (rounded to the nearest dollar).

Once he earned more than \$[text box].00 per year at age 64, Social Security benefit payments would be reduced.

Threshold for those who thought benefits would not be affected.

[only asked of participants who answered that Nate's benefits would stay the same for Working benefits question]

In the previous question, you indicated that Nate's benefits would stay the same even if he returned to work that year. Is there any amount that Nate could earn during the year that he is 64 that would reduce his Social Security benefits that year?

1. Yes, there is some amount that he could earn that would reduce his benefits
2. No, the Social Security benefits would not be reduced, no matter how much he earned

Threshold amount for those who thought benefits would not be affected.

[only asked of participants who answered "Yes" to previous question]

You indicated that there is some amount that a person can earn that would reduce the Social Security benefits he is entitled to for that year. What is this amount?

Even if you don't know the exact amount, please give us your best guess (rounded to the nearest dollar).

Once he earned more than \$[text box].00 per year at age 64, Social Security benefit payments would be reduced.

After FRA vs. original amount.

Now, imagine Nate decided to stop working again after turning 65.

We'd like to ask you about what would happen to Nate's Social Security benefits at age 68, assuming that he worked for one full year while he was receiving benefits. Remember, age 68 is older than Nate's full retirement age.

As a reminder, here's a timeline with some details about Nate's situation:

- Age 62: Nate stops working and claims a monthly Social Security benefit of \$1,000 for one year
- Age 64: Nate goes back to work for one year and earns \$30,000
- Age 65: Nate stops working
- Age 68: Nate is not working

Please select the option below that best describes what would happen to Nate's Social Security benefits at age 68:

1. His monthly benefits at age 68 would be **unchanged** – in other words, Nate would still receive the same \$1,000 per month that he would have had he not returned to work
2. His monthly benefits at age 68 would be **reduced** – in other words, Nate would receive less than the \$1,000 per month that he would have had he not returned to work
3. His monthly benefits at age 68 would be **increased** – in other words, Nate would receive more than the \$1,000 per month that he would have had he not returned to work

After FRA vs. benefit at 65

You indicated that, as a result of his work while he was age 64, Nate's Social Security benefit would grow to more than \$1,000 at age 68. We'd like to ask about how you think his benefit at age 68 would compare to his benefit amount at age 65, after he has stopped working but before he reaches full retirement age.

As a reminder, here's a timeline with some details about Nate's situation:

- Age 62: Nate stops working and claims a monthly Social Security benefit of \$1,000 for one year
- Age 64: Nate goes back to work for one year and earns \$30,000
- Age 65: Nate stops working
- Age 68: Nate is not working

Remember – we are assuming there is no inflation and no cost of living increases.

Do you think that the Social Security benefit he is paid while age 68 would be:

1. Less than the benefit paid while he is age 65
2. The same as the benefit paid while he is age 65
3. Greater than the benefit paid while he is 65

Scenario confidence.

Please use the scale below to indicate your level of agreement or disagreement with the statement:

I felt confident in my answers to the questions about Nate's circumstances.

Strongly disagree 1

2

3

4

Strongly agree 5

Introduction to objective knowledge post-test.

Now that you've read some information about the retirement earnings test and worked through an example scenario related to this policy, we'd like to ask you some of the same questions we asked you earlier in the survey regarding your knowledge of the rules related to earning while claiming Social Security benefits.

Please answer to the best of your knowledge, based on what you knew before the survey and what you may have learned during the survey.

[participants asked same objective knowledge questions as in pre-test, with same skip patterns. See questions “Working and Claiming” through “Recoup” above]

Subjective understanding introduction.

The next set of questions will ask about your current levels of knowledge about and comfort with various aspects of the retirement decision-making process.

Rules.

Please use the scale provided to indicate your level of agreement or disagreement with the statement below.

I feel confident that I understand the rules of the retirement earnings test.

Strongly disagree 1

2

3

4

Strongly agree 5

Consequences.

Please use the scale provided to indicate your level of agreement or disagreement with the statement below.

I feel confident that I understand the consequences of earning above the income threshold while younger than full retirement age and claiming retirement benefits from Social Security.

Strongly disagree 1

2

3

4

Strongly agree 5

Knowledgeable.

How knowledgeable do you consider yourself to be about the retirement earnings test?

Not at all knowledgeable 1

2

3

4

Very knowledgeable 5

Comfortable.

Given your current understanding, do you feel comfortable in understanding the tradeoffs from earning income while also claiming Social Security benefits in the years before your full retirement age?

Not at all comfortable 1

2

3

4

Very comfortable 5

Appendix 3A: Relevant Measures from Study 2A Survey Instrument

Question text and answer options are in normal text, preceded by a bolded descriptive name for the question. Notes related to survey programming and analyses are bracketed and in bold text.

[STUDY INFORMATION SHEET / CONSENT]

Introduction to task.

In what follows, we will ask for your preferences regarding a hypothetical financial decision.

Although all choices made in this experiment are hypothetical, we ask that you respond as if you were making decisions about real money. There is no right or wrong answer. We are only interested in your preferences.

Introduction to scenario.

We'd like you to imagine that you currently work in the fossil fuels industry, earning \$3,500 per month (after taxes) while working full-time (40 hours per week). As the government pushes for a switch to clean energy, the company that you work for will be closing down at the end of 2021.

The government is offering a program to train all affected employees for a new job in the clean energy industry. The government plans to offer a stipend and benefits for those participating in the program and will guarantee a job for all those who complete it. The training program will be taking place in 2022, but the government will begin providing stipend payments and benefits next month.

Description conditions.

[participants were randomly assigned to see one of the six description conditions]

Control.

You have also been given the option either to stop working at your current company starting next month (July 2021) or continue working part-time (20 hours a week) up until December 2021. If you choose to continue working for some months, the government will reduce your stipend payments during each month you are working. The amount that your payments are reduced, however, isn't truly lost. Your benefit will increase in 2022 to account for payment withheld due to work.

If you choose to stop working in July 2021, you will receive \$3,250 each month (after taxes) through the end of 2022. If you choose to continue working for some months, the government will reduce your payments by 40% during the months you are working.

Emphasis.

You have also been given the option either to stop working at your current company starting next month (July 2021) or continue working part-time (20 hours a week) up until December 2021. If you choose to continue working for some months, the government will reduce your stipend payments during each month you are working.

The amount that your payments are reduced, however, isn't truly lost. Your benefit will increase in 2022 to account for payment withheld due to work.

If you choose to stop working in July 2021, you will receive \$3,250 each month (after taxes) through the end of 2022. If you choose to continue working for some months, the government will reduce your payments by 40% during the months you are working.

Plain bar graph.

[same text as emphasis condition, plus the below]

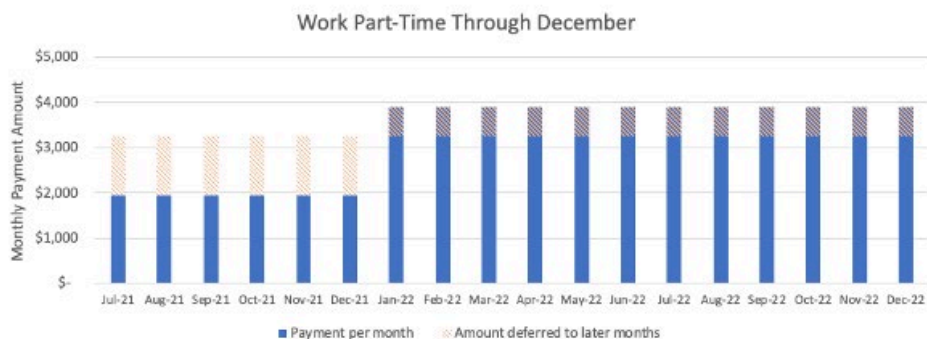
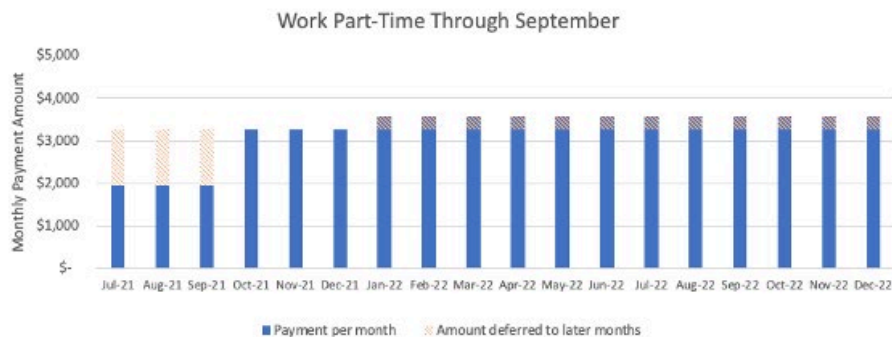
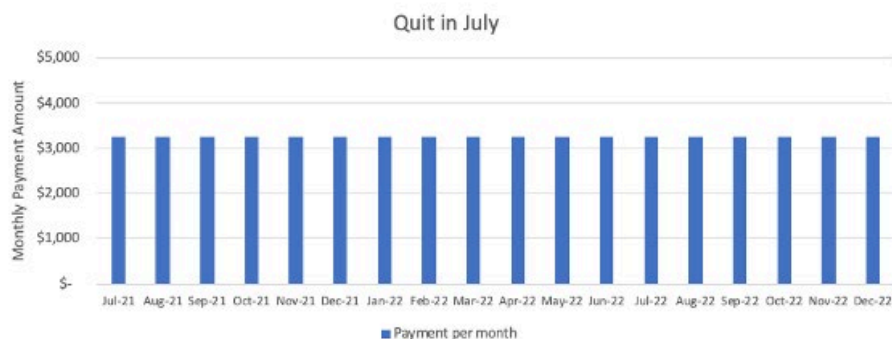
The graphs below provide details on the payments per month you would receive in three example scenarios:



Shifted bar graph.

[same text as emphasis condition, plus the below]

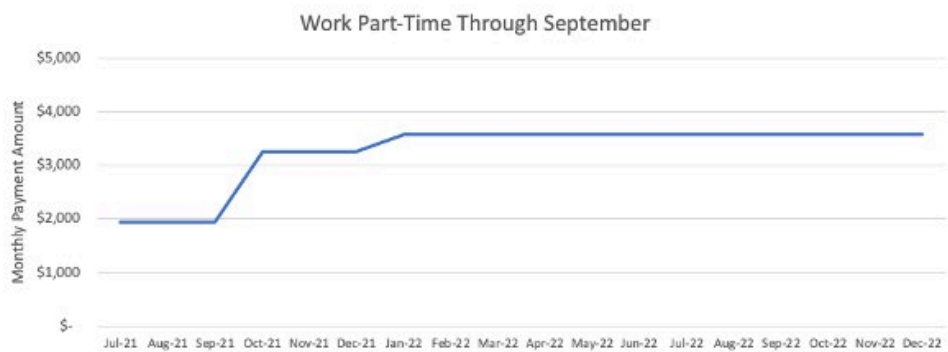
The graphs below provide details on the payments per month you would receive in three example scenarios:



Line graph.

[same text as emphasis condition, plus the below]

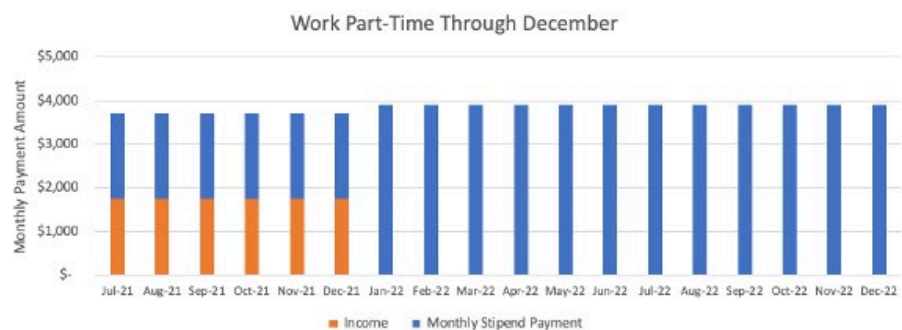
The graphs below provide details on the payments per month you would receive in three example scenarios:



Income bar graph.

[same text as emphasis condition, plus the below]

The graphs below provide details on the payments per month you would receive in three example scenarios:



Work choice.

Using the options below, please indicate how much you would work in each month remaining in 2021 in this scenario.

[rows]

July 2021

August 2021

September 2021

October 2021

November 2021

December 2021

[columns]

Do not work at all

Work part-time

Understanding.

Now, imagine that you have two coworkers, Alex and Chris, who faced the same choice that you did in terms of working and collecting stipend payments from the government.

Alex decided to work part-time every month through December, while Chris decided to stop working in July and did not work during any of the remaining months of 2021.

How would the total amount they receive from the government compare?

1. Alex would receive a lot more than Chris
2. Alex would receive a little more than Chris
3. Alex and Chris would receive the same amount
4. Chris would receive a little more than Alex
5. Chris would receive a lot more than Alex

Appendix 3B: Relevant Measures from Study 2B Survey Instrument

Question text and answer options are in normal text, preceded by a bolded descriptive name for the question. Notes related to survey programming and analyses are bracketed and in bold text.

[STUDY INFORMATION SHEET / CONSENT]

Introduction to task.

In what follows, we will ask for your preferences regarding a hypothetical financial decision.

Although all choices made in this experiment are hypothetical, we ask that you respond as if you were making decisions about real money. There is no right or wrong answer. We are only interested in your preferences.

Introduction to scenario.

We'd like you to imagine that you currently work in the fossil fuels industry, earning \$3,500 per month (after taxes) while working full-time (40 hours per week). As the government pushes for a switch to clean energy, the company that you work for will be closing down at the end of 2021.

The government is offering a program to train all affected employees for a new job in the clean energy industry. The government plans to offer a stipend and benefits for those participating in the program and will guarantee a job for all those who complete it. The training program will be taking place in 2022, but the government will begin providing stipend payments and benefits next month.

Description conditions.

[participants were randomly assigned to see one of the six description conditions]

Control.

You have also been given the option to stop working at your current company starting next month (July 2021) or continue working (10, 20, 30, or 40 hours per week) up until December 2021. If you choose to continue working, the government will reduce your stipend payments during each month you are working. The amount that your payments are reduced, however, isn't truly lost. Your benefit will increase in 2022 to account for payment withheld due to work.

If you choose to stop working in July 2021, you will receive \$3,250 each month (after taxes) through the end of 2022. If you choose to continue working, the government will reduce your payments for July through December based on how much you decide to work:

- In months that you work 10 hours per week, your payments will be reduced by 20%
- In months that you work 20 hours per week, your payments will be reduced by 40%
- In months that you work 30 hours per week, your payments will be reduced by 60%
- In months that you work 40 hours per week, your payments will be reduced by 80%

Emphasis.

You have also been given the option to stop working at your current company starting next month (July 2021) or continue working (10, 20, 30, or 40 hours per week) up until December

2021. If you choose to continue working, the government will reduce your stipend payments during each month you are working.

The amount that your payments are reduced, however, isn't truly lost. Your benefit will increase in 2022 to account for payment withheld due to work.

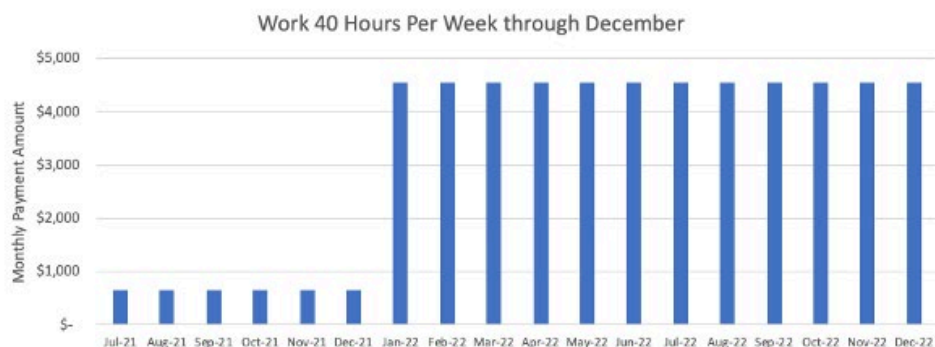
If you choose to stop working in July 2021, you will receive \$3,250 each month (after taxes) through the end of 2022. If you choose to continue working, the government will reduce your payments for July through December based on how much you decide to work:

- In months that you work 10 hours per week, your payments will be reduced by 20%
- In months that you work 20 hours per week, your payments will be reduced by 40%
- In months that you work 30 hours per week, your payments will be reduced by 60%
- In months that you work 40 hours per week, your payments will be reduced by 80%

Plain bar graph.

[same text as emphasis condition, plus the below]

The graphs below provide details on the payments per month you would receive in three example scenarios:



Shifted bar graph.

[same text as emphasis condition, plus the below]

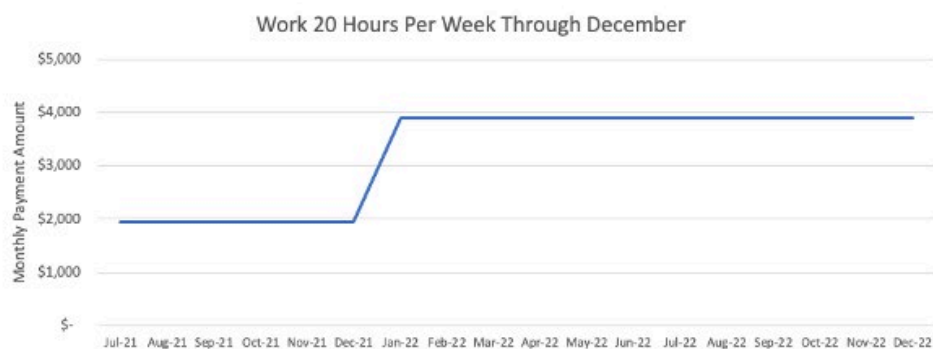
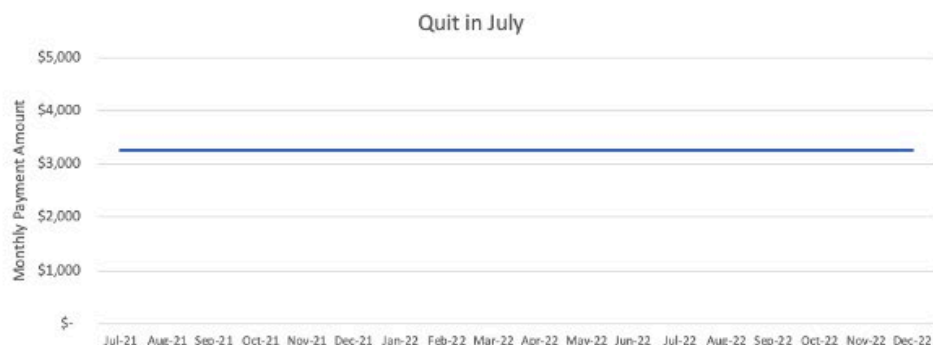
The graphs below provide details on the payments per month you would receive in three example scenarios:



Line graph.

[same text as emphasis condition, plus the below]

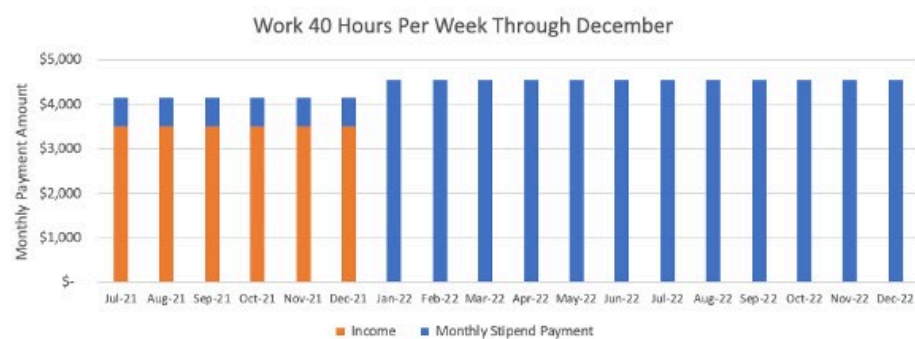
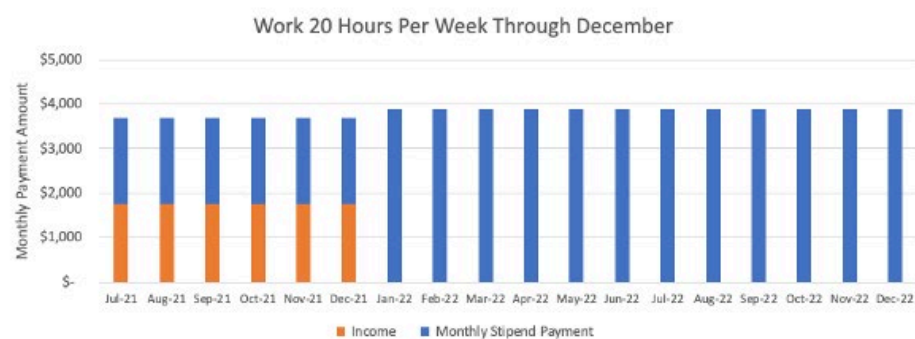
The graphs below provide details on the payments per month you would receive in three example scenarios:



Income bar graph.

[same text as emphasis condition, plus the below]

The graphs below provide details on the payments per month you would receive in three example scenarios:



Work choice.

Which option would you choose in this scenario?

1. Stop working in July 2021
2. Continue working 10 hours per week through December 2021
3. Continue working 20 hours per week through December 2021
4. Continue working 30 hours per week through December 2021
5. Continue working 40 hours per week through December 2021

Understanding.

Now, imagine that you have two coworkers, Alex and Chris, who faced the same choice that you did in terms of working and collecting stipend payments from the government.

Alex decided to keep working 40 hours per week through December, while Chris decided to stop working in July.

How would the total amount they receive from the government compare?

1. Alex would receive a lot more than Chris
2. Alex would receive a little more than Chris
3. Alex and Chris would receive the same amount
4. Chris would receive a little more than Alex
5. Chris would receive a lot more than Alex

Appendix 4: Relevant Measures from Study 3 Survey Instrument

Question text and answer options are in normal text, preceded by a bolded descriptive name for the question. Notes related to survey programming and analyses are bracketed and in bold text.

[STUDY INFORMATION SHEET / CONSENT]

Introduction to survey.

We are interested in understanding retirement decision making and knowledge about Social Security benefits and policies. In this survey, there may be some questions that are hard to answer exactly. Please take time to think about the questions and give us your best guess, even if you do not know the exact answer. Your best guess will be very helpful to us in this research. Additionally, please assume for the remainder of this survey that Social Security will be around when you start claiming benefits. Thank you for your help!

Introduction to general knowledge questions.

This next set of questions is about your knowledge of Social Security Administration (SSA) benefits and policies.

RET unaided awareness.

Are you aware of Social Security's "retirement earnings test"?

1. Yes
2. No
3. Not sure

Early claiming age.

The Social Security Administration determines the monthly amount of a person's retirement benefits based on a number of factors, including the age at which they decide to begin claiming benefits.

What is the earliest age at which a person can begin to claim Social Security retirement benefits?
[text box]

Full retirement age.

Social Security dictates a "full retirement age" or "normal retirement age." A person who retires at this age is entitled to their full monthly benefit amount. To the best of your knowledge, what is your full retirement age? In other words, what age do you need to be in order to claim your full benefit amount?

Use the two boxes below to indicate your full retirement age in years and months.

[text box] years

[text box] months

Later vs. earlier claiming.

If a person decides to begin claiming Social Security benefits at 63 years old, how would their monthly benefit amount compare to the amount they would get if they began claiming at 67 years old?

1. The monthly amount they would get if they claimed at 63 would be less than the amount they would get if they claimed at 67
2. The monthly amount they would get if they claimed at 63 would be the same as the amount they would get if they claimed at 67
3. The monthly amount they would get if they claimed at 63 would be more than the amount they would get if they claimed at 67

Expected income.

[only asked of participants who were already claiming or were eligible to claim in the future]

From the list below, please select the income amount that is closest to what you expect to be earning in the three years leading up to when you're thinking about starting to claim Social Security retirement benefits.

Note: your choice should reflect what's closest to the average income that you expect to be earning in the 3 years before you begin claiming, not necessarily your total household income. You might want to think about whether you would scale back your work, only work part-time, etc.

1. Less than \$30,000 per year
2. \$30,000 - \$50,000 per year
3. More than \$50,000 per year

RET description introduction.

On the next page, we're going to show you some information about a Social Security Administration policy called the Retirement Earnings Test (RET). Even if this is something you have heard of before, please read the information carefully.

As a reminder, the earliest a person can begin claiming benefits from Social Security is 62 years old. For people born 1960 or later, the "full retirement age" (FRA – or the age at which a person is entitled to their full monthly benefit amount) is 67.

Early claiming age attention check.

What is the earliest age at which a person can begin to claim Social Security retirement benefits?
[text box]

FRA attention check.

For people born 1960 or later, what is their "full retirement age" (the age at which a person is entitled to their full monthly benefit amount)?
[text box]

RET description introduction part 2.

[shown to participants who indicated they are currently claiming or will be eligible to claim in the future] We realize that the RET may not apply in everyone's situation. Even if you don't plan to earn income once you begin claiming, we're still interested in your reactions to the information and your understanding of the policy. To attempt to make the information as relevant to you as possible, we've used the information you provided us earlier in the survey to determine a set of example scenarios to show you about the claiming situation for a hypothetical beneficiary (that is, an imaginary person who is eligible for claiming retirement benefits from Social Security).

[shown to participants who indicated ineligibility for SSA retirement benefits] Earlier in the survey, you let us know that you won't be eligible to receive retirement benefits. However, we're still interested in your reactions to the information and your understanding of the RET. To attempt to make the information as easily understandable as possible, we've included a set of example scenarios about the claiming situation for a hypothetical beneficiary (that is, an imaginary person who is eligible for claiming retirement benefits from Social Security).

[shown to everyone] As you read the information, please keep in mind that the example scenarios are rough approximations of monthly benefits amounts received in each situation. The examples also assume the beneficiary is receiving benefits for the full year and don't account for adjustments for cost-of-living and/or RET exempt amounts. For exact information on the calculations that Social Security does, please consult the resources provided at the end of this survey.

Description conditions.

[all descriptions had the following header at the top: “Description of Social Security Administration's Retirement Earnings Test (RET)”. There were three versions of each description condition, for three different benefits scenarios (“income” conditions):

- 1. Low income (\$25,000 per year) / low benefits (\$1,000 per month without RET)**
- 2. Middle income (\$40,000 per year) / middle benefits (\$1,600 per month)**
- 3. High income (\$60,000 per year) / high benefits (\$2,200 per month)**

Participants who were already claiming or who would be eligible to claim in the future were placed into an income condition based on their answer to the expected income question. Participants who were not eligible to claim were randomized into one of the three income conditions. The following questions display the numbers and graphs associated with the low income/low benefits condition]

[text shown in all description conditions]

Information adapted from Social Security Administration (SSA)

You can get Social Security retirement or survivors benefits and work at the same time. But, if you're younger than full retirement age, and earn more than certain amounts, your benefits will be reduced.

The amount that your benefits are reduced, however, isn't truly lost. Your benefit will increase at your full retirement age to account for benefits withheld due to earlier earnings.

If you're younger than full retirement age during all of 2021, Social Security must deduct \$1 from your benefits for each \$2 you earn above \$18,960. If you reach full retirement age during 2021, Social Security must deduct \$1 from your benefits for each \$3 you earn above \$50,520 until the month you reach full retirement age.

Control.

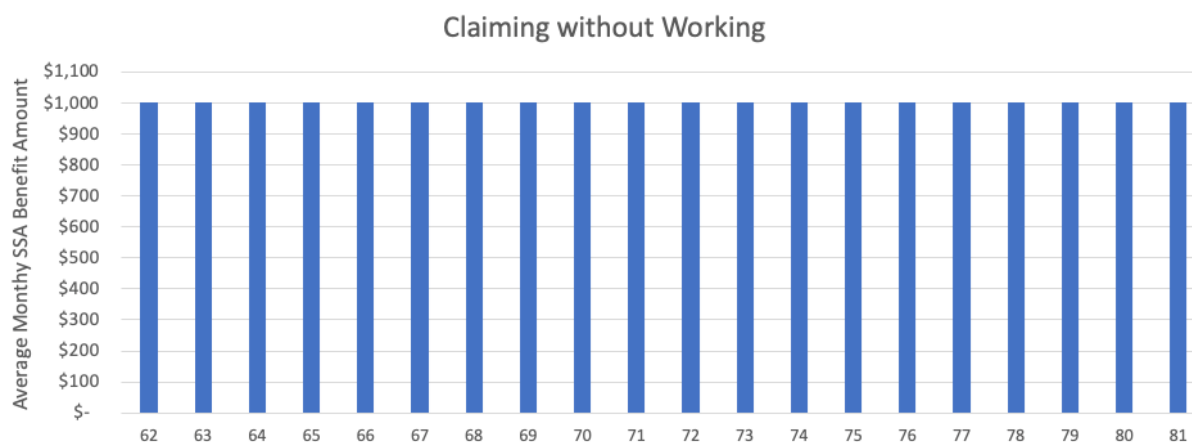
The examples below explain how the RET works for two scenarios involving a hypothetical beneficiary who claims benefits at age 62.

- If the beneficiary chooses to stop working when she begins claiming, her benefits would be \$1,000 per month.
- If the beneficiary chooses to claim while also working, earning \$25,000 per year until she turns 67, her benefits would be \$748 per month on average until she reaches her full retirement age and stops working. After her full retirement age, her benefits would be \$1,090.

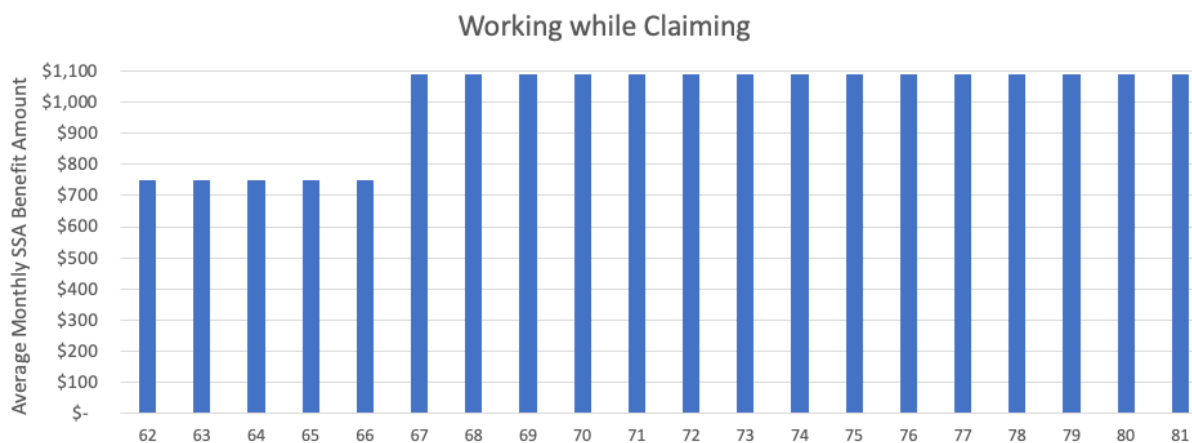
Plain bar graph.

The graphs below show how the RET works for two scenarios involving a hypothetical beneficiary who claims benefits at age 62.

The first graph shows her expected monthly benefits amounts each year if she chooses to stop working when she begins claiming:



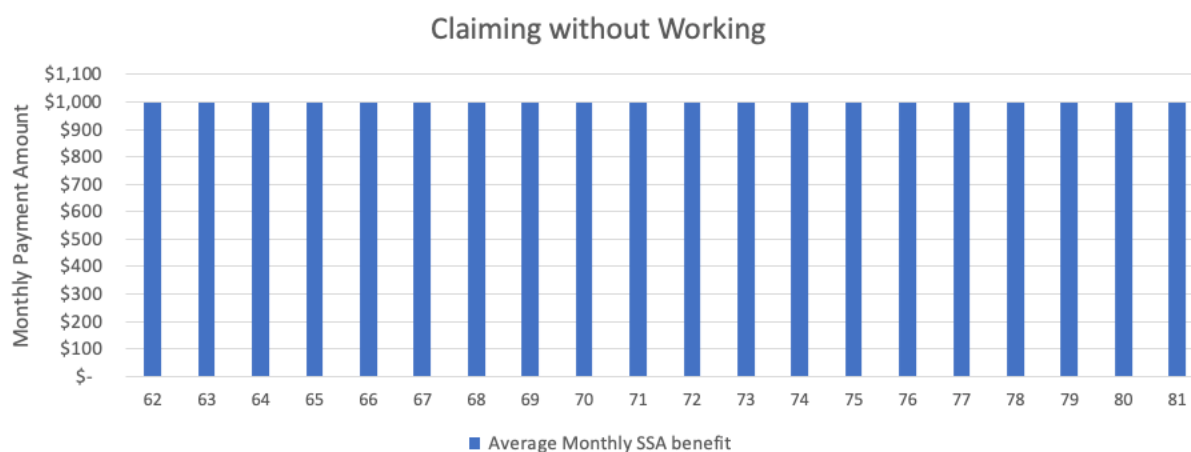
The second graph shows her expected monthly benefits amounts each year if she chooses to claim while also working, earning \$25,000 per year until she turns 67:



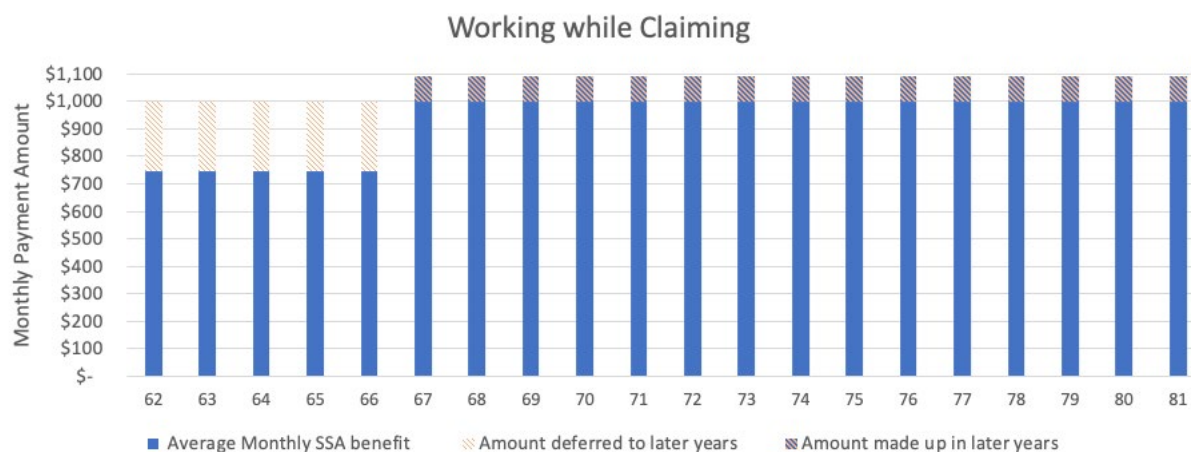
Shifted bar graph.

The graphs below show how the RET works for two scenarios involving a hypothetical beneficiary who claims benefits at age 62.

The first graph shows her expected monthly benefits amounts each year if she chooses to stop working when she begins claiming:



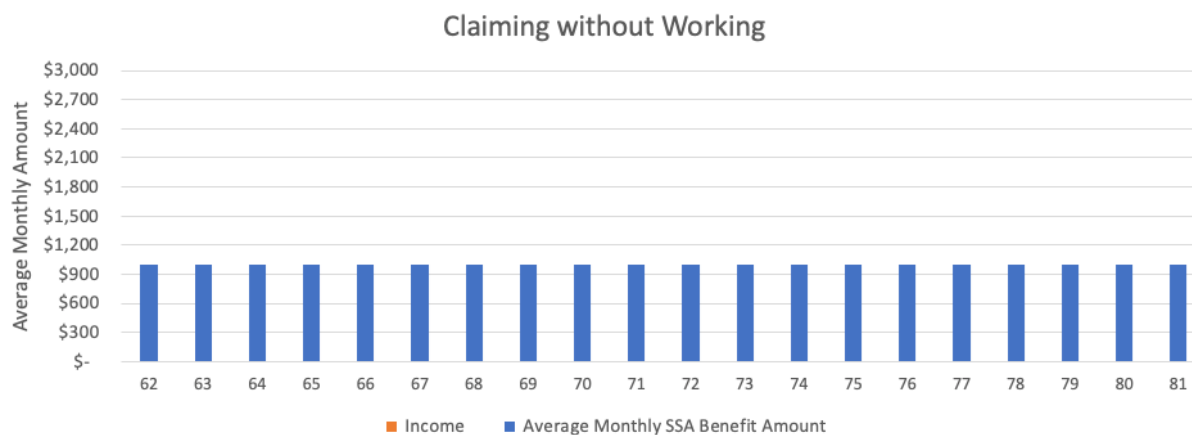
The second graph shows her expected monthly benefits amounts each year if she chooses to claim while also working, earning \$25,000 per year until she turns 67:



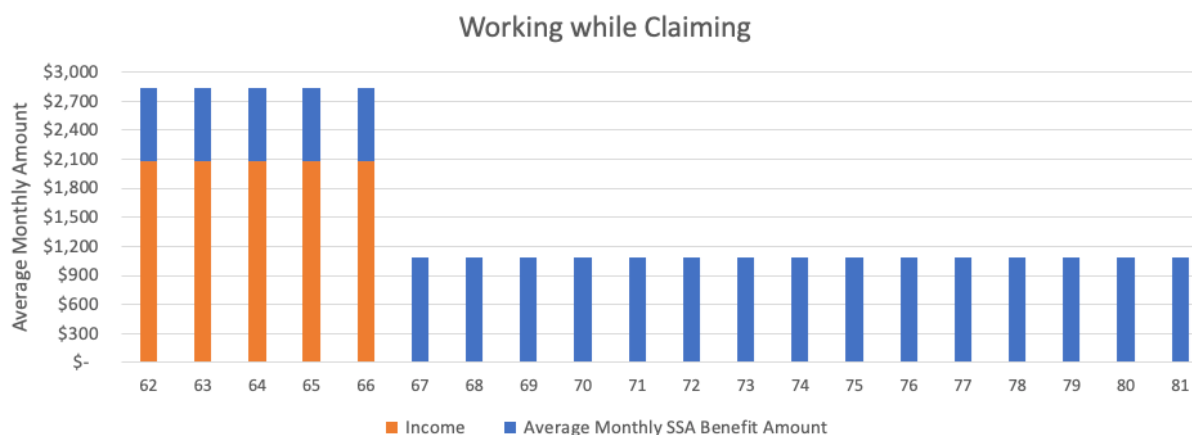
Income bar graph.

The graphs below show how the RET works for two scenarios involving a hypothetical beneficiary who claims benefits at age 62.

The first graph shows her expected monthly benefits amounts each year if she chooses to stop working when she begins claiming:

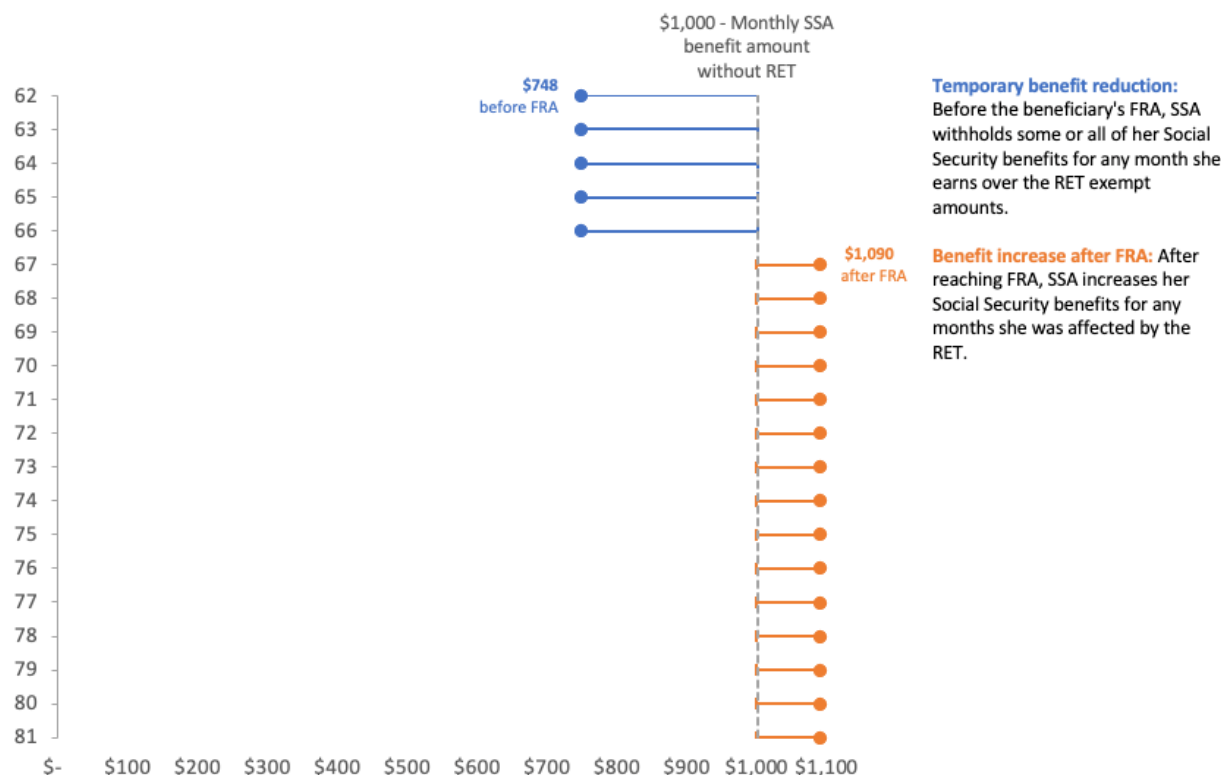


The second graph shows her expected monthly benefits amounts each year if she chooses to claim while also working, earning \$25,000 per year until she turns 67:



SSA.

The graph below shows how the RET works for a scenario involving a hypothetical beneficiary who claims benefits at age 62 and works, earning \$25,000 per year until she turns 67:



Prior knowledge of RET.

Please choose the answer below that best reflects your prior knowledge about the retirement earnings test. Before reading the information on the previous page:

1. I was not aware that Social Security had rules about how much a person who is younger than their full retirement age could earn while collecting benefits
2. I was aware that Social Security had rules about how much a person who is younger than their full retirement age could earn while collecting benefits but did not know that this was called the retirement earnings test
3. I was aware that Social Security had rules about how much a person who is younger than their full retirement age could earn while collecting benefits and did know that this was called the retirement earnings test

Questions about the description.

After reading this description, do you have any specific questions, points of confusion, or comments related to the retirement earnings test?

Introduction to objective knowledge questions.

Now that you've read some information about the retirement earnings test, we'd like to ask you some questions regarding your knowledge and understanding of the rules related to earning while claiming Social Security benefits. Please answer to the best of your knowledge, based on what you knew before the survey and what you may have learned during the survey.

Limit Past FRA.

When a person is past their full retirement age and receiving benefits from Social Security, is there a limit to the amount of income they can earn at a job before their monthly benefit amount is affected?

For this question, please think about a situation in which a person is older than their full retirement age for the entire year (for example, when they are 68-69 years old).

1. Yes, there is a limit on how much a person can earn when older than full retirement age (i.e., if they earn over a certain amount, their benefits for that year might be affected)
2. No, there is not a limit on how much a person can earn when older than full retirement age (i.e., they can earn any amount of money and their benefits for that year will remain unaffected)

Limit amount past FRA.

[only asked of participants who indicated "Yes" to previous question, even though there is no limit on earnings past FRA]

What is the limit on how much a person can earn during a year when they are past their full retirement age before their benefits are affected?

Even if you don't know the exact amount, please provide your best guess.

Once a person earns more than \$[text box].00 per year when younger than full retirement age, Social Security benefits payments would be affected.

Limit under FRA.

When a person is under their full retirement age and receiving benefits from Social Security, is there a limit to the amount of income they can earn at a job before their monthly benefit amount is affected?

For this question, please think about a situation in which a person is younger than their full retirement age for the entire year (for example, when they are 63-64 years old).

1. Yes, there is a limit on how much a person can earn when younger than full retirement age (i.e., if they earn over a certain amount, their benefits for that year might be affected)
2. No, there is not a limit on how much a person can earn when younger than full retirement age (i.e., they can earn any amount of money and their benefits for that year will remain unaffected)

Limit amount.

[only asked of participants who answered previous question correctly]

What is the limit on how much a person can earn during a year when they are younger than full retirement age before their benefits are affected?

Even if you don't know the exact amount, please provide your best guess.

Once a person earns more than \$[text box].00 per year when older than full retirement age, Social Security benefits payments would be affected.

Defer.

[only asked of participants who correctly answered Limit under FRA question]

What happens to a person's benefits if they earned above the limit during the year when they are younger than their full retirement age and claiming benefits from Social Security?

1. Their benefits would be reduced during the year they were earning above the limit
2. Their benefits would stay the same during the year they were earning above the limit
3. Their benefits would be increased during the year they were earning above the limit

Defer amount.

[only asked of participants who correctly answered previous question]

You indicated that a person's benefits would be reduced if they earned above the limit during a year when they are younger than their full retirement age and claiming benefits from Social Security.

Social Security decreases benefits by a specific amount based on how much income a person earns above the limit. Please fill in the statement below to reflect the calculation that Social Security performs to determine the amount that a person's benefits are decreased.

Even if you don't know the exact amount, please provide your best guess.

For every \$[text box].00 that a person earns above the limit during a year when they are younger than their full retirement age, Social Security will deduct \$1 from their benefits amount.

Recoup.

[only asked of participants who correctly answered Defer question]

You indicated that a person's benefits would be reduced if they earned above the limit during a year when they are younger than their full retirement age and claiming benefits from Social Security.

Which of the below situations best characterizes what happens to the person's benefits in the long term?

1. The reduction in benefits due to earning over the limit is never recovered (in other words, the person will never be repaid for the amount lost while earning and claiming)
2. The reduction in benefits due to earning over the limit is recovered later (in other words, the person is repaid for the amount lost while earning and claiming)

Scenario knowledge introduction.

The next few pages will consist of questions about an imaginary scenario related to retirement benefits. Please read the scenario information carefully and respond to the questions according to your understanding of the situation. For the purpose of these questions, please assume there is no inflation and thus no cost-of-living adjustments that will be made.

Scenario introduction.

Imagine you have two friends, Alex and Taylor, who both decided to quit work and begin claiming retirement benefits from Social Security on January 1 of this year, when they were both 62 years old. They had similar work records, and both are currently receiving \$1,000 per month from Social Security.

Alex has decided to take up a part time job next year (while he is 63 years old) and expects to earn \$30,000 per year while he is working.

Who gets higher benefits while working.

In the year(s) that Alex is working (and Taylor is not working), will there be a difference in the monthly retirement benefits that each friend receives from Social Security?

1. Yes, Alex will be receiving a higher monthly benefit from Social Security
2. Yes, Taylor will be receiving a higher monthly benefit from Social Security
3. No, they will be receiving the same monthly benefit from Social Security

Who gets higher benefits after FRA.

Now, suppose that Alex quit working part-time when he reached age 66, while Taylor never returned to work since she began claiming retirement benefits from Social Security.

When Alex and Taylor both reach their full retirement age (67), will there be a difference in the monthly benefits amount that each friend receives from Social Security?

1. Yes, Alex will receive a higher monthly benefit amount after he reaches full retirement age
2. Yes, Taylor will receive a higher monthly benefit amount after she reaches full retirement age
3. No, both friends will receive the same monthly benefit amount after they reach full retirement age

Who gets more in the long-term.

Based on what you read about RET earlier in the survey, will there be a difference in terms of the total amount that each friend receives from Social Security in the long-term?

As a reminder, Alex earned \$30,000 per year while collecting Social Security benefits from age 63-66 while Taylor did not work.

1. Yes, Alex will receive more in total in the long-term
2. Yes, Taylor will receive more in total in the long-term
3. No, both friends will receive roughly the same amount in total in the long term

Subjective understanding introduction.

The next set of questions will ask about your current levels of knowledge about and comfort with various aspects of the retirement decision-making process.

Rules.

Please use the scale provided to indicate your level of agreement or disagreement with the statement below.

I feel confident that I understand the rules of the retirement earnings test.

Strongly disagree 1

2

3

4

Strongly agree 5

Consequences.

Please use the scale provided to indicate your level of agreement or disagreement with the statement below.

I feel confident that I understand the consequences of earning above the income threshold while younger than full retirement age and claiming retirement benefits from Social Security.

Strongly disagree 1

2

3

4

Strongly agree 5

Knowledgeable.

How knowledgeable do you consider yourself to be about the retirement earnings test?

Not at all knowledgeable 1

2

3

4

Very knowledgeable 5

Comfortable.

Given your current understanding, do you feel comfortable in understanding the tradeoffs from earning income while also claiming Social Security benefits in the years before your full retirement age?

Not at all comfortable 1

2

3

4

Very comfortable 5