**Investigating the Effect of Service Messages on Noncompliant Taxpayers' Reactions to Ineffective Audits**

Nina Collum
Assistant Professor
Louisiana Tech University

Susan Jurney
Associate Professor
Oklahoma City University

Mary Marshall
Assistant Professor
Louisiana Tech University

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# Investigating the Effect of Service Messages on Noncompliant Taxpayers' Reactions to Ineffective Audits

ABSTRACT: We examine the very real possibility that audits begin to lose effectiveness as tax authorities continue to receive fewer resources. In an experiment using real US taxpayers, we predict and find a negative relationship between declining audit effectiveness and taxpayer compliance in subsequent periods. Although the most obvious solution would be to invest the resources necessary to achieve full audit effectiveness, this is not feasible in the current budgetary environment. Thus, we propose and test that the inclusion of minimal cost service messages can offset the negative effect of declining audit effectiveness by influencing how the taxpayers perceive the taxing authority. Specifically, our results show taxpayers who view a service message are more likely to view the Internal Revenue Service as focused on customer service (rather than as focused on punishing criminals). Results contribute to the literature on individual tax compliance behavior, particularly related to taxpayers' awareness of the balance between the service and enforcement efforts of tax authorities.

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## 1. Introduction

*An examination is primarily an education vehicle, so the taxpayer learns the rules, corrects mistakes, and can comply in the future. In fact, the IRS gains about twice as much from the long-term effects of an audit than it does from the actual audit itself.*

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Income tax audits are a key aspect of a voluntary tax compliance system. Prior research finds income tax audits increase compliance among taxpayers who are noncompliant (Boylan 2010; Kastlunger et al. 2011); however, these studies assume all audits detect all noncompliance (i.e., achieve full audit effectiveness), which is unlikely given the potential for imperfect audits.[1] Much attention has been paid to the declining percentage of returns audited with very little attention paid to the effectiveness of those audits. Continued funding cuts for the IRS have resulted in a 22% reduction in the IRS's workforce from June 2010 to June 2018 (TRAC 2019) and decreasing ability to respond to taxpayer requests (National Taxpayer Advocate 2019). The continued resource cuts have been demoralizing for IRS employees (National Taxpayer Advocate 2018), which may lead to decreased audit effectiveness for at least two reasons. First, auditors may be assigned increasing caseloads, which would limit their abilities to fully examine returns. Second, auditors may face declining motivation, which could limit both their abilities to

[1] Following prior research, we define "audit effectiveness" as the percentage of noncompliance detected during a tax examination (Alm and McKee 2006). This is similar to "detection risk perceptions," as defined by Carnes and Englebrecht (1995); however, we aren't measuring perceptions. Rather, we are manipulating how effective a particular audit is in terms of detection. Audit effectiveness may influence detection risk perceptions, but it is not a declared detection risk.

fully examine returns and their motivation to remain with the agency. Although increased technological capabilities have offset the decreased personnel in some ways, our paper focuses on the human element of an audit. Thus, we expect reduced resources to hinder IRS employees' efforts to achieve the agency's objectives.

Our study uses a simulated compliance setting to examine the effects of declining audit effectiveness on subsequent compliance decisions. Although prior research finds experiencing an audit increases compliance in subsequent periods by increasing the salience of the associated noncompliance penalties (Boylan 2010; Hageman, LaMothe, and Marshall 2019), we expect the effect of audits on subsequent compliance to decrease as audit effectiveness declines. Although the simplest solution is to allocate the enforcement resources necessary to support more effective audits, this is not a practical solution given the current budgetary environment. Admittedly, achieving more effective audits is challenging regardless of resource levels. Instead, we examine another possible solution by assessing whether an increased focus on service-oriented messaging can offset the negative influence of declining audit effectiveness.

A growing stream of academic literature suggests enforcement agencies should focus on balancing enforcement efforts with more service-based efforts (e.g., Vossler and Gilpatric 2018; Hoffman et al. 2014; Alm et al. 2010), but most of these efforts require additional resources. For example, the IRS currently provides tax assistance to taxpayers through its toll-free telephone helpline, taxpayer assistance centers, and website. The IRS also provides grants to IRS partner organizations for the Volunteer Income Tax Assistance (VITA) and Tax Counseling for the Elderly (TCE) programs. Hoffman, et al. (2014) suggest that the inclusion of service efforts with enforcement efforts is more effective than either strategy by itself. However, many service efforts require significant resources, which are unlikely to surface for new initiatives.[2] Thus, we examine the effect of adding relatively costless reminders of existing service elements to taxpayers' experiences with enforcement efforts. Specifically, we test the effect of two service-minded "reminder" messages that reinforce the IRS mission and the importance of tax collections for society.

We test our predictions with a 2x3 between-subjects experiment distributed to US taxpayers solicited from mTurk via Turk Prime, a research participant recruitment platform. Because audit effectiveness can only decline when the audit is of an evading taxpayer, we limit our analysis to taxpayers who demonstrate a tendency to evade during our simulation. In the experiment, participants perform an earnings task and decide how much of the earnings to report to a tax authority after each of the three experimental rounds. Responses from participants who report all of their earnings (i.e., "compliers") are analyzed in a concurrent project. We manipulate audit effectiveness in two ways (100% of noncompliance is detected v. 50% of noncompliance is detected) during an audit experienced after reporting second round earnings and manipulate the service message in three ways (message highlighting the IRS mission and Taxpayer Bill of Rights, message highlighting the IRS mission and its willingness to help, and no message) before participants report third round earnings. Our primary dependent variable is the change in compliance from round 2 to round 3.

We test for our predicted pattern of results with custom contrast testing (Guggenmos, Piercy, and Agoglia 2018). We predict and find participants decrease compliance more after experiencing a less effective audit. Additionally, we expect and find service messages moderate this effect by redirecting taxpayer focus to the ethical and societal concerns around taxation.

[2]The Taxpayer First Act, Public Law No. 116-25 (July 1, 2019) requires the IRS, in part, to improve its customer service to taxpayers, but fails to identify additional funding to accomplish this goal.

Results show both of the messages we tested mitigated the negative effect of less effective audits. Thus, we provide evidence that tax authorities may be able to offset the negative effects of persistently declining enforcement budgets by incorporating simple reminders of their service efforts into the compliance process. In our setting, taxpayers viewed the message just before reporting their earnings; thus, tax authorities may consider embedding similar reminders in instructions, reminders, and notices to help increase the perception of the authority as a service-focused organization.[3]

Our findings contribute to theory in two primary ways. First, we extend the literature on the effect of audits on tax compliance. Prior literature finds audits increase compliance among those who were initially noncompliant (Boylan 2010) and decrease compliance among those who were initially compliant (Hageman, LaMothe, and Marshall 2019). We add to this literature by examining varying audit effectiveness levels. Specifically, we highlight boundary conditions for prior findings that implicitly assume 100% audit effectiveness as such an assumption is unrealistic, especially in the current budgetary environment. Second, we add to a growing literature on the importance of establishing taxpayer awareness of both enforcement and service activities in a tax agency's operations (Vossler and Gilpatric 2018; Hoffman et al. 2014; Alm et al. 2010). Although prior literature has examined the effects of both enforcement and service, we experimentally disentangle the interactive effects of the two items. Interestingly, we highlight a relatively costless option for offsetting decreasing audit effectiveness.

Our findings may also inform policy-makers, specifically those who are charged with increasing tax collections despite the increasingly scarce resources available to them for enforcement. By identifying a less costly alternative to increase taxpayer focus on societal

[3] The IRS currently provides the Taxpayer Bill of Rights as part of the audit process. In one condition, we examine the effects of providing it instead prior to compliance in hopes of preventing the need for an audit.

obligations, we provide a practical option for tax agencies to implement to, at least partially, offset the decreased enforcement resources. Although our experiment focuses on the effects of budget funding on the IRS's federal income tax collections, it is important to note that most state tax enforcement agencies face similar issues. Challenges such as economic conditions and budget fluctuations, along with an aging workforce, make it difficult for a state tax agency to use their audit and enforcement time efficiently (Reissig 2016). Thus, our study informs tax enforcement at multiple levels.

## 2. Background and Hypothesis Development

### *Effects of Tax Audits on Subsequent Compliance*

Our study is primarily concerned with the effects of a taxpayer audit in one year on that taxpayer's compliance in subsequent years. Several prior studies have examined such indirect effects of audits with interesting results (Erard 1992; Bloomquist 2004, 2013; Mittone 2006; Maciejovsky et al. 2007; Alm, Jackson, and McKee 2009; Kleven, Knudsen, Kreiner, Pedersen, and Saez 2011; Ratto et al. 2013; Mittone et al. 2017; Hageman, LaMothe, and Marshall 2019). Consistent with prior findings that taxpayers incorporate information other than that included in the traditional model (e.g., current period penalties and interest) into their compliance decisions across multiple periods, we test the unexplored effect of audit effectiveness on subsequent compliance. Other studies have examined similar "missing factors" of tax evasion. For example, Alm, et al. (2009) find pre-announcing audit rates and announcing results of prior period audits at the beginning of a period influences compliance. In a field experiment, Kleven, et al. (2011) find knowledge of prior audits influences taxpayers' compliance when reporting self-reported income. Thus, prior literature provides robust support for a persistent effect of audits on taxpayer behavior across multiple periods.

Although many studies have found audits reduce tax evasion in subsequent years (Alm, et al 2009; Boylan 2010; Kleven, et al. 2011), some studies have documented an increase in tax evasion following an audit (Mittone 2006; Maciejovsky et al. 2007; Mittone et al. 2017). One growing stream of literature examines the misperception of chance on the part of the taxpayers because they assume the same taxpayer is unlikely to be audited twice. This misconception is often termed the "bomb crater effect" (BCE), originating from the phenomenon of soldiers in World War I who would dive into existing bomb craters during bombardments (Mittone 2006; Mittone et al. 2017). Andreoni, Erard, and Feinstein (1998) provide two potential reasons audits may not improve compliance long term: (1) audit outcomes may not be as negative a taxpayer expected (e.g., noncompliance remains undetected and/or penalties are not appropriately calibrated) or (2) audits may be a negative experience and attempt to recover perceived losses or avenge the perceived injustice of the experience.

The second explanation posited by Andreoni et al, (1998), is addressed in part by + and Hageman, et al. (2020). Specifically, Gemmell and Ratto (2012) identify that those who were compliant (noncompliant) on an audited return are more likely to decrease (increase) subsequent compliance. Extending this study, Hageman, et al. (2020) disentangle the effect of being audited with the burden experienced as part of that audit. They find the primary driver of differential reactions to audits occurs when audit burden, which they define as the economic and non-economic costs of undergoing an audit, is high. Drawing from these studies, our study focuses on the behavior of tax evaders (i.e., report less than 100% of earnings), as they are the only group of taxpayers who can experience a less effective audit (i.e., fully compliant taxpayers have no noncompliance to detect), to address Andreoni, et al.'s (1998) suggestion that audits may be less effective in increasing long-term compliance because they fail to be sufficiently deterrent.

### *Audit Effectiveness*

We examine declining audit effectiveness as a potential factor in exploring the indirect effect of audits. We define audit effectiveness as the extent to which an auditor detects noncompliance.[4] Even before the recent downward budget trend, improving audit effectiveness was an important element of the detection efforts of a tax authority. In fact, tax gaps, or the amount of uncollected tax revenue, exist in nations across the world with very different funding situations.[5] In the U.S., the National Tax Advocate highlighted the negative effect of continuously declining resources on customer service efforts in her recent reports (National Taxpayer Advocate 2018; 2019). Specifically, the National Taxpayer Advocate highlighted how the IRS's budget shortfall could negatively influence both enforcement and service activities of the IRS "due to antiquated technology, a smaller workforce, and an increasing workload" (National Taxpayer Advocate 2019). The impact of continued funding cuts for the IRS has resulted in a 22% reduction in the IRS's workforce from June 2010 to June 2018 (TRAC 2019). The audit rate has also changed for individual tax returns over the same ten-year period. In fact, total audits decreased by just over 57 percent. The decline in field audits was likely even larger given that the number of correspondence audits increased slightly. Because correspondence audits are often single-issue audits, taxpayers may feel as if they got away with noncompliance in other, unexamined areas. Unfortunately, the current political climate does not indicate that this trend will change, which may exacerbate any audit effectiveness issues present before the budget

[4] Notably, 100% detection is an unreasonable expectation even with surplus resources.
[5] In the U.S., the net average annual net tax gap (after IRS enforcement and administrative activities) estimate is $381 billion, which translates to an estimated 85.8% net compliance rate (Internal Revenue Service 2019). Individual income tax comprises approximately 71% of this tax gap, and the estimated compliance rate for these taxpayers is 78% (Internal Revenue Service 2019).

cuts.[6] Thus, we expect the IRS to continue to operate with fewer resources than necessary to achieve their enforcement objectives.

Prior research finds income tax audits increase subsequent tax compliance among taxpayers who are noncompliant (Alm et al 2009; Boylan 2010; Kastlunger et al. 2011). However, these studies are designed to assume audits detect 100% of noncompliance, which is likely an unreasonable assumption given the sheer number of returns filed with the IRS each year, but is likely especially unreasonable in the current budgetary environment that has resulted in reduced staffing and fewer audited returns. Whereas Boylan (2010) finds experiencing an audit increases the salience of the associated penalties in subsequent reporting periods, we propose that taxpayers who experience a less effective audit are less likely to adjust expectations. In fact, it is possible taxpayers who become aware that audits may be less effective than expected could feel emboldened to increase evasion on subsequent returns.

Our predictions draw from findings related to the effect of detection efforts such as audit, penalty, and tax rates on compliance (Carnes and Englebrecht 1995; Alm, Jackson, and McKee 1992; Allingham and Sandmo 1972). Generally, prior studies find a positive relationship between compliance and detection efforts. The evasion model developed by Allingham and Sandmo (1972) includes audit rate, detection rate, and penalty rate in predictions of a taxpayer's expected utility for evasion. Thus, changes in audit effectiveness would be expected to influence taxpayer compliance decisions; however, most prior experimental studies implicitly assume audited tax returns result in 100% detection of noncompliance (i.e., full audit effectiveness).

[6] We acknowledge the Internal Revenue Service has invested in technology to improve audit selection efforts (e.g., big data analysis of social media, cash payment applications, etc.); however, the current study focuses on the "human element" of the audit process. Refined selection procedures do increase the likelihood of detection; however, examinations of returns including unmatched income require significant human involvement.

Prior literature has examined the effect of audit effectiveness when it is known by the taxpayer *a priori*. Specifically, Alm and McKee (2006) examine audit effectiveness using notifications to taxpayers. They find taxpayers who expect to be audited and are informed that the audit will be effective (i.e., highly effective) are more likely to comply. However, this increase in compliance requires that taxpayers be notified of both audit probability *and* effectiveness of audits prior to making any reporting decision. It is unlikely that an enforcement agency would provide advance notice to taxpayers that an audit would not be effective. Nor is it reasonable to expect a taxing authority to know an audit was not effective; thus, we examine the effect of income tax audits of varying audit effectiveness in a simulated compliance setting to determine the effect of reduced audit effectiveness on subsequent compliance. Although prior research finds experiencing an audit increases compliance in subsequent periods by increasing the salience of the associated noncompliance penalties, we expect the effect of audits on subsequent compliance to decrease as audit effectiveness declines because taxpayers associate lower costs with a noncompliance decision (e.g., lower perceived detection). Stated formally, our first hypothesis is:

> **H1: Taxpayers who experience less effective audits are less likely to increase subsequent compliance than those who experience more effective audits.**

***The Service Paradigm***

Regardless of the budget changes, less effective audits will remain a problem due to time pressure, resource demands, and the volume of tax returns filed each year. Rather than introduce an additional service to attempt to offset audit effectiveness, we examine another possible solution by assessing whether an increased focus on service-oriented messaging can offset the negative influence of declining audit effectiveness. Although the traditional evasion model examines the effects of enforcement activities, recent findings indicate enforcement agencies should shift from the “enforcement paradigm” to a “service paradigm” where individuals are viewed as customers and the agency’s efforts are focused on facilitating appropriate compliance rather than detecting and punishing criminals.

A growing stream of literature supports the idea that enforcement agencies should focus on balancing enforcement efforts with service-based efforts (e.g., Vossler and Gilpatric 2018; Hoffman et al. 2014; Alm et al. 2010). Alm et al. (2010) examine the effect of taxpayer services when taxpayers experience uncertainty through complicated reporting requirements. They find taxpayers who receive agency-provided assistance are more likely to both file a tax return and to pay a larger proportion of their taxes due when they choose to file. Vossler and Gilpatric (2018) extend the findings of Alm et al. (2010) by also manipulating the cost and the quality of the information service provided by the agency. They find the presence of an information service reduces the negative reactions to being audited, *even if the service is not used.* Together, these studies document a strong positive effect of service efforts on compliance. Further, they suggest taxpayers who are willing to evade when reporting income can be influenced by a message highlighting that the tax agency is serviced-focused.

The IRS offers programs similar to what Alm et al. (2010) and Vossler and Gilpatric (2018) test by providing the toll-free information phone line, grants to organizations to provide services like VITA, and through the National Taxpayer Advocate, among other programs. All of these services require resources, which are scarce in governmental agencies. Thus, the present study focuses on a messaging initiative that reinforces the IRS’s efforts to facilitate taxpayer compliance. Rather than creating and testing a new service-based initiative, we examine the effect of increasing taxpayer awareness of the service side of the IRS as prior literature has documented a positive effect of the mere existence of such programs (Hoffman et al. 2014).

There are several potential reasons service efforts influence reactions to enforcement activities. Hoffman, et al. (2014) suggest service and enforcement efforts elicit perceptions of different types of power, which have varied influences on trust. They find enforcement efforts (which increase perceived coercive power) decrease many elements of trust that inform compliance decisions. However, they ultimately find that the inclusion of service efforts (which increase perceived legitimate power) with enforcement efforts can eliminate those negative effects. Thus, service efforts highlighting the government's willingness to assist taxpayers in their efforts to comply may increase their trust in government.

It is also possible that a service message may lead previously noncompliant taxpayers to view compliance as a purely economic decision (rather than a moral or ethical one). Mazar, Amir, and Ariely (2008) suggest individuals who cheat are faced with a dilemma to balance the gain they receive from dishonesty with the loss they experience from being a dishonest person. They argue that people can categorize their dishonesty without challenging their self-concept as an honest person. In a tax context, noncompliant taxpayers experience a gain from the reduced tax liability. Thus, noncompliant taxpayers may find ways to separate the economic gain (i.e., reduced taxes) from the unethical behavior (i.e., not fulfilling their obligation to the tax system). Traditional enforcement activities cost the taxpayer in lost time, fees for advice, and assessed penalties when noncompliance is detected; thus, we suggest experiencing an audit may frame the decision as more of an economic gamble. We further suggest a service message reminding taxpayers of the IRS's service-based efforts could redirect taxpayers to (1) consider compliance from an ethical perspective and/or (2) view the IRS as an agency focused on taxpayer service in addition to enforcement. We expect taxpayers who see both declining enforcement and increasing service are less likely to decrease compliance than those who see only declining enforcement. Thus, our second hypothesis is:

> **H2: Taxpayers who experience less effective audits are more likely to increase compliance in subsequent years when they are more aware of service efforts.**

## 3. Methods

To test our predictions, we use a between-subjects experiment manipulating audit effectiveness (more or less) and the presence of a service message (present or absent).[7] The experiment was conducted via an online Qualtrics instrument distributed to US taxpayers solicited through mTurk via Turk Prime. Prior studies have identified best practices for use of mTurk participants in experimental studies (Grenier, Reffett, Simon, and Warne 2018). Consistent with these recommendations, we required participants have at least a 95% approval rate, have completed at least 1,000 Human Intelligence Tasks (HITs), and pass a screening test. We also embedded several attention checks in the instrument to ensure attentive completion.

The experimental procedures are modified from Hageman, LaMothe, and Marshall (2019), which was modified from Austin, Bobek, and LaMothe (2020) and shown graphically in Figure 1. Participants are paid up to $2 ($1 plus up to $1 bonus) upon completion of the study. The bonus is based upon experimental earnings in one randomly selected round in accordance with the proportion of the experimental currency earned in that round (e.g., a participant earning 7,500 Lira would be entitled to a $0.75 bonus). In the experiment, participants perform an earnings task and decide how much of the earnings to report to a tax authority after each of three experimental rounds.[8] Only participants who reported less than the full amount of earnings in

[7] The instrument included two service messages, one reminding taxpayers of the IRS's interest in helping with compliance concerns and another informing taxpayers of the Taxpayer Bill of Rights. Participant reactions to the two message produced no significant differences. For brevity and ease of presentation, we exclude one of the message conditions from discussion.
[8] We do not disclose the number of rounds to participants to avoid an end-of-game effect.

round 2 are included in the analysis for this paper to ensure that we capture the reactions of taxpayers who are most likely to evade.[9]

**Task and Procedure**

Participants begin by completing three screening questions. Only taxpayers who are citizens or residents of the US, at least 25 years old, and have filed at least two U.S. tax returns are allowed to continue. The instrument includes two parts. The first part of the instrument is the earnings and reporting task, which is the focus of this study. The second part of the instrument is a questionnaire that provides measures of common individual differences present among individual taxpayers (e.g., perceptions of tax fairness, trust in government, and social norms of taxation). Because the questionnaire prompts participants to consider their attitudes toward taxation, we randomize the order of the two parts to control for any order effects.

Participants first examine the rules, including a 30% tax rate, a 5-20% audit probability, and the independence of each round's reporting from other rounds' likelihood of being audited. They next complete a quiz measuring their understanding of the rules before proceeding to the task. If they incorrectly respond to any of the quiz questions, they are redirected to a review screen and offered the opportunity to respond again. Participants who successfully pass the quiz by the second attempt proceed to round one, which serves as a practice round in which they complete five slider tasks to simulate earning income. They decide how much of the 10,000 Lira they earned to report to the tax authority, view a summary of their reported before-tax and after-tax earnings, are informed that they were not audited, and move on to round two. The procedure

[9] From a practical perspective, it is impossible to manipulate the effectiveness of an audit if a taxpayers is 100% compliant. As a result, our sample also produced a set of compliers whose behavior was incompatible with our research design. Rather than losing these participants, we developed a questionnaire to compare ethical and other characteristics that may differ between evaders and compliers. The comparison questionnaire is used as the primary data source for a concurrent paper.

repeats for three full rounds. All participants classified as evaders experience an audit during the second round and participants in the message conditions view a service message prior to reporting earnings in the third round.[10]

### *Manipulated Variables*

After reporting their earnings in the second round, all evaders experience an audit in which either 100% or 50% of unpaid taxes are detected and penalties are assessed. To ensure the audit experience is salient, participants complete a transcription task to simulate the audit process. Next, participants complete a third earnings and reporting round. Immediately prior to reporting their round three earnings, participants who are assigned to the message conditions view the service message, which includes the IRS mission and language drawn from Hasseldine, Hite, James, and Toumi's (2007) persuasive message manipulation and is shown below:[11]

> *THE MISSION OF THE INTERNAL REVENUE SERVICE*
>
> *Congress passes the tax laws and requires taxpayers to comply; however, the IRS is responsible for enforcing those laws. Thus, the IRS mission is to provide America's taxpayers top quality service by helping them understand and meet their tax responsibilities and enforce the law with integrity and fairness to all.*
>
> *The IRS wants to make it easier for you to make a complete and accurate return. We are here to give you advice and support if you need it.*

### *Dependent Variable*

The dependent variable is the change in the amount of income reported to the tax authority from the second round (the audited round) to the third round (the round subsequent to the audit where participants viewed the message manipulation).

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[10] Our experimental instructions inform participants of a 5-20% audit rate. Evaders faced a 33% audit rate; however, the data for this study was collected concurrently with the data for another study focused on compliers. Compliers were never audited, so the expected audit rate was below 33%. Because the proportion of compliers to evaders is not predictable prior to collection, we provided a range to avoid deception.
[11] See Appendix 1 for the second service message, which produced similar responses and is not included in analysis for brevity and ease of presentation.

### *Manipulation Checks and Additional Measures*

We confirm the manipulation of audit effectiveness with participants' responses to "The auditor did a good job identifying any income I omitted from my tax return," which is presented on a 1-7 Likert-type scale where 1 indicates strongly disagree and 7 indicates strongly agree. The manipulation is confirmed if taxpayers who experience more effective audits report significantly more agreement than those who experienced less effective audits. We confirm the manipulation of the message with participants' responses to "Which of the following did you view during the simulation?" The manipulation is effective if participants in the "no message" condition select "neither of the above messages," and participants in the "message" conditions select the description of the appropriate message they viewed. Finally, we collect a number of additional items including demographic characteristics, risk preferences, personality traits, and prior beliefs about the income tax system and audits.

## 4. Results

### *Participants*

A total of 595 U.S. taxpayers completed the experiment through mTurk for payment of $1 plus up to $1 bonus. Of those, 324 participants were excluded from analysis because they were fully compliant which is incompatible with experiencing a less effective audit and 88 were removed as part of the second message condition. After excluding compliers and removed conditions, we report the results of 181 remaining participants.[12] On average, the participants spent 21 minutes completing the experiment and received $1.81 in payment. The bonus was

[12] Of the 271 "evaders," only 6 were identified as potentially inattentive based on their responses to the three attention check items to ensure workers were paying attention. The first item required participants to select "neither agree nor disagree," the second item instructed them to select any option other than "somewhat agree" in a second item, and the third item required them to identify the largest number from among a list. Results are not statistically different when the 6 inattentive participants are excluded.

calculated as $1 per 10,000 Lira in one selected round of after-tax earnings. As shown in Table 1, participants are relatively young and highly educated. Specifically, 51% of participants are male, over half of participants are younger than 45 years old, and 96% have filed at least three tax returns in the past, primarily on their own with tax software. Most participants report earning between $25,000 and $75,000. None of these demographic variables are significantly different across conditions.

[Insert table 1 here]

***Manipulation Checks***

When asked whether the auditor "did a good job identifying any income I omitted from my tax return," participants in the more effective audit condition reported significantly higher agreement than those in the less effective audits ($p < 0.001$, two-tailed, untabulated). This confirms our manipulation of effectiveness such that participants experiencing less effective audits were aware of the lower likelihood of an auditor discovering their future omissions. Additionally, 165 participants (90%) correctly responded to the message manipulation check. Thus, we conclude the manipulations were effective.

***Hypothesis Testing***

Table 2, Panel A lists the mean and standard deviation for participants' reported earnings in each round and the change in earnings reported from round two to round three. Results from a 2 x 2 ANOVA indicate significant main effects of message ($p < 0.001$) and effectiveness ($p = 0.015$) on change with an insignificant interaction term ($p = 0.316$, Table 2, Panel B). Mean change by condition is depicted in Figure 2. The insignificant interaction is not problematic as H2 predicts an ordinal interaction, rather than the standard disordinal interaction tested by ANOVA. We discuss our analysis of H2 later in the results section.

[Insert Table 2 here]

[Insert Figure 2 here]

Hypothesis 1 predicts tax compliance will decrease with less audit effectiveness. Thus, we expect a main effect of effectiveness such that taxpayers who experience a less effective audit increase evasion (i.e., decrease compliance) more than those who experience a more effective audit. Mean responses are shown in Table 2, Panel A. Hypothesis 1 is supported such that taxpayers experiencing lower audit effectiveness, regardless of message, decreased their compliance significantly more than those experiencing higher audit effectiveness ($p$ = 0.015, two-tailed, Table 2, Panel B). As a more direct test, we also compare the effect of audit effectiveness on change in compliance for taxpayers who viewed no message. In further support of H1, we find taxpayers who experienced less audit effectiveness increased tax evasion and those who experienced more audit effectiveness increased compliance ($M_{less}$ = -1,391, $M_{more}$ = 913, $t$ = 3.553, $p$ = 0.001, two-tailed, untabulated). Thus, we conclude a significant effect of audit effectiveness, supporting H1.

Hypothesis 2 predicts an interaction such that taxpayers experiencing less effective audits who viewed a service reminder message will be less likely to decrease compliance than those who do not view a service message. That is, we expect message to moderate the effect of low effectiveness. Because we predict an ordinal interaction, the standard ANOVA is not appropriate to test H2. Consequently, we use custom contrast testing using the three steps established by Guggenmos, et al. (2018). We first determine custom contrast codes for the conditions. Our hypotheses predict audit effectiveness has a negative relationship with compliance and service messages have a positive relationship with compliance. Further, we expect service to have a stronger influence on taxpayers when they experience a less effective audit. We assign a custom contrast coding of -3 to the less effective condition without a message and codes of 1 to all three other conditions.[13] We do so because we expect the less effective audits to provide strong economic incentive for continued evasion (rather than the intended deterrent effect of audits); however, we expect the message to offset this effect by shifting that focus from economic to more of a focus on societal obligations. Our predicted pattern is in Figure 3, Panel A, below.

[Insert Figure 3 here.]

To test the contrast effect, we first determine the visual fit of the contrast codes to the study's data. As shown in Figure 3, Panel B, visual inspection of the data supports the predicted pattern. Second, Guggenmos et al. (2018) recommend that researchers establish both the statistical significance of the contrast test and the non-significance of the residual between-cells variance test. As shown in Table 2, Panel C, results indicate a significant contrast ($p = 0.001$) and a non-significant residual between-cells variance test ($p = 0.181$), which provides support for a significant interaction in the second step of the Guggenmos et al. (2018) process. Their third step requires evaluating the contrast variance residual metric, or $q^2$, which identifies the proportion of between-cells variance that the contrast does *not* explain. As shown in Table 2, Panel C, $q^2 = 0.171$, indicates that the contrast does not explain 17.1% of the between-cells variance (and *does* explain the remaining 82.9%). Together, the three steps of the Guggenmos et al. (2018) process (i.e., identifying visual fit, establishing both significance of contrast test *and* insignificance of residual between-cells variance test, and confirming the contrast variance residual metric is sufficiently low) indicate support for a significant interaction, which aligns with our hypothesis

[13] Our theory predicts at least partial, but potentially full, moderation; however, it does not identify specific codes. We test for full moderation, where the message completely mitigates the effect of low effectiveness, with the codes of [1,-3,1,1]. To ensure the results of our custom contrast coding analysis was not subject to calibration, we confirmed similar results to our codes (reported above) with alternate analysis using the following less aggressive codes [1,-2.5,1,.5], [1,-2,1,0], [0,-0.5,0.5,0]. Results were substantively unchanged across coding schemes.

that a service message mitigates the negative effect of declining audit effectiveness, thus supporting H2.

We further test H2 with simple effects tests comparing the effects of each message on compliance to that reported in the no message condition. Specifically, when examining the effect of the message on taxpayers' change in compliance when they experience less effective audits, we find significant increases in compliance ($p = 0.016$, two-tailed, Table 2, Panel D). Results further support H2 such that taxpayers experiencing more effective audits did not change compliance differently than those who experienced less effective audits and viewed the messages focused on helpfulness ($p = 0.405$, two-tailed, Table 2, Panel D). Thus, we find the message was very effective in offsetting the negative effect of less effective audits on changes in compliance. This is particularly interesting given that our study focuses on the behavior of tax evaders, who may be the least likely to respond to service efforts due to their propensity to evade.

***Analysis Excluding Extreme Evaders***

Our experimental design precluded analysis of participants who reported 100% of earnings; however, we next test the robustness of our results by removing the participants who reported 0% of earnings. After excluding the 75 participants who reported no earnings in round 2, we confirm our findings as reported in Table 2. Further, when examining only the 75 participants who reported no earnings in round 2, we find a significant effect of audit effectiveness ($p < 0.000$), two-tailed, untabulated), a significant effect of message ($p = 0.020$, one-tailed, untabulated), and no significant interaction ($p = 0.435$, untabulated). Results are similar to our primary analysis, providing additional support for the effects of both effectiveness and message, even on those who were willing to report no earnings in the audited round.

***Analysis of the Effect of the Message on Taxpayer Objectives***

To explain the psychological mechanism driving the effect of a message on change, we also measure participants' reported objectives (e.g., societal obligation or economic gain) and participants' perception of the IRS's focus (e.g., punishing criminals or providing customer service). Our hypotheses inherently predict taxpayers who view a message will view their obligation to pay taxes differently than those who do not view a message. To test this theory, we presented participants with four objectives they may have considered when making their reporting decisions. Two of the objectives were designed to describe a taxpayer who focused on reducing the economic impact of tax compliance, including "paying as little taxes as possible" and "being frugal." The other two objectives were designed to describe a taxpayer who focused on societal obligations, including "fulfilling your obligations to society" and "being an honest person." We paired each objective with the objective with opposite focus (see Appendix 1 for details) to construct six comparison questions. Participants then selected which objective best fit their decision making on a 6-point scale, where "0" indicated one objective and "5" indicated the other. We re-coded the responses such that neutral is "0," the two economically-focused objectives were always anchored at "-2.5" and the other objectives were anchored at "2.5."[14] By including no midpoint, we were able to force participants to indicate at least a slight preference for one objective over the other.

We use the mean response to indicate whether the taxpayer was more focused on economic impact or societal obligations, shown by condition in Table 3, Panel A. We expect taxpayers who view a message to react less negatively (e.g., decrease compliance less) to experiencing less audit effectiveness because they focus on their societal obligations rather than

[14] We also measure taxpayer focus on either societal obligations or tax-minimization with a single item. Results are no different than the results of the composite measure comprised of the six paired questions. For brevity, we only present one measure.

minimizing economic costs. As shown in Table 3, Panel A, we find taxpayers who experience less audit effectiveness and do not view a message (*M* = -1.1398) are significantly less (more) likely to report that they are focused on the societal impact (economic cost) of compliance than those who experience less audit effectiveness and view the helpfulness message (*M* = -0.706, $p$ = 0.015).

[Insert Table 3 here].

***Analysis of the effect of message on taxpayers' perspectives of the IRS focus***

We measure taxpayers' perspectives of the IRS with the following question: "Based on what you have viewed in this simulation, would you say the IRS is more likely to view taxpayers as customers who need assistance or as criminals who need to be punished?" on a five-point scale where "0" indicates "definitely punishing criminals" and 5 indicates "definitely providing service." Mean responses are shown in Table 4, Panel A. Results examining the effect of the message on those in the less effective audit conditions, presented in Table 4, Panel B, show taxpayers who view the service message are more likely to view the IRS as service-focused than those who do not view a message ($p < 0.001$).

[Insert Table 4]

Finally, we also examine the effect of the message on three documented predictors of tax compliance: tax fairness measured with the scale of Farrar, Massey, Osecki, and Thorne (2020) , social norms measured with the scale of Bobek, Hageman, and Kelliher (2010), and trust in government measured with the scale of Murphy (2004). We find the service message increases taxpayers' perceptions of the evenhandedness of the tax authority ($p$ = 0.075, two-tailed, untabulated). The evenhandedness of the tax authority is one of the fairness dimensions identified by Farrar, et al. (2020). The message did not influence participants' social norms or trust in government, which is reasonable because both constructs are formed over time and a single interaction is unlikely to significantly influence either trust in government or social norms. None of the abovementioned variables were influenced by changes in audit effectiveness.

## 5. Conclusion and Discussion

In a simulated compliance setting, we experimentally examine one likely effect of dwindling enforcement resources: decreased audit effectiveness. We find that taxpayers who experience a less effective audit are less likely to increase compliance in the subsequent reporting period, which creates a vicious cycle by further reducing revenues available for allocation by Congress. We further propose and test service reminder messages as a minimal-cost solution that tax authorities can use to offset the potential for declining audit effectiveness. Our results indicate that service reminder messages are effective at both moderating the effect of declining audit effectiveness *and* shifting taxpayer perceptions of IRS intentions. Specifically, we find taxpayers who experience a less effective audit change their compliance similarly to those who experienced a more effective audit when they view a simple, relatively cost-free message reminding them of the IRS mission and willingness to assist.

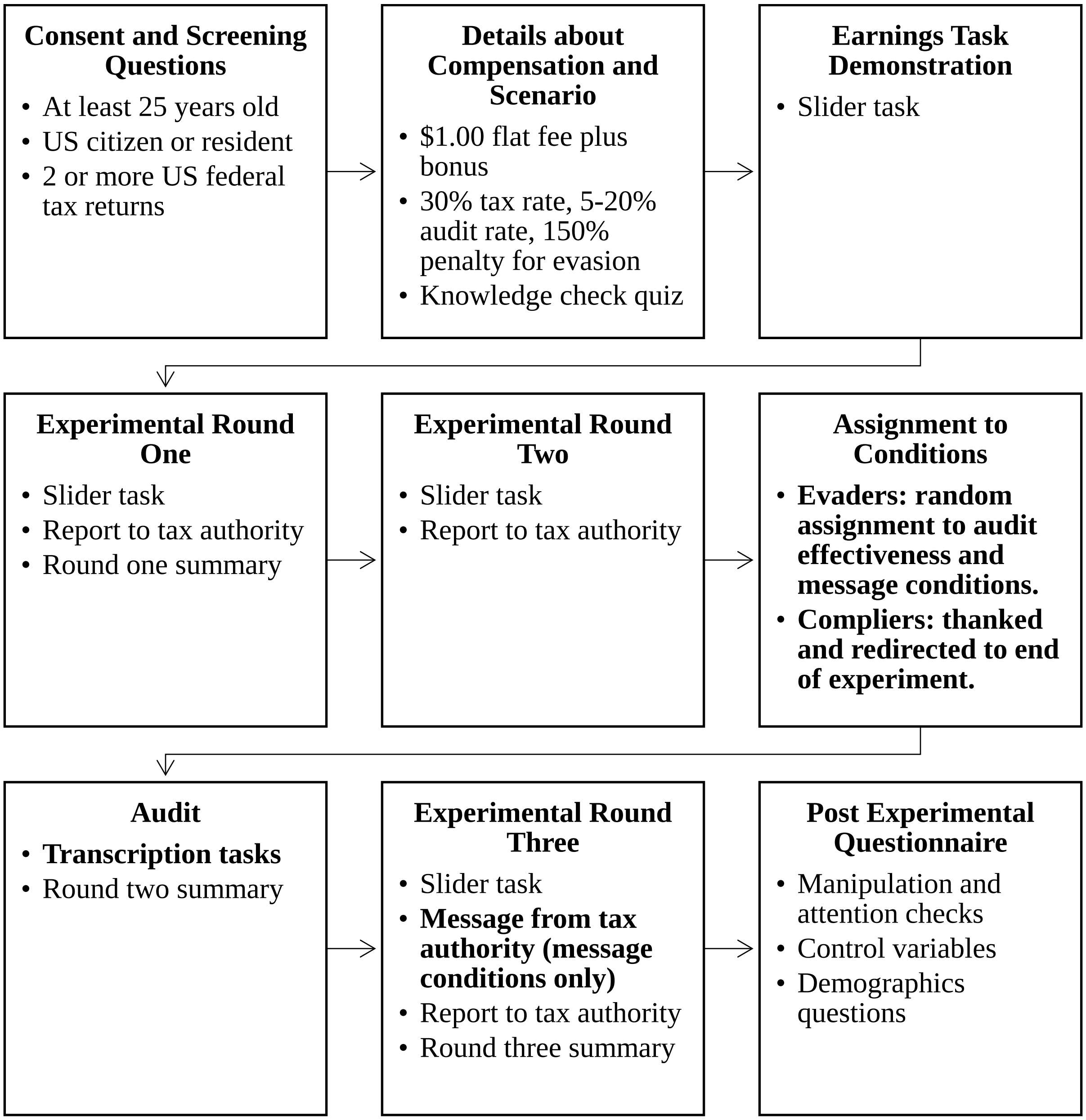
Our study shares similar limitations to other experimental investigations of taxpayer compliance. First, our scenario includes decisions about specific amounts of obviously-taxable income. In reality, taxpayers are often considering reporting earnings with less precise treatments, which may influence the generalizability of our findings to more complex situations. Second, our earnings and audit tasks are modified from prior experimental studies; however, they are necessarily abstract and may not fully replicate the experience of taxpayers experiencing the compliance and/or enforcement process in practice. Third, our participants complete three rounds of earnings and reporting in minutes. Although we are unaware of specific concerns related to the applicability of these findings to a more longitudinal environment, interpretation of results should consider the accelerated time frame. Fourth, our results only examine behavior in the immediately subsequent reporting period. Future research should examine the lasting effects of a service approach in the presence of continually declining enforcement resources. Finally, we test whether the service message can increase compliance of taxpayers who were initially noncompliant. Thus, inferences drawn from our study should not be applied to increasing the compliance of compliant individuals.

Despite these limitations, our findings contribute to theory in two primary ways. First, we extend the literature on the effect of audits on tax compliance. Prior literature finds audits increase compliance among those who were initially noncompliant (Boylan 2010) and decrease compliance among those who were initially compliant (Hageman, LaMothe, and Marshall 2019). To our knowledge, these studies largely operationalize audits such that returns that are audited are done so with 100% effectiveness. Given that real-world audits are not 100% effective on average, we add to this literature by examining varying audit effectiveness levels (more or less). Specifically, we highlight boundary conditions for prior findings. Second, we add to a growing literature on the importance of establishing taxpayer awareness of both enforcement and service activities in a tax agency's operations. Although prior literature has examined the effects of both enforcement and service, we experimentally disentangle the interactive effects of the two items.

Our findings may also inform policy-makers, specifically those who are charged with increasing tax collections despite the increasingly scarce resources available to them for enforcement. By identifying a less costly option to increase taxpayer morale towards the agency, we provide a practical option for tax agencies to implement in order to offset the decreased enforcement resources.

## Appendix 1. Details of and Excerpts from Experimental Materials

**Panel A: Flow of the Experiment**




The experimental materials, including some of the appendix material, are modified from Austin, et al. (2020) and Hageman, et al. (2019).

**Panel B: Instructions and Knowledge Quiz**

In the simulation, you will complete multiple rounds in which you will earn Lira by completing an earnings task and then report your earnings to the taxing authority. The information on this screen explains how your after-tax earnings are calculated. Do not leave this screen until you feel comfortable with understanding how your after-tax earnings are calculated. You may choose to report any amount of your earnings to the tax authority, and a 30% income tax will be assessed on any earnings you choose to report. However, 5-20% of all returns submitted to the tax authority will be audited. Audits do not depend on the amount of income you decide to report and selection for audit does not depend on the outcome of previous audits. If you are audited and your reported earnings are not equal to your actual earnings, you will owe income tax on the portion of earnings that you did not report. Additionally, there will be a penalty of 150% of the tax due on the underreported amount. To illustrate these rules, the following table summarizes a few possible scenarios assuming 10,000 Lira of earnings.

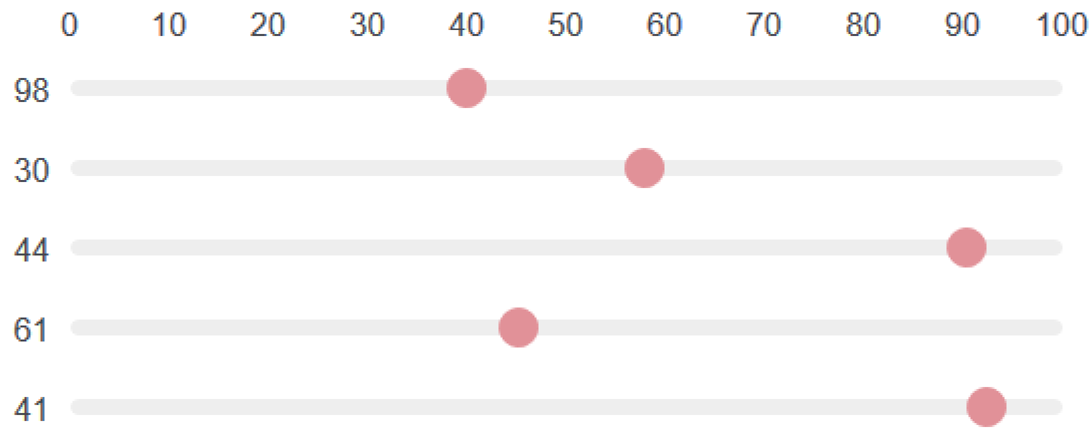
| **NOT selected for audit (80-95% chance)** | | | |
|---|---|---|---|
| **Scenario** | **1** | **2** | **3** |
| Earnings | 10,000 | 10,000 | 10,000 |
| Tax Rate | 30% | 30% | 30% |
| Reported Earnings | --0-- | 5,000 | 10,000 |
| Tax on Reported Earnings | --0-- | 1,500 | 3,000 |
| After-tax earnings if NOT selected for audit | 10,000 | 8,500 | 7,000 |
| **Selected for audit (5-20% chance)** | | | |
| **Scenario** | **1** | **2** | **3** |
| Earnings | 10,000 | 10,000 | 10,000 |
| Tax Rate | 30% | 30% | 30% |
| Reported Earnings | --0-- | 5,000 | 10,000 |
| Tax on Reported Earnings | --0-- | 1,500 | 3,000 |
| Unreported Earnings | 10,000 | 5,000 | --0-- |
| Tax on Unreported Earnings | 3,000 | 1,500 | --0-- |
| Penalty for Unreported Earnings | 4,500 | 2,250 | --0-- |
| After-tax earnings if selected for audit | 2,500 | 4,750 | 7,000 |

*After reviewing the information above, participants are required to respond to the following items:*

1. If I am not audited, I am taxed on ALL of my earnings regardless of what I report to the taxing authorities. *False.*
2. If I am audited and am found to have under-reported earnings, I am more likely to be audited the next period. *False.*
3. What is the income tax rate? *30%*
4. What percentage of reports to the taxing authority will be audited? 5-20%
5. Two questions about how to calculate the participation bonus.

*If the participant does not answer all of the questions correctly, s/he is shown the correct answers and is given a second chance to answer the knowledge quiz. Upon failing to correctly answer all items a second time, participants are dismissed from the study.*

**Panel C: Example of Earnings Task**
To complete this task, you must correctly set all 5 of the sliders below to the number indicated to the left. You will not be allowed to continue until you correctly set each of the sliders.




**Panel D: Example of Transcription Task**
You received a request from the auditor to provide information related to your report to the tax authority. Please complete the transcription task below to simulate complying with the auditor's request for information. To complete the task, simply type in the code from the corresponding grid in the table below. For example, the left most box below requires you to type in the code from the sixth row from the top in the right most column (the code starts with GXSS).

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | GFNLEICGKO | IUPXJWTRFZ | DQIWQEOHJP | DEEVXRXWJH | JUWEJFJXPE |
| 2 | XBIGLHKUMH | RMAXCVTLVD | HPAXGFUSUC | UYVRKTYAZE | WUQLQBIQMU |
| 3 | SHVRVVESUN | UNDWTQWIDU | NPBJRJFBVM | QALHSFCMXD | ZIZOCSQAFO |
| 4 | KJGSFMCZMW | HHHJJIHZXU | BSJUQXCMWY | AZKYHKFOKB | UUFIUGDXAO |
| 5 | FDTJHPXCAU | GCDRKCZGOZ | LFYGGKRISY | LLQHXYEBDF | WZTBKZPTKQ |
| 6 | SIQTJMYAUT | FHXDEGJJZY | XROKCFUUQR | KSETXSRLRK | GXSSWTSRUP |
| 7 | VEGSADAGFI | NRLEDLCDNQ | QVMMDWXARP | WEVWGEGOMQ | BAXEXUVWSY |
| 8 | MVODEKUCQM | ONEKKKAOWI | UGEQXEUXDB | ENSCUIDYOC | EQPMGIXSJJ |

E6 D6

**Panel E: Audit Results Screen**

**Round Two - Summary**

| | |
|---|---|
| You earned: | 10,000 |
| You chose to report: | ***X*** |
| You paid taxes equal to: | ***X * 0.30*** |
| | |
| The auditor determined you failed to report an additional: | ***Y (Manipulated as either 100% or 50% of omitted earnings.)*** |
| So you were required to pay an additional tax of: | ***Z (Y * 0.30)*** |
| And an additional penalty of: | ***Z * 150%*** |
| Your after-tax earnings for this round is: | ***10,000 – all taxes and penalties*** |

Your after-tax earnings for round two is ***calculated***.

Click “Next” to Continue.

**Panel F: Message Screen**

Those in the “service” messaging condition, which is included in results discussion, view a message before reporting their “Round Three” Earnings.

**THE MISSION OF THE INTERNAL REVENUE SERVICE**

**Congress passes the tax laws and requires taxpayers to comply; however, the IRS is responsible for enforcing those laws. Thus, the IRS mission is to provide America's taxpayers top quality service by helping them understand and meet their tax responsibilities and enforce the law with integrity and fairness to all.**

**The IRS wants to make it easier for you to make a complete and accurate return. We are here to give you advice and support if you need it.**

Those in the “Bill of Rights” messaging condition, reactions to which were not significantly different than those in the “service” messaging condition, view a message before reporting their “Round Three” Earnings. Participants who viewed this message are omitted from the analysis for brevity and ease of presentation.

**THE MISSION OF THE INTERNAL REVENUE SERVICE**

**The IRS mission is to provide America's taxpayers top quality service by helping them understand and meet their tax responsibilities and enforce the law with integrity and fairness to all.**

**In order to fulfill the mission, the IRS has outlined your rights during the process in a document entitled** *Taxpayer Bill of Rights,* **which assures taxpayers are offered the right to:**

**1. Be informed**
**2. Quality service**
**3. Pay no more than the correct amount of tax**
**4. Challenge the IRS's position and be heard**
**5. Appeal an IRS decision in an independent forum**
**6. Finality**
**7. Privacy**
**8. Confidentiality**
**9. Retain representation, and**
**10. A fair and just tax system.**

**Panel G. Taxpayer Focus Questions**

[Note: The order of the six questions shown below was randomized.]

When you made your reporting decision in the third round, were you more focused on **paying as little as possible in taxes** or **fulfilling your obligations to society?**

| Definitely paying as little as possible in taxes. | | | | Definitely fulfilling my obligations to society. | |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |

When you made your reporting decision in the third round, were you more focused on **being an honest person** or **fulfilling your obligations to society?**

| Definitely being an honest person. | | | | Definitely fulfilling my obligations to society. | |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |

When you made your reporting decision in the third round, were you more focused on **being an honest person** or **being frugal?**

| Definitely being an honest person. | | | | | Definitely being frugal. |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |

When you made your reporting decision in the third round, were you more focused on **paying as little as possible in taxes** or **being an honest person?**

| Definitely paying as little as possible in taxes. | | | | | Definitely being an honest person. |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |

When you made your reporting decision in the third round, were you more focused on **paying as little as possible in taxes** or **being frugal?**

| Definitely paying as little as possible in taxes. | | | | | Definitely being frugal. |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |

When you made your reporting decision in the third round, were you more focused on **fulfilling your obligations to society** or **being frugal?**

| Definitely fulfilling my obligations to society. | | | | | Definitely being frugal. |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |

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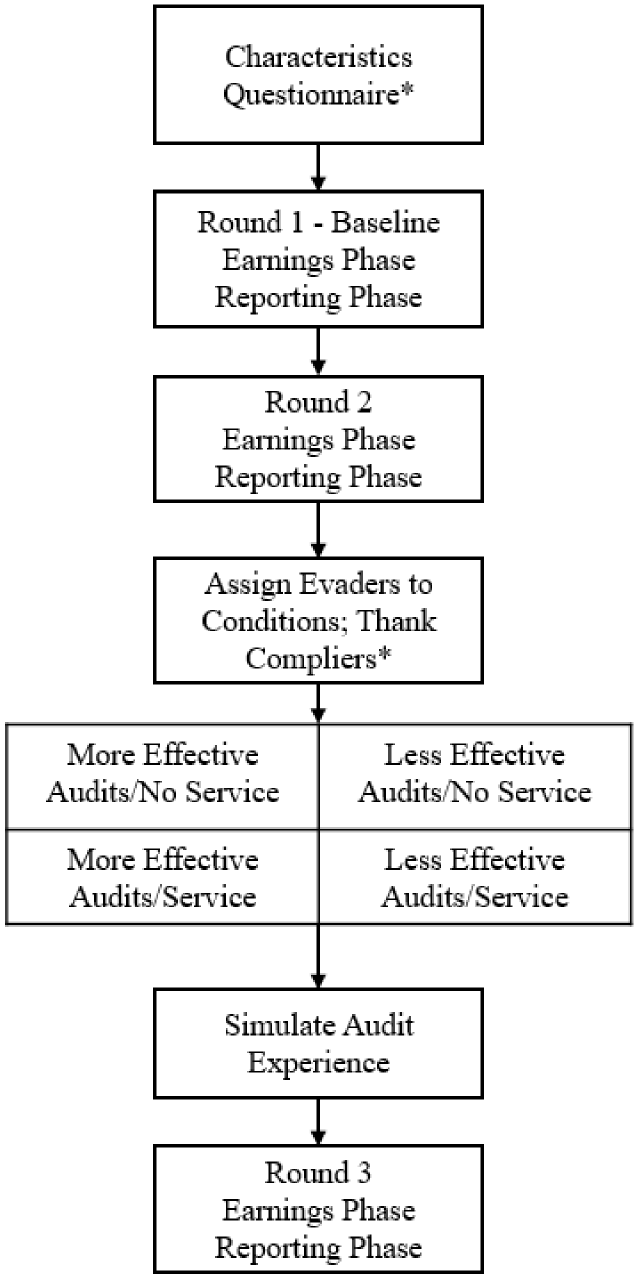
**Figure 1.**
**Experimental Procedure**




*Half of participants view the characteristics questionnaire at the beginning of the experiment and the other half view it at the end. Responses to the questionnaire are analyzed in a concurrent study.

**Figure 2**
**Pattern of Results**

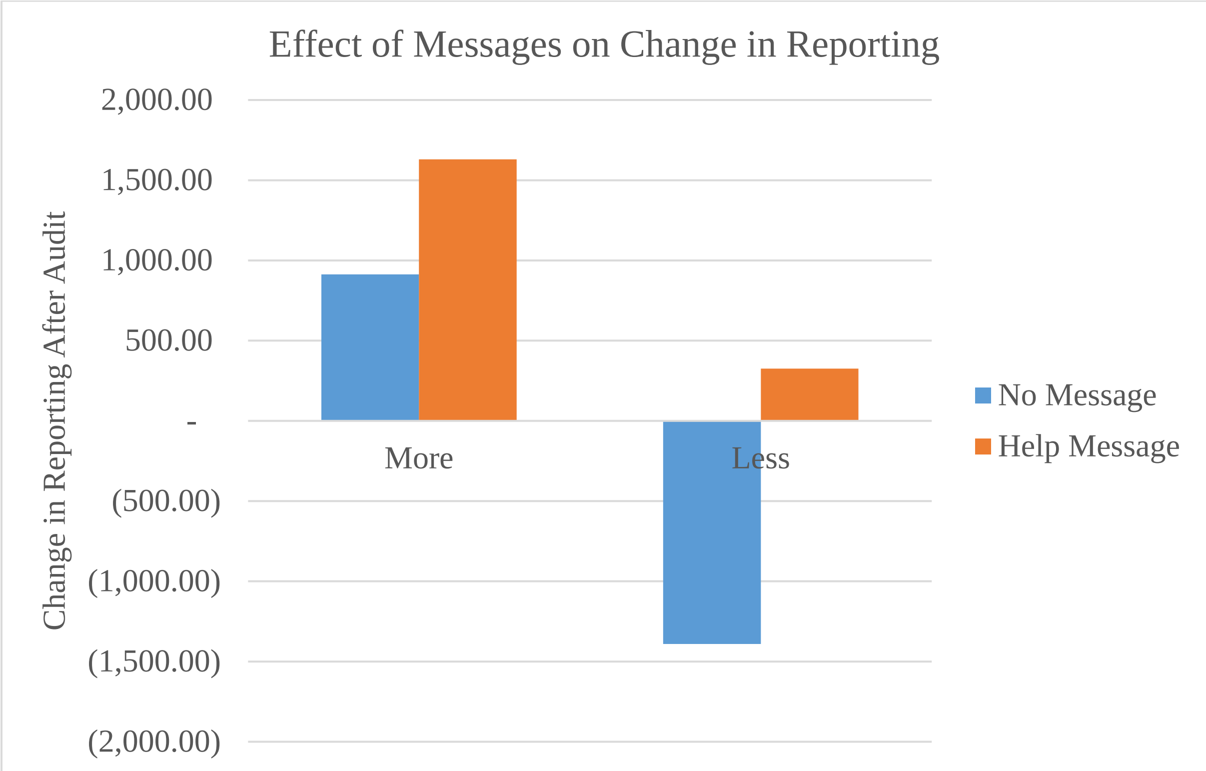



Figure 2 displays the mean change in reported earnings from round 2 (prior to audit) to round 3 (after experiencing the audit in round 2 and viewing the message, if applicable, in round 3) for each condition.

**Figure 3**
**Predicted and Actual Interaction Plots**

**Panel A: Predicted Pattern of Means**


**Panel B: Actual Results**

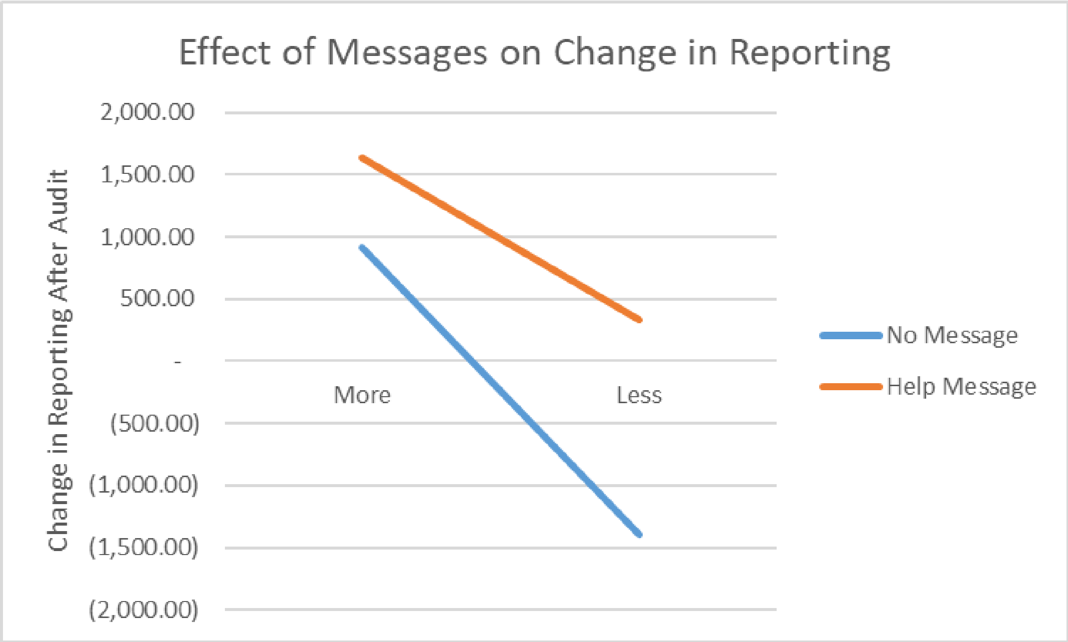


**TABLE 1**
**Demographic Statistics**

**Panel A. Sample Demographics**

| | **Sample (n=184)** | **US Population** |
|---|---|---|
| **Gender** | | |
| Male | 51% | 49% |
| Female | 48% | 51% |
| **Age** | | |
| 25 to 34 | 34% | 20% |
| 35 to 44 | 35% | 19% |
| 45 to 54 | 19% | 20% |
| 55 to 59 | 5% | 10% |
| 60 or older | 7% | 31% |
| **Education** | | |
| Less than high school | 1% | 13% |
| High school | 9% | 27% |
| Some college courses | 27% | 21% |
| College graduate | 45% | 27% |
| Post-graduate degree or courses | 19% | 12% |
| **Income** | | |
| Less than $25,000 | 14% | 21% |
| $25,000 to $49,999 | 30% | 23% |
| $50,000 to $74,999 | 27% | 18% |
| $75,000 to $99,999 | 14% | 12% |
| $100,000 or more | 15% | 26% |
| Prefer not to respond | 1% | - |
| **Last Tax Return** | | |
| Self-prepared by hand | 10% | - |
| Self-prepared with software | 63% | - |
| Prepared by friend/family | 3% | - |
| Prepared by tax professional | 23% | - |

Gender, age, education, and household income are from the US Census Bureau 2017 estimates (factfinder.census.gov). Age and education data is based on the population over age 25.

**TABLE 2**
**Primary Analysis**

**Panel A. Mean [Std. Dev.] of Income Reported in each Round (n=184)**

| Condition | Round 1 | Round 2 | Round 3 | Change |
|---|---|---|---|---|
| More Effectiveness/No Message | 3,934 | 3,500 | 4,413 | 913 |
| (n=46) | [3,946] | [3,216] | [4,214] | [3,424] |
| More Effectiveness/Message | 5,282 | 4,456 | 6,086 | 1,630 |
| (n=46) | [3,569] | [3,174] | [4,004] | [3,861] |
| Less Effectiveness/No Message | 3,826 | 3,717 | 2,326 | (1,391) |
| (n=46) | [3,707] | [3,277] | [3,026] | [2,761] |
| Less Effectiveness/Message | 4,239 | 4,260 | 4,586 | 326 |
| (n=46) | [3,509] | [3,574] | [3,792] | [3,354] |

Income reported is the average amount of income in Lira (the experimental currency) reported by participants in a given condition for each round. The most participants could report in a given round is 10,000 Lira.

**Panel B. ANOVA Results (2x2) by message**

| Source | df | F-stat | *p*-value |
|---|---|---|---|
| Message | 1 | 13.166 | <0.001 |
| Effectiveness | 1 | 5.994 | 0.015 |
| Message * Effectiveness | 1 | 1.011 | 0.316 |
| Total between-cells variance | 3 | 6.724 | <0.001 |
| Residuals | 180 | | |
| Total | 183 | | |

Panel B includes ANOVA results of audit effectiveness and message. The dependent variable is the change in compliance between round 2 and round 3 (after experiencing an audit and, if applicable, viewing a message).

**Panel C: Contrast and Residual Between-Cells Variance Test (by message)**

| Source | df | F-stat | *p*-value |
|---|---|---|---|
| Contrast | 1 | 16.719 | 0.001 |
| Residual between-cells variance | 2 | 1.726 | 0.181 |
| Total between-cells variance | 3 | 6.724 | <0.001 |
| Error | 180 | | |
| Total | 183 | | |
| Contrast Variance Residual, $q^2$ | | 17.1% | |

This panel includes results of contrast coding analysis assigning a code of "-3" to the Less Effective/No Message condition and a "1" to all other conditions, which allows for testing of the disordinal interaction predicted by H2.

**Panel D: Simple Effects Tests**

| Comparison | df | t-stat | p-value |
|---|---|---|---|
| More (No Message) | | | |
| v. Less (No Message) (H1) | 180 | 3.277 | 0.001 |
| v. Less (Message) | 180 | 0.835 | 0.405 |
| v. More (Message) | 180 | 1.020 | 0.309 |
| Less (Control) v. Less (Message) (H2) | 180 | 2.442 | 0.016 |
| More (Message) v. Less (Message) | 180 | 1.855 | 0.065 |

This panel reports simple effects tests contrasting specific relationships between cells.

## TABLE 3
## Supplemental Analysis

**Panel A. Mean Responses to Taxpayer Objective: Economic v. Society (n=184)**

| | No Message | Message | Total |
|---|---|---|---|
| **More Effectiveness** | -0.862 | -0.536 | -0.699 |
| | [1.657] | [1.627] | [1.642] |
| **Less Effectiveness** | -1.398 | -0.706 | -1.053 |
| | [1.277] | [1.387] | [1.371] |
| **Total** | -1.130 | -0.621 | -0.876 |
| | [1.496] | [1.506] | [1.518] |

Panel A includes the calculated variable measuring participants' responses to the forced choice pairings of the following groups of items: Two of the objectives were designed to describe a taxpayer who focused on reducing the economic impact of tax compliance, including "paying as little taxes as possible" and "being frugal." The other two objectives were designed to describe a taxpayer who focused on societal obligations, including "fulfilling your obligations to society" and "being an honest person." Negative numbers indicate a focus on economic impacts, where "0" is neutral and "-3" is completely focused on economic impacts. Positive numbers indicate a focus on society, where "0" is neutral and "3" is completely focused on society.

**Panel B. Post-hoc Comparisons of the effect of message on Taxpayer Objective**

| Comparisons | Mean Difference | Std. Error | *p*-value |
|---|---|---|---|
| All Conditions (n=184) | -0.353 | 0.221 | 0.115 |
| Less Effective Only (n=92) | -0.692 | 0.278 | 0.015 |

Panel B reports the results of post-hoc comparisons examining the difference in taxpayers' responses about whether they were more focused on minimizing taxes or contributing to society when they made their reporting decisions in round 3.

## TABLE 4
## Supplemental Analysis

**Panel A. Mean Responses to Taxpayer Perceptions of Tax Authority Objective (n=266)**

| | No Message | Message | Total |
|---|---|---|---|
| **More Effectiveness** | 2.023 | 3.065 | 2.576 |
| | [1.320] | [1.421] | [1.454] |
| **Less Effectiveness** | 2.267 | 3.356 | 2.848 |
| | [1.269] | [1.069] | [1.300] |
| **Total** | 2.146 | 3.209 | 2.712 |
| | [1.293] | [1.261] | [1.382] |

Panel A includes the mean responses to the item "Based on the information you have viewed in this simulation; would you say the IRS is more likely to view taxpayers as customers who need assistance or as criminals who need to be punished?" The scale is anchored by "definitely criminals who need to be punished" and "definitely customers who need assistance." Higher numbers indicate a focus on customers and lower numbers indicate a focus on criminals. The midpoint is 2.5.

**Panel B. Post-hoc comparisons of the effect of messages on perceptions of agency focus**

| Comparisons | Mean Difference | Std. Error | *p*-value |
|---|---|---|---|
| All Conditions (n=184) | 0.272 | 0.223 | 0.183 |
| Less Effectiveness Only (n=92) | -1.087 | 0.247 | <0.001 |

Panel B reports the results of post-hoc comparisons examining the difference in taxpayers' perception of whether the IRS is more focused on "punishing criminals" or "providing service."