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The Effects of Tax Law Information, Deterrence, and Tax Morale on "High-Opportunity" Taxpayers' Intentions to Report Income

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I. Introduction

Tax compliance remains a topic of theoretical and practical importance after decades of research on this subject. Important legal, social, and socio-psychological events can impact a taxpayer's compliance with tax laws. Researchers have examined this topic from the lenses of economics, law, accounting, fraud prevention, and ethics. It seems; however, tax compliance can still be improved. According to the Internal Revenue Service (IRS), the Voluntary Compliance Rate (VCR) of individual taxpayers, the rate at which taxes are accurately reported and paid, remained steady in the range of 82% to 84% in tax years (TY) 2011 to TY 2013, according to the most recently available data (IRS, 2019).

Studies show that certain practices (e.g., information reporting using W-2s and 1099s) have different effects on tax compliance rates. From TY 2011 to 2013, underreporting of individual taxes accounted for 56% of the total gross tax gap, the difference between the taxes paid voluntarily and on time, and the estimated actual tax liability owed to the IRS (IRS, 2019). Based on estimates of TY 2011 through TY 2013, the underreporting of individual income dropped from 55% to 5% when information reporting is required. Additionally, when taxes are withheld, underreporting drops to 1% (Slemrod, 2019). The IRS also uses deterrents to encourage voluntary compliance, such as prosecuting and publicizing tax offenses (e.g., Willie Nelson and Wesley Snipes) to "scare" the public into reporting income (Thorne and Stryker, 2018). Still, the underreporting of income continues. Thus, research on effective and efficient mechanisms to improve tax compliance among taxpayers is needed.

Slemrod, Blumenthal, and Christian (2001) coined the term "high-opportunity" taxpayers in an experiment to observe how taxpayers respond to the increasing possibility of being audited by the IRS. Depending on the sources of their income, "high-opportunity" taxpayers are those with more opportunities to evade income taxes because they receive compensation (e.g., cash, gift cards, barter) for their services that are not reported to the government (Slemrod, et al., 2001). Thus, for IRS auditors to uncover the fraud, they must reconstruct the lifestyle of a taxpayer to estimate actual income. On the other hand, high-income taxpayers use other schemes to avoid taxes (e.g., via sophisticated tax planning schemes) to reduce their tax liabilities. The source of income, generally cash, gives high-opportunity taxpayers the chance to underreport. Anyone receiving cash for services could be classified as a high-opportunity taxpayer. One large group of high-opportunity taxpayers are tipped restaurant employees since they receive a portion of their pay in cash tips. Thus, the IRS has pursued compliance of restaurant servers through various agreements with restaurant owners.

This study sheds light on the underreporting of cash income among high-opportunity taxpayers using a quasi-experimental research design. Researchers recruit employed restaurant servers to participate in an online experiment, randomly assigning them to one of three groups. The first group's intervention presents accurate information about tip reporting requirements as stipulated in the tax law. The second group's intervention includes information about the reporting requirements and a deterrence message. The third group is presented with information about the reporting requirements, the deterrence message, and a moral appeal.[1] Servers are asked twice about their intentions to report cash tip income before and

[1] Detailed descriptions of the interventions are presented in the research design section.

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after the intervention. The results show that restaurant servers are more likely to report cash tip income to their employers after the educational interventions but to differing degrees. Demographic information, including gender, age, educational attainment, and whether servers are required to pay state taxes, did not affect the servers' intentions to report tip income.

This study's contribution to the tax compliance literature is twofold. First, this study expands the discussion of tax compliance of high-opportunity taxpayers. The quasi-experiment design in this study presents a valid approach to access this hard-to-reach population, which paves the way for future research. Second, this study applies and compares three tax compliance theories—the expected utility theory, behavioral economics theory, and tax morale—in one experiment. The tax compliance literature is rich but still fragmented. Different theoretical approaches do not often overlap. Although this study does not intend to integrate all three theoretical perspectives into one united theory, it demonstrates the possibility and benefits of jointly applying different tax compliance theories and suggests the direction of a comprehensive tax compliance theory. In practical terms, the results of this study suggest that when income information is not automatically reported to the IRS, as in the case of cash tips, tax information, deterrence, and moral appeal might impact high-opportunity taxpayers' intentions to report income. This study's comprehensive approach toward encouraging tax compliance could result in improved tax reporting results in practice.

The remainder of the study is organized in the following sections. First, researchers examine the literature related to tax compliance and high-opportunity taxpayers. Next, they develop testable hypotheses based on the review of tax compliance theories. Third, researchers discuss the methodology used in the study and the results. Last, they discuss the contributions and limitations of the study and give suggestions for future research.

II. Literature Review and Hypotheses Development

The following section describes three theories of tax compliance, defines high opportunity taxpayers, discusses tip reporting, and develops the research hypotheses.

Theories on Tax Compliance

After Allingham and Sandmo (1972) proposed the expected utility model of tax reporting, studies on individual tax compliance and tax evasion proliferated. The expected utility model assumes taxpayers are rational individuals who weigh the benefits of cheating (mainly the benefits from not paying taxes) and the expected costs (penalties if caught) when making decisions about tax compliance. A risk-averse individual will comply and pay the tax if the total combined expected utility is less than zero. Treating income as an exogenous variable, the expected utility model encompasses the tax rate, the probability of being audited, and penalties (monetary and imprisonment) as the main variables determining tax compliance. This model provides a parsimonious approach to explaining the expected utilities of individual tax compliance and non-compliance while capturing the impact of key variables. Consequently, the expected utility model has been widely employed and tested in empirical studies, inspiring extensions of the model.

Critics of the expected utility model relay the practical shortcomings of the model, including varying theoretical viewpoints. The expected utility model takes the economics-of-crime approach, thereby assuming that individual tax compliance is determined by enforcement, which starts with discovery, then an audit, followed by civil and criminal penalties (Alm, 2014). Because the audit rate by the IRS has been historically low, and the penalties for individual tax avoidance are not severe, one might argue that the deterrence of the U.S. tax system is negligible. Thus, the basic expected utility model would predict low tax compliance rates of individual taxpayers. However, the actual tax compliance rate hovers around 83% (IRS, 2019). Individuals voluntarily pay more taxes than the expected utility model would predict, pointing out a drawback of the model (Alm et al., 1992).

Behavioral theorists (usually also economists) provide alternative explanations for the higher-than-expected compliance rate in the U.S. Individual taxpayers may comply for reasons beyond the fear of punishment or the threat of external enforcement. Benjamini and Maital (1985) proposed behavioral reasons for tax compliance: subjective probability bias, perception of other people's behavior, and social stigma. Taxpayers also might be intrinsically motivated to pay taxes, which is called tax morale (Torgler, 2003). Luttmer and Singhal (2014, p. 150) define tax morale as a term "capturing nonpecuniary motivations for tax compliance as well as factors that fall outside the standard, expected utility framework." Unlike the economic models, theories of tax morale encompass a myriad of socio-psychological concepts and broad constructs, including honesty, guilt and shame, trust in government, perceptions of fairness, religiosity, and cultural

differences (Erard and Feinstein, 1994; Torgler, 2003). The concept of tax morale captures the morale and social dynamics of tax compliance but has yet to be investigated in the context of high-opportunity taxpayers.

High-Opportunity Taxpayers

The abovementioned theories explain why non-compliance varies among taxpayers. Additional studies have used empirical data to corroborate these findings. The tax-systems framework proposed by Slemrod and Gillitzer (2014) suggests three factors – tax bases and rates, remittance rules, and enforcement rules – that affect tax compliance rates. First, individual taxpayers can be divided into low-opportunity and high-opportunity taxpayer groups. While the statutory tax rates are the same for both groups of taxpayers, they are subject to different levels of information reporting to the IRS. "Low-opportunity" taxpayers are those who have their taxes withheld by employers and reported to the government, minimizing opportunities to cheat. On the other hand, "high-opportunity taxpayers" are often self-employed or those who received cash payments with amounts not reported to the IRS, making it easier to underreport income. Finally, the IRS audit rates are low for all taxpayers. Therefore, both low-opportunity and high-opportunity taxpayers rarely fear enforcement risks, regardless of income levels, making non-compliance more attractive to high-opportunity taxpayers (Yaniv, 1999).

Restaurant Servers and Tax Compliance

Income underreporting is a problem in the U.S. The IRS (2019) estimates total underreported salaries, wages, and tips to be $9 billion annually in TY 2011 through TY 2013. Section 61(a) of U.S. Code Title 26 Internal Revenue Code defines gross income as "all income from whatever source derived." Restaurant servers often receive cash tips as part of their compensation. Point-of-sale systems track credit card tips automatically, but servers need to report their cash tips to their employers. The IRS has long established that tip income is treated similarly to salaries and wages because tips are received for services performed. The IRS requires servers to keep a daily tip record for withholding and reporting purposes (IRS, 2020a). Servers who underreport tips to their employer may face a penalty of up to 50% of their taxes on the underreported tips.

Tips, however, have been chronically underreported intentionally or unintentionally by servers (redacted, 2016). Some servers view tips as tax-free gifts from customers, leading to unintentional underreporting, although the tax code unequivocally states tips constitute taxable income. Other servers may intentionally underreport tip income to avoid paying taxes. Since employers do not know the exact amount of cash tips received, the servers have an opportunity to report a lower amount of cash tips to their employers.

As a practical matter, Section 6053 of the Internal Revenue Code, *Reporting of Tips*, requires employers to allocate a minimum of 8% of gross receipts as tip income for their servers on IRS Form 8027. Servers might misunderstand and think that reporting 8% of cash receipts meets their tip reporting obligation. Furthermore, for those servers who intentionally underreport tips, the 8% of gross receipts rule falsely gives them a sense of security that they will not be audited. The law requires all cash tip income (or an agreed-upon percentage, usually a rate close to the credit card tip rate) to be reported to the IRS.

The IRS has established multiple programs to promote tax compliance, giving taxpayers a host of free tools to promote accurate tax reporting. Some examples include videos, social media, a help portal, and an interactive tax assistant. For employers in the restaurant industry, the IRS created three voluntary compliance agreements (IRS, 2020b). The three programs—Tip Reporting Alternative Commitment (TRAC), Tip Rate Determination Agreement (TRDA), Employer-Designed Tip Reporting Alternative Commitment (EMTRAC)—if adopted by restaurants, lower the chances of being audited. The programs have an educational component and may include an agreed-upon reporting rate (i.e., all tips, cash, and credit, are reported at 15% of sales) in exchange for an IRS commitment to not audit the restaurant or its employees.

Hypothesis Development

The literature suggests that restaurant servers could have learned erroneous information and may be confused about the tip reporting requirements (Swann and Hofmann, 2013). In some cases, servers are told to report 8% of their cash sales as cash tips when their actual tips are at a much higher percentage. The expected utility theory assumes taxpayers are rational individuals who follow the law when given accurate information about the law. Consequently, the researchers expect accurate information about tip reporting will improve servers' intentions to report cash tips. This expectation leads to our first hypothesis in the alternative:

Hypothesis 1: Giving servers accurate information about tip reporting requirements will reduce intended cash tip underreporting.

The expected utility theory suggests that penalties imposed by tax laws are an important deterrence for tax non-compliance. Taxpayers may comply out of fear of punishment. The IRS uses penalties as an important tool to enforce the law. From the perspective of behavioral economics theory, taxpayers have different perceptions of the possibilities of being caught and facing the penalties. The threat of penalties will only materialize if tax non-compliance is caught. Consequently, deterrence stems from the detection of cheating and the charging of related penalties. For high-opportunity taxpayers, the lack of withholding and information reporting makes it more difficult for the IRS to catch their cheating. Thus, the deterrence effect might be muted among high-opportunity taxpayers. Balancing the two perspectives, we expect the information on deterrence will prompt servers to report more cash tip income. This expectation leads to our second hypothesis in the alternative:

Hypothesis 2: Giving servers information on statutory penalties for tax evasion will reduce intended cash tip underreporting.

Tax morale among high-opportunity taxpayers is under-researched. Some high-opportunity taxpayers, such as the self-employed and others with significant cash income, do not have employers to report income (e.g., W-2s) or to withhold taxes. On the other hand, restaurant servers who receive cash tips, have a reciprocal relationship with their employers. Together they form a service team. This reciprocal relationship supports the moral appeal. In addition, an individual servers' tax non-compliance could impact other employers' and their colleagues' welfare when the restaurant is punished. This concern for negative externality also provides support for the moral appeal. Thus, servers feel a moral obligation to care for the restaurant. We expect a moral appeal for the well-being of the restaurant will reduce the server's cash tip underreporting. Therefore, our third hypothesis is as follows in the alternative:

Hypothesis 3: Giving servers information on how their actions could negatively affect their employer (the restaurant) will reduce intended cash tip underreporting.

III. Research Design

Difficulty accessing individual-level data on tax compliance has long been recognized in the literature (Pyle, 1991). More recently, Conwell (2003) cautioned that taxpayers will not self-report illegal activities. Simply surveying taxpayers about non-compliance could provide inaccurate information (Andreoni, et al.,1998). Taxpayers cannot be expected to provide honest answers about cheating behaviors (Mascagni, 2018). Thus, this study uses a quasi-experimental design. In most cases, lab experiments use students, not actual taxpayers, which causes concerns about the validity of the results. This study uses real taxpayers, restaurant servers, and randomly assigns them to one of three interventions. The design keeps participant names anonymous to encourage honest responses as it tested the effectiveness of the interventions.

This research uses a Difference-In-Difference (DID) design that investigates the impacts of different manipulations over time, controlling for characteristics of the server and the restaurant. The experiment specifically asks participants to assume the role of a server at the restaurant where they are currently or were last employed. To avoid any confusion about reporting tip income to their employer versus to the IRS, servers are asked to indicate how much tip income they would report to their employer, assuming the gratuity is cash only. Reporting tip income to the employers is used as a surrogate for reporting tip income to the IRS. The scenario is presented to the participant in the following way. "During a shift as a restaurant server, you receive cash tips of $100. Your total sales for your shift are $1,000. How much of the tips will you report to your employer?"

Participants are asked for tips they intend to report to their employer twice, before and after exposure to tip reporting tax information that has three different levels of manipulations. The manipulated tax information is presented to tax servers randomly assigned to one of three groups. The three scenarios are as follows:

- The first scenario presents only tax information, stating: Here is what the tax law says about tip reporting: Internal Revenue Service Publication 531 states, "All tips you receive are income and subject to federal income tax."
- The second scenario presents the tax law and a personal threat, stating: Here is what the tax law says about tip reporting: Internal Revenue Service Publication 531 states, "All tips you receive are income and subject to federal income tax. If you are not reporting ALL of your tips, you are committing the crime of tax evasion and could face fines and jail time."

- The third scenario presents the tax information, a personal threat, and a threat to the restaurant (evoking a tax morale response), stating: Here is what the tax law says about tip reporting: Internal Revenue Service Publication 531 states, "All tips you receive are income and subject to federal income tax. If you are not reporting ALL your tips, you are committing the crime of tax evasion. This action could result in fines and jail time for you and potential closure of the restaurant."

Data Collection

Participants in the study are servers at least 18 years old who receive tips as a portion of their income in the last six months before the study. Researchers recruited qualified participants through Qualtrics, an online paid survey vendor, over a period of four weeks.[2] Many respondents had completed prior surveys for Qualtrics and were paid approximately $5 to complete the survey (Appendix A). On average, participants spent 16 minutes completing the survey, which was equal to an effective wage of $18.75 per hour.

The survey[3] asked participants several questions to make sure they met the qualifying criteria for the study, with 475 servers completing the study. The participants were randomly assigned to one of three groups, yielding a fairly even distribution, with 34% of participants in Group 1, 33.4% in Group 2, and 32.6% in Group 3.

Qualtrics does not provide information regarding the number of individuals who did not meet the required criteria or who only partially completed the survey. Due to this limitation, researchers cannot calculate the response rate for the survey.

Control Variables

Three groups of control variables are considered in this study: knowledge of tax laws, the use of POS systems, and demographics, as discussed below.

Knowledge of Tax Laws

The first control variable relates to the individual's knowledge about tax laws. Learning about tax laws can encourage tax compliance. On the other hand, taxpayers with knowledge about the low audit rates might see this as an opportunity to underreport their income. Taxpayers can learn about tax laws from self-study, other employees, or part of the restaurant's training program.

POS Systems

The second control variable pertains to tip reporting controls at the restaurant. When sales are reported at the restaurant and paid by a credit card, a Point-of-Sales (POS) system will record those transactions. Some POS systems keep a record of the sales only (e.g., fast food restaurants where there are no tips), and others track credit card tips and self-reported cash tips, while others may allow the restaurant owner to set up tip reporting percentages. Servers' tip reporting actions may differ based on their knowledge of what their POS systems record or do not record.

Demographics

The third set of control variables are demographic variables. They include state of residence, age, gender, and educational attainment. Seven states did not have a state income tax at the time of this study: Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming. The variable StateTax indicates whether the participants pay state income taxes or not. Servers who pay state income taxes will have a higher combined income tax rate (federal and state), which could affect the server's intention to report tip income. Early data about age and tax compliance suggested that seniors, sixty-five or older, are less likely to cheat (Clotfelter, 1983; Feinstein, 1991). When tax data were analyzed jointly with census data, studies show that voluntary compliance rates were higher in communities with higher concentrations of senior citizens (Dubin and Wilde, 1988). Research, however, on the interaction between gender and tax compliance was mixed. While some early evidence suggested that females were less likely to evade paying taxes than males (Baldry, 1987), others found men more compliant than women (Kirchler and Maciejovsky, 2001). Bruner, D'Attoma, and Steinmo (2017) conducted experiments in the U.S., the U.K., Sweden, and Italy finding evidence that tax compliance is greater among women than men. Lastly, Jackson and Milliron (1986) identify education as a factor related to increased compliance behavior. Similarly,

[2] The Institutional Review Board (IRB) at one of the universities approved this study to be administered on-line.
[3] Questions relevant to this study are shown in Appendix A.

researchers find that taxpayers with higher education attainment better-understood tax laws, enhancing tax compliance (Richardson, 2006; Saad, 2014). However, these studies about age, gender, and educational attainment do not specifically address the tax compliance rates of high-opportunity taxpayers, which this study addresses.

The Regression Model

The following regression model (Figure 1) is used to assess the relationship between the amount of tip reporting before and after the intervention. The dependent variable, Tip Reporting, indicates the amount that participants intend report to their employers when receiving a $100 cash tip. The independent variables include the effects of the three interventions (labeled as Time Dummy, Type Dummy1, Type Dummy2, and their interactions), additional training (Knowledge of Tax Laws, Reading of Tax Laws, and Additional Training), and the other control variables (POS systems, age, gender, and education). All the variables are described in more detail in Appendix B.

Figure 1: Regression Equation

$$\text{Tips Reporting} = \beta_0 + \beta_1\text{Time\_Dummy} + \beta_2\text{Type\_Dummy1} + \beta_3\text{Type\_Dummy2} + \beta_4\text{Time\_Dummy*Type\_Dummy1} + \beta_5\text{Time\_Dummy*Type\_Dummy2} + \beta_6\text{Knowledge\_Dummy} + \beta_7\text{Read\_Tax\_Law\_Dummy} + \beta_8\text{Additional\_Training\_Dummy} + \beta_9\text{POS\_Dummy1} + \beta_{10}\text{POS\_Dummy2} + \beta_{11}\text{StateTax} + \beta_{12}\text{Age} + \beta_{13}\text{Gender} + \beta_{14}\text{Education} + \varepsilon$$

The regression results from this study are discussed in the next section.

IV. Results

In this section, we present the participants' demographics, discuss the effects of the interventions, and conclude with a discussion of the results.

Demographics

The survey participants are restaurant servers. Most (74.1%) of the participants are female, while 25.9% are male. Younger servers in the age group of 18-35 represent 61.6% of the sample. About 24.8% of the participants are between the age of 36 and 50. About 13.6% of the participating servers are 51 years old or older. Over 29.2% of the participants have a high school education or less. Most (63.4%) of participants have some college education or a two- or four-year college degree. The rest of the participants have undergraduate and graduate degrees. The results are summarized in Table 1.

Table 1:Descriptive Statistics—Respondent Demographics

		N	%
Gender:	Female	358	74.1
	Male	125	25.9
	Total	463	100
Age:	18–35	298	61.6
	36–50	120	24.8
	51–65	62	12.8
	66 and older	4	0.8
	Total	464	100
Educational Attainment:	High School or less	139	29.2
	Some College	82	17.2
	Two-Year Degree	59	12.4
	Four-Year Degree	155	32.8
	Graduate Degree	40	8.4
	Total	475	100

Pearson Correlations

Pearson correlations between variables in the regression analysis are reported in Table 2. The most important correlations are between reporting cash tips, changes between and after the interventions, the prior knowledge of servers, and what the POS system reports, gender, and educational attainment.

Table 2: Pearson Correlation between Variables

		1	2		3	4	5	6
1	Report_Cash_Tips	1.000						
2	Time_Dummy	.326**	1.000					
3	Type_Dummy1	-.025	0		1.000			
4	Type_Dummy2	.057	0		-.492**	1.000		
5	Knowledge_Dummy	.203**	0		-.037	.014	1.000	
6	Read_Tax_Law_Dummy	-.013	0		-.042	-.068*	-.191**	1.000
7	Additional_Training_Dummy	-0.42	0		.031	.019	-.008	-.128**
8	POS_Dummy1	.126**	0		.033	.046	.166**	-.226**
9	POS_Dummy2	-0.19	0		-.051	-.011	.036	-.017
10	Age	-.035	0		.032	-.030	.061	.016
11	Gender	.073*	0		.029	-.031	.049	.071*
12	Education	.070*	0		-.010	.101**	.092**	-.109**

		7	8	9	10	11	12
7	Additional_Training_Dummy	1.000					
8	POS_Dummy1	.130**	1.000				
9	POS_Dummy2	.032	-.485**	1.000			
10	Age	-.074*	-.091**	-.081*	1.000		
11	Gender	-.046	-.056	.095**	-.070*	1.000	
12	Education	.073*	.023	.134**	-.079*	.130**	1.000

* Significant at the 0.05 level; ** significant at the 0.01 level.

Effects of Intervention 1, 2, and 3

Researchers asked participants to report the amount of cash tips they intended to report to their employers before and after participating in one of the interventions. The findings are summarized in Table 3A.[4] The amounts represent the mean amounts reported when they received $100 in cash tips. After the three interventions, the intended reported amounts increased from an average of $64.70 to $ 86.60. These percentage changes were statistically significant based on paired sample t-tests. Thus, the interventions have a positive effect on tip compliance.

Table 3A: Average Amount of Tip Income Intended to Report to Employer When Receiving $100 Cash Tip

	Before Intervention	After Intervention	Change Percentage
Intervention 1 (tax law)	$ 65.79	$ 83.13	26.4%*
Intervention 2 (tax law plus deterrent)	$ 64.14	$ 85.60	33.5%*
Intervention 3 (tax law, deterrent, and moral)	$ 64.70	$ 91.08	40.8%**
Average amounts reported	$ 64.88	$ 86.60	33.5%

* Significant at the 0.05 level; ** significant at the 0.01 level.

[4] An ad hoc analysis of the three interventions is provided in Appendix C (Table 3B). The table presents the effects of the interventions on different subgroups of the participants, based on paired sample t-tests.

The effects of the interventions on intentions to report cash tips to employers are reported in Table 4. The R square of the saturated model is 17% (the adjusted R square is 15.6%), exceeding the 10% threshold recommended by Falk and Miller (1992). All the interventions increased the tax compliance of servers when reporting cash tips and were statistically significant. When the deterrence message was added (Intervention 2), the tax compliance of servers did not significantly increase over Intervention 1. However, when the moral appeal message was added to Intervention 3, tip reporting compliance was higher than reported in Intervention 1. Knowledge about tip reporting requirements stipulated in the tax law also significantly impacted the intention to report cash tips. Similarly, when restaurants had a POS system that recorded all tips, the participants reported more cash tips. Other variables (i.e., age, gender, education, state of residence) did not have a significant effect on the servers' intentions to report cash tips.[5] Two separate models that included Type_Dummy1 and its interaction with Time_Dummy, and Type_Dummy2 and its interaction with Time_Dummy, while keeping the other variables the same, also are reported in Table 4. The results of those two models are consistent with the saturated model.

Table 4: Effects of Interventions and other Independent Variables on Intentions to Report Cash Tips

Variable	Model 1 with Type_Dummy1 only	Model 2 with Type_Dummy2 only	Full Saturated Model
Time_Dummy	23.207**	19.457**	17.887**
Type_Dummy1	-1.012		-1.624
Type_Dummy2		-0.499	-1.320
Time_Dummy*Type_Dummy1	-2.218		0.310
Time_Dummy*Type_Dummy2		9.252*	10.822*
Knowledge_Dummy	12.808**	12.975	12.975**
Read_Tax_Law_Dummy	2.793	3.051	3.042
Additional_Training_Dummy	-3.408	-3.416	-3.409
POS_Dummy1	7.509**	7.353**	7.346**
POS_Dummy2	-0.039	0.149	0.141
StateTax	-1.678	-1.661	-1.683
Age	-0.129	-0.122	-0.122
Gender	4.774	4.903	4.903
Education	0.990	0.844	0.847
Sample size	871	871	871
Adjusted R^2	15.19%	15.77%	15.61%

*, ** indicates significance at P<0.05, P<0.01, respectively. Variables are defined as in Appendix B.

IV. Discussion and Conclusion

This study investigates the effects of three interventions on the level of reporting of cash income of high-opportunity taxpayers. Three interventions—tax information, tax deterrence, and moral appeal—are examined as determinants of tip reporting intentions of servers in a quasi-experiment. Hypothesis 1 is supported by the data. Information about tip reporting requirements reduced underreporting of cash tips. When adding a deterrence statement, Intervention 2 is not statistically more effective than Intervention 1. Therefore, Hypothesis 2 is not supported by the data. When adding a moral appeal, Intervention 3 significantly increases cash tips reporting over Intervention 1. Hypothesis 3 is supported by the data.

The three hypotheses are derived from different theoretical perspectives. The research design of this study provides an opportunity to compare the effects of tax law information, deterrence, and tax morale on tax compliance of restaurant servers side by side. Hypothesis 1 is supported by the data, indicating the effectiveness of tax law information in encouraging tax compliance among restaurant servers. When deterrence is added to tax law information to form Hypothesis 2, the result suggests that there is no significant additional effect with the addition, due to the mitigating effect of perceived low

[5] A robustness test has been added to this study in Appendix D, Tables 5–7, which shows servers behave differently when reporting cash tips and credit card tips. POS systems automatically track credit card tips but often require servers to input cash tips. Although the law requires all tips to be reported, servers generally only report a portion of their cash tips.

possibilities of being caught. However, the combined incremental effects of deterrence and tax morale is significant, and Hypothesis 3 is supported by the data.

Cash tip reporting also was affected by different control variables. More knowledge about tip reporting requirements prior to the experiment was associated with less tax underreporting. Demographic variables investigated in this study—gender, age, state of residence, and educational attainment—had no impact on cash tip reporting. Noticeably, when POS systems tracked all tips, participants reported more cash tips.

High-opportunity taxpayers in this study behaved in the way predicted by the expected utility theory, the behavioral economics theory, and the tax morale theory regarding tax compliance. Cash tips present an opportunity for taxpayers to underreport income since cash tips are not automatically reported to the IRS. The finding that servers responded positively to learning tax information suggests that accurate information increases tax compliance. Therefore, theoretically speaking, the IRS tip compliance programs, which include educational training about tip reporting, also should result in improved tax compliance. This could mean when educated, other high-opportunity taxpayers, might report income more accurately too.

Simply adding deterrents, such as statements regarding penalties, did not increase compliance for several reasons. The servers might not have been audited by the IRS before or known anyone who had been audited. Therefore, they do not believe they will be audited either in the future. This points to the inherent risk of low tax enforcement, namely, the audit rate is not high enough to increase compliance by itself. As the literature suggests, the threat of penalties needs to be backed up by actual enforcement activities (Mascagni, 2018).

Interestingly, when adding a moral statement about how underreporting might cause their restaurant to be closed, participants tended to report cash tips more accurately. While some authors have argued that moral and social factors in tax compliance lack empirical support (e.g., Mascagni, 2018), our findings provide some evidence that servers behave in an altruistic manner. When servers are reminded of the possible consequences for their employers, servers increased their reporting of cash tips. The relationship between servers and restaurants often transcends the typical employment relationship. The sense of moral responsibility could stem from the notion that servers and restaurants reciprocally earn the tips together as they work as a team to provide food and service to their customers. The servers' moral concern for the restaurants' welfare might be unique to this group because other high-opportunity taxpayers (i.e., self-employed individuals) do not have similar connections with other taxpayers.

Limitations and Future Studies

To encourage participation and honest responses, the survey did not ask participants for their income. As a result, this study did not control for the possible impacts of different income levels. On the one hand, higher-income servers benefit more from underreporting tip income because of their marginal tax rates. On the other hand, servers also might underreport tip income because the likelihood of being audited is low. Future studies could include asking servers their income. Intervention 3 in this study exposes the participants to the damages the restaurants could face when servers underreport tip incomes. However, the questionnaire did not ask the participants whether they had been informed by the restaurant regarding the existence of the three agreements offered by the IRS (TRAC, TRDA, and EMTRAC). Future studies that adopt this research design should include this question to explore its impacts. In addition, the scope of this study is limited to restaurant servers. Future work could be conducted to investigate whether the mix of information, deterrence, and moral suasion will increase tax compliance among other groups of high-opportunity taxpayers. Finally, future research could be conducted to address the additional gaps in tax compliance (IRS, 2019), including the gap in cash tip reporting.

Appendix A: Survey Instrument

Qualification	Have you worked at a restaurant in the past six months as a waiter / waitress and received tips?
Q1	We are studying how tips are reported at restaurants in the U.S. In this study, you will be asked to complete a survey about your tip reporting habits. Your participation should take 10–15 minutes. There are no risks to you. All information is handled confidentially, and your responses will not be associated with your name in any way. No individual information will be reported; only mean level results will be reported in an academic journal. Your participation in this study is completely voluntary and you may withdraw at any time without negative consequences, simply by exiting the survey.
Q2	What State do you work in?
Q3	During a shift as a restaurant server, you receive cash tips of $100 and credit card tips of $100. Your total sales for your shift are $1,000. How much of the tips will you report to your employer?
Q3a	How much of the $100 of credit card tips will you report?
Q3b	How much of the $100 of cash tips will you report?
	Interventions (servers received 1 of 3)
Q17 Type A	Here is what the tax law says about tip reporting: Internal Revenue Service Publication 531 states, "All tips you receive are income and subject to federal income tax." Given this information, please address each of the following independent scenarios. During a shift as a restaurant server, you receive cash tips of $100 and credit card tips of $100. Your total sales for your shift are $1,000. How much of the tips will you report to your employer?
Q17a	How much of the $100 of credit card tips will you report?
Q17b	How much of the $100 of cash tips will you report?
Q18 Type B	Here is what the tax law says about tip reporting: Internal Revenue Service Publication 531 states, "All tips you receive are income and subject to federal income tax." If you are not reporting ALL of your tips you are committing a crime of tax evasion and could face fines and jail time. Given this information, please address each of the following independent scenarios. During a shift as a restaurant server, you receive cash tips of $100 and credit card tips of $100. Your total sales for your shift are $1,000. How much of the tips will you report to your employer? How much of the $100 of credit card tips will you report? How much of the $100 of cash tips will you report?
Q19 Type C	Here is what the tax law says about tip reporting: Internal Revenue Service Publication 531 states, "All tips you receive are income and subject to federal income tax." If you are not reporting ALL of your tips you are committing the crime of tax evasion. This could result in fines and jail time for you and potential closure of the restaurant. Given this information, please address each of the following independent scenarios. During a shift as a restaurant server, you receive cash tips of $100 and credit card tips of $100. Your total sales for your shift are $1,000. How much of the tips will you report to your employer? How much of the $100 of credit card tips will you report? How much of the $100 of cash tips will you report?
Q29	Does your restaurant have a computerized point-of-sale system with automated tip reporting? 1. Yes, it tracks all of our of tips for us

	2. Yes, but it only tracks credit card tips for us 3. No, we have a computerized system, but it does not track tips 4. No, we use a manual system, and we track our own tips 5. Other, Please Specify
Q30	Who provided training on tips (check all that apply) 1. Management 2. IRS video 3. Trainer 4. Other servers 5. Prior jobs 6. None given 7. Other, Please Specify
Q33	Would you like additional training on tip reporting? 1. Yes 2. No 3. Not sure
Q34	Age
Q35	Gender
Q36	Highest Level of Education
Q103	Have you ever read what the tax law requires you to report? 1. Yes, I read the law 2. Yes, I read about it in training 3. No 4. No, but I was told what the tax law says 5. Not sure

Appendix B: Variable Definitions

Variable	Definition
Tips_Report	The amount that a participant intends to report to her employer when receiving a $100 cash tip
Time_Dummy	Indicator variable equal to 1 for results after the intervention, 0 otherwise
Type_Dummy1	Indicator variable equal to 1 for results from Intervention 2, 0 otherwise
Type_Dummy2	Indicator variable equal to 1 for results from Intervention 3, 0 otherwise
Time_Dummy*Type_Dummy1	Interaction between Time_Dummy and Type_Dummy1
Time_Dummy*Type_Dummy2	Interaction between Time_Dummy and Type_Dummy2
Knowledge_Dummy	Indicator variable equal to 1 for participants with knowledge on the tax law, 0 otherwise
Read_Tax_Law_Dummy	Indicator variable equal 1 if the participant reads the tax law, 0 otherwise
Additional_Training_Dummy	Indicator variable equal 1 if the participant wants additional training on tip report, 0 otherwise
POS_Dummy1	Indicator variable equal 1 if a POS system is in place to report all tips at the restaurant, 0 otherwise
POS_Dummy2	Indicator variable equal 1 if a POS system is in place to report all credit card tips only at the restaurant, 0 otherwise
StateTax	Indicator variable equal 1 if living in a state with a state income tax, 0 otherwise
Age	Age of the participant
Gender	A dummy variable indicating females and males
Education	Highest educational level attained by the participant

Appendix C

Table 3B: Average Amount of Tip Income Intended to Report to Employer When Receiving $100 Cash Tip Among Subgroups

	Do you know that all tips are required to be reported by the law?			
	Yes (43.3%)		No (56.7%)	
	Before Intervention	After Intervention	Before Intervention	After Intervention
Intervention 1 (tax law)	76.92	89.95*	55.16	83.42**
Intervention 2 (tax law plus deterrent)	69.43	95.80**	60.94	92.59**
Intervention 3 (tax law, deterrent, and moral)	82.00	92.97*	52.32	76.48**

	Have you ever read what the tax law requires you to report?			
	Yes (57.8%)		No (42.2%)	
	Before Intervention	After Intervention	Before Intervention	After Intervention
Intervention 1 (tax law)	68.20	86.79**	62.32	85.62**
Intervention 2 (tax law plus deterrent)	64.84	95.31**	65.31	92.84**
Intervention 3 (tax law, deterrent, and moral)	60.79	83.43**	74.73	83.82

	Does your restaurant have a POS system tracking tips?					
	Yes, all tips (33.0%)		Yes, but credit tips only (32.4%)		No (34.6%)	
	Before Intervention	After Intervention	Before Intervention	After Intervention	Before Intervention	After Intervention
Intervention 1 (tax law)	75.07	88.28*	63.77	85.65**	54.07	84.31**
Intervention 2 (tax law plus deterrent)	72.00	94.64**	67.86	96.53**	53.28	90.80**
Intervention 3 (tax law, deterrent, and moral)	78.44	88.22	59.40	81.76**	62.59	83.03**

Note: * and ** indicate a significant increase in reported tip income before and after the intervention at .05 and .01 level respectively

This supplemental analysis reports the effects of the interventions on different subgroups of the participants, based on paired sample t-tests. For both, those participants who know all tips are required to be reported and those who did not know, all the three interventions significantly increased the amount of tip income that they intended to report. Participants who reported that they had read the tax law reported significantly more tip income after being exposed to the three interventions. Participants who had not read the tax law responded to Interventions 1 and 2 also reported significantly more tip income, but not tax morale. This finding was unexpected, but we do not believe it detracts from the overall findings for the study, and more a result of an anomaly in the data. Also, when the restaurant used a POS system that recorded all tips, participants reported significantly more tip income after being exposed to Interventions 1 and 2. When the restaurants' POS system only recorded credit card tips or did not have a POS system, participants report significantly more tip income after being exposed to all three interventions.

Appendix D: Supplemental Analysis—Robustness

The authors conducted additional tests to determine the robustness of the findings. All other conditions were kept the same in the robustness test, except participants were told they received credit card tips, not cash tips. Since 2011, restaurants that process electronic payments (e.g., credit cards) are requested to report the information to the IRS. Credit card tips are automatically recorded with each sale, and consequently, there is little or no opportunity for tax underreporting.

Table 5 summarizes the impact of the interventions on reporting cash and credit card tips. Restaurant servers reported significantly less cash tips than credit card tips, both before and after the interventions, clearly indicating that restaurant servers treat cash tips and credit card tips differently. Again, servers may underreport cash tips because it is unlikely to be detected and punished (supporting the expected utility theory).

Table 5: Impacts of Interventions on Tip Reporting

Panel A: Intentions to Report Cash Tips vs. Credit Card Tips before the Interventions

Cash Tips	Credit Card Tips	T-Statistic	P-Value
65.16	86.02	-12.28	<0.01

Panel B: Intentions to Report Cash Tips vs. Credit Card Tips after the Interventions

Cash Tips	Credit Card Tips	T-Statistic	P-Value
87.93	90.94	-2.54	<0.01

Table 6 presents the results of intended amounts to report tip income out of the $100 credit card tip. Although the average reported amount was greater after the intervention than before the intervention for all three interventions, the increases were not statistically significant.

Table 6: Average Amount of Tip Income Intended to Report to Employer When Receiving $100 Credit Card Tip

	Before Intervention	After Intervention
Intervention 1	85.44	90.25
Intervention 2	85.79	91.28
Intervention 3	86.52	91.37

A second regression analysis was conducted to investigate the impact of independent variables on credit card tip reporting with findings in Table 7. None of the three interventions had a significant effect on credit card tip compliance. The reporting rate of credit card tips before the interventions was already high. Interestingly, participants who wanted more tip reporting training intended to report significantly fewer credit card tips. This result is consistent with the finding that servers who have more knowledge on tip reporting report more credit card tips than others. Those servers who wanted more training might possess less such knowledge.

Table 7: Effects of Interventions and Independent Variables on Intentions to Report Credit Card Tips

Variable	Parameter Estimate	T-Statistic
Time_Dummy	5.679	1.89
Type_Dummy1	2.808	0.93
Type_Dummy2	3.708	1.21
Time_Dummy*Type_Dummy1	-0.411	-0.10
Time_Dummy*Type_Dummy2	-0.985	-0.23
Knowledge_Dummy	8.096**	4.44
Read_Tax_Law_Dummy	10.951**	5.81
Additional_Training_Dummy	-7.336**	-3.42
POS_Dummy1	1.142	0.50
POS_Dummy2	3.979	1.78
StateTax	-0.860	-0.35
Age	0.070	0.97

Gender	-0.718	-0.36
Education	1.032	1.62

*, ** indicates significance at P<0.05, P<0.01, respectively. Variables are defined as in Appendix B.

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