

ATTITUDES, INCENTIVES, AND TAX COMPLIANCE

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Abstract:

Data published by the Canada Revenue Agency show that tax compliance at the most basic level (filing and remitting on time) is quite satisfactory, while the more significant levels of tax compliance, as measured by the proportion of taxpayers judged to be at “substantive risk of non-compliance”, shows more problems. Whether increased audits and penalties are the best way to deal with this non-compliance depends on the reasons why taxpayers fail to comply. If taxpayers care only about incentives and are “playing the audit lottery”, increasing penalty and audit rates should improve compliance. But if psychological factors (including moral and ethical concerns) are important, improved compliance might instead be achieved by strategies that change taxpayers’ attitudes towards the tax system such as increasing its perceived fairness and making it easier to comply with the tax laws.

This study contributes to the compliance literature by studying the appropriate measure of tax compliance to use in research aimed at determining those changes in tax laws which would encourage higher levels of compliance. In the past some studies have used measures based on questions about tax compliance in hypothetical situations while others have used measures based on the experimental economics methodology. This paper finds that experimental economics methods produce the measure with the better correlation with self-reported participation in tax evasion, at least if the experimental-economics work is of the type described below in which tax-specific terminology is used.

A second purpose of the paper is to use a controlled experiment of tax compliance with student subjects to test predictions of economic theory as well as a particular psychological theory of why taxpayers might comply or fail to comply, Ajzen’s Theory of Planned Behaviour. In the tradition of experimental economics, participants in the experiment are given real monetary incentives to motivate their behaviour. However, in order to introduce psychological factors such as attitudes about the morality of tax evasion, this study breaks with most past experimental-economics work by using tax-specific terminology to describe the decision-making situation to participants. The results generally confirm the predictions of Ajzen’s theory and highlight the importance of considering individuals’ attitudes and intentions towards tax compliance over and above pure economic considerations. Subsequent research to confirm our findings and to determine how best to apply them in policy contexts is needed before such findings can be applied to make policy decisions.

Key Words: Attitudes, Intentions, Tax Compliance, Tax Evasion, Experimental Economics, Moral Development.

INTRODUCTION

Encouraging Tax Compliance

The Canada Revenue Agency's (CRA) assessment of the current level of compliance with Canadian tax laws is that "while non-compliance overall is certainly material, it remains at relatively low levels, consistent with prior years and in relation to other countries".¹ Still, non-compliance is not a problem which can be safely ignored. The data in Table 1 show that while compliance at the most basic level (filing and remitting on time) is quite satisfactory, the more significant levels of compliance (as measured by the proportion of taxpayers judged to be at "substantive risk of non-compliance") exhibit more problems. In particular, only 8% of individuals do not file on time and 6% do not remit on time, and the similar rates for taxable corporations are higher but still low at 13% and 9% respectively. In contrast, 29% of self-employed individuals and 38% of corporations are believed by the CRA to be in substantive risk of non-compliance. Although this information is subjective and cannot be independently verified, it is the only data available drawn from actual taxpayer records in Canada.²

The CRA, of course, attempts to reduce non-compliance. It appears to be effective as judged by its fiscal impact data, which is part of a report judged to be "a fair and reliable account, in most significant respects" by the Auditor General.³ The CRA's estimate is that the net fiscal impact of its compliance activities is to contribute an extra \$8 billion to the public purse, which is up 70% in the three years from 2000-01 to 2003-04.⁴ This rising trend is perhaps somewhat surprising, in that both audit rates appear to have been relatively flat over the same period⁵ and penalty rates have not increased.

¹ CCRA Annual Report to Parliament, 2003-2004, at 1-24, Exhibit 6.

² Much more data is made public by the United States Internal Revenue Service (see Estevez, 2004; IRS Databook, various editions).

³ Supra note 1, at 1-97.

⁴ In comparison, the CRA spent \$709 million dollars on compliance programs during the 2003-2004 period (Exhibit 4, Page 1-22, CCRA Annual Report to Parliament, 2003-04). Thus, as a crude inference, it appears that the CRA collects approximately \$11 dollars from its compliance activities for every dollar spent. Another figure to compare to the \$8 billion is \$313 billion dollars (including customs deposits) that the CCRA deposited into the Consolidated Revenue Fund during 2003-2004 (Exhibit 4, Page 1-22, CCRA Annual Report to Parliament, 2003-04), so it would appear that something like 97% of the funds collected are paid without the requirement of CCRA intervention. Whether these numbers are good or bad is outside the scope of this paper.

⁵ It seems reasonably safe to conclude from CRA statistics (see Table 1) that audit rates for the largest corporations have remained fairly constant recently at about 55-60% while small business audit rates have increased from about 0.8% to about 1.2%. However, the audit rate for individuals is a murky concept, and trends in this rate are even harder to interpret. Table 1 appears to show that the audit rate for individuals has remained fairly constant at no more than 1.3%, but this rate is far too low as it does not include two major compliance verification programs directed at non-business individuals. First, the matching of tax slips is used to verify the returns of the vast majority of tax filers, and over 1 million taxpayers were reassessed for this reason in 2003-2004. Second, the validation program (e.g., requests for charitable slips and medical expense slips for e-filers) reviewed the deductions and credits of over 744,000 tax returns in 2003-04. However, it is unclear how effective the CRA is in, first, identifying non-compliant taxpayers and, second, in unearthing the full extent of the non-compliance of those identified as being non-compliant. In this regard, evidence from the Taxpayer Compliance Measurement Program (TCMP) in the US suggests that as much as half the amount of evasion remains undetected even under the very rigorous TCMP audits (IRS 1988, A-31; Feinstein 1991).

Whether increased audits and penalties is the best way to deal with non-compliance depends on the reasons why taxpayers comply or fail to comply. Broadly speaking, there are two classes of theories – economics-based theories which emphasize incentives and psychology-based theories which emphasize attitudes.⁶ Economic theories of compliance suggest that taxpayers “play the audit lottery”, i.e., they make calculations of the economic consequences of different compliance alternatives (such as whether or not to evade tax), the probabilities of detection and the consequences thereof, and then choose the alternative which maximizes their expected after-tax return (possibly after adjustment for the desired level of risk). In contrast, the second class of theories assumes that psychological factors -- including moral and ethical concerns -- are also important to taxpayers, and so taxpayers may comply even where the risk of audit is low. Of course, some taxpayers’ behaviour may follow the economic theories while others may follow the psychological theories, and mixtures are also possible. A recent comment by a Canadian tax practitioner illustrates this well for the issue of transfer pricing documentation:

“The attitude of taxpayers varies considerably. Some comply to the fullest extent required, irrespective of whether the IRS is actively auditing them or their industry. Other taxpayers essentially play the audit lottery and either do not prepare contemporaneous documentation or prepare the absolute minimum with the hope of avoiding the imposition of penalties.”⁷

These theories are of more than academic interest since they differ in where the CRA should invest its resources. Economic theories generally call for increased audits and penalties as the solution to compliance problems. The policy prescriptions of psychological theories differ across theories, but these theories generally lead to policy prescriptions which de-emphasize audits and penalties and instead focus on changing individuals’ attitudes toward the tax system by increasing its perceived fairness and making it easy to comply with the tax laws through such measures as superior website information, increased telephone assistance, and shorter line-ups in CRA offices. Both theories generally support measures which result in reduced opportunity for non-compliance, such as third-party reporting.

The CRA’s interest in this research is shown by the establishment of the Compliance Research and Strategic Analysis Division within the Compliance Programs Branch, which has as one of its three mandates “comprehensive research and analysis of...factors that contribute to compliant and non-compliant behaviour”.⁸ Currently this division has only 28 personnel, in contrast to perhaps 28,000 in the entire CRA.⁹ However, the Compliance Research and Strategic Analysis Division has plans to “identify opportunities for partnering in research projects where there is mutual interest and benefit” (through joint projects with other analytical areas within the

⁶ Refer to Torgler (2002), Alm and McKee (1998), Cuccia (1994), Jackson and Milliron (1986) for reviews of these theories and associated empirical studies.

⁷ Turner, CTF 2003 Conference Report, paper 11, p.27.

⁸ Greg Maloney, “Compliance Research at the Canada Revenue Agency” A Presentation to the IRS Research Conference 2-3 June 2004”, p. 2. This is available at. <http://www.irs.gov/taxstats/article/0,,id=122790,00.html>.

⁹ The 28,000 is the number of full-time equivalent staff in the tax services section of the former CCRA: Page 1-21 and 1-4, CCRA Annual Report to the Parliament 2003-2004.

CRA, which may potentially extend to other government departments and academics) and produce an annual report on compliance.¹⁰

Alternative Research Approaches

Testing the economic and psychology based theories to see which can better explain taxpayer behaviour can be done in several ways. One approach is to study the effects on compliance of actual changes in the laws, such the introduction of civil penalties for tax practitioners. The problem with the approach is the lack of such changes in adequate numbers and the statistical problem of sorting out this effect from the effect of simultaneous change of other factors in the economy, such as economic growth and self-employment trends. Another approach, which is used in this study, is to use surveys and social-science experiments with actual taxpayers with the goal of generalizing from the sample of taxpayers studied to overall tax compliance behaviour for the whole country.¹¹ Within this approach, this study focuses on two research questions – what is the best way to measure compliance behaviour, and whether the Theory of Planned Action of Ajzen (1991) provides a good explanation of tax compliance behaviour.

Measuring compliance behaviour would seem to be simple, but the problem is to find a measure which allows the researcher to directly study how compliance changes with a change in an underlying tax-related parameter, such as the audit rate. Thus, directly asking participants about their own past involvement in tax evasion is not sufficient. What is needed is a compliance indicator which can be repeatedly measured with changes in policy parameters. One possibility is to ask hypothetically about tax evasion behaviour (possibly with a case situation to describe the context in detail) and how it would differ if a specific change occurred. Alternatively, an experiment could be conducted in which the participants engage in tax-reporting situations in a controlled setting in which they derive real monetary rewards based on their decisions. Under this experimental-economics framework, taxpayers receive a certain amount of income, choose how much to report to the tax authority, pay tax accordingly, are possibly audited and, if found to have evaded tax, are required to pay the tax evaded plus a penalty. The effects on compliance of changes in policy parameters can be measured by having the participants make repeated tax-reporting decisions within the context of environments with different tax-related parameters.

Purpose of This Study

The choice between the hypothetical-situation and experimental economics approaches has often been made on a theoretical basis, with researchers choosing on the basis of how important they think real economic incentives are in simulating real-life behaviour. This study suggests instead that a more empirical criterion be applied -- which indicator is more strongly associated with past involvement in tax evasion? The rationale is that since actual tax evasion is the ultimate variable of interest, the proper indicator is the one which is most strongly correlated

¹⁰ Supra note 7, at 12-13.

¹¹ Examples of studies which either focus on tax evasion in Canada or use Canadian participants in tax evasion experiments are Chung and Trivedi (2003), Trivedi et al. (2003), Erard (1998), Brooks and Doob (1990), and Hill and Kabir (1996).

with it. By comparing the two indicators on this basis, this study provides some evidence on this issue.¹²

The second issue which forms a focus for this study is to attempt to determine the precise chain of reasoning which taxpayers use in making decisions about tax compliance. Although one could directly ask people to explain their reasoning, tax reporting behaviour is sufficiently complex as to render this approach unworkable. Instead, the approach used is to postulate a specific psychological theory as to how individuals make decisions and test whether it applies to tax compliance. This does not imply that the study excludes economic theories of tax compliance; instead, the statistical tests employ both psychological and economic variables. However, since it is not possible to consider all of the psychological theories for testing in one study, this study picks as a particular theory for examination the Theory of Planned Behavior (TPB) of Ajzen (1991), which is a successor to the Theory of Reasoned Action (TRA) of Fishbein and Ajzen (1975), Ajzen and Fishbein (1980) and Ajzen (1988). This theory is described in the section on survey and experimental instruments below.

This study may be seen as an extension of previous TPA-TPB research to the experimental-economics framework. Previous studies of the TRA and TPB in a tax compliance context have used hypothetical situations (Hanno and Vilotte, 1996; Blanthorne 2000; Bobek and Hatfield, 2003) and thus have not examined whether attitudes and intentions influence behaviour in the face of real monetary considerations. On the other hand, previous experimental-economics work on tax has typically excluded psychological considerations by refraining from using context-specific language in the instructions to the participants.^{13, 14} In other words these studies

¹² Past studies by Elffers et al. (1992) and Hessing et al. (1988) have found that neither self-reports nor experimental measures of tax compliance are related to actual tax evasion behaviour. Both studies were of Dutch taxpayers and had the advantage of using tax evasion data from tax returns as their measure of actual tax evasion (as opposed to self-reported tax evasion, which is employed in this study). Hessing et al. (1988) compared this measure to taxpayers' self-reports of tax evasion, while Elffers et al. (1992) compared it to experimentally-measured tax evasion as well. One possible problem with using tax-return-based measures of tax evasion is that Elffers et al. (1992) note that there was wide disagreement among the tax officers on the tax evasion status of the individuals included in their study.

A second problem with Elffers et al. (1992) is that the tax task in their experiment was embedded in a much wider business simulation context, yet their participants had little real-life experience running similar businesses. Therefore, it is possible that the participants were more intent on getting their business decisions "right" and thus may have failed to pay adequate attention to the possibility of evading taxes. In any event, they may not have viewed their tax compliance decisions in the experiment as being reflective of their real-life tax compliance decisions.

¹³ Typically, neutral terms like "fee" for income, "check" for audits and "shortfall payment" for penalties are used in these studies. Bloomfield and Libby's (1996) research in financial reporting shows that experimental markets results are different if one uses familiar terms that have meaning rather than artificial terms that are unfamiliar to the participants. Tax evasion decisions especially have strong ethical and moral implications, which are typically absent in accounting related tasks. These implications can additionally influence participants' tax compliance behaviour in the laboratory. Therefore, the issue of using contextual (actual tax related) terminology versus using neutral terms is of special significance in the tax evasion context as compared to other contexts.

¹⁴ Previous studies which have used tax-terminology in an experimental economics frame work include Collins and Plumlee (1991) and Moser et al. (1995) among others. However, none of these studies have attempted to link individuals' personality related variables, such as attitudes and intentions to their tax compliance decisions in the laboratory, or attempt to relate the latter to the participants' actual compliance decisions.

focused on people's reactions to incentives, without regard to the psychological context of the incentives. Consequently, no attempt is made in these studies to relate participants' tax evasion decisions to their personality related variables, attitudes and intentions.¹⁵ To allow for the incorporation of this set of potential determinants of tax evasion, we make use of tax-specific language by urging our participants, via repeated verbal instructions, to act in a manner similar to the way in which they would act if placed in a similar taxpaying situation in real life.

In the next section, we discuss our work on the measurement of tax compliance behaviour. We describe our sample, our survey and experiment instruments, and our results. In the following section, we report on our test of one psychological theory of tax compliance, the Theory of Planned Behaviour. We discuss first the portions of our survey which relates to this theory, and then we discuss our results. Finally, the contributions and limitations of this paper, together with suggestions for future research, conclude the paper.

MEASURING TAX COMPLIANCE BEHAVIOUR

Overview of the Survey and Experiment

Hill and Kabir (1996) report that participation in the underground economy and, by extension; tax evasion in Canada is especially high among low-income individuals (including students, unemployed, and receiving social assistance), youths and unmarried persons. In this context Jackson and Milliron (1986) observe that tax evasion studies should focus on groups of interest rather than try to obtain a diverse set of participants. Consequently, our study focuses on students recruited from a mid-size Canadian university, McMaster University in Hamilton.

We held a three-hour session to obtain demographic data, administer the survey instruments, and conduct the experiment.¹⁶ Our survey and experiment instruments (i.e., forms for the participants to fill out) covered tax compliance behaviour and psychological variables suggested by the TPB.¹⁷ The instruments are available from the McMaster Experimental

¹⁵ Outside the TPA-TPB context, Collins et al. (1992) is a good example of using personality related variables to explain hypothetical tax evasion decisions.

¹⁶ The sequence of administering the different tasks is as follows: demographic data was elicited first, the survey was completed next, the experiment was administered third, and the Defining Issues Test (DIT), which is discussed below, was completed last. Refreshments were provided to the participants during the course of the three hours to maintain energy levels and to reduce the impact of fatigue on the participants. The survey instrument included questions to elicit participants' attitudes, intentions as well as hypothetical compliance decisions. Therefore, the order of eliciting information may have influenced participants' subsequent behavior in the experiment. However, we are not aware of any a priori reason why such an influence should differ between hypothetical and experimentally-measured compliance decisions. Given that our main focus is the comparison between these two types of compliance decisions, we believe that the influence of order if any does not pose a major threat to our findings. Finally, the DIT measures innate moral reasoning, which, theoretically, is not susceptible to change over short periods of time (Rest et al., 1986, 28-58). Therefore, we do not apprehend a problem in administering the DIT last.

¹⁷ The instruments used to elicit participants' attitudes, social norms, perceived behavioural control and intentions are based on different instruments pre-tested and used previously in Hanno and Violette (1996) and Blanthorne (2000) respectively. However, we did not use the actual questions used in Hanno and Violette (1996) since the authors of that study could not provide us with a copy of their instrument. Instead, we came up with questions similar to those used in Hanno and Violette (1996) based on the descriptions provided about each question in their paper.

Economics Laboratory website.¹⁸

Participants' compensation for completing the above tasks included a show-up fee of \$10, earnings from the experiment, and \$20 to complete the last survey instrument, the Defining Issues Test (discussed below). Parameters for the laboratory sessions were structured such that on average participants would earn approximately \$15 per hour. For the ten decision rounds, 41 participants were provided with an income of \$1 (5,000 Lira) per round while 38 participants were provided with an income of \$1.40 (9,000 Lira) per round. The use of the special "Lira" currency, where 5,000 Lira equals \$1 Canadian, was used to ease calculation of taxes and penalties to be paid by the participants by allowing for easy rounding of figures. If Canadian dollars had been used instead, participants may have had to deal with decimal amounts. The use of laboratory currency, while not required, is common in experimental economics studies.

To maintain participants' anonymity and to reduce any implicit pressure participants may feel to provide the "right" answers, participants were identified only by unique identification numbers. Participants were further assured of the confidentiality of the study through a cover letter, which promised that only the principal researchers would have access to their data.

Consistent with the fact that all of our participants are students, the mean (i.e. average) age of our sample is 24.4, with a range of 19 to 54 years. 65 of our 79 participants are undergraduates, the rest being MBA students. Our sample is evenly matched in terms of gender with 40 females and 39 males. Fully, 96 percent of our participants had tax filing experience.

One individual provided incomplete information, so that person was dropped from the sample, resulting in a useable sample of 78 participants.

Compliance Measures

Two measures of past evasion were elicited from participants. The first question is "Did you, when filing last year's tax return, underreport your income or report unwarranted deductions?" A second question asked "Have you ever underreported income or reported unwarranted deductions on any previous year's tax return?". The answers provided were "yes" and "no". In the statistical work, a binary scale is used, with a "yes" response coded as one and a "no" response coded as 0.

We also asked several questions about hypothetical compliance. The first was:

Assume that you have earned an income of \$2,500. The tax rate is 30 percent. There is a 0 (Zero) percent chance that your tax return will be audited and the full extent of your unreported income will be detected by Revenue Canada. Please indicate below how much of the amount of \$2,500 earned by you that you will report to Revenue Canada.

The second question was similar, but allowed for audits:

Assume that you have earned an income of \$2,500. The tax rate is 30 percent. There is a 25 percent chance that your tax return will be audited and the full extent of your

¹⁸ <http://socserv.socsci.mcmaster.ca/econ/mceel/papers/taxcomp-inst.pdf> and <http://socserv.socsci.mcmaster.ca/econ/mceel/papers/taxcomp-surv.pdf>. The Defining Issues Test which is discussed below is not included since it is a copyrighted instrument.

unreported income will be detected by Revenue Canada. On detection, not only will you have to pay the taxes owed on the unreported tax, but you will also have to pay a penalty equal to 1.5 times such unpaid taxes. Please indicate below how much of the amount of \$2,500 earned by you that you will report to Revenue Canada.

The compliance measures corresponding to these questions, Hypothetical-situation Compliance at 0 percent Audit and Hypothetical-situation Compliance at 25 percent Audit, were the proportions of the \$2,500 in income reported to Revenue Canada in the two situations.

Participants also responded to four case situations of 4-7 sentences each, related to the likelihood that the participant would not report to Revenue Canada (the CRA's name at the time of the experiments) the income received of four different types -- restaurant tips and three types of part-time self-employment income (artist, computer consultant, and home handyman).¹⁹ Participants' responses regarding this likelihood were obtained on a Likert-type scale ranging from -3 to +3, with -3 labelled "unlikely" and +3 labelled "likely", with zero being the midpoint. Responses to all four case scenarios were highly correlated to each other,²⁰ so the four variables were combined into one variable, termed Responses to Cases, was used in further data analysis.²¹ Response to Cases may also be considered an indicator of hypothetical compliance, so we have a total of three measures of this concept.

We measured compliance in the face of monetary incentives using experimental economics techniques. The instructions told each participant that he or she had received some income and had to decide what amount to report to Revenue Canada. We asked our participants to behave identically to what their compliance behaviour would be if placed in real-world tax compliance contexts with similar economic consequences.²² The penalty for understating income was stated to be 150 percent of the tax evaded. There were ten repetitions ("rounds") for each participant; with the only difference across rounds being the audit rate. This rate was set at zero

¹⁹ It is not clear what audit rate the survey participants would have in mind when answering this question. As noted in footnote 5 above, the idea of an audit rate of individuals is a murky concept. Even if the average audit rate for the country of about 1.3% from Panel A of Table 1 was accurate, the audit rate is not uniform over the entire population. CRA targets those posing a higher risk of evading taxes and our survey participants would appear to be in a higher-risk category, but on the other hand our participants may face a lower audit rate because the tax revenues recoverable may be meagre as they are all college students and are by and large young. Also, it is quite possible that most people think that a CRA tax audit is a random event although they have no idea of the probability of this random event. Further, even if they know the true audit rate, they may act as if it is larger than it really is (Alm et al. (1992)).

²⁰ The associated Cronbach's Alpha, which is a measure of internal consistency based on the average inter-item correlation, is a very high 0.814. The four cases through in general patterned on cases used in prior studies were specially prepared by us for our research project and have therefore not been pre-tested before. These cases are short and may therefore appear sparse and not rich enough to capture taxpayers' mental taxpaying models. However, our statistical results indicate otherwise. While the participants' responses to all four case scenarios load on to one factor, there are significant differences in the average responses which are noted below in the Results section.

²¹ Factor analysis suggested that all four loaded on to a single component (results not presented), and their factor score is the variable described above. Whenever required, we used factor scores from the related factor analysis and not simple averages of the underlying indicators during further data analysis.

²² Participants were instructed verbally instead of via written instructions to act as they would in a real tax setting to make such a requirement salient to the participants. Further, these instructions were repeated throughout the experiment to ensure that participants did not forget this point.

percent for the first five rounds and 25 percent for the next five rounds.²³ The average proportion reported over the five rounds under each treatment was used as the indicator of experimentally-measured compliance for that audit rate. In the tables, the two variables are “Experimentally-measured Compliance at the Zero Percent Audit Level” and “Experimentally-measured Compliance at the 25 Percent Audit Level” respectively.²⁴

In the five rounds where the audit rate was 25 percent, all participants knew before making their income reporting decisions for those rounds, that there was a one in four or 25 percent chance that they would be audited in a particular round and that their chance of getting audited in each round was random and independent of what happened in a previous round. Four numbered balls in a can were used to determine whether or not participants would or would not be audited in each of those rounds. One of the participants had been asked at the beginning of the five rounds to identify one of the balls as the audit ball, by randomly picking one of them. Thereafter, in each of the five rounds, after all participants had submitted their income tax reports, one of the participants was asked to pull out one of the four balls at random and without looking. If the ball picked up was the designated audit ball, then all participants were audited in that round. Otherwise, no participant was audited in that round. Thus, the audit procedure was conducted in full view of the participants so as to make the risk of being audited tangible and real to them.

For the experimental-economics work, some individuals had a higher income per round than others. Participants provided with 5,000 Lira per round had to pay taxes at 10 percent, while participants at the 9,000 Lira level had to pay taxes at 50 percent. Therefore, at full compliance the after-tax income for both levels of income would be the same, 4,500 Lira.²⁵ As a consequence however, a limitation of our study is that we cannot distinguish statistically between differences caused by changes in income and differences caused by changes in tax rates.

Results

a) LEVELS OF COMPLIANCE

Table 2 shows the levels of compliance revealed by participants. In terms of actual compliance, 13.9 percent of all participants report that they did not report all of their income in the previous year and 17.9 percent indicated that they did not report all of their income in any past year. This means that they reported, as a group, at least 86.1 percent of their income in the previous year (82.1 percent in the previous or past years). For the hypothetical situations, an average of 57 percent of income is reported when there is no chance of audit and 76 percent is

²³ The reason for asking about the zero percent rate first is that we wanted to elicit participants' behaviour in the absence of audits first, when they had no prior experience of being audited in the experiment. To mitigate any ordering effect, we asked the participants to provide their hypothetical compliance decisions assuming a 25 percent audit first and zero percent audit next. Nonetheless, given the strong audit treatment, zero to 25 percent, we do not believe that the order of administering the two levels would have made a qualitative change to our results.

²⁴ Similar results were obtained when data from the last round in each set, i.e. the 5th and 10th rounds respectively were used instead in our statistical analysis.

²⁵ The reason for providing different levels of income with different tax rates to these two groups was to determine whether compliance would differ between the two groups because of the difference in tax rates despite the fact that both groups would be equally well-off when totally compliant.

reported when there is a 25 percent chance of an audit.²⁶ In the experimental-economics decision rounds, where money is at stake, only 55 percent of income is reported when there is no chance of an audit while 62 percent is reported when there is a 25 percent chance of audit.²⁷ As previously noted, in these controlled environments tax-specific language was used and participants were told via verbal instructions to act as they would in a real tax setting.

It is perhaps a concern that the average levels of actual self-reported compliance on tax returns are greater than the average levels of both hypothetical-situation compliance and experimentally-measured compliance. A potential explanation for the difference may be that third-party reporting occurs in real life but was not implemented in this experiment, i.e., audit rates are much greater than 25% in real life for types of income such as employment income. Alternatively, the participants may have under-reported their actual degree of tax evasion. Perhaps compliance behaviour in the laboratory reflects compliance in real-life situations where there is little chance of being caught, as in the case of income from tips or casual labour.

The reported levels of hypothetical-situation and experimentally-measured compliance shed some light on the predictive validity of economic theories of compliance. Since the penalty for understating income was stated to be 150 percent of the tax evaded, the participants are essentially choosing between paying the true tax with certainty or a gamble of zero tax if they are not audited and 250 percent of the tax if they are audited. This implies that a 40 percent audit rate would be required to make a participant who was maximizing expected income to be indifferent between compliance and non-compliance. With any lower audit rate, the participant would not comply and hence pay zero tax. Since both the hypothetical-compliance measures and the experimental-economics measures had a maximum audit rate of 25 percent, a participant who is maximizing expected income would have 100 percent non-compliance. Thus, compliance was much higher than would be predicted by a simple economic theory of decision-making. Presumably, psychological factors such as ethics must explain the higher levels of compliance that were observed.

b) CORRELATIONS AMONG COMPLIANCE MEASURES

As noted in the Introduction section, researchers need an indicator of tax compliance which can be varied within the survey or experiment for different values of the policy parameters. This would allow the researcher to determine, for example, the effect of changes in audit rates on compliance behaviour. For the indicator to have validity in predicting real-life behaviour, it should be highly correlated with past compliance behaviour, as measured in our study by two variables – non-compliance in the previous year and non-compliance in any past year.

This study includes two potential indicators -- hypothetical tax compliance, measured by three variables, and experimentally-measured tax compliance, measured by two variables. Table 3 shows that the three variables for hypothetical compliance all have low correlations with actual tax-return non-compliance, with just one having any reasonable degree of statistical significance:

²⁶ 65.8 percent and 39.2 percent of our participants did not fully report their hypothetical income when the audit rate was zero and 25 percent respectively.

²⁷ 77.2 percent and 74.7 percent of our participants did not fully report their income when the audit rate was zero and 25 percent respectively in the experiment.

Response to Cases has a 0.22 correlation with actual non-compliance in the previous year. Even this one lacks much practical significance, as it implies that Response to Cases explains less than 5 percent of the variation in actual non-compliance in the previous year.²⁸ All of the correlations have the expected sign: positive for Response to Cases and negative for Hypothetical-situation Compliance at the 0 percent and 25 percent rates.

In contrast, in Table 3, experimentally-measured tax compliance is much better correlated with actual compliance -- all correlations are the right sign (i.e., increased experimentally-measured compliance is associated with increased actual compliance), and all are statistically significant at various levels, and the percentage of variance explained varies from four percent to 13 percent. The strongest correlations are with actual tax-return non-compliance in the previous year, which is the most important measure of real-life behaviour as it reflects the most recent actual decision-making.

Still, there is obviously much variance left to be explained. Part of the problem may be that the measure of actual non-compliance is a zero-one variable, which cannot be expected to explain a high percentage of the variance of a continuous variable.²⁹ Another issue which was stated above is that responses on actual non-compliance in the past may reflect non-compliance both in the presence and absence of third party reporting, while the different measures of non-compliance elicited in this study may reflect non-compliance in the absence of any third-party reporting.

Note that the experimental-economics compliance measures used in this study were elicited using tax language and while repeatedly urging our participants to behave as they would in real life (as discussed in the Introduction). Thus, the contrasting finding of Elffers et al. (1992) that their experimentally-determined tax compliance was unrelated to actual tax evasion behaviour may perhaps be explained by the fact that that study used a general business context and did not highlight its link to tax compliance. The previous discussion suggests that the use of tax terminology and instructions to act in a manner consistent with real life may produce tax compliance measures which are more closely connected to real-world behaviour.

c) COMPLIANCE BY SITUATION

Participants' average responses to the case situations suggested that the ranking of the situations in which they were most to least likely to evade tax on the income is as follows: restaurant tips (mean 1.34), home handyman (mean 1.24), artist (mean 0.71), and computer consultant (mean 0.43). Thus, it appears that the participants were more sympathetic to and more inclined to behave like the characters in the cases when there appeared to be a genuine reason for such tax evasion (i.e., when the evasion was by a poor student funding her university education through restaurant tips, or the home handyman supplementing his income to support his family of four children and wife).³⁰

²⁸ The square of the correlation is the proportion of variance explained. This has a minimum of 0% and a maximum of 100%.

²⁹ Possibly future research could ask people what percentage of past year's income and income in previous years respectively they reported to the tax authority.

³⁰ Some of these differences are statistically significant. When paired-sample t-tests were conducted, the average response relating to the restaurant tips case is significantly ($p < .001$) different from the average response of the

TESTING A THEORY OF TAX COMPLIANCE

Variables Suggested by the Theory of Planned Behaviour

Ajzen's (1991) theory models behaviour as depending on behavioural intention, and behavioural intention in turn as depending on three factors attitude toward the behaviour; subjective norms; and perceived behavioural control. This theory is diagrammed on Figure 1 (but note that the bottom two arrows relating to ethics are explained below). Attitudes relate to one's own personal views about the behaviour. Subjective norms are a function of an individual's perception that one or more relevant people would approve of a particular behaviour and the extent to which the individual's behaviour will be influenced by that. Perceived behavioural control refers to an individual's perception regarding the extent of control he or she has over a particular behaviour. These concepts will become clearer as we discuss below the questions that are used to measure them.

Perceived behavioural control is modeled as capable of influencing behaviour directly as well as through its effect on intentions. The indirect link represents the motivational influence of control on behaviour. To the extent people believe that they have limited control over performing a particular behaviour, their intention to perform the behaviour may be decreased. The direct link from perceived behavioural control to behaviour represents the actual control an individual has over behavioural performance.

Participants were asked two questions concerning each of 23 aspects of attitudes, social norms and perceived behavioural control which relate to tax compliance. They first were asked how much they valued each of the beliefs, and then they were asked to rate the degree to (or probability with which) the associated belief is likely to occur or ensue.³¹ A sample pair of questions which relate to social norms is:

- "How much do you care whether your current or future employer approves or disapproves of your correct reporting of your income and deductions on your tax return?...[with answer endpoints "not at all" and "very much"]", and
- "If I complied with the federal and provincial income taxes (if I correctly reported my income and deductions on my tax return), my current or future employer would...[approve, disapprove]".

Similarly, a pair of questions relating to attitudes is:

- "Fulfillment of my personal, moral and ethical obligations as a consequence of my complying with the federal and provincial income tax laws (correctly reporting my income and deductions on my tax return) is: [with answer endpoints "bad" and "good"]"³² and

participants relating to either the computer consultant or artist cases, the average response to the computer consultant case was significantly different from their average response to the home handyman case ($p < .001$), and the average response to the artist case was significantly different from their response to the home handyman case..

³¹ This is called "expectancy" in the literature.

³² For this question a clearer indication of how much the participant valued the belief might have been obtained by using the answer endpoint words like "important" and "unimportant" instead of "good" and "bad", but the questions used in Hanno and Violette (1996) were employed because they had already been pre-tested by that previous study.

- “Complying with the federal and provincial income tax laws (correctly reporting my income and deductions on my tax return) will result in the fulfillment of my personal, moral and ethical obligations: [unlikely, likely].”

Responses to both types of questions were measured on a seven point Likert scale from -3 to +3. Zero (0), the midpoint in the range, indicated a neutral response, negative values indicated a negative response (such as “unlikely” or “not at all”), and positive values indicated a positive response (such as “likely” or “very much”)

For each pair of questions, an indicator was constructed by multiplying the numbers representing the answers to the two questions.³³ Since many of the 23 indicators are similar to each other and including them all into our statistical analysis is not feasible given our sample size, we used factor analysis to reduce these 23 indicators into six components.^{34, 35} 20 of the 23 above indicators load onto (i.e., are strongly correlated with) six principal components. The six components have been labelled as follows.³⁶ For convenience, the factor from Figure 1 to which each of these components relate is listed first before listing the components.³⁷

- *SUBJECTIVE NORMS FACTOR*

- Subjective Norms component. Six indicators load on this component -- the questions relating to the importance to their tax compliance decisions of the approval of such decisions by their friends, tax preparer, peers, spouse, employer and family.

- *ATTITUDES FACTOR*

It appears that our participants understood the questions used by us and answered them correctly, since participants’ responses to these questions were in the expected direction and the indicators that are similar load significantly onto similar factors.

³³ Before multiplying, one of the two Likert scales in the pair, the likelihood scale, was transformed from the range [-3, 3] to the range [1, 7]. This transformation avoids inaccurate indicator scores, since both (-3) times (-3) and 3 times 3 equal 9. After the transformation, the indicator for the (-3,-3) pair becomes -21 and the indicator for the (3, 3) pair becomes +21.

³⁴ We consistently adopted a cut-off of one for eigenvalues while identifying factors during factor analysis.

³⁵ Exploratory factor analysis was necessary to identify which of the 23 indicators need to be retained. Further, reliability analysis using Cronbach’s Alpha, indicated that this grouping of the 20 indicators across the six components to be reasonable (see the next footnote below). We use exploratory factor analysis to reconfirm the validity of the instruments used in our study. Specifically, we believe that exploratory and not confirmatory factor analysis (structural equations modeling) is appropriate in our study given that i) our study represents the first study to use Canadian participants, whereas, earlier research which have used these indicators were conducted using US participants, ii) we were using for the first time the questionnaire we devised based on the description provided in Hanno and Violette (1996), and iii) Tabachnick and Fidell (1996, page 715), note that at least a sample size of 200 is required for small to medium size models to use structural equations modeling, which is a confirmatory technique. While sample size is also an issue for exploratory factory analysis, the requirements are not as stringent.

³⁶ The Cronbach’s Alpha values relating to the first five components are respectively 0.863, 0.849, 0.659, 0.763, and 0.374.

³⁷ For each of the six factors above, the related factor scores, which are normalized with a mean of zero, and calculated using the regression method, were used in further data analysis. The individual data that we analyze are therefore deviations from the mean of the factor score for each factor.

- Duties of a Citizen component. Five indicators load on this component -- the importance to the tax compliance decisions of fulfilling one's moral and ethical obligations, funding the government, fulfilling duties of citizen, recognition of good ethics by community, and the presence of records (e.g., computer records or receipts).
- Advantage of the System component. Four indicators load on this component -- the importance to their tax compliance decisions of their perceptions regarding having taken advantage of the system or of factors necessary for doing so, specifically being able to brag about their actions, knowledge of the income tax system, feeling of beating the system, and effort required to prepare their tax return.
- Monetary Considerations component. Two indicators load on this component -- the prospect of receiving a refund, and of having extra cash consequent to their actions.

- PERCEIVED BEHAVIOURAL CONTROL FACTOR

- Penalties component. Two indicators load on this component. These indicators relate to the importance to their tax compliance decisions of legal or social penalties ensuing from such actions, the two being i) possibility of penalties (e.g. fines or jail time), and ii) making friends feel awkward consequent to such actions.
- Third Party Reporting component. A single indicator loads on this component.

Table 2 provides descriptive statistics on these six components.

Tax Compliance Intentions

Following Hanno and Violette (1996), we elicited five measures of intention to comply or to misreport deductions. Intentions are distinguished from behaviour in that the former are responses to questions starting "I will try to" or "I intend to" and are not specifically about past behaviour. All five were measured using a Likert-type scale ranging from -3 to +3, with -3 labelled unlikely and +3 labelled likely that they would report their income or overstate deductions. The wording of four of these measures is extremely similar and in factor analysis they load on to a single component (the associated Cronbach's Alpha is 0.791), so this component was named Intent to Comply and used in further statistical tests. The last measure, being single, was retained in its original unmodified and un-normalized form and was labelled Intent to Overstate Deductions. In summary, therefore, we use two measures of intention – Intent to Comply, and Intent to Overstate Deductions.

Ethics

Ajzen (1991) notes that the TPB is open to the inclusion of additional predictor variables if they improve the prediction of intention or behaviour after the original variables have been taken into account. In the tax compliance context, ethics appears to be a natural choice as an additional predictor which influences behaviour both directly and through behavioural intentions. Measures of this additional construct are discussed below. The bottom two arrows in Figure 1 illustrate this concept.

One dimension of ethics is moral reasoning. We use the P score of the Defining Issues Test (DIT) to investigate the impact of moral reasoning on tax compliance. The DIT is grounded in the theory of the stages of moral reasoning first proposed by Piaget (1965) and later

formalized by Kohlberg (1969). Rest (1979) developed the DIT to assess participants' moral reasoning in terms of the Kohlberg model, and its reliability has been tested in hundreds of research studies (Rest et al., 1986, 28-58). The P Score which represents the extent of post-conventional level of moral development attained by each individual (Rest et al., 1986, 185-200).^{38, 39} The predicted relationship with compliance is positive, so participants with higher P scores may be expected to show higher levels of compliance.

Studies of tax compliance in the laboratory have also used another dimension of ethics, which is whether the participant exhibits an "anti-establishment orientation, a point of view which condemns location and existing social order for its arbitrariness or its corruption by the rich for exploitation of the poor... [It is] possibly a transition phase between conventional morality and principled morality." [Rest, 1987, p. 4.2]. This is measured by the A score on the DIT. If we assume the government and its tax authorities represent as the "establishment" then intuitively the A Score may have some relationship to tax compliance. The expected relationship is negative, so participants with higher A scores should have lower levels of compliance. Both the P and A scores from the DIT have been used in prior research to explain tax compliance behaviour in the laboratory (Kaplan et al., 1997; Trivedi et al., 2003).

Results

Recapping the theory presented above and pictured in Figure 1, we have two propositions to test:

Hypothesis 1: Tax compliance behaviour is determined by three factors: tax compliance intention, perceived behavioural control and ethics. Attitudes and subjective norms should not directly affect tax compliance behaviour.

Hypothesis 2: Tax compliance intention is determined by four factors: attitudes, subjective norms, perceived behavioural control and ethics.

³⁸ Kohlberg's stage theory states that individuals make moral judgments based on a concept of justice which develops as individuals mature. Kohlberg (1969, 382-391) identifies three levels of moral development (pre-conventional, conventional, and post conventional), with each level including two distinct stages of moral reasoning. In the pre-conventional level, moral decisions are motivated by fear of punishment (stage 1) or from self-interest (stage 2). At the conventional level, moral decisions are influenced by the social group, so the individual acts to please or help others (stage 3) or to fulfill societal, legal, or religious norms, i.e., rule-based reasoning (stage 4). Finally, at the post-conventional level individuals make ethical choices based on concepts of justice, such as individual rights and socially accepted standards, i.e., a social contract (stage 5) or from universal ethical principles as defined by the decision-maker's conscience (stage 6). Thus, the moral reasoning stages involve how one perceives the justice of "self" vs. "others" relationship.

³⁹ The DIT consists of either three or six cases relating to ethical dilemmas. The six cases extended DIT was used in this study. An example of these cases is the case of the husband, who is faced with an ethical dilemma stemming from his wife's life threatening disease. The husband has to decide whether or not to break into the pharmacy of a price gouging pharmacist to steal a very rare drug invented by that pharmacist. This drug can cure his wife of her life threatening disease. After reading each case participants are required to respond to many questions relating to that case, including on whether or not the action contemplated in the case should or should not be carried out. Participants' responses were captured on a machine readable scoring sheet. The scoring sheets with the participants' responses were sent to the Center for the Study of Ethical Development, University of Minnesota for scoring. The P Score and the A Score for each participant was generated by the Center and sent back to us. While an accounting specific DIT exists (Thorne, 2000), a tax-specific DIT does not, thereby motivating us to use the generic DIT of Rest (1979).

Each of these hypotheses is tested by statistically estimating a regression equation and checking whether the variables relating to the determining factors listed above are statistically significant at the 5% level.^{40, 41}

a) TESTS OF HYPOTHESIS 1

Tax compliance behaviour, the dependent variable, is measured in two different ways: hypothetical-situation compliance and experimentally-measured compliance.⁴² Since our participants provided information about their compliance behaviour at two different audit rates (0% and 25%) for each way of measuring compliance, there are four different variables for compliance behaviour. A regression equation is estimated for each variable.

Consider first the two equations relating to experimentally-measured compliance, for which the results are shown in Panel A of Table 4. Hypothesis 1 is largely confirmed. As the theory predicts, variables relating to compliance intention and ethics are statistically significant while the variables relating to attitudes and subjective norms are not significant. Furthermore, these variables predict the dependent variable reasonably well.⁴³ On the other hand, the variables relating to behavioural control are not significant.

Among the two ethics variables, only the P score (moral reasoning) is significant, and it is the most significant variable in the regression equation. Among the two intent variables, Intent to Comply is significant for both audit rates while Intent to Overstate Deductions is significant

⁴⁰ Given that our sample size is only 78 and the number of potential variables and interactions is large, the following procedures were adopted to estimate the regression equations. First, step-wise regressions were estimated without interactions. Cut-offs of 0.20 and 0.25 were used for including and excluding variables respectively. The variables included initially in a model depended on the nature of the associated dependent variable. In the models with hypothetical measures of compliance as the dependent variables, the independent variables included initially into the model were all six principal components, the two measures of intent, the variable to identify whether the participant was an undergraduate or a MBA, P Score and the A Score. When the dependent variables were the experimentally-measured compliance measures, these variables were supplemented by a variable to identify the income provided, 5,000 or 9,000 Lira, and in the models with two data points per participant, the audit rate was also included as an additional independent variable. Likewise, in the models where the dependent variables were the intent measures, the independent variables initially included were the six principal components, the variable to identify whether the participant was an undergraduate or a MBA, the P Score and the A Score. Second, using only the independent variables found to be significant for each model in the above procedure, we added interaction terms so as to include not only the main effects but also all possible higher order interactions between such main effects. Finally, all interactions insignificant at or above the 0.25 level were eliminated with their sums of squares being pooled with the error term. Only these final equations are reported in the tables.

⁴¹ Eliminating insignificant variables using step-wise regressions is also appropriate given that i) our study is not a test of any one particular theory and ii) variables included in these step-wise regressions are motivated by more than one theory. Further, the fact that only some and not all variables motivated by any one theory are significant attests to the appropriateness of using step-wise regressions initially to identify significant variables. Finally, the use of step-wise regressions, an exploratory technique, is consistent with the use of exploratory factor analysis in our study.

⁴² Results (not shown) were obtained from a model using Response to Cases (the factor score obtained based on the participants' responses to the four case scenarios presented to them). Consistent with the models using hypothetical compliance measures presented in Table 4, the Adjusted R square is only 20.1 percent. Only two variables, Monetary Considerations and Intent to Comply are significant. While Monetary Considerations make the participants more non-compliant, Intent to Comply has a negative influence on non-compliance.

⁴³ The adjusted R-squared values of the two models are 42 and 48 percent respectively

only in the 0% audit case. This is reasonable, since in an audit trying to defend fictitious expenses is more difficult than defending concealed income.

Consider next the equations relating to hypothetical-situation compliance, as shown in Panel B of Table 4. The results are similar. Again, Hypothesis 1 is generally confirmed in that variables relating to compliance intention and ethics are statistically significant while the variables relating to attitudes and subjective norms are not significant. Behavioural control again is not significant. However, these equations do not predict the dependent variable as well.⁴⁴ Among the two ethics variables, it is now the variable for anti-establishment views (the A score) which is significant.

The above results used the data for 0% and 25% audit in separate equations. It is also possible to pool the compliance data for these two compliance rates and thus estimate an equation based on 156 observations (two for each participant) rather than 78. The purpose of this procedure is to create an additional independent variable, the audit rate, which may be thought of as another type of perceived behavioural control. The results, which are shown in Panel C of Table 4, are that the audit rate is not significant in the equation for experimentally-measured compliance but is significant for hypothetical-situation compliance. Other results are generally unchanged, except that ethics is no longer significant in the equation for hypothetical-situation compliance. Thus, the results in Panel C of Table 4, suggest that ethics and attitudinal variables have greater influence on compliance than does perceived behavioural control, which is affected by the audit rate.

The Theory of Planned Behaviour depicted in Figure 1 says that perceived behavioural control, intentions, and ethics are generally important in determining compliance. However, simple economic theory suggests that for the particular parameterization of the laboratory environment (for both hypothetical and experimental environments), perceived behavioural control is likely not relevant (given the penalty for non-compliance, changing audit rates should have no effect on compliance behaviour).⁴⁵ The regression using the experimentally-measured compliance data is consistent with this amended hypothesis, while the regression using the hypothetical-situation compliance data is not consistent with it.

b) TESTS OF HYPOTHESIS 2

Behavioural intention, the dependent variable, is measured in two ways – Intent to Comply and Intent to Overstate Deductions. In Table 5, the equation for the former does well in explaining the dependent variable while the equation for the latter has relatively low explanatory power.⁴⁶ Support for Hypothesis 2, which is based on the Theory of Planned Behaviour, is poor: while attitudes are significant in both equations, subjective norms are significant only in the Intent to Comply equation, and neither perceived behavioural control nor ethics are significant in either equation. In conclusion our results appear to support the Theory of Planned Behaviour in a modified form which includes only the three significant variables.

⁴⁴ The adjusted R-Squared values are substantially less than for the equations relating to experimentally-measured compliance (21% and 25% vs. 42% and 48%).

⁴⁵ See the last paragraph of the section headed “Levels of Compliance” above.

⁴⁶ The adjusted R-squared values are 58% and 12% respectively.

CONCLUSION

As noted in the Introduction, there are two purposes to this study. Both of these purposes relate to our use of tax-specific terminology in our instructions to our participants which is in contrast to the traditional practice in experimental economics of using neutral terms such as “fee” for income, “check” for audits and “shortfall payment” for penalties. The use of tax terminology allows for more realistic modelling of the tax setting and the introduction of psychological variables into the analysis.

The first purpose is to compare alternative measures of tax compliance behaviour which allow the researcher to directly study how compliance changes with a change in an underlying tax-related parameter, such as a change in the audit rate. The two alternatives are measures based on hypothetical situations and measures based on experimental economics. Our test in this paper is which measures are best correlated with past involvement in tax evasion. The conclusion is that experimentally-based measures are superior in that the correlations are higher, are in the expected direction, and are statistically significant in all four cases.

The second purpose of this study is to test a particular psychological theory of tax compliance, the Theory of Planned Behaviour of Ajzen (1991), in the context of experimental economics. As applied to tax compliance, this theory postulates the relationships in Figure 1, namely that attitudes, subjective norms, perceived behavioural control and ethics influence intention, while intention, perceived behavioural control and ethics influence behaviour. The statistical analysis in the paper mostly confirms the theory. The theory is particularly effective in explaining experimentally-measured compliance behaviour, which is important as this measure of compliance is found above to have a relatively high correlation with actual tax evasion behaviour on tax returns.

As other researchers have concluded (Alm and McKee, 1988; Alm et al., 1995), we found that economic variables do not go very far in explaining tax compliance behaviour. In our experiment, the audit and penalty rates are such that any participant who is maximizing expected take-home pay would report zero income for tax purposes, but in fact our participants reported 55-62% of their income. Psychological factors were also found to be important in the case situations, in which it appeared that the particular tax context was quite important. Participants were more inclined to evade taxes when there appeared to be a genuine reason for such tax evasion, as in the case of the poor student funding her university education through restaurant tips. Similarly, in the statistical analysis of Hypothesis 1, it was found that perceived behavioural control variables such as third-party reporting, penalties and audit rates were not as statistically significant as psychological factors such as ethics. Of course, this should not surprise tax practitioners, who are very familiar with clients fully complying with the tax laws despite very low audit rates.

As a side question, we discovered that participants’ average responses to the case situations suggested that the ranking of the situations in which they were most to least likely to evade tax on the income is as follows: restaurant tips (mean 1.34), home handyman (mean 1.24), artist (0.71), and computer consultant (0.43). Thus, it appears that the participants were more sympathetic to and more inclined to behave like the characters in the cases when there appeared to be a genuine reason for such tax evasion.

Our study is subject to a number of limitations. First, it is possible that despite our clear instructions that their behaviour in the experiment should reflect real-life taxpaying decisions, participants' tax compliance decisions in the experiment may not reflect such real-life taxpaying decisions. Second, our participants' admissions of past evasion may have been influenced by concerns regarding self-presentation or may have been affected by poor memory regarding such behaviour. Third, research by Boylan and Sprinkle (2001) suggests that participants' reactions when they are endowed with income is different from their reactions when they are required to earn their income, at least in the context of changes in tax rates.⁴⁷ Further, individuals' compliance behaviour may depend on the source of their income and individuals may also differ based on whether their non-compliance is intentional or unintentional. Future research can explore these issues in greater detail by varying the source of income provided to see whether such differences lead to differences in compliance behaviour and by differentiating between intentional and unintentional compliance behaviour. Fourth, our sample size is modest, especially of MBA students. Therefore, related results should be interpreted with caution.

We urge future researchers to replicate our study with a larger sample and to use confirmatory statistical techniques like path analysis or structural equations to test the robustness of our findings.

Subsequent research to confirm our findings and to determine how best to apply them in policy contexts is needed before such findings can be applied to make policy decisions.

⁴⁷ However, note that the tax experiment in Boylan and Sprinkle was for a single round. Therefore, it is uncertain whether their results extend to our experimental context, where we administered the same treatment combination over multiple rounds. Additionally, Alm et al. (2004), whose participants earned their income, find results similar to earlier research in which participants were endowed with income. The results in Alm et al. (2004) appear to suggest that it does not matter whether individuals earn their income or are endowed with their income when making decisions over multiple rounds as in our study.

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Figure 1: Theory of Planned Behaviour with Moral Reasoning

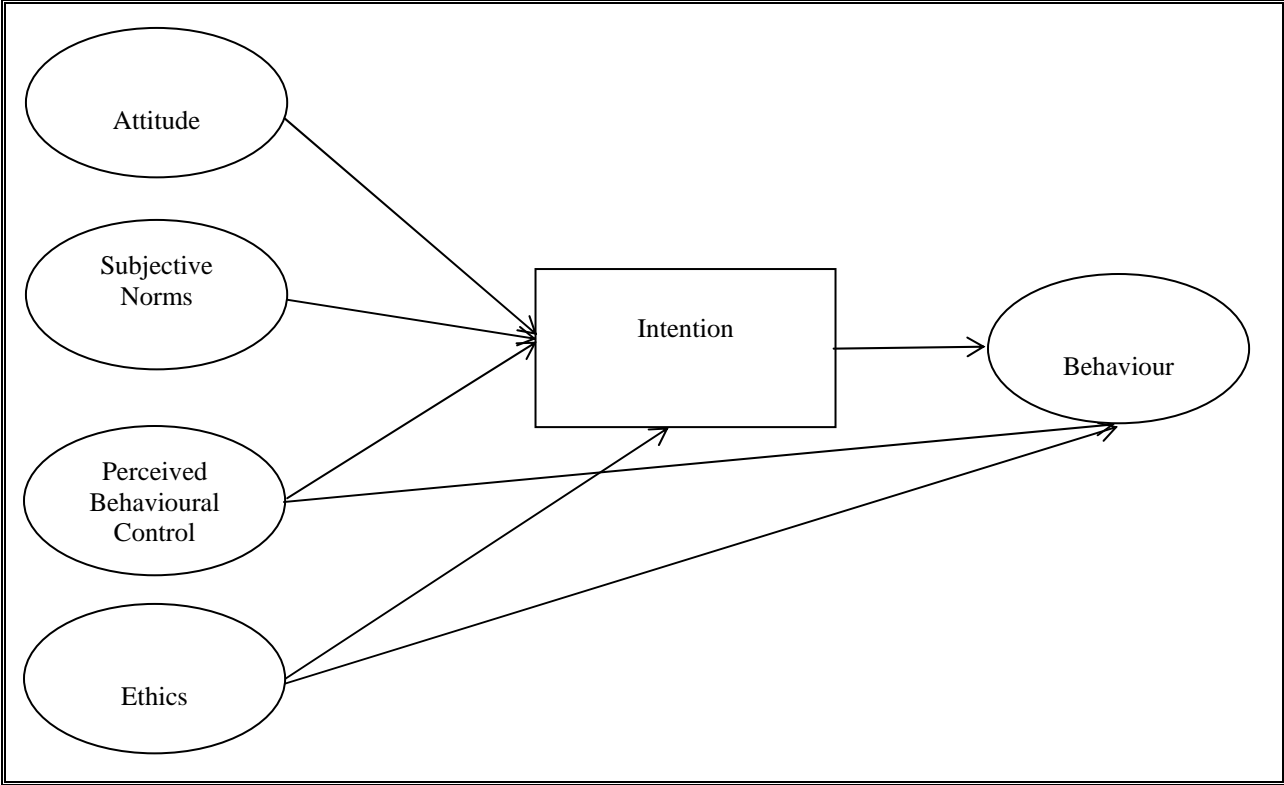


Table 1: CRA Disclosures Regarding Taxpayer Compliance*
Panel A: Audit Coverage Rates Relating to Audit Type Activity

	2000- 2001	2001- 2002	2002- 2003	2003- 2004	2005-2006 Target
Large Businesses					
Basic Files	12.00% ^a	13.00% ^b	21.80% ^b	25.00% ^b	20.80% ^g
Large Files	54.00% ^a	54.20% ^b	56.60% ^b	56.60% ^b	60.00% ^g
Small Businesses					
Unincorporated	0.68% ^a	0.82% ^b	1.01% ^b	0.97% ^b	1.16% ^g
Corporate	0.87% ^a	0.95% ^b	0.99% ^b	0.90% ^b	1.26% ^g
GST/HST post-payment audits	0.80% ^a	0.82% ^b	1.04% ^b	0.96% ^b	1.38% ^g
Audits, Examinations & Reviews Completed (A)	288107 ^c	282974 ^d	301714 ^e	304707 ^f	NA
Other enforcement actions ^h	2663 ^c	3093 ^d	3990 ^e	3327 ^f	NA
Files Processed (in Millions)					
Individual (B)	22.80 ^c	22.80 ^d	22.90 ^e	22.70 ^f	NA
Corporate	1.30 ^c	1.60 ^d	1.40 ^e	1.50 ^f	NA
GST/HST	6.10 ⁱ	6.40 ⁱ	6.80 ^e	6.90 ^f	NA
Audit rate for individuals--upper limit: (A)/(B)	1.26%	1.24%	1.32%	1.34%	NA

Panel B: Estimated Percentage of Business Accounts Deemed to be at Substantive Risk of Non-Compliance

	2000- 2001 ^j	2001- 2002 ^k	2002- 2003 ^k	2003-2004 ^k
GST/HST Accounts	18.00%	17.00%	18.00%	17.00%
Individuals/Self-Employed	19.00%	22.00%	27.00%	29.00%
Corporate	29.00%	31.00%	38.00%	38.00%

Panel C: Estimated Non-Compliance Rates

	2000- 2001	2001- 2002 ⁿ	2002- 2003 ^o	2003- 2004 ^o
Filing Non-compliance (% who did not file on time)				
Individuals	8.40% ^l	6.10%	5.70%	7.90%
Taxable Corporations	8.20% ^l	11.10%	12.80%	12.90%
GST/HST Returns	10.30% ^l	9.70%	8.40%	8.50%
Employers	NA	3.60%	3.60%	3.50%
GST/HST Registration (% not registered where required)	23.70% ^l	18.80%	15.40%	13.40%
Remittance Non-compliance (% who did not pay tax on time)				
Individuals	5.60% ^m	9.70%	6.90%	5.70%
Taxable Corporations	8.00% ^m	5.00%	7.00%	9.00%
Employers	NA	10.10%	9.90%	9.90%

Panel D: Total Gross Fiscal Impact of 2003-2004 Tax Compliance Activities in Millions of Dollars (audit and enforcement activities)

	2000-2001^p	2001-2002^q	2002-2003^r	2003-2004^s
Large Business Audit	2066 (34.45%)	2017 (31.10%)	2417 (26.18%)	2185 (21.42%)
Small & Medium Enter. Audits	1403 (23.40%)	1430 (22.05%)	1617 (17.51%)	1637 (16.05%)
Non-filers ^t	750 (12.51%)	1418 (21.87%)	1655 (17.92%)	2046 (20.06%)
GST/HST & Employer Comp	NA	NA	2027 (21.95%)	2340 (22.94%)
Other Audit Programs ^u	1777 (29.64%)	1620 (24.98%)	1518 (16.44%)	1992 (19.53%)
Gross Fiscal Impact in Billions of Dollars	6.00 (100.00%)	6.50 (100.00%)	9.20 (100.00%)	10.20 (100.00%)
Net Fiscal Impact in Billions of Dollars after Appeals (16%) & uncollectible (6%)	4.68	5.00	7.00	7.96

Notes:

* Definitions not disclosed by CRA unless noted otherwise.

^a Figures 5-1 and 5-2, Page 1-46, CCRA Annual Report to the Parliament 2002-2003. The annual reports are available at <http://www.cra-arc.gc.ca/agency/annual/>.

^b Figures 7 and 8, Page 1-30, CCRA Annual Report to the Parliament 2003-2004.

^c Page 1-33, CCRA Annual Report to the Parliament 2000-2001.

^d Page 1-40, Main Points, Tax Services, CCRA Annual Report to the Parliament 2001-2002.

^e Page 1-37, CCRA Annual Report to the Parliament 2002-2003.

^f Exhibit 4, Page 1-22, CCRA Annual Report to the Parliament 2003-2004.

^g Exhibits 9-1 and 9-2, Page 1-55, Main Points, Tax Services, CCRA Annual Report to the Parliament 2001-2002.

^h Includes criminal investigations of tax evasion and audits under the special enforcement program of income obtained from illegal activity.

ⁱ Exhibit 2, Page 14, Comprehensive Discussion of Our Performance by Business Line in Support of Accountability – 2001-2002 CCRA Annual Report to Parliament.

^j Figure 4-1, Page 1-43, CCRA Annual Report to the Parliament 2002-2003.

^k Figure 6, Page 1-29, CCRA Annual Report to the Parliament 2003-2004. The CCRA Annual Report to Parliament 2002-03 attributes the jump in the bottom two series in this panel in that year to the refinement and inclusion of new criteria rather than to any real increase in non-compliance.

^l Exhibit 1-1, Page 1-43, Main Points, Tax Services, CCRA Annual Report to the Parliament 2001-2002.

Information on taxable corporations not comparable to figures for later years due to subsequent change in methodology.

^m Exhibit 4, Page 1-27, CCRA Annual Report to the Parliament 2000-2001.

ⁿ Exhibit 4-2, Page 1-44, CCRA Annual Report to the Parliament 2002-2003.

^o Exhibit 6, Page 1-24, CCRA Annual Report to the Parliament 2003-2004.

^p Exhibit 13, Page 2-44, Annexure: Tax Services, CCRA Annual Report to the Parliament 2000-2001.

^q Exhibit 8-1, Page 1-53, Main Points, Tax Services, CCRA Annual Report to the Parliament 2001-2002.

^r Exhibit 5-3, Page 1-47, CCRA Annual Report to the Parliament 2002-2003.

^s Figure 9, Page 1-31, CCRA Annual Report to the Parliament 2003-2004.

^t Presumably includes individuals as well as corporations.

^u Other audit programs includes tax avoidance, international tax programs, tax incentives and investigations.

Table 2: Descriptive Statistics on Attitude, Intentions, Personality Variables, and Different Measures of Compliance

Variable	n	Min.	Max.	Mean	Std. Dev.
<i>Compliance</i>					
Hypothetical-situation Compliance at 0% Audit	79	0.000	1.000	0.566	0.406
Hypothetical-situation Compliance at 25% Audit	78	0.000	1.000	0.763	0.342
Experimentally-measured Compliance at 0% Audit	79	0.000	1.000	0.551	0.373
Experimentally-measured Compliance at 25% Audit	79	0.000	1.000	0.617	0.366
Response to Cases	79	-2.603	1.380	0.000	1.000
Non-compliance in Previous Year	79	0.000	1.000	0.139	0.348
Non-compliance in Previous Years	78	0.000	1.000	0.179	0.386
<i>Attitudes</i>					
Subjective Norms	78	-2.129	2.158	0.000	1.000
Duties of a Citizen	78	-1.932	3.223	0.000	1.000
Monetary Considerations	78	-2.165	2.686	0.000	1.000
Advantage of the System	78	-1.828	3.453	0.000	1.000
Penalties	78	-2.525	3.937	0.000	1.000
Third Party Reporting	78	-3.104	3.133	0.000	1.000
<i>Intentions</i>					
Intent to Comply	79	-2.852	1.267	0.000	1.000
Intent to Overstate Deductions	79	-3.000	3.000	-0.392	1.996
<i>Personality Variables</i>					
A Score	79	0.000	11.000	3.096	2.811
P Score	79	10.000	66.700	34.980	13.682

Note: See the text for the development of these variables.

Table 3: Parametric Correlations between and Percentage of Variance Explained Relating to Different Measures of Compliance (N=78)

	Non-Comp. in the Prev. Year	Non-Comp. in Any Past Year
Correlations Relating to Hypothetical-situation Compliance Measures		
Hypothetical-situation Compliance at Zero Percent Audit	-0.057 (0.3) ^a	-0.089 (0.8)
Hypothetical-situation Compliance at 25 Percent Audit	0.022 (0.0)	-0.045 (0.2)
Response to Cases	0.218* (4.8)	0.123 (1.5)
Correlations Relating to Experimentally-Measured Compliance Measures		
Experimentally-Measured Compliance at Zero Percent Audit	-0.368*** (13.5)	-0.221* (4.9)
Experimentally-Measured Compliance at 25 Percent Audit	-0.301*** (9.1)	-0.226** (5.1)

Notes: See the text for the development of these variables.

*** (**, *) Significant at the 1%(5%,10%) level.

^a Figures within brackets represent percentage of variance explained.

Table 4: Ordinary Least Squares (OLS) Results from Models Using Different Compliance Measures

Panel A: OLS Results from Full Model Relating to Experimentally-measured Compliance (N=78)

Parameter	Dependent Variable				Dependent Variable			
	β	Std. Error	t	Sig.	β	Std. Error	t	Sig.
	Comp. at 0% Audit Rate				Comp. at 25% Audit Rate			
Intercept	-0.010	0.094	-0.103	0.918	-0.035	0.117	-0.300	0.765
P Score (A)	0.016	0.003	6.280	0.000	0.017	0.003	6.758	0.000
Intent To Comply (B)	0.297	0.093	3.191	0.002	0.278	0.105	2.657	0.010
Advantage of System (C)	0.065	0.034	1.929	0.058	0.165	0.094	1.746	0.086
Intent to Overstate Deds. (D)	-0.041	0.018	-2.319	0.023				
Third Party Reporting (E)					0.218	0.159	1.367	0.177
Undergraduates (F)					0.073	0.086	0.854	0.396
A x B	-0.007	0.003	-2.501	0.015	-0.005	0.003	-1.764	0.083
E x F					0.282	0.102	2.774	0.007
A x C					-0.002	0.003	-0.594	0.555
A x E					-0.011	0.004	-2.779	0.007
B x C					-0.030	0.033	-0.932	0.355
B x E					-0.291	0.163	-1.780	0.080
C x E					0.160	0.126	1.265	0.211
A x B x E					0.007	0.005	1.415	0.162
A x C x E					-0.006	0.004	-1.660	0.102
B x C x E					0.143	0.052	2.769	0.007
Adjusted R-Squared	0.424				0.482			
Model F (Significance)	12.343 (0.000)				5.777 (0.000)			

Panel B: OLS Results from Full Model Relating to Hypothetical-situation Compliance (N=78)

Variable	Dependent Variable				Dependent Variable			
	β	Std. Error	t	Sig.	β	Std. Error	t	Sig.
	Hyp. Comp. at 0 % Audit				Hyp. Comp. at 25% Audit			
Included Variables								
Intercept	0.648	0.066	9.801	0.000	0.871	0.052	16.822	0.000
Intent to Comply	0.176	0.041	4.265	0.000	0.122	0.039	3.153	0.002
A Score	-0.035	0.015	-2.399	0.019	-0.035	0.012	-2.815	0.006
Undergrads	-0.159	0.108	-1.472	0.145				
Third Party Reporting					0.061	0.035	1.761	0.082
Monetary Considerations					0.055	0.039	1.425	0.158
Adjusted R-Squared	0.253				0.206			
Model F (Significance)	9.695 (0.000)				5.995 (0.000)			

Table 4 (Continued)
Panel C: OLS Results from Using Pooled Data from Both the 0% and 25% Audit Rate
(N=156)

Variable	Dependent Variable				Hypothetical-situation			
	Exp.-Measured Compliance				Compliance			
	β	Std. Error	t	Sig.	β	Std. Error	t	Sig.
	Included Variables							
Intercept	0.040	0.071	0.558	0.578	1.121	0.093	12.008	0.000
Zero % Audit (A)	-0.065	0.045	-1.437	0.153	-0.195	0.051	-3.833	0.000
Undergraduates (B)					-0.287	0.095	-3.006	0.003
Intent to Comply (C)	0.205	0.066	3.122	0.002	0.321	0.097	3.300	0.001
A Score (D)					-0.031	0.010	-3.241	0.001
Third Party (E)					0.041	0.087	0.470	0.639
Subjective Norms (F)					-0.040	0.031	-1.289	0.200
P Score (G)	0.016	0.002	8.812	0.000				
Intent to Overstate								
Deductions (H)	-0.026	0.013	-2.051	0.042				
Advantage of System (I)	0.069	0.024	2.884	0.005				
A x C					0.063	0.051	1.246	0.215
B x C					-0.210	0.093	-2.247	0.026
B x E					-0.045	0.097	-0.463	0.644
C x E					-0.317	0.148	-2.148	0.033
C x F					0.005	0.036	0.145	0.885
E x F					-0.071	0.038	-1.872	0.063
C x G	-0.004	0.002	-2.187	0.030				
C x H	-0.027	0.013	-2.117	0.036				
B x C x E					0.344	0.146	2.355	0.020
B x E x F					0.093	0.045	2.054	0.042
Adjusted R-Squared		0.420				0.330		
Model F (Significance)		17.061 (0.000)				6.443 (0.000)		

Note: See the text for the development of these variables.

Table 5: OLS Results from Full Model Relating to Intentions (N=78)

Variable					Dependent Variable			
	β	Std. Error	t	Sig.	β	Std. Error	t	Sig.
	Intent to Comply				Intent to Overstate Deds.			
Intercept	0.164	0.111	1.477	0.144	-0.410	0.213	-1.931	0.057
Monetary Considerations (A)	-0.447	0.082	-5.452	0.000	0.505	0.214	2.362	0.021
Advantage of System (B)	-0.054	0.147	-0.367	0.715	0.531	0.214	2.482	0.015
Subjective Norms (C)	0.376	0.080	4.688	0.000				
Duties of a Citizen (D)	0.431	0.076	5.704	0.000				
A Score (E)	-0.044	0.027	-1.605	0.113				
Third Party Reporting (F)					-0.299	0.214	-1.398	0.166
A x C	0.141	0.080	1.759	0.083				
B x D	0.159	0.088	1.808	0.075				
B x E	-0.050	0.037	-1.360	0.178				
C x D	-0.177	0.083	-2.142	0.036				
Adjusted R-Squared	0.581				0.122			
Model F (Significance)	12.847 (0.000)				4.564 (0.005)			

Note: See the text for the development of these variables.