Tax compliance inventory TAX-I: Designing an inventory for surveys of tax compliance

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ABSTRACT

Surveys on tax compliance and non-compliance often rely on ad hoc formulated items which lack standardization, theoretical background, and empirical validation. We present an inventory to assess different intentions of compliance and non-compliance: voluntary versus enforced compliance, tax avoidance, and tax evasion. First, items eligible to differentiate between the intentions of compliance and non-compliance were collected from past research and newly developed, and tested empirically with the aim of producing four validated scales with a clear factorial structure. Second, findings from the first analyses were replicated and validated on the basis of motives of compliance and non-compliance, and on the basis of behaviour in a tax experiment. A standardised inventory is provided which can be used in surveys in order to collect data which are comparable across research focusing on self-reports. The inventory can be used in either of two ways: either in its entirety, or by applying the single scales independently, allowing an economical and fast assessment of different intentions underlying tax behaviour.

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1. Introduction

Following publications of the tax evasion models by Allingham and Sandmo (1972) and Srinivasan (1973), based on Becker's (1968) theory of crime, there was significant movement in the research on tax evasion. Research has continued to grow to the present day. Andreoni, Erard, and Feinstein (1998) observed that it was particularly the effects of audit probabilities and fines that were studied in the context of rational choice theory. Despite Schmölders' (1959) early emphasis on the relevance of citizens' opinions about the government in general, and fiscal policy in particular, sociological and social psychological studies addressing tax compliance are still rare. Moreover, the approach taken in social psychology has tended not so much towards forming a clearly expressed theory, as, for instance, the economic model, but has rather focused on unsystematically addressing specific and often isolated questions (Kirchler, 2007). Hence, future research on taxes should follow a clear conceptualisation of tax behaviour and commensurate measurement.

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In the following we discuss different intentions of tax behaviour, derived from research on tax compliance and non-compliance. Subsequently, we present conceptual clarifications and definitions of different behavioural intentions of compliance and non-compliance. Further, an inventory for the assessment of intentions of compliance and non-compliance according to our definitions is presented. First, items on voluntary and enforced compliance, tax avoidance and evasion are collected from previous research and newly formulated, and their factor structure is analysed. Second, the inventory is cross-validated, and the validity of the scales is additionally assessed by means of reference to motivational postures (Braithwaite, 2003; Braithwaite, 2009) and behavioural data collected in a tax experiment.

1.1. Research methods

There are several methodological problems to be solved in order to integrate research findings into a coherent theoretical framework able to describe tax behaviour and to inform policy. Kirchler (2007) and Torgler (2002) discuss the arsenal of methods, sampling techniques, operationalisation of variables as well as the inconsistent use of self-reports and observed tax behaviour, and come to the conclusion that different research methods often lead to contradictory results. Similar conclusions were drawn in a workshop on measuring the indirect effects of services and enforcement on taxpayer compliance, conducted by the US Internal Revenue Service (IRS., 2008).

Methods vary from aggregate econometric modelling to micro-econometric modelling, field experiments and quasi naturalistic experiments, to laboratory experiments, agent based modelling and network analyses, to surveys. Aggregate econometric modelling uses panel data on observations of tax reporting and filing behaviour, aiming at providing reliable estimates of the effects of tax policy for the entire population (e.g., Dubin, 2007; Dubin, Graetz, & Wilde, 1990; Plumley, 1996). One challenge of aggregate econometric modelling, which may account for controversial results, concerns confounding influences. Micro-econometric approaches predominantly examine the impact of audit probability, fines in cases of evasion, tax rate, and income and develop highly stylised mathematical models, which, however, fail to incorporate many facets of taxpayers' realities. Field experiments are valuable methods of providing reliable estimates for compliance determinants. Here the challenge is to find comparable treatment and control groups in the population and to control for treatment and confounding variables. In contrast, laboratory experiments (e.g., Alm, Jackson, & McKee, 1992; Friedland, Maital, & Rutenberg, 1978; Kastlunger, Kirchler, Mittone, & Pitters, 2009) are conducted in highly controlled environments and are most appropriate for validating theoretical assumptions. They suffer, however, from external validity and generalisability. Although "hard" empirical data would provide a better understanding of tax compliance, the difficulty of obtaining this data has led researchers to generate their own data via surveys (Baldry, 1987).

Studies in economic psychology in particular rely on survey data in which taxpayers are asked to report their intended tax behaviour. This way of collecting data is usually convenient; however, generalisability of findings is problematic (e.g., Wilson & Sheffrin, 2005). Generalisability suffers from memory lapse and social desirability biases, and reliability and (construct) validity in particular are to be questioned. If answers in surveys can be trusted as accurately reflecting tax compliance, honesty and perfect recall are required. Hessing, Elffers, and Weigel (1988) examined whether self-reports can be used as substitutes for direct observations of tax evasion behaviour, and found serious limitations. The concordance between participants' self-reports of tax evasion and officially found evasion behaviour was negligible. Although participants knew that their self-reports could be compared with the results of their audited tax records, the correlations between self-reports and observed behaviour were weak. Hessing et al. (1988) found that different explanatory variables were either linked with self-reports or with observed evasion behaviour: Attitudes toward tax evasion and subjective norms were found to correlate with self-reported compliance but not with observed compliance. Personality dispositions, in contrast (e.g., tolerance of illegal behaviour; competitiveness) correlated with observed data but not with self-reports. While the studies conducted by Hessing et al. (1988) do give grounds for serious concern, Hite (1988) found positive relationships between data obtained from self-reports and compliance observed by tax authorities.

The questionable relation between observed and self-reported behaviour may be due to a series of methodological shortcomings: Besides the existence of differences in authorities' and taxpayers' interpretations of tax law and legal and illegal acts, authorities may not always detect subtle tax evasion, whereas taxpayers are aware of it and report their behaviour in surveys. Moreover, sometimes taxpayers may unintentionally make mistakes which are interpreted as evasion by authorities.

Direct observations of tax behaviour may reflect tax behaviour best. However, combining direct observations with results from laboratory studies and surveys further broaden our understanding of tax behaviour. Especially, when information on motives or intentions regarding a particular behaviour should be investigated, surveys are a necessary tool.

In addition to concerns regarding research methods, there is a lack of clear definitions of compliance and non-compliance. A particular problem is the absence of a validated inventory assessing behavioural intentions of compliance and non-compliance. Surveys often make use of one or more items developed in an ad hoc manner, asking respondents to indicate their willingness to comply, their filing habits or their readiness to evade taxes without considering previous items on tax behaviour and theoretical or statistical foundations. The source of the serious limitations of self-reports and the difficulties experienced when trying to compare data from different research lie in insufficient reflection of different intentions of tax behaviour and often vague definitions of compliance and non-compliance. Moreover, the lack of a validated scale on behavioural intentions of compliance and non-compliance usable across various research programmes makes it difficult if not impossible to compare findings across different studies.

1.2. Voluntary and enforced tax compliance, avoidance, and evasion

From the perspective of tax law, a clear definition of compliance and non-compliance is lacking. Also, research is far from providing well established clear concepts which allow unequivocal operationalisation and measurement. Tax compliance represents the most inclusive and neutral term for taxpayers' willingness to pay taxes. Although tax compliance leads to the honest payment of taxes, the underlying intentions of this behaviour can either be voluntary or enforced by authorities. Non-compliance refers to the behavioural outcome of paying less tax than obligated to. Underlying intentions of this behaviour could be minimising tax payments by legal tax avoidance or by the violation of tax law.

The intention to pay taxes according to the law can be seen as a continuum (James & Alley, 2002), ranging from commitment to society's and government's objectives on the one hand, to law enforcement on the other hand. On the compliance side, McBarnet (2001) differentiates between (a) committed compliance, referring to taxpayers' willingness to pay taxes without complaining, (b) capitulative compliance, describing taxpayers who give in and pay taxes, and (c) creative compliance, which covers activities addressed to reducing taxes within the brackets of the law. Translating McBarnet's (2001) characterisations of compliance to James and Alley's (2002) continuum concept, one extreme would reflect committed compliance or the intention to comply voluntarily, and the other extreme would describe capitulative compliance or the intention to comply due to efficient audits and fines. Similarly, Kirchler (2007; Kirchler, Hoelzl, & Wahl, 2008) developed a concept – the "slippery slope framework" – which differentiates between taxpayers who intend to voluntarily comply with the law, versus taxpayers who intend to comply as a result of enforcement activities. The intentions to comply voluntarily or enforced as well as the intention to avoid or evade taxes are described as resulting from the interaction between taxpayers' trust in authorities and authorities' power to monitor taxpayers. When trust in the authorities is high, taxpayers will intend to pay their taxes voluntarily. In contrast, when trust in the authorities is low, taxpayers are assumed to intend to withhold their contributions. When trust is low, but authorities' power to effectively audit and sanction wrong behaviour is strong, taxpayers' compliance is enforced; however, it is assumed that taxpayers intend to reduce their taxes within the legal range of the law and engage in tax avoidance, but are deterred from illegal reductions. If trust in the authorities and also if the power of the authorities is low, taxpayers are expected to break the law and evade taxes.

Regarding non-compliance, tax avoidance is legal. Taxes are intentionally reduced by legal means through taking advantage of loopholes in the law. Tax evasion, on the other hand, is illegal, as taxpayers break the law deliberately through understating income (e.g., failing to report assets) and/or through exaggerating deductions (e.g., falsely reporting personal expenses as business expenses, Webley, 2004). Elffers, Weigel, and Hessing (1987) characterise "tax evasion behaviour" or "tax cheating" similarly as an intentional act of non-compliance that leads to payment of less tax than is actually owed. Memory lapses, unintentional calculation errors or errors due to inadequate knowledge of the tax law are excluded from the concept of tax evasion. Sandmo (2003) likewise regards tax evasion as intentionally breaking the law.

Gassner (1983) states that taxpayers are not deterred from "creatively" describing their income in order to pay minimum taxes. Tax avoidance refers to taxpayers' freedom to present their income in such a form that they pay the minimum in tax by respecting the "letter of the law". Taxpayers' freedom of income presentation ends and tax evasion begins where "the letter of the law" is not respected. Although legality distinguishes between tax avoidance and tax evasion, in practice this distinction is rather ambiguous. The reasons for the unclear distinction lie in the over-complexity and equivocality of the tax law, lack of expertise on the part of taxpayers, and sometimes practices by tax administrators to effectively ignore a particular transaction or activity even where the law is unequivocal (Slemrod, Blumenthal, & Christian, 2001).

Compliance and non-compliance are the actual behaviours of paying taxes or reducing existing tax liabilities, respectively. However, as reviewed above, previous literature suggests that the same behavioural outcomes can originate from different intentions. Therefore, we differentiate between these intentions and define voluntary compliance and enforced compliance as behavioural intentions of compliance behaviour and avoidance and evasion as intentions of non-compliant behaviour. According to the reviewed literature, scales measuring voluntary compliance, enforced compliance, avoidance, and evasion will be developed and validated.

1.3. Validation with motives for compliance or non-compliance

Behavioural intentions are bound to motives to perform an actual behaviour (Ajzen, 1985, 1991; Fishbein & Ajzen, 1975). To validate the assumption that tax behaviour can be assigned to the four suggested intentions, we investigate the relations between motives of tax behaviour and the intentions of voluntary compliance, enforced compliance, avoidance, and evasion. It is assumed that voluntarily compliant taxpayers are motivated to cooperate, and tax cheating is out of the question. In contrast, taxpayers whose compliance is enforced are motivated to be compliant as long as they fear being monitored and consider fines more costly than cooperation. If the opportunities to avoid or to evade taxes are perceived as high, and audit probability as well as fines as low, cheating pays.

Braithwaite (2003) distinguishes five motives underlying compliance and non-compliance and coined them to motivational postures (see Table 1). Her scales will be used as an external criterion to validate the scales on behavioural intentions of compliance and non-compliance. Motivational postures originate from the perceived "social distance" (Bogardus, 1928) between taxpayers and authorities. Motivational postures that result where social distance is close and the stance towards the authorities is positive are summarized as deference motives, termed commitment and capitulation. Committed taxpayers regard contributions to the public welfare as a moral law, and see the tax law and tax collection as fair. Capitulated

Table 1
Motivational postures and statements representing them in English (Braithwaite, 2003, p. 20) and German (Rechberger, et al., 2009).

Motivational posture	Description	Statements representing motivational postures	German translations of motivational postures
Commitment	Commitment combines a positive orientation towards tax authorities and deference. The tax system is perceived as desirable, tax law and tax collection are perceived as fair. Committed taxpayers feel a moral obligation to pay their share and to act in the interest of the collective	• Paying tax is the right thing to do • Paying tax is a responsibility that should be willingly accepted by all Australians • I feel a moral obligation to pay my tax • Paying my tax ultimately advantages everyone • I think of tax paying as helping the government do worthwhile things • Overall, I pay my tax with good will • I resent paying tax (reversed) • I accept responsibility for paying my fair share of tax	• Es gehört sich, seine Steuern zu bezahlen • Steuern zu bezahlen ist eine Verantwortung, die von allen BürgerInnen gerne akzeptiert werden sollte • Ich fühle mich moralisch verpflichtet, meine Steuern zu bezahlen • Wenn ich meine Steuern bezahle, nützt das letztendlich Allen • Steuern zahlen hilft der Regierung sinnvolle Dinge zu tun • Alles in allem zahle ich gerne meine Steuern • Ich ärgere mich, meine Steuern zahlen zu müssen (reversed) • Ich sehe es als meine Verantwortung, meinen Steueranteil zu bezahlen
Capitulation	Capitulation reflects a positive orientation in terms of acceptance of the tax authorities which hold legitimate power to pursue the collective's goals. As long as citizens act according to the law, authorities are perceived to act in a supportive way	• If you cooperate with the Tax Office, they are likely to be cooperative with you • Even if the Tax Office finds that I am doing something wrong, they will respect me in the long run as long as I admit my mistakes • The Tax Office is encouraging to those who have difficulty meeting their obligations through no fault of their own • The tax system may not be perfect, but it works well enough for most of us • No matter how cooperative or uncooperative the Tax Office is, the best policy is to always be cooperative with them	• Wenn ich mit der Steuerbehörde kooperiere, wird sie auch bereit sein, mir zu helfen • Auch wenn die Steuerbehörde herausfindet, dass ich etwas falsch gemacht habe, wird sie mich respektieren, solange ich meinen Fehler eingestehe • Die Steuerbehörde hilft jenen, die ohne Absicht ihre Steuererklärung falsch abgeben • Das Steuersystem mag nicht perfekt sein, aber für die Meisten erfüllt es seinen Zweck gut genug • Die beste Strategie ist immer mit der Steuerbehörde zu kooperieren, egal ob diese kooperativ ist oder nicht
Resistance	Resistance reflects a negative orientation and defiance. The authority of tax officers may be doubted and their acts may be perceived as controlling and dominating rather than as supportive	• If you don't cooperate with the Tax Office, they will get tough with you • The Tax Office is more interested in catching you for doing the wrong thing, than helping you do the right thing • It's important not to let the Tax Office push you around • It's impossible to satisfy the Tax Office completely • Once the Tax Office has you branded as a non-compliant taxpayer, they will never change their mind • As a society, we need more people willing to take a stand against the Tax Office	• Wenn ich nicht mit der Steuerbehörde kooperiere, wird sie härter mit mir umgehen • Steuerbehörde ist eher daran interessiert, mich zu ertappen, wenn ich etwas falsch gemacht habe, als mich dabei zu unterstützen, alles richtig zu machen • Es ist wichtig, sich nicht von der Steuerbehörde herumschubsen zu lassen • Es ist unmöglich, die Steuerbehörde vollkommen zufrieden zu stellen • Wenn mich die Steuerbehörde einmal als SteuersünderIn eingestuft hat, wird sie ihre Meinung nicht mehr ändern • Als Gesellschaft brauchen wir mehr Menschen die sich gegen die Steuerbehörde zur Wehr setzen

| Disengagement | Disengagement also reflects a negative orientation and correlates with resistance. Individuals and groups keep socially distant and blocked from view and have moved beyond seeing any point in challenging tax authorities | • If I find out that I am not doing what the Tax Office wants, I'm not going to lose any sleep over it
• I personally don't think that there is much the Tax Office can do to me to make me pay tax if I don't want to
• I don't care if I am not doing the right thing by the Tax Office
• If the Tax Office gets tough with me, I will become uncooperative with them
• I don't really know what the Tax Office expects of me and I'm not about to ask | • Wenn ich bemerke, dass ich nicht exakt das tue, was die Steuerbehörde von mir erwartet, bereitet mir das keine schlaflosen Nächte
• Ich persönlich glaube nicht, dass die Steuerbehörde viel dagegen tun kann, wenn ich meine Steuern nicht bezahlen möchte
• Mir ist es egal, wenn ich nicht das mache, was die Steuerbehörde von mir verlangt
• Wenn die Steuerbehörde härter mit mir umgeht, werde ich weniger kooperieren
• Ich weiß nicht wirklich, was die Steuerbehörde von mir erwartet und ich werde auch nicht nachfragen |
| Game playing | Game playing expresses a view of law as something that can be moulded to suit one's purposes rather than as a set of regulations that should be respected as guideline of one's actions. In the field of tax behaviour, game playing refers to "cops-and-robbers" games with taxpayers detecting loopholes for their advantages and perceiving tax officers as cops which engage in catching cunning taxpayers | • I enjoy spending time working out how changes in the tax system will affect me
• I enjoy talking to friends about loopholes in the tax system
• I like the game of finding the grey area of tax law
• I enjoy the challenge of minimising the tax I have to pay
• The Tax Office respects taxpayers who can give them a run for the money | • Ich überlege gerne welche Auswirkungen Veränderungen der Steuergesetzgebung auf mich haben könnten
• Ich spreche gerne mit FreundInnen über die Lücken und Schlupflöcher im Steuersystem
• Es macht mir Spaß, die Lücken und Grauzonen des Steuerrechts herauszufinden
• Ich finde Vergnügen daran, einen Weg zu finden, wie ich meine Steuerzahlungen minimieren kann
• Die Steuerbehörde respektiert SteuerzahlerInnen, die sich nicht so leicht unterkriegen lassen |

taxpayers are willing to cooperate because they accept the authorities as a legitimate power set up to pursue the collective's goals. Although tax authorities may have the formal power and legal legitimacy to constrain taxpayers to fulfil their duties, it is necessary for taxpayers to ascribe expert authority to them, perceive them as engaging in accepted behaviour, and psychologically legitimise them to exert power.

The motivational postures that result where social distance is great and the stance towards the authorities is negative are summarized as defiance motives, termed resistance, disengagement, and game playing. Resistant taxpayers are suspicious when authorities engage in citizen-friendly activities and assume that they lack willingness to cooperate. Resistant taxpayers doubt the authority of tax officials and perceive them as dominating and controlling rather than being supportive. Disengaged taxpayers keep the greatest distance from the authorities and do not care about doing the right thing. Disengagement is an extreme motivational posture which leads taxpayers to oppose the authorities and the law. Game playing taxpayers compete with the tax law and seek to exploit possibilities to increase their own profit. Game playing refers to "cops-and-robbers" games, with taxpayers detecting possibilities to increase their own income and with authorities trying to increase the public revenue. Table 1 represents definitions of the five postures accompanied by statements representing them.

1.4. Relations between voluntary compliance, enforced compliance, tax avoidance, tax evasion, and motivational postures

Although both voluntary compliance and enforced compliance result in the payment of one's tax share, a positive correlation between voluntary and enforced compliance is not expected. Voluntary and enforced tax compliance represent two different intentions of tax behaviour with different underlying motives. Voluntary compliance should not be correlated with enforced compliance, and it should be negatively related to tax avoidance and tax evasion. Since enforced compliance originates from the authorities' power to constrain citizens to cooperate, it fosters extensive decisions about whether to pay taxes honestly or to evade them at the risk of being audited and fined, should evasion be detected. We expect enforced compliance to be positively linked to searching for loopholes in the tax law, and therefore to see a positive correlation to tax avoidance. A positive correlation with evasion is less likely, due to perceived constraints.

The relationship between tax avoidance and evasion is less clear: While both forms of non-compliance are directed towards reducing tax payments, legality and illegality are the crucial differences. Taxpayers avoiding taxes might consider the possibilities of evasion; however, they are deterred from actual cheating on account of audits and fines.

Braithwaite (2003, 2009) found that the motives subsumed under deference are negatively related to actual avoidance and evasion behaviour, whereas motives linked to defiance are positively related. We expect that the intentions of compliance and non-compliance will be correlated in the same manner. Voluntary tax compliance will be positively linked to deference, that is, commitment and capitulation, and negatively linked to defiance, that is, resistance, disengagement, and game playing. Enforced tax compliance, tax avoidance, and tax evasion will be negatively linked to deference and positively linked to defiance. Taxpayers whose compliance is enforced have little perception of the authorities as a legal power and are therefore unlikely to show motives like commitment or capitulation; instead they show resistance. Taxpayers who engage in legal or illegal tax reductions lack insight into the necessity of the tax system and may perceive tax collection as unfair. Therefore, we expect to find tax avoidance and evasion to be negatively correlated with deference and positively with defiance. While tax avoidance is expected to be positively related to game playing, due to the interest in seeking legal ways to reduce taxes, tax evasion should be highly correlated with resistance and disengagement.

We present below a study in which a representative sample of Austrian self-employed taxpayers completed a survey consisting of items on voluntary compliance, enforced compliance, tax avoidance, and evasion as well as motivational postures. The sample was randomly split into two subsamples (Jöreskog & Sörbom, 1993). In the first part of the analysis, the focus is on item quality and item structure. These were assessed in order to obtain scales to assess different intentions of compliance and non-compliance. In the second part of the analysis, findings from the first part were cross-validated and findings extended with the aim of testing the relationship between the intentions of compliance and non-compliance and their underlying motives. In other words, the first step was to develop a reliable inventory consisting of four scales; in the second step the validity was checked on the basis of correlations with motivational postures. Additionally, we conducted a laboratory experiment on tax behaviour and validated the scales with actual tax behaviour shown by participants. The construction of scales and analyses followed test construction suggestions by Bühner (2006).

2. Method

2.1. Participants and procedure

In early 2009, an internationally operating market research institute was engaged to collect data via an online questionnaire in Austria. The web link to the online questionnaire was sent out to a representative pool of self-employed taxpayers with an invitation to complete the survey and the incentive of credits for participation. Austrian self-employed file their income themselves, whereas white-collar and blue-collar workers' taxes are retained and transferred by their employers to the tax office. Self-employed taxpayers are a particularly interesting group of taxpayers due to their higher opportunities to evade taxes (Kirchler, 2007). The total sample consisted of 98 females and 212 males, aging between 20 and 70 years (M = 43.13, SD = 10.58, Md = 43.00). A high percentage (32.20%) of participants held a university degree; 35.40% held a

Table 2
Descriptives, Cronbach's alpha, and inter-item-correlations of the items on voluntary tax compliance, enforced tax compliance, tax avoidance, and tax evasion (part I).

Item	M	SD	Md	Skewness	Inter-item correlations										Alpha
					VTC1	VTC2	VTC3	VTC4	VTC5	VTC6	VTC7	VTC8	VTC9	VTC10	
Voluntary tax compliance															
VTC1	5.12	2.82	5.00	−0.15	1.00										
VTC2	3.32	2.39	3.00	0.69	.24	1.00									
*VTC3	6.17	2.57	7.00	−0.76	.50	.34	1.00								
VTC4	5.87	2.80	7.00	−0.55	.51	.08	.61	1.00							
*VTC5	4.92	2.74	5.00	−0.18	.42	.21	.44	.45	1.00						
*VTC6	4.46	2.70	5.00	0.07	.44	.24	.41	.39	.82	1.00					
*VTC7	5.67	2.70	6.00	−0.52	.45	.19	.71	.67	.61	.52	1.00				
*VTC8	5.73	2.61	6.00	−0.58	.52	.20	.60	.57	.70	.66	.72	1.00			
VTC9	6.36	2.66	7.00	−0.78	.05	.05	.21	.27	.23	.21	.36	.32	1.00		
VTC10	6.56	2.56	7.00	−1.00	.43	.11	.58	.70	.54	.47	.72	.71	.37	1.00	.89
					ETC1	ETC2	ETC3	ETC4	ETC5	ETC6	ETC7	ETC8			
Enforced tax compliance															
ETC1	7.23	2.34	9.00	−1.24	1.00										
*ETC2	5.50	2.68	5.00	−0.25	.38	1.00									
ETC3	6.74	2.61	8.00	−0.82	.30	.24	1.00								
*ETC4	5.10	2.55	5.00	−0.16	.29	.81	.35	1.00							
*ETC5	5.28	2.67	5.00	−0.21	.22	.60	.27	.65	1.00						
*ETC6	6.45	2.69	7.00	−0.77	.26	.51	.25	.50	.54	1.00					
*ETC7	4.13	2.89	4.00	0.35	.14	.24	.22	.29	.32	.21	1.00				
ETC8	6.93	2.45	8.00	−0.95	.10	.07	.17	.08	.02	.05	.29	1.00			.78
					TA1	TA2	TA3	TA4	TA5	TA6	TA7	TA8			
Tax avoidance															
*TA1	5.85	3.12	7.00	−0.50	1.00										
*TA2	5.36	3.13	6.00	−0.22	.31	1.00									
*TA3	5.97	2.87	7.00	−0.62	.39	.34	1.00								
TA4	3.49	2.94	2.00	0.77	.09	.31	.16	1.00							
*TA5	5.15	2.88	5.00	−0.20	.30	.28	.20	.29	1.00						
*TA6	6.44	2.72	7.00	−0.83	.10	.36	.37	.24	.26	1.00					
TA7	7.70	2.30	9.00	−1.85	.04	.12	.01	−.02	.02	.17	1.00				
TA8	5.47	3.17	6.00	−0.31	.02	.23	.25	.21	.23	.31	.29	1.00			.69
					TE1	TE2	TE3	TE4	TE5	TE6	TE7	TE8	TE9		
Tax evasion															
TE1	4.98	3.11	5.00	−0.02	1.00										
TE2	4.43	3.04	5.00	0.28	.68	1.00									
*TE3	4.14	3.09	3.00	0.44	.32	.48	1.00								
*TE4	3.85	2.94	3.00	0.64	.39	.45	.70	1.00							
*TE5	4.45	3.01	5.00	0.22	.56	.58	.51	.58	1.00						
TE6	4.15	3.02	4.00	0.35	.37	.41	.45	.47	.52	1.00					
*TE7	5.01	3.12	5.00	−0.08	.39	.45	.47	.49	.59	.65	1.00				
TE8	3.21	2.80	2.00	0.97	.40	.49	.55	.53	.51	.52	.50	1.00			
*TE9	4.01	2.97	3.00	0.43	.32	.43	.59	.63	.46	.52	.49	.58	1.00		.90

Note: * items included in the scales voluntary tax compliance, enforced tax compliance, tax avoidance, and tax evasion. Correlations equal to or above .16 are significant on a level of $p < .05$.

secondary education qualification, 24.20% a primary education qualification, and 8.10% indicated other education; 63.50% reported a yearly income lower than or equal to Euro 30,000, and 36.50% reported that they earned more than Euro 30,000.

2.2. Material

First, past research (Holler, Hoelzl, Kirchler, Leder, & Mannetti, 2008; Rechberger, Hartner, & Kirchler, 2009; Roberts, 1994; Strümpel, 1966; Tyler, 2003) was scanned for items measuring avoidance and evasion. The intention to avoid taxes differs from the intention to evade taxes on a concrete behavioural level. However, the intention to comply voluntarily can hardly be differentiated from the intention to comply by enforcement to the concrete behavioural level, as the behavioural outcome in both cases is compliance. Therefore, in order to achieve clarity in the explanation of non-compliant behaviour we formulated items representing concrete intentions of tax avoidance and tax evasion. To address the two intentions of compliance, items on voluntary and enforced compliance were formulated in a more abstract way. The formulated items were discussed within a group of economic psychologists. The resulting final set used in the survey comprised 35 items, with answering formats ranging from complete disagreement (1) to complete agreement (9), or very unlikely (1) to very likely (9).

Furthermore, Braithwaite's (2003) scales to measure motivational postures and two items directly addressing past tax cheating behaviour were included in the survey. The items on different intentions of compliance and non-compliance were presented block-wise to ease the understanding of the concepts. According to Mummendey and Grau (2008), blocks of items minimise confounding effects between different concepts. Further, this presentation facilitates the development of scales for independent use.

Voluntary tax compliance (*VTC*): Ten items were formulated to assess the intention to comply voluntarily, especially by referring to taxpayers' perceived obligation to cooperate with the nation state. In addition, we alluded to items measuring organisational commitment (Tyler, 2003) and reformulated them accordingly. All items are presented in the Appendix, in German and English (e.g., "When I pay my taxes as required by the regulations, I do so because I like to contribute to everyone's good.").

Enforced tax compliance (*ETC*): Eight items were formulated to investigate enforced tax compliance (e.g., "When I pay my taxes as required by the regulations, I do so because I know that I will be audited.").

Tax avoidance (*TA*): To measure the intention to reduce taxes legally, eight items were formulated. Each item used a fictitious case scenario to state a concrete legal tax reduction. Participants were asked how likely they would be to engage in the behaviour concerned (e.g., "You could deduct against tax the training costs you incurred for your employees as an allowable deduction for education and training. How likely is it that you would use the allowable deduction for education and training?"). As tax laws of different countries differ, loopholes to avoid taxes differ as well. Some of the stated case scenarios only apply to legal tax reductions in Austria. In countries with a similar tax law these items can be easily applied, however, also in countries with a different tax law the item structure can be used with a country-specific modified content.

Tax evasion (*TE*): Scanning of past research on evasion yielded four items measuring the intention to reduce taxes illegally; five items were newly formulated. Each item used a fictitious case scenario to state a concrete way of evading taxes. Participants were asked how likely they would be to engage in the behaviour (e.g., "You could intentionally declare restaurant bills for meals you had with your friends as business meals. How likely would you be to declare those restaurant bills as business meals?").

Motivational postures were measured using Braithwaite's (2003, 2009) scales on commitment, capitulation, resistance, disengagement, and game playing. Items were translated into German (Rechberger et al., 2009).

Direct questions on tax cheating: Two items directly asked about cheating activities in the past. The items were used to estimate the criterion validity of the inventory. Questions were: "Have you ever thought about evading taxes or about cheating on your income tax return?" and "Have you ever evaded taxes or cheated on your income tax return?".

3. Results

The sample of 310 participants was randomly divided into two subsamples of *N* = 155 each. No significant differences were found between the samples with regard to sex, age, education, and yearly income, indicating that randomisation was successful.

3.1. Part I: construction of the inventory with the first subsample

First, descriptive statistics were computed for each item and normal distribution was checked. Second, items on voluntary compliance, enforced compliance, avoidance, and evasion were factor analysed by principal component factor analysis with varimax rotation to examine the factor structure. Third, for each concept, the five items with the highest factor loadings were selected and confirmatory factor analyses were run to check for the best fitting factor structure of the inventory. Fourth, construct validity of the four scales was assessed.

Item selection: Table 2 shows means, standard deviations, medians, and skewness of all items included in the survey, as well as the inter-item correlations and reliability of each scale. Items which were skewed (skewness < −1.00 or skewness > 1.00) and items with floor and ceiling effects (medians ⩽ 2.00 or medians ⩾ 8.00) were excluded from further analyses. Accordingly, items VTC10, ETC1, ETC8, TA7, and TE8 were disqualified for further analyses.

A principal component factor analysis with varimax rotation was conducted with the normally distributed items to examine whether the factor structure suggests a differentiation into four scales. The analysis with an unconstrained number of factors yielded eigenvalues = 6.34, 3.98, 3.06, 2.14, 1.34, 1.18, 1.07, and 1.00. The fact that more than one general factor is suggested to explain the covariance in the data, can be interpreted as hint proposing no common measurement bias (cf. Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). When constraining for four factors, 51.72% of variance were explained. Items on voluntary compliance, enforced compliance, avoidance, and evasion loaded highest on the respective factor.

To determine whether the items on voluntary compliance and on enforced compliance measure different intentions of compliance, the respective items were analysed by an exploratory factor analysis with varimax rotation. When extracting an unconstrained number of factors the analysis yielded eigenvalues = 4.69, 3.24, 1.11, 1.06, 0.91, 0.76, 0.66, and 0.55. A constrained two factor solution analysis explained 52.89% of variance and revealed that all but two items loaded above 0.40. Items VTC2 and VTC9 with lower loadings were excluded from further analyses. Also item ETC3 was excluded as it also showed a high loading on the second factor (−0.31). Recalculation of the factor analysis with a two factor solution showed

Table 3
Descriptives, Cronbach's alphas, inter-scale-correlations of voluntary tax compliance, enforced tax compliance, tax avoidance, tax evasion, motivational postures, and direct questions on evasion behaviour (parts I and II).

Scale	M	SD	MD	Alpha	VTC	ETC	TA	TE		
Part I										
Voluntary tax compliance (VTC)	5.39	2.22	5.80	.89	1.00					
Enforced tax compliance (ETC)	5.29	2.03	5.40	.81	−.03	1.00				
Tax avoidance (TA)	5.75	1.94	6.00	.68	.16*	.18*	1.00			
Tax evasion (TE)	4.29	2.42	4.20	.86	−.26**	.12	.11	1.00		
	M	SD	MD	Alpha	VTC	ETC	TA	TE	DQC1	DQC2
Part II										
Voluntary tax compliance (VTC)	5.71	2.10	6.00	.88	1.00					
Enforced tax compliance (ETC)	5.10	2.10	5.40	.83	−.16*	1.00				
Tax avoidance (TA)	5.66	1.74	6.00	.55	−.06	.15	1.00			
Tax evasion (TE)	4.07	2.30	4.00	.84	−.34***	.15	.14	1.00		
Commitment	5.80	1.75	6.00	.88	.77***	−.15	.01	−.34***		
Capitulation	5.53	1.72	5.60	.78	.32***	−.12	−.07	−.14		
Resistance	5.56	1.80	5.50	.81	−.34***	.36***	.24**	.26**		
Disengagement	4.51	1.29	4.60	.49	−.28**	.04	−.05	.37***		
Game playing	5.30	1.65	5.20	.69	−.19*	.07	.27**	.16*		
Have you ever thought about evading taxes or about cheating on your income tax return? (DQC1, Spearman's Rho)	3.99	2.71	4.00		−.46***	.05	.16*	.51***	1.00	
Have you ever evaded taxes or cheated on your income tax return? (DQC2, Spearman's Rho)	2.68	2.29	2.00		−.31***	−.02	−.02	.39***	.69***	1.00

* $p < .05$.
** $p < .01$.
*** $p < .001$.

that 61.44% are explained with all items having factor loadings above 0.40, either on the voluntary compliance scale or on the enforced compliance scale.

In order to obtain short and reliable scales, the highest loading five items of each scale were selected: items VTC3, VTC5, VTC6, VTC7, and VTC8 forming the scale of voluntary compliance, and items ETC2, ETC4, ETC5, ETC6, and ETC7 representing the scale of enforced compliance.

Also, items on tax avoidance and tax evasion were factor analysed. The solution of the exploratory factor analysis after varimax rotation showed eigenvalues = 4.84, 2.40, 1.12, 0.98, 0.84, 0.79, 0.72, and 0.70. A further analysis, constrained to a two factor solution, revealed that the two factors explain 48.21% of variance, and all items reach loadings above 0.40 either on the factor tax avoidance or tax evasion. No item loaded on the lower loading factor above 0.25. While one factor represents items on illegal tax reductions, the other factor encompasses items on legal tax reductions.

Again, the highest loading five items of each scale were selected, with the scale tax avoidance consisting of items TA1, TA2, TA3, TA5, and TA6; and the scale tax evasion consisting of items TE3, TE4, TE5, TE7, and TE9.

Answers to the five selected items of each scale were averaged to produce indices of voluntary compliance, enforced compliance, avoidance, and evasion. Table 3 shows means, standard deviations, medians, and Cronbach's alphas of the four scales, as well as inter-scale correlations. All items are presented in the Appendix, with selected items marked by an asterisk.

Finally, the five items of each scale were analysed by confirmatory factor analyses to test the fit indices of different factor structures. When the 20 chosen items of the inventory were restricted to one general factor the fit indices were not sufficient ($\chi^2(170) = 1113.74$, $p < .01$, $RmSEA = .19$, $CFI = .30$; cut-off values indicating a good model fit are a non-significant chi-square-test with $\chi^2/df < 2.00$; $RmSEA < .06$ and $CFI > .90$). Also a two factor solution with the items on voluntary compliance and enforced compliance as well as the items on avoidance and evasion being constrained to one factor each did not reveal adequate fit indices ($\chi^2(169) = 749.25$, $p < .01$, $RmSEA = .15$, $CFI = .56$). The four factor solution with the five items belonging to one scale loading on one underlying factor suggests better model fits than the other solutions ($\chi^2(164) = 334.39$, $p < .01$, $RmSEA = .08$, $CFI = .87$). However allowing for correlations between the error terms of items which address the same concept further improved the fit to the data ($\chi^2(160) = 221.97$, $p < .01$, $RmSEA = .05$, $CFI = .95$).[2] Fig. 1 depicts the structure of the inventory as well as regression coefficients and correlations between factors.

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[2] To account for a bias stemming from the use of similar measures, we included to the four factor model with correlating error terms a latent method factor (cf. Podsakoff et al., 2003). Despite of a significantly increasing model fit ($\chi^2(140) = 154.70$, $p = .19$, $RmSEA = .03$, $CFI = .99$) all loadings of the four factors on the respective items remain significant. Furthermore, the mean explained method factor variance only accounts for 7.88% of the total variance, compared to 25% explained method factor variance reported by Williams, Cote, and Buckley (1989). These results suggest that participants differentiated between the variables and that a common method bias is not an eminent problem in the present study.
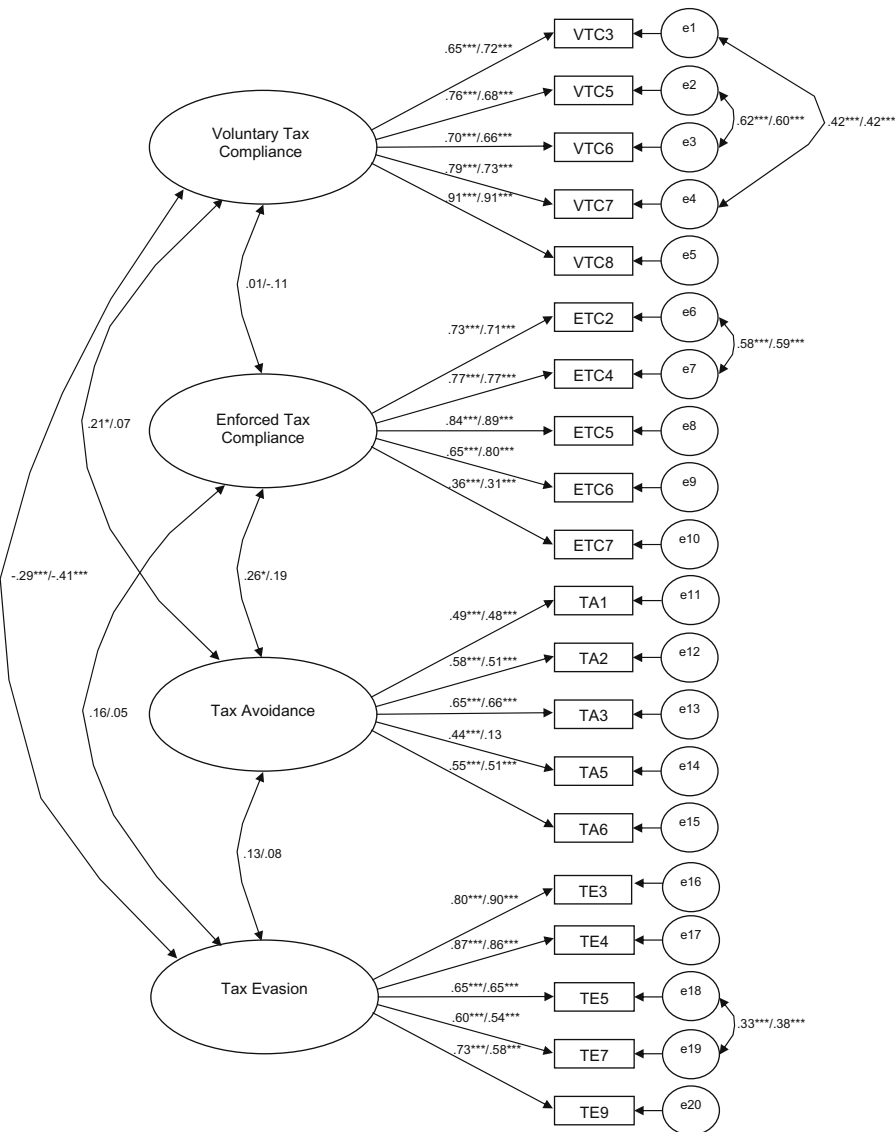
Fig. 1. Factor structure found in part I replicated with data of part II. *Note:* The first numbers indicate results of part I and following numbers show results of part II; VTC = voluntary tax compliance; ETC = enforced tax compliance; TA = tax avoidance; TE = tax evasion. ***$p < .001$, *$p < .05$.

Construct validity of the inventory was assessed by analysing the correlations between the scales. If voluntary tax compliance represents a different concept than enforced compliance, then the scales should not be correlated. Moreover, voluntary compliance should be negatively related to tax avoidance and evasion, whereas enforced compliance should be positively related. Tax avoidance and tax evasion should be either marginally positively related or not correlated. As shown in Table 3, these expectations are largely met by the data: voluntary tax compliance and enforced tax compliance are not correlated ($r = -.03$, $p = .72$). However, voluntary tax compliance is positively related to tax avoidance ($r = .16$, $p < .05$). Nevertheless, the correlation is small with the explained variance = 2.56%. Voluntary compliance is negatively related to tax evasion ($r = -.26$, $p < .01$). Enforced tax compliance is positively related to tax avoidance ($r = .18$, $p < .05$), but not to evasion ($r = .12$, $p = .14$). No relation was found between tax avoidance and tax evasion ($r = .11$, $p = .17$).

In sum, an inventory to differentiate between intentions of tax compliance (i.e., voluntary compliance and enforced compliance) and non-compliance (i.e., tax avoidance and tax evasion) was derived. The four standardised scales – each containing five items – show high reliability and good construct validity. In part two, the inventory is assessed and confirmed. Additionally, validity of scales is assessed on the basis of motives which underly behavioural intentions.

3.2. Part II: replication of the inventory and validity assessment with the second subsample

Model test: Confirmatory factor analyses with different factor structures were conducted on the base of the second sample. The one factor solution and the two factor solution did not reveal sufficient fit ($\chi^2(170) = 1024.45$, $p < .01$, $RmSEA = .18$, $CFI = .36$ and ($\chi^2(169) = 778.57$, $p < .01$, $RmSEA = .15$, $CFI = .55$, respectively). The four factor solution without correlations between error terms yielded acceptable model fits ($\chi^2(164) = 361.36$, $p < .01$, $RmSEA = .09$, $CFI = .85$). However, the four factor structure found in part I which allowed for correlations between error terms of items which address similar concepts provided the most satisfactory fit without further refinements ($\chi^2(160) = 232.16$, $p < .01$, $RmSEA = .05$, $CFI = .95$). There is a negligible weakness in the tax avoidance scale, with item TA5 showing only a weak relation with the overall scale index ($\beta = .13$, $p = .20$). Regression coefficients and correlations between factors are shown in Fig. 1.

Validity of the inventory: As in part I, the correlations between the scales were used as indicators of construct validity. Table 3 shows the indices and Cronbach's alphas of the four scales as well as inter-scale correlations. Voluntary tax compliance and enforced tax compliance are negatively related ($r = -.16$, $p < .05$); however, the explained variance of 2.56% is small. Voluntary compliance is not correlated with tax avoidance ($r = -.06$, $p = .43$). As expected, voluntary tax compliance and tax evasion are negatively related ($r = -34$, $p < .01$). No relation was found between enforced tax compliance and tax avoidance ($r = .15$, $p = .07$), between enforced tax compliance and tax evasion ($r = .15$, $p = .06$), and between tax avoidance and tax evasion ($r = .14$, $p = .08$). The pattern of results suggests satisfactory construct validity.

Additional estimates of the scales' construct validity were obtained by correlating scale indices with motivational postures. Voluntary tax compliance is expected to be positively linked to deference postures and negatively related to defiance postures. For enforced tax compliance, tax avoidance, and tax evasion the opposite patterns are expected. First, indices of motivational postures were calculated as well as Cronbach's alphas. Second, correlations between tax compliance and non-compliance scales and motivational postures were computed (Table 3). Results confirm that voluntary tax compliance is positively correlated with commitment ($r = .77$, $p < .01$) and capitulation ($r = .32$, $p < .01$) and negatively with resistance ($r = -.34$, $p < .01$), disengagement ($r = -.28$, $p < .01$), and game playing ($r = -.19$, $p < .01$). Enforced tax compliance shows a positive relation with resistance ($r = .36$, $p < .01$). Tax avoidance is positively linked with game playing ($r = .27$, $p < .01$). As expected, tax evasion is negatively linked to commitment ($r = -.34$, $p < .01$) and positively to resistance ($r = .26$, $p < .01$), disengagement ($r = .37$, $p < .01$), and game playing ($r = .16$, $p < .05$). Correlations with motivational postures confirm satisfactory construct validity.

In order to examine the criterion validity of the inventory we calculated the relations between the scales and the direct questions on tax cheating. We would expect to find that voluntary compliance is negatively related to self-reported cheating, whereas enforced tax compliance and avoidance are positively related to the thought of cheating but not to reports of actual cheating. Furthermore, evasion should be positively correlated with both questions on tax cheating. Table 3 shows the average answers to the direct questions on tax cheating, inter-item correlations, and correlations between the four scales. Non-parametric correlations indicate that voluntary tax compliance is negatively linked to both direct questions on tax cheating ($r = -.46$, $p < .01$ and $r = -.31$, $p < .01$). No relation was found between enforced tax compliance and the direct questions on cheating ($r = .05$, $p = .58$ and $r = -.02$, $p = .83$). A positive link between tax avoidance and the question about the thought of cheating was found ($r = .16$, $p < .01$), however, no link was found between tax avoidance and the blunt question on tax cheating ($r = -.02$, $p = .85$). Tax evasion was positively related to both direct cheating questions ($r = .51$, $p < .01$ and $r = .39$, $p < .01$). The results confirm satisfactory criterion validity.

In sum, results in part II confirm the findings in part I and yield support for construct and criterion validity of the inventory. In the next section we assess external validity on the base of actual behaviour in a tax experiment.

3.3. Validation of the inventory on the base of behavioural data

As intentions to perform a particular behaviour are supposed to be predictors of actual behaviour (Ajzen, 1985, 1991; Fishbein & Ajzen, 1975), we assume that the intentions to comply voluntarily and by enforcement are positively related to tax payments and negatively related to actual evasion. With regard to tax avoidance and tax evasion we expect a reversed pattern: negative relations with tax payments and positive relations with non-payments. We compared answers to items on intended compliant and non-compliant behaviour (i.e., voluntary compliance, enforced compliance, tax avoidance, and tax evasion) with data collected in a laboratory tax experiment. Although it can be doubted that data from laboratory tax experiments reflect tax behaviour in natural settings, experimental data serve as a first external validation of our inventory.

3.3.1. Participants
In total, 38 female and 22 male students enrolled in social sciences (mean age = 23.70, SD = 2.75, Md = 23.00; median income = Euro 501–1000) filled in the questionnaire developed in the previous sections and participated in a tax experiment.

3.3.2. Material and procedure
Participants imagined to be self-employed with the need to pay taxes on their income. First, they answered the 20 items on voluntary compliance, enforced compliance, avoidance, and evasion, developed in the previous sections of this

Table 4
Descriptives, Cronbach's alphas of voluntary tax compliance, enforced tax compliance, tax avoidance, tax evasion as well as correlations of the scales with average filed taxes during 20 periods and frequencies of filing no taxes during the 20 periods in the tax experiment.

Scale	M	SD	MD	Alpha	Average taxes filed	Frequency of filing no taxes
Voluntary tax compliance (VTC)	4.94	0.99	5.00	.60	.27[*]	−.23[*]
Enforced tax compliance (ETC)	4.18	1.59	4.20	.86	−.15	.15
Tax avoidance (TA)	4.75	1.04	4.80	.61	−.28[*]	.25[*]
Tax evasion (TE)	4.19	1.44	3.80	.79	−.31[*]	.37[**]

[*] $p < .05$ (one-sided).
[**] $p < .01$ (one-sided).

paper. The answering format ranged from 1 ("fully disagree") to 7 ("fully agree") and from 1 ("very unlikely") to 7 ("very likely"), respectively. Second, participants read instructions for the tax experiment. They were informed that they would earn ECU 1000 (experimental currency units) in each of 20 tax filing rounds and that they had to file their taxes in each round. Taxes amounted to 20% of their income (=ECU 200), probability of tax audits was 15% and fines in case of detected evasion amounted to three times the evaded amount. Audits were randomly chosen before the experiment and occurred after periods 7, 11, and 20. The experimental software used to programme the experiment was Z-Tree (Fischbacher, 2007).

Participants' profit in each period consisted either of their income minus filed taxes when no audit occurred. In case of an audit and detection of evasion, the profit consisted of their income minus filed taxes, minus three times the evaded amount. Further, participants were informed that at the end of the experiment they will receive their average gain paid in Euro (ECU 150 = Euro 1). To ensure understanding of instructions, participants were advised to compute their profit in an example task. Overall, seven participants were detected to have problems in understanding the instructions and in solving the computational task; therefore they were excluded from further analyses. At the end of the experiment, participants were paid a show-up fee of Euro 3 plus their average profit in the 20 rounds (average payments amounted to Euro 8.70; SD = 0.19).

3.3.3. Results

Table 4 shows means, standard deviations, medians, and reliabilities of the scales on voluntary compliance, enforced compliance, avoidance, and evasion. In order to assess external validity of these scales, participants' average filed taxes during the 20 experimental periods served as indices of compliant behaviour (taxes paid in ECU amounted on the average to $M = 112.48$, SD = 62.32, Md = 121.00, which indicates that evasion amounted to approximately 40%). Frequency of filing no taxes during the 20 periods was used as second indicator of tax (non)-compliance (Md = 1.00).

Scales on intended voluntary and intended enforced compliance are expected to be positively related to compliant behaviour and negatively linked to non-compliant behaviour. On the other hand, intended tax avoidance and intended tax evasion should be negatively related to compliant behaviour and positively to non-compliant behaviour. As shown in Table 4, these expectations are met. One-sided Pearson product-moment correlations show a positive relation for voluntary compliance with taxes paid ($r = .27$, $p < .05$); one-sided tested Spearman's Rho revealed a negative link between voluntary compliance and frequency of total evasion ($r = −.23$, $p < .05$). For avoidance and evasion negative relations with paid taxes were found (one-sided Pearson product-moment correlations; $r = −.28$, $p < .05$ and $r = −.31$, $p < .05$, respectively). Furthermore, the one-sided Spearman's Rho showed positive links between avoidance and frequency of total evasion ($r = .25$, $p < .05$) as well as between evasion and frequency of total evasion ($r = .37$, $p < .01$). Between enforced compliance and taxes paid and frequency of total evasion no significant relations were found ($r = −.15$, $p = .14$ and $r = .15$, $p = .14$, respectively). Altogether, these results indicate satisfactory external validity.

In sum, the scales voluntary compliance, avoidance, and evasion show good external validity. The non-significant correlations between enforced compliance and behavioural data could be due to the manipulation of enforcement power in the tax simulation experiment. An audit probability of 15% and fines amounting to three times the evaded amount might hardly be perceived by the participants as powerful enforcement strategies. Therefore, results on enforced tax compliance could be due to the missing perception of authorities' enforcement power in the experiment.

4. Discussion

The aim was to develop a standardised inventory to measure different intentions of tax compliance and non-compliance. A study was conducted on a sample drawn from a representative pool of self-employed taxpayers. Overall, 20 items were found sufficient to measure voluntary compliance, enforced compliance, tax avoidance, and tax evasion. The four scales of the inventory which was detected in part I of the present study and supported in part II as well as in a tax simulation experiment, represents a reliable and valid instrument. The advantage is not only that it is a standardised

inventory for research on tax behaviour, but also that each scale provides researchers with a tool to distinguish between and measure single intentions of compliance and non-compliance and each can be applied independently. Furthermore, since each standardised scale consists of only five items, the inventory's application is economically convenient and time-saving.

Major problems of self-reported data result from imperfect recall of prior behaviour. The use of fictitious actions in the present items keeps problems of recalling past behaviour to a minimum. Since all participants receive the same information, the answers are comparable (Suhling, Löbmann, & Greve, 2005). The use of fictitious case scenarios is also likely to overcome the problem of socially desirable answers, because the question format is only indirectly addressing deviant behaviour (Suhling et al., 2005). Similar positive effects can be obtained when asking about behavioural intentions rather than quering actual behaviour. Because participants do not have to reveal their own (deviant) behaviour, the answers are likely to produce more accurate and reliable reports about non-compliance intentions. Although, the inventory presented in this paper cannot substitute data directly obtained from self-filed tax returns, it can be used to investigate and differentiate between different intentions of compliant and non-compliant behaviour.

In contrast to previous research which often used ad hoc items on compliance and non-compliance, the inventory follows clear definitions derived from the literature on tax behaviour. Consequently, the scales on voluntary and enforced compliance proposed in this paper are addressing different intentions of compliance. Voluntary compliance originates from spontaneous willingness to cooperate, emanating from taxpayers' moral obligation to contribute to the public welfare. Enforced compliance states that tax payments according to the law arise from taxpayers' concern of being audited and fined (James & Alley, 2002; Kirchler, 2007; Kirchler et al., 2008; McBarnet, 2001). Tax avoidance is defined as the intention to minimising tax liabilities within the legal range of the law (Gassner, 1983; Sandmo, 2003), whereas evasion refers to intentionally breaking the law (Elffers et al., 1987; Sandmo, 2003; Webley, 2004). It is important in tax behaviour research to differentiate between these intentions of compliance and non-compliance in order to deepen the understanding of tax behaviour and obtain comparable results across studies.

If we are to broaden the understanding of tax behaviour, findings of different studies need to be comparable. However, previous studies on self-reports focus on different definitions and operationalisations of tax behaviour and apply items that address different intentions of compliance and non-compliance. Thus, comparison of findings is difficult if not impossible. Previous research comparing tax behaviour across countries also often relies on a very small number of survey items (e.g., Alm & Torgler, 2006; Torgler, 2003; Torgler, 2005; Wenzel, 2004a; Wenzel, 2004b; Wenzel, 2007). Validity and reliability are rarely questioned (e.g., Wilson & Sheffrin, 2005).

To conduct comparable cross-national or cross-cultural studies on tax compliance and non-compliance, the inventory's scales need to be translated. Translating items on voluntary compliance and enforced compliance should be rather uncomplicated, since these items address the underlying behavioural intentions in an abstract way. Furthermore, although items on evasion state intentions to perform concrete tax reduction behaviours, these tax reductions are illegal in almost all countries. Therefore, also translating items on tax evasion should be an easy task. However, three of the five concrete actions stated in the items on tax avoidance reflect possibilities to avoid taxes according to the Austrian tax law. When using these items in other countries they require adaptations to country-specific tax laws. Reformulations only concern the particular content, whereas the basic structure of the items does not need to be changed. The inventory's scales provide the possibility of national and cultural comparisons of behavioural intentions with a standardised instrument for people who have to file their own income tax returns.

In the present paper we not only provide scales to measure different intentions of compliance but also examine the relations between them. The finding that voluntary compliance and enforced compliance are not correlated, suggests that the two concepts do indeed address different intentions of honest tax behaviour which have not been taken into account in previous research. Disregard of differences between voluntary and enforced compliance may explain why research has yielded contradictory results, and may also explain why some studies find a strong effect of audits and fines on compliance, whereas others find either no relationship or the opposite effect to that expected. We assume that voluntary compliance leads taxpayers not to engage in extensive decision making over whether it pays to evade or not, but rather to cooperate spontaneously, independently of audit probabilities and fines. In a climate of cooperation between taxpayers and authorities, audits and fines might communicate distrust by authorities and lead to the opposite effects to those theoretically expected. On the other hand, if taxpayers need enforcement if they are to comply, then audits and fines are likely to exert deterrent effects (Kirchler, 2007). Voluntary compliance originates from taxpayers' trust in authorities, whereas enforced compliance is fostered through the power of authorities to effectively carry out audits and impose fines (Forest, 2000; Kirchler, 2007).

Appendix

Items on voluntary tax compliance, enforced tax compliance, tax avoidance, and tax evasion in the original German version and the translated English version

	ID	German Freiwillige Steuerehrlichkeit	English Voluntary tax compliance
		Wenn ich meine Steuern vorschriftsmäßig zahle, dann tue ich das, …	When I pay my taxes as required by the regulations, I do so …
	VTC1	… weil ich freiwillig meine Steuern bezahle	… because I pay my taxes voluntarily
	VTC2	… ohne lange darüber nachzudenken, wie ich sie reduzieren könnte	… without spending a long time thinking how I could reduce them
*	VTC3	… weil es für mich selbstverständlich ist	… because to me it's obvious that this is what you do
	VTC4	… auch dann, wenn es keine Steuerprüfungen gäbe	… even if tax audits did not exist
*	VTC5	… um den Staat und andere BürgerInnen zu unterstützen	… to support the state and other citizens
*	VTC6	… weil ich gerne zum Wohl Aller beitrage	… because I like to contribute to everyone's good
*	VTC7	… weil es für mich ganz natürlich ist	… because for me it's the natural thing to do
*	VTC8	… weil ich es als meine Pflicht als BürgerIn ansehe	… because I regard it as my duty as citizen
	VTC9	… obwohl ich weiß, dass Andere das nicht tun	… even though I know that others do not do that
	VTC10	… weil ich überzeugt bin, das Richtige zu tun	… because I am sure I am doing the right thing
		Erzwungene Steuerehrlichkeit	Enforced tax compliance
		Wenn ich meine Steuern vorschriftsmäßig zahle, dann tue ich das, …	When I pay my taxes as required by the regulations, I do so …
	ETC1	… weil ich mich gezwungen fühle, meine Steuern zu zahlen	… because I feel forced to pay my taxes
*	ETC2	… weil viele Steuerprüfungen stattfinden	… because a great many tax audits are carried out
	ETC3	… obwohl ich am liebsten gar keine Steuern zahlen würde	… although I would really prefer not to pay any taxes
*	ETC4	… weil die Steuerbehörde häufig kontrolliert	… because the tax office often carries out audits
*	ETC5	… weil ich weiß, dass ich kontrolliert werde	… because I know that I will be audited
*	ETC6	… weil Hinterziehung sehr streng bestraft wird	… because the punishments for tax evasion are very severe
*	ETC7	… weil ich nicht genau weiß, wie ich Steuern unauffällig hinterziehen kann	… because I do not know exactly how to evade taxes without attracting attention
	ETC8	… nach langem Hin- und Herüberlegen, wie ich legal Steuern sparen könnte	… after putting a lot of thought into how I could legally save taxes
		Steuervermeidung	Tax avoidance
*	TA1	Sie könnten sich selbst genau mit dem Steuergesetz auseinandersetzen, um nach Einsparungsmöglichkeiten zu suchen. Wie wahrscheinlich würden Sie sich genau mit dem Steuergesetz auseinandersetzen?	You could take a detailed look at the tax regulations yourself to search for potential savings. How likely would you be to take this detailed look at the tax regulations?
*	TA2	Sie könnten in Ihrer Privatwohnung noch Lärmschutzfenster einbauen lassen und die entstandenen Kosten als Wohnraumsanierung in Ihrer Steuererklärung geltend machen. Damit würde sich Ihre Steuerlast reduzieren. Wie wahrscheinlich würden Sie die Wohnraumsanierung vornehmen?	You could install soundproof windows in your private dwelling and claim the resulting cost as housing space reconstruction on your income tax return. This would have the effect of reducing your tax burden. How likely would you be to carry out the housing space reconstruction?
*	TA3	Sie könnten einen Kurs besuchen, der Sie über derzeitige steuerliche Absetzmöglichkeiten informiert. Wie wahrscheinlich würden Sie einen solchen Kurs besuchen?	You could attend a course which informs you about the current possibilities for making claims against tax. How likely would you be to attend such a course?
	TA4	Sie könnten im nächsten Jahr weniger arbeiten, damit Sie in eine geringere Einkommensklasse fallen und dadurch weniger Steuern zahlen müssen. Wie wahrscheinlich ist es, dass Sie im nächsten Jahr weniger arbeiten?	You could work less next year, so as to fall into a lower income group and consequently pay less in tax. How likely is it that you would work less next year?
*	TA5	Sie könnten geringwertige Wirtschaftsgüter (z.B.: PC, Scanner, und andere Anschaffungen unter € 400, –), die Sie jedoch zur Zeit nicht benötigen, für Ihr Unternehmen anschaffen, um Ihre Bemessungsgrundlage zu verringern. Wie wahrscheinlich würden Sie solche Güter anschaffen?	You could buy low-value assets (e.g., PC, scanner, and other purchased equipment with a value below € 400, –) which you do not currently need for your company, so as to decrease the figure on which your tax calculation is based. How likely would you be to purchase such assets?
*	TA6	Sie könnten Bildungsausgaben, die Sie für Ihre MitarbeiterInnen hatten, als Bildungsfreibetrag von Ihrer Steuer absetzen. Wie wahrscheinlich ist es, dass Sie den Bildungsfreibetrag nutzen?	You could deduct against tax the training costs you incurred for your employees as an allowable deduction for education and training. How likely is it that you would use the allowable deduction for education and training?

Appendix (*continued*)

ID	German Freiwillige Steuerehrlichkeit	English Voluntary tax compliance
TA7	Sie könnten Ihre Steuererklärung mit einem Steuerberater bzw. einer Steuerberaterin besprechen. Er bzw. sie könnte Ihnen noch ein paar Tipps geben, wie Sie mehr Steuern sparen könnten. Wie wahrscheinlich ist es, dass Sie mit einem bzw. einer Steuerberaterin sprechen?	You could discuss your income tax return with a tax accountant. He or she could give you some hints as to how you could save more in tax. How likely is it that you would talk to a tax accountant?
TA8	Sie könnten eine Lebensversicherung abschließen und diese als Sonderausgabe, die Ihre Bemessungsgrundlage verringert, von der Steuer absetzen. Wie wahrscheinlich ist es, dass Sie eine Lebensversicherung abschließen?	You could contract a life insurance policy and deduct it as a special expense against your taxable income. How likely is it that you would contract the life insurance?

	Steuerhinterziehung	Tax evasion
TE1	Sie könnten Ihr Auto als Geschäftswagen deklarieren, obwohl Sie es nur zu 30% für geschäftliche Zwecke nutzen und die Nutzung eines Geschäftswagens mindestens 50% geschäftlich sein muss. Wie wahrscheinlich würden Sie Ihr Auto als Geschäftswagen deklarieren?	You could declare your car as a company car, although your use of it is only 30% for business purposes, and at least 50% business use is required for it to be assessed as a company car. How likely is it that you would declare your car as company car?
TE2	Sie könnten in Ihrem Fahrtenbuch auch private Fahrten als geschäftliche Fahrten angeben. Wie wahrscheinlich würden Sie private Fahrten als geschäftliche Fahrten angeben?	You could enter private journeys as company journeys in your driver's logbook. How likely is it that you would enter private journeys as company ones?
* TE3	Eine Kundin hat bar bezahlt und keine Rechnung verlangt. Sie könnten diese Einnahme in Ihrer Steuererklärung absichtlich weglassen. Wie wahrscheinlich würden Sie diese Einnahme weglassen?	A customer paid in cash and did not require an invoice. You could intentionally omit this income on your income tax return. How likely is it that you would omit this income?
* TE4	Sie haben einen Teil Ihrer Ware privat eingekauft. Sie könnten diese Ware später an StammkundInnen weiterverkaufen und den dabei erzielten Gewinn in Ihrer Steuererklärung verschweigen. Wie wahrscheinlich würden Sie den erzielten Gewinn in Ihrer Steuererklärung verschweigen?	You bought some of your goods privately. You could resell those goods later to established customers and omit the profit from this sale on your income tax return. How likely would you be to omit the profit from this sale on your income tax return?
* TE5	Sie könnten Rechnungen von Abendessen mit Ihren FreundInnen absichtlich als Geschäftsessen deklarieren. Wie wahrscheinlich würden Sie diese Rechnungen als Geschäftsessen deklarieren?	You could intentionally declare restaurant bills for meals you had with your friends as business meals. How likely would you be to declare those restaurant bills as business meals?
TE6	Sie waren geschäftlich im Ausland. Der Flug wurde von Ihren GeschäftspartnerInnen bezahlt, jedoch haben Sie die Flugtickets noch. Sie könnten diese Flugtickets in Ihrer Steuererklärung geltend machen. Wie wahrscheinlich würden Sie die Flugtickets geltend machen?	You have been abroad on business. The flight was paid for by your business partners; however, you still have the plane tickets. You could claim those plane tickets on your income tax return. How likely would you be to claim the plane tickets?
* TE7	Sie waren im Ausland, um Verwandte zu treffen und eine kurze Unterredung mit einer Ihrer LieferantInnen zu führen. Trotzdem könnten Sie die Hotelkosten und das Essen, auf das Sie Ihre Verwandten eingeladen haben, als Geschäftsreise bzw. -essen deklarieren. Wie wahrscheinlich würden Sie diese Ausgaben als Geschäftsreise bzw.-essen deklarieren?	You have been abroad to meet relatives and to have a short meeting with one of your suppliers. Regardless of this you could declare your expenses for the hotel and for the meals you invited your relatives to, as business travel and a business meal. How likely would you be to declare your expenses as business travel or a business meal?
TE8	Um Ihre Steuerlast zu verringern, könnten Sie eine befreundete Studentin bitten, Ihnen eine Honorarnote auszustellen, obwohl Sie keine Dienstleistungen in Anspruch genommen bzw. bezahlt haben. Wie wahrscheinlich würden Sie die Studentin bitten, Ihnen eine Honorarnote auszustellen?	To decrease your tax burden, you could ask a friend who is a student to issue an invoice for services, although you did not in fact request or pay for any such services. How likely would you ask the student to issue an invoice?
* TE9	Vor kurzem haben Sie im Unternehmen einer Bekannten an einem Projekt mitgearbeitet. Nun könnten Sie diesen steuerpflichtigen Zusatzverdienst in Ihrer Steuererklärung verschweigen. Wie wahrscheinlich ist es, dass Sie diesen Zusatzverdienst verschweigen?	Recently you took part in a project in an acquaintance's company. Now you could conceal this taxable additional income on your income tax return. How likely is it that you would conceal this additional income?

Note: * items included in the scales to assess voluntary tax compliance, enforced tax compliance, tax avoidance, and tax evasion.

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