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Main article

Accountants' cognitive styles and ethical reasoning: A comparison across 15 years

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ABSTRACT

Recent attention to accountants' ethics in the news, in professional practice, and by academia leads to questions about the ethical and cognitive characterization of students selecting accounting careers. We employ the Myers/Briggs Type Indicator (MBTI) for assessing cognitive styles, and the Defining Issues Test (DIT) for assessing ethical reasoning to study differences between two groups of accounting graduates and new hires entering the accounting profession across a period of 15 years. We show that the dominant cognitive make-up of accountants has not changed significantly over the study period, which is consistent with prior research. Also, we hypothesize and provide evidence that this dominant style is associated with lower levels of ethical reasoning (as measured by the DIT) than other cognitive styles. The ethical reasoning scores are lower for the 2005 sample than for the 1990 sample. This result may be attributable to age, gender, grade point average, or political orientation; however, incomplete data in our sample does not allow us to make definitive conclusions regarding these control variables. We discuss the implications of these findings for curriculum development and professional practice.

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1. Introduction

Many high profile corporate scandals rocked the accounting profession in the first years of this century. In addition, numerous financial restatements were issued in recent years reflecting aggressive earnings management by companies, whose accountants and auditors had failed to recognize accounting misstatements before releasing audited financial statements. Critics of the accounting profession argue that in many of these cases, accountants' lapses in professional judgment could be blamed on "poor ethics." For example, [Flanagan and Clarke \(2007, 488\)](#) state that accountants "often lack the knowledge and skills to analyze issues effectively, and when confronted with conflicting ethical problems cannot choose the way to move forward that is consistent with their own values and/or the profession's code of professional conduct." Accounting educators have reacted to this gap by amending curricula to cover ethical studies and training around ethical reasoning in order to address public concerns about the accounting profession's ethics and behavior (cf., [Bernardi & Bean, 2006; Haas, 2005](#)).

One might expect that this recent attention to accountants' ethics would lead to a noticeable difference in the characteristics of students graduating with accounting degrees. In particular, one outcome of this combination of bad press and ethics-based curricular backlash might be a tendency for individuals with different cognitive and ethical propensities to choose accounting as a career. The purpose of this study is to investigate whether the cognitive styles and ethical reasoning of accounting graduates have changed in recent years. We compare the cognitive style and a measure of ethical reasoning of accounting students and recent professional hires to those of their counterparts 15 years prior in order to capture changes in the characteristics of students self-selecting into accounting.

We focus on graduating students new to the profession because the literature suggests that a college education is a significant contributor toward increasing ethical reasoning. While completing a bachelor's degree boosts ethical reasoning test scores an estimated 10%, ethical reasoning reaches a plateau at the point of graduation from college ([Rest, 1979, 143](#)). [Dellaportas \(2006\)](#) noted a significant (12.18%) increase in DIT scores by accounting students that he attributed to the ethics course they took as part of an undergraduate degree program, giving credence to [Rest's \(1979\)](#) assertion that focused ethics intervention has a significant positive impact on students. Thus, the transition from accounting student to new hire is a good opportunity to assess the characteristics of a cohort of accountants entering the profession. With the benefit of access to previously collected data, it is then possible to compare the characteristics of two cohorts across 15 years to detect differences in potentially significant personal characteristics.

We first examine whether the cognitive styles of students entering the accounting profession have changed over time. Prior research (e.g., [Wheeler, 2001; Wheeler, Hunton, & Bryant, 2004](#)) advises accounting researchers to undertake studies that use cognitive style theory to understand the nature of the people practicing in the field. For example, [Wheeler et al. \(2004\)](#) review the literature on personality type theory and its measurement instrument, the Myers/Briggs Type Indicator (MBTI). They conclude that MBTI provides many opportunities for studying behavioral issues in accounting information systems.

A similar argument can be made for opportunities to investigate accounting graduates' MBTI and its relationship with other important variables such as ethical reasoning. A line of research has studied accounting students (e.g., [Briggs, Copeland, & Haynes, 2007](#)) or recent graduates (e.g., [Abdolmohammadi, Read, & Scarborough, 2003](#)) and has reported that accountants' MBTI is dominated by a certain type. What is interesting about this finding is that accountants with this MBTI type have also been found to be associated with relatively low levels of ethical reasoning ([Abdolmohammadi et al., 2003; Fisher & Ott, 1996](#)). We extend this literature by investigating the temporal changes in MBTI and ethical reasoning of accounting graduates across a 15-year period.

Our review of the accounting literature indicates that with two exceptions ([Fisher & Ott, 1996](#) and [Abdolmohammadi et al., 2003](#)), cognitive styles and ethical reasoning of practicing accountants have seldom been investigated together. In one of these studies, [Abdolmohammadi et al. \(2003\)](#) reported the cognitive styles and ethical reasoning scores of 90 staff accountants that were collected in 1990. They provided evidence that the accounting profession recruited disproportionately higher levels of certain cognitive styles to serve as public accountants. They also found that these styles were

associated with relatively low levels of ethical reasoning. We use their data set as the starting point for comparison with data collected in 2004–2005.

We then explore potential relationships between ethical reasoning and cognitive style and a number of control variables to explain differences between the 1990 and 2005 data. Another motivation for our study is therefore to investigate whether demographic variables, such as gender or GPA, explain any differences noted in the cognitive style and ethical reasoning of new entrants to the accounting profession.

The next section of the paper contains a discussion of the background literature leading to our research hypotheses. The method of investigation and results are then presented, followed by a summary of the results and implications from the study.

2. Background and hypotheses

Many factors affect how or why students choose college majors. Cognitive style and ethical reasoning may play a role in self-selection, or they may correlate with other characteristics that do. Our goal is not to study the factors *causing* selection of a particular major, but rather whether the *result* of self-selection (i.e., major choice) is associated with different combinations of specific characteristics among a set of students. Thus, in this study, we examine two main characteristics to note whether or not those students selecting to major in accounting reflect a pattern that differs from the general population, and whether this pattern has changed over the past 15 years.

With respect to cognitive style, prior studies (e.g., Abdolmohammadi et al., 2003; Fisher & Ott, 1996) show evidence of self-selection into the accounting major of individuals with proportionately higher levels of certain cognitive styles that are associated with lower levels of ethical reasoning. This correlation may help explain the observation by St. Pierre, Nelson, and Gabbin (1990) that cognitive styles of students vary across majors. In the next section, we briefly discuss cognitive style and ethical reasoning as a means of establishing our research hypotheses.

2.1. Cognitive style and the MBTI

The Myers/Briggs Type Indicator or MBTI (Myers, 1962) is a personality inventory designed to identify individuals' basic preferences for perceiving and processing information, including their cognitive styles (Conoley & Kramer, 1989; Johnson, Johnson, Murphy, Weiss, & Zimmerman, 2001). MBTI was designed to make Jung's (1923) theory of psychological cognitive styles more practical (Katz, Joyner, & Seaman, 1999). Jung (1923) theorized that individuals are either extraverted or introverted and they prefer one way of perceiving (sensing or intuition) and one way of judging or deciding on an action (thinking and feeling). Thus, four scales determine a person's preferences by the following dichotomies: extroverted–introverted (E–I), sensing–intuitive (S–N), thinking–feeling (T–F), and judging–perceiving (J–P). The MBTI identifies preferences rather than competencies, and is explained by Salter, Evans, and Formey (1997) in their statement, “scores do not measure the extent of a trait, but rather they are used to indicate tendency to prefer a type of disposition.” The four mental functions are presented in Table 1. These specific combinations of perception (S and N) and judgment (T and F) generate the function pairings of ST, SF, NF, and NT.

According to Salter et al. (1997), the function pairs (ST, SF, NF, and NT) have the most impact on job selection. ST combinations thrive on impersonal analysis of concrete facts, especially in the fields of

Table 1
The four cognitive styles.

Judgment	Perception	
	Sensing	iNtuition
Thinking	ST	NT
Feeling	SF	NF

accounting, economics, business, law, surgery, production, and handling machines and materials (Keirse, 1998; Myers, 1990; Myers, McCaulley, Quenk, & Hammer, 1998). SFs are often found in healthcare and education, since they enjoy helping people in practical ways. NFs want to serve others through endeavors in the arts, religion, and counseling. NTs find theoretical frameworks in science, technology, and management appealing.

A review of the accounting literature reveals that ST and SF are the dominant cognitive styles of accounting students (Abdolmohammadi et al., 2003; Fisher & Ott, 1996; Geary & Rooney, 1993) and practicing accountants (Briggs et al., 2007; Jacoby, 1981; Kovar, Ott, & Fisher, 2003; Scarbrough, 1993; Schloemer & Schloemer, 1997; Vaassen, Baker, & Hayes, 1993). For example, 66% of the accounting students in Abdolmohammadi et al.'s (2003) study were either STs (46%) or SFs (20%). Based on the reported consistency of the domination of these types within accounting over long periods of time (Briggs et al., 2007; Kovar et al., 2003), we expect the predominance of SF and ST to hold. Thus, we expect no difference in cognitive style mix over time.

H1. The cognitive style mix of accounting profession entrants remains constant over time.

2.2. Ethical reasoning

Much of the ethical reasoning literature in accounting (e.g., Bay & Greenberg, 2001) is based on Kohlberg's (1981) cognitive developmental theory of ethics. As the name implies, this theory posits three developmental levels of ethics called Pre-conventional, Conventional and Post-conventional. Each of these levels is subdivided into two sub-levels called stages (lower stage, upper stage). The theory proposes that individuals develop into higher stages and levels by age and education. The highest level to achieve is the third or Post-conventional level, where an individual's reasoning is at a "principled" level of ethics. Rest (1986) developed an instrument called the Defining Issues Test (DIT) to measure one's degree of ethical reasoning at the Post-conventional level.

Studies of ethical reasoning of accounting students and practicing accountants have reported two particularly significant findings based on administration of the DIT. First, accounting graduates generally possess lower levels of ethical reasoning than the average of all college graduates (Armstrong, 1987; Lampe & Finn, 1992) in general, and liberal arts students in particular (e.g., Ponemon & Glazer, 1990). While accounting students did score as high as, or higher than, other business students in early studies (e.g., Icerman, Karcher, & Kennelley, 1991), their ethical reasoning was still lower than national averages for college students in Rest (1994).

Second, from a review of prior studies, Rest (1994) concludes that ethical reasoning increases with age and education, but education is the primary factor in this relationship. For example, in a meta-analysis of various studies with over 6000 subjects, Thoma (1986) reported that age and education explain approximately 52% of the variation in ethical reasoning in cases where more educated and older people have higher levels of ethical reasoning than younger and less educated people. In support of this finding, other researchers have noted correlations between ethical reasoning and age and education (Bernardi & Bean, 2008). Other researchers (e.g., Thorne, 2001) have found no relationship or a negative relationship between ethical reasoning and these control variables. In addition, some studies in accounting indicate that older and more experienced audit managers possess lower levels of ethical reasoning than the younger and less experienced audit seniors (cf., Ponemon, 1992; Ponemon & Gabhart, 1993). In his explanation of this issue, Ponemon (1992) suggests that high-ranking accountants may be attracting or retaining people similar to themselves in a selection socialization mechanism, thus promoting individuals with a lower level of ethical reasoning than found in the overall population of lower rank accountants. More recent and larger scale studies find no evidence in support of this bias in promotion to higher ranks for CPAs in public practice (Bernardi & Arnold, 2004; Scofield, Phillips, & Bailey, 2004) or industry practice (Abdolmohammadi & Ariail, 2009).

A conclusion from the above literature is that higher levels of ethical reasoning are preferred over lower levels, especially in a profession like accounting where public trust is crucial to the survival of the profession. Recognizing the importance of ethics to the accounting profession, many colleges and universities have incorporated ethics into the accounting curriculum in recent years to meet industry

demands (Bernardi & Bean, 2006; Haas, 2005). The positive relationship noted between ethics education and ethical reasoning (Clikeman & Henning, 2000; Dellaportas, 2006) suggests that the level of ethical reasoning of students entering the accounting profession should be higher in 2005 than those who entered the profession in 1990. This is because the more recent graduates have experienced a stronger emphasis on ethics-based course content than their predecessors. Thus, we state a directional hypothesis as follows:

H2. Recent graduates entering the accounting profession will exhibit higher ethical reasoning than those predating the current emphasis on ethics-based course content.

2.3. Relationship between MBTI and DIT

The results reported in the cognitive style and ethical reasoning literatures suggest that there is an association between cognitive style and ethical reasoning. In a preliminary study of accounting students, Fisher and Ott (1996) found that there is a significant correlation between the two. The major characteristics of the MBTI classifications are adapted from a summary by Fisher and Ott (1996) as reported in Exhibit 1. From the descriptions of the cognitive styles and Kohlberg's Cognitive Developmental Theory, Abdolmohammadi et al. (2003) derived the relationship listed in the last line of Exhibit 1.

As reported in Exhibit 1, NTs are open to considering various possibilities, not just facts, and use logic to solve problems. In doing so, they consider justice and fairness in their decision making process, and they reason at the upper-end (Stage 6) of Kohlberg's Post-conventional level of ethical reasoning. Thus, NTs are expected to have relatively high levels of moral reasoning. On the other hand, SFs are fact-based and use personal warmth in a friendly and cooperative manner to make their decisions. They also use cost/benefit analysis and group norms to make their decisions. The adherence to group norms places SFs in the lower end (Stage 3) of Kohlberg's Conventional level of moral reasoning. This classification indicates that SFs are relatively low in their moral reasoning.

Like SFs, STs tend to use facts to make decisions, but they are also more practical and impersonal in their analysis than SFs. They also are more likely to conform to laws and codes of conduct. This attribute places STs in the upper-end (Stage 4) of Kohlberg's Conventional level of moral reasoning. Thus, STs are likely to have higher level of moral reasoning than SFs, but lower than NTs. As Exhibit 1 shows, STs are expected to be moderately low in their moral reasoning. Finally, NFs use various possibilities,

Exhibit 1

Characteristics of cognitive styles.

Focus on	Sensing/ thinking Facts	Sensing/feeling Facts	Intuitive/feeling Possibilities	Intuitive/thinking Possibilities
Handle these with	Impersonal analysis	Personal warmth	Personal warmth	Impersonal analysis
Tend to become	Practical and matter-of-fact	Sympathetic and friendly	Enthusiastic and insightful	Logical and ingenious
Good at	Observing and ordering	Empathizing	Imagining	Discovery and inquiry
	Filing and recalling	Cooperating	Forming hypotheses	Problem solving
	Sequencing and categorizing	Personalizing	Making new combinations	Comparing and contrasting
Important issues in moral reasoning and judgments	Conform to laws and codes of conduct	Personal cost/benefit and group norms	Harmony based on personal values and values of others close to them	Justice and fairness leading to objective decision making
Expected level of moral reasoning	Moderately low	Low	Moderately high	High

Adapted from Fisher and Ott (1996) and Abdolmohammadi et al. (2003).

personal warmth, and are imaginative in finding alternative solutions for their decision making processes. They use personal values and the values of others who are close to them to make their moral judgment. This focus places NFs in the lower end (Stage 5) of Kohlberg's Post-conventional level of moral reasoning. Thus, NFs' moral reasoning is considered to be moderately high.

Abdolmohammadi et al. (2003) argue that the MBTI is value-free because it does not presume that one method of thinking is superior to another. On the other hand, the DIT is descriptive of the cognitive ethical reasoning of the individual, where higher levels are preferable to lower levels. Thus, it is reasonable to describe the DIT and MBTI as complementary measures of an individual's cognitive processes. As explained earlier, we would expect that there will be an order effect such that ethical reasoning will be associated with cognitive styles (from highest to lowest) SF, ST, NF, and NT (see the bottom of Exhibit 1). Thus, we propose the following hypothesis.

H3. SF/ST cognitive styles of accounting profession entrants are associated with significantly lower ethical reasoning scores than NF/NT styles.

2.4. Control variables

Gender has been extensively studied in both the DIT and MBTI literatures. Referring to a national representative sample stratified by gender (Myers et al., 1998), we note that more males (41%) tend to exhibit the ST type than females (19%). Females also outnumber males in the SF category by 56–30%. However, no gender differences were found in a recent study of accounting students by Briggs et al. (2007), where 75.5% of males and 75.7% of females were placed in the ST/SF categories. Regarding the DIT, a meta-analysis indicated that women have equal or higher ethical reasoning than men (Thoma, 1986). Similarly, some accounting studies have shown significantly higher ethical reasoning scores for females than males among students (e.g., Abdolmohammadi, Gabhart, & Reeves, 1997) and professional accountants (e.g., Bernardi & Arnold, 1997), while other studies (e.g., Ponemon & Gabhart, 1993) have not found significant differences between males and females. Overall, Bernardi and Bean's (2008) meta-analysis indicates that females in accounting studies have higher ethical reasoning than males. Given these prior findings, we include gender as a control variable in our multivariate analysis.

With respect to grade point average (GPA), Shaub (1994) found students' GPA to be positively and significantly associated with ethical reasoning. Thus, we also use GPA as a control variable in the study. Also, as discussed earlier, the ethics literature indicates that both age and education are positively associated with ethical reasoning (Bernardi & Bean, 2008), so that we also include age as a control variable.³

3. Research method

The Defining Issues Test (DIT) is a self-administered, multiple-choice questionnaire with six ethical dilemmas, each accompanied by twelve questions for a total of 72 questions. The DIT provides several indices, but the most commonly used score is the principled score (*P*-score), which is based on the relative importance that a subject gives to items representing the highest level (i.e., Post-conventional) in Kohlberg's Cognitive Developmental Theory of ethics. Rest (1994, 13) summarizes the results of many DIT studies, and reports that the "test–retest correlation of the DIT (over a period of several weeks) averages in the 1980s, and the internal reliability of the DIT also averages in the 1980s (Cronbach's Alpha)."

We used the MBTI and DIT instruments to collect data for this study at two points in time (1990 and 2005) and among two groups of subjects at each point in time (graduating accounting students and new hires at large professional accounting firms in the same geographical area: Northeastern United States). The 1990 MBTI forms were manually scored, while the 2005 MBTIs were scored on-line by

³ GPA and graduate/undergraduate standing are highly correlated in our sample (Pearson correlation = 0.433, $P < 0.001$), so we do not include graduate/undergraduate (i.e., level of education) as a control variable.

Table 2
Description of samples.

Year	Sample	N	Gender		Age	GPA
			M	F		
1990	Staff	90	43	47	NA	NA
	Student	75	29	46	NA	2.90
2005	Staff	41	21	18	22.56	3.51
	Student	127	63	62	24.17	3.26
	Total	333 ^a	156 ^a	173 ^a	NA	NA

NA = not available; M = male; F = female.

^a The difference between $156 + 173 = 329$ and 333 is due to missing data.

the vendor. All of the DIT instruments were scored by the Center for the Study of Ethical Development at the University of Minnesota (now at the University of Alabama).

Table 2 provides the demographic mix of the three samples combined for analysis. The first is a sample of 90 audit staff from several large accounting firms who participated in a study by Abdolmohammadi et al. (2003). The subjects in this sample were recent graduates from accounting programs who were working for the then Big-6 accounting firms in Northeastern United States. This sample consisted of 43 males and 47 females. The second sample consists of 75 undergraduate students (29 males and 46 females) who graduated in 1990. We gained access to the data about this sample of students from the registrar's office of the university.⁴ The registrar's database contained MBTI (but not DIT) data from these students.⁵

The final sample is drawn from 2005 graduates of the same university. This is the sample for which we collected MBTI, DIT and demographic data in fall 2004 and spring and summer 2005. We identified undergraduate and Master's of Science in Accounting (MSA) students in their last year of studies and administered the tests in several required courses.⁶

Comparison of the DIT and MBTIs of these samples provides the basis for investigating the difference in the MBTI mix and ethical reasoning of the students entering the accounting profession in 1990 and 2005. This sample is stratified into those we verified as beginning their careers in major public accounting firms ($n = 41$), whom we call "staff", and those who went elsewhere (such as corporate accounting or local CPA firms) upon graduation ("other", $n = 127$).⁷ The staff group had 21 males and 18 females, while the other group had 63 males and 62 females.

An interesting observation from Table 2 is that the mean age of the 2005 staff is 22.56 years, which is significantly (T -statistic = 2.28, $P = 0.024$) younger than the 24.17 years of age for other students. It suggests that public accounting firms either recruited younger students or were more successful with younger hires in 2005. These students also have higher GPAs (3.51) than other students (3.26), and the difference is highly significant (T -statistic = 4.77, $P < 0.001$).

4. Results

4.1. Accountants' cognitive style (H1)

The first hypothesis predicts that accountants' cognitive styles will not differ across the 1990 and 2005 samples. We compare the data for the staff and students in 1990 and 2005 and use the

⁴ We gained access by a special permit supported by the Institutional Review Board (IRB). Other data collected for the study in 2004–2005 were also approved by the IRB.

⁵ The MBTI data had been collected for counseling services by the university's Counseling and Student Development Center. Because of the passage of time and the anonymity of the student subjects, 1990 DIT scores could not be retroactively collected for the current study.

⁶ Permission was obtained from course professors to collect data during class time. Participation was not mandatory, although only two students opted out of the study for confidentiality reasons.

⁷ The dominance of the ST/SF combination among accountants prevails across time, location, and firm size, and is similar among undergraduate accounting students and accounting professionals (Briggs et al., 2007; Wheeler et al., 2004).

Chi-square test of the expected versus observed frequencies to analyze the data. Table 3 presents the results. The last row of Table 3 provides the breakdown of cognitive style of all subjects. Consistent with the literature, the dominant cognitive styles of these accountants are ST (40%) and SF (31%). Only 15% and 14%, respectively, of the subjects were NFs and NTs. While analysis by gender indicated some isolated differences, collectively 71% of males (52% + 19%) and females (31% + 40%) were STs + SFs. Furthermore, these results do not significantly differ between the 1990 and 2005 samples ($\chi^2 = 1.711$, $P = 0.635$). Thus, we find support for H1.

4.2. Temporal differences in the DIT P-score (H2)

H2 predicts that recent graduates entering the accounting profession will exhibit higher ethical reasoning than those predating the current emphasis on ethics-based course content. To test this hypothesis we compare the mean P-scores of 1990 and 2005 for the staff accountants. The results are presented in Table 4. Contrary to the prediction of H2, the mean P-score of the 2005 sample (38.70) is lower than that of the 1990 sample (44.16), and the difference is statistically significant (T -statistic = -2.31 , $P = 0.024$). This finding indicates that despite the attention in recent years to the importance of ethics and social responsibility in the accounting curriculum and the profession (cf., Bernardi & Bean, 2006; Haas, 2005), the ethical reasoning scores of those attracted to public accounting seems to have actually deteriorated over the past 15 years.

4.3. Moral reasoning by cognitive style (H3)

Table 5 presents mean P-scores and their standard deviations by cognitive style. In Panel A, we use analysis of variance to compare the mean P-scores among the four cognitive styles, while in Panel B we use the two-sample t -test to compare the results between the two dominant cognitive styles (ST/SF) and their counterparts (NF/NT). These results are consistent with the predictions of H3 and the detailed predictions in the bottom of Exhibit 1. Specifically, the ANOVA reported in Panel A of Table 5 shows that there is a significant difference between the mean P-scores for the four cognitive styles (F -statistic = 2.48, $P = 0.032$). The pattern is as predicted in the bottom of Exhibit 1 in that while the NT subjects have the highest P-score, followed by NFs, SFs have the lowest P-score, leaving STs somewhere in the middle. Panel B of Table 5 presents a more precise test of H1. It shows that the combined SF/STs (the dominant cognitive styles) with a mean P-score of 36.66 have significantly lower P-scores than the NF/NT subjects with a mean of 41.83 (T -statistic = 2.26, $P = 0.027$).

Table 3
Cognitive style by year and staff/student.

Year	Sample	N	ST	SF	NF	NT
1990	Staff	90	41 (46%)	18 (20%)	13 (14%)	18 (20%)
	Student	75	24 (32%)	29 (39%)	15 (20%)	7 (9%)
Total 1990		165	65 (39%)	47 (28%)	28 (17%)	25 (15%)
2005	Staff	39	14 (36%)	12 (31%)	4 (10%)	9 (23%)
	Student	123	53 (53%)	41 (12%)	17 (12%)	12 (23%)
Total 2005		162	67 (41%)	53 (33%)	21 (13%)	21 (13%)
χ^2 (Sig.)		1.711 (0.635)				
Grand total		327	132 (40%)	100 (31%)	49 (15%)	46 (14%)

Table 4
Temporal differences in the P-score.

Year	Sample	Mean	Std. Dev.
1990	90	44.16	11.72
2005	40	38.70	12.73
T -statistic (Sig.)		-2.31 (0.024)	

Table 5DIT *P*-score by cognitive style.

<i>P</i> -score	SF <i>n</i> = 53	ST <i>n</i> = 67	NF <i>n</i> = 21	NT <i>n</i> = 21	<i>F</i> -statistic (significance)
<i>Panel A: analysis of variance by cognitive style</i>					
Mean	34.78	38.14	41.68	41.98	2.48 (0.032) ^a
Std. Dev.	11.77	12.76	12.40	13.70	
<i>P</i> -score	SF/ST <i>n</i> = 120		NF/NT <i>n</i> = 42		<i>T</i> -statistic (significance)
<i>Panel B: T-test between SF/ST and NF/NT</i>					
Mean	36.66		41.83		2.26 (0.014) ^a
Std. Dev.	12.40		12.91		

^a One-tailed.**Table 6***P*-score as a function of cognitive style, gender, and age.

Predictor	Hypothesized Sign	Standard β	<i>T</i> -statistic	Significance	
Constant			2.00	0.05	
SF/ST versus NF/NT	–	–0.16	–1.98	0.05	
Gender	0	0.05	0.68	0.50	
GPA	+	0.14	1.67	0.10	
Age	+	0.14	1.69	0.09	
Source	DF	SS	MS	F	<i>P</i> -value
<i>Analysis of variance</i>					
Regression	4	1835.6	458.9	3.00	0.02
Residual error	154	23569.5	153.1		
Total	158	25405.1			

Model $R^2 = 7.2\%$; Adjusted $R^2 = 4.8\%$.

4.4. Multivariate analysis

We analyze the explanatory and control variables through a multivariate regression model to investigate the relationship between the *P*-score (as the dependent variable) and cognitive style (as an explanatory variable) in which the effects of the control variables, gender, GPA, and age are also simultaneously investigated.⁸ The results are presented in Table 6. The regression model is significant (*F*-statistic = 3.00, *P* = 0.02), indicating that a significant proportion of variation ($R^2 = 7.2\%$) in the dependent variable, *P*-score, is explained by the independent variables included in the model. Specifically, with a standardized coefficient of –0.16, the SF/ST cognitive styles are associated with significantly lower *P*-score than the NF/NTs (*T*-statistic = –1.98, *P* = 0.05). The results for control variables indicate that gender is not significant (female and male *P*-scores: 38.10 and 37.90, respectively). Other control variables, GPA and Age are positively associated with the *P*-score; however, they are only marginally significant at 0.10 and 0.09, respectively. While the GPA and Age results are consistent with prior research using the DIT (Thorne, 2001), they should be interpreted cautiously due to the lack of some demographic data (e.g., age) for part of our 1990 sample (see Table 2).

4.5. Other analyses

We performed a number of other analyses and found the main MBTI results to hold. For example, the results reported in Tables 5 and 6 hold for both graduate students and undergraduate students in 2005, and we find no significant effects for Masters of Science in Accounting versus undergraduate

⁸ This analysis was performed on a partial sample because other parts of the sample lacked data on all demographic variables for analysis. For example, most of the 1990 sample lacked data on the age of staff and students (see Table 2).

Accounting or undergraduate Corporate Finance and Accounting degrees. Also, activity in student organizations (students who participated in various student organizations versus those who did not) was not significantly associated with cognitive style.

The results related to ethical reasoning are also generalizable, as we find demographic variables other than those used in the multivariate model to have no effect on the *P*-score. The same demographic tests were conducted with the DIT results as were conducted with the MBTI, and they also proved not to be significant.

5. Summary and implications

We compared the cognitive styles and ethical reasoning of a sample of students and professional accounting staff in 2005 to those in 1990. Consistent with the literature that indicates cognitive styles to be stable over time, our findings show that the dominant cognitive styles of accountants have generally stayed as SF/ST, and that these dominant cognitive styles are associated with lower ethical reasoning than those with the NF/NT styles. For example, compared to Abdolmohammadi et al.'s (2003) 66% ST/SF among staff in 1990, 71% of the 1990 graduates in this study were ST/SFs. Similarly, 67% of staff and 65% of students in 2005 were ST/SFs. These numbers are remarkably similar over time.

In addition, we obtained support for the hypothesized *P*-score relationships in this study, indicating lower *P*-scores for ST/SFs than NF/NTs. Contrary to our expectations, we find the *P*-scores of the sample in 2005 to be significantly lower than that of 1990 sample. Our multivariate analysis with partial data indicates that age and GPA (but not gender) may be positively associated with ethical reasoning. However, the finding may be attributable to other variables such as political orientation that were not investigated in this study. Future research may benefit from investigating the relationship between political orientation and other demographic variables with ethical reasoning.

It is possible that self-selection explains the noted patterns among those seeking an accounting career. Abdolmohammadi et al. (2003) reported evidence of selection-socialization at the entry level hires to accounting firms. Ponemon (1992) provided early evidence of a selection-socialization in which disproportionately more accountants with low levels of *P*-scores were promoted to higher professional ranks in accounting firms than those with higher *P*-scores. However, more recent, and larger scale, studies have not found selection-socialization to be a factor in promotion in public practice (Bernardi & Arnold, 1997; Scofield et al., 2004) or industry practice (Abdolmohammadi & Ariail, 2009). Our finding of SF/ST dominance in 2005 that is also associated with lower *P*-score than NF/NTs raises the question again as to whether or not a conscious (or unconscious) selection takes place that might explain why these individuals are attracted to the accounting profession. The findings that the 2005 samples have significantly lower ethical reasoning scores than those in 1990 also raise significant questions about curricular efficacy, considering that accounting educators have amended their curricula to address public concerns about the accounting profession's ethics and behavior in recent years (Bernardi & Bean, 2006; Haas, 2005). Further study is needed to propose and document why this shift has occurred.

Another research direction is to investigate the relationship between cognitive style and ethical reasoning of accounting professionals and their accounting practice. Accountants are expected to comply with strict standards, rules and regulations that may invoke only low levels of principles-based ethical reasoning. As presented in Exhibit 1, ST, the predominant cognitive style of accountants, is also associated with conformance to laws and codes of conduct. One can argue that when rule-based standards and regulations prevail, the ST types may actually be the preferred group for accounting practice. However, recent movement by regulators to make standards and rules more principles-based, may mean that ST may not be the preferred cognitive style for accounting practice in the future. Recent studies have begun to document the relationship between rule-based versus principles-based standard setting and cognitive style preferences within these two regimes. Stetson (2007) studied the willingness of accounting professionals to approve an "inappropriately aggressive transaction," and found that those classified as STJ (39.1% of accounting professionals, per Kovar et al., 2003) were more likely to approve the transaction in a rules-based context. An unstudied issue is the link between level of ethical reasoning and each of these standard setting regimes. One might argue that profession-

als with higher ethical reasoning scores may be needed for a principles-based system such as IFRS when compared with a rule-based system such as US GAAP. Future theoretical work is needed to model these links and investigate their validity through empirical investigation.

This study is not without limitations. Our sample, while larger than those of prior studies in this genre (Bay & Greenberg, 2001; Dellaportas, 2006), is nevertheless limited to one geographical area and two specific points in time from which trends are inferred. Generalizeability would improve if researchers could include data from multiple regions and multiple points in time. In our case, privacy and confidentiality policies made it impossible to get access to comparable 1990 data at universities other than our own at the time the current study was conducted.

The study limitations aside, our results suggest that there is a need for better training of public accountants in ethical reasoning, particularly among the dominant SF/ST types. We note that NASBA (2009) has recently approved a requirement for additional ethics training of accounting students planning to take the CPA exam.⁹

In addition, both practicing professionals and current students are demanding that ethics be emphasized in the accounting curriculum (Bernardi & Bean, 2006; Haas, 2005). Dellaportas (2006) showed that a single, substantial course on ethics within an accounting curriculum can make a noticeable and measurable difference in the DIT scores of students. If adopted by different states, NASBA's (2009) ethics education requirement will result in curricular improvements in ethics education. If ethical course content is implemented properly, Dellaportas' (2006) results suggest that future students should exhibit higher levels of ethical reasoning. We invite accounting researchers to conduct studies comparing other students' *P*-scores to those reported here, to investigate if in fact measurable improvements result from alternative formal ethics intervention in curricula as required by NASBA (2009).

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⁹ NASBA (2009) requires that CPA applicants must have earned a minimum of three semester credit hours (SCH) in an undergraduate and/or a graduate course listed or cross listed as an accounting or business course in ethics. The three SCH course can be a standalone or integrated throughout the undergraduate and/or graduate accounting or business curriculum.

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