

EFFECT OF COGNITIVE STYLE ON PERFORMANCE IN INTRODUCTORY FINANCIAL ACCOUNTING AND THE DECISION TO MAJOR IN ACCOUNTING

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ABSTRACT

This paper investigates the effect of cognitive style upon subsequent performance in an introductory financial accounting at university and the decision to major in accounting. In assessing these outcomes, the study controls for students' grade point averages, whether they took accounting in high school, and the possibility of an instructor effect. The results indicate that cognitive style affected the final decision to major in accounting but did not affect the initial decision to major in accounting or performance in introductory financial accounting. Of the control variables, high school accounting positively affects performance, and while it also affects the initial intention to major in accounting, it does not affect the final decision to major in accounting. Other results indicate that students with higher grade point averages perform better and initially choose to major in accounting.

Key words: Decision making, accounting major, cognitive style, field dependence, introductory financial accounting, and examination performance

Data availability: The data are available upon request from the second author.

INTRODUCTION

Accounting academics over the world are interested in factors affecting student performance in introductory financial accounting and why students do or do not select accounting as their major. A related issue concerns the retention of students once they select accounting; factors that motivate students to remain or change to a different major should interest educators, since this decision has significant resource implications. A better understanding of factors which impact student performance and their interest in the accounting profession is critical to both the academy and the profession if we are to attract the best students in large numbers into accounting.

Of the many possible factors that could be involved in a student choosing to major in accounting – motivational, parental, prior educational background, for example – cognitive style is examined here. Cognitive style, which can be viewed as “... an individual preferred and habitual approach to organizing and representing information” (Chen and Macreadie, 2002. p. 3), has been used for more than 25 years by researchers to investigate how individuals process information and make choices in learning. Cognitive style, like reasoning ability, has been extensively studied over many disciplines (e.g. Davis, 1991), and recent studies have looked at the role it plays in individuals’ choice of vocation (Hicks et al., 2007). The research questions we hope to answer are: whether or not cognitive style can be used to explain which students select accounting; how they perform in accounting exams; and which ones decide to remain (or not) in accounting until they graduate. Both Chen and Macreadie’s (2002) definition and Zelniker’s (1989) definition – the preferred approach to problem solving that characterizes an individual’s typical behavioral tendencies across a variety of situations and content domains – suggest that a useful factor in predicting both of these outcomes (performance in the introductory accounting class and the selection of accounting as the major) might be the students’ cognitive style.

A global decline in the number of students who major in accounting – observed in the US (Albrecht and Sack, 2000); the United Kingdom (Marriott and Marriott, 2003); Ireland (Byrne and Willis, 2005); and Japan (Sugahara et al., 2006) – may be turning around for some universities, possibly due to students’ perception of better job prospects given the current recessionary environment. Identifying factors that explain which students perform better and are attracted to the discipline of accounting in the first place is of world-wide interest. The current study adds to the literature by examining the impact of cognitive style on performance and choice of major while simultaneously controlling for the effects of prior exposure to accounting (high school), students’ grade point average, and instructor.

The remainder of this paper is organized as follows: the next section contains a literature review that explains the role of cognitive style in general (and the Group Embedded Figures Test in particular) as it relates to managers, practising accountants and students. This is followed by a discussion of the research design and development of the research hypotheses. Subsequent sections present the experimental design and results respectively, while the final section offers a discussion and conclusion.

LITERATURE REVIEW

Financial accounting courses require students to possess and develop problem-solving skills. A considerable body of research literature exists that indicates that cognitive style is extremely relevant in identifying this ability among individuals.¹ Phillips (1998) notes that, in accounting

¹See, for example: Shute (1979), Pratt (1980), Amernic and Beechy (1984), Gul (1984), Jones and Davidson (1995).

education research, cognitive style has received the greatest attention when assessing performance. There are various theoretical classifications of cognitive style, but the one which has probably garnered the most attention in the literature is Witkin's Field Dependence/Field Independence (FD/FI) model (Witkin et al., 1977). In this classification, it is argued that FI individuals rely more on internal frames of reference (that is, they are less dominated by the more obvious or salient cues that a problem presents and are thus able to perceive analytically), while FD individuals rely more on external frames of reference (that is, they depend to a greater extent on their superior social skills to solve a problem), implying that FDs have a greater ability to perceive globally.² Davis (1991) describes Witkin et al.'s advocacy for the concept of Field Dependence (and their Group Embedded Figures Test (GEFT) as the appropriate measurement instrument):

Based on 30 years of field dependence-independence research, Witkin, Moore, Goodenough and Cox (1977) felt that their cognitive style approach could be profitably applied to issues relevant to education. In reviewing this research, they recognized that it was only in the beginning stages, but felt there was a sufficient body of empirical evidence to suggest that field dependence had educational implications for how students learn, how teachers teach, how students and teachers interact, and how students make vocational decisions. (p. 149).

Davis (1991) continues to summarize the results of studies investigating field dependence and academic achievement, and reports that they all show a consistent pattern – that field independent students perform significantly better than field dependent students in virtually all curriculum areas.

The GEFT consists of locating a series of simple figures within larger more complex figures that is designed so as to insert or hide the simpler figure. The ability to find the simple figure within the complex figure also reflects “an ability to solve a cognitive problem by isolating a critical element and using it in a different context” (Leader and Klein, 1996. p. 6). Individuals who are able to ignore the complex surroundings and thus “see” the simple figure inside are classified as field independent, whereas those who have difficulty in locating the simple figure are classified as field dependent. The significance of the test is explained by way of the following analogy: a subject is placed in a room and is presented with a stick and a bottle that has a cork partially inserted in its neck. The subject's task is to wedge the stick in the doorway to the room. Because the stick is slightly too short to fit into the space, this poses a problem and the field dependent subject is unable to carry out the task. The field independent subject, however, realizes that the cork can be literally taken out of its context (of stoppering a bottle) and placed in a different context – that of acting as an extension to the stick, thereby enabling the stick to fit into the doorway.

Several researchers have examined field dependency, as measured by GEFT, among various professions and student populations. Among professionals, Hicks et al. (2007), using GEFT, has shown that accountants tend to be more analytical than intuitive in terms of cognitive style (that is, they tend to be more field independent than field dependent), and they reported that disciplines such as accounting, engineering and science tend to attract more field independent individuals, while the

²Witkin et al. (1971) state that the essential difference is one of embedding: FIs are better able to overcome an embedding context than are FDs. They argue that FDs rely on external (i.e., more literal or global) cues while FIs rely on internal (i.e., more analytical) cues to solve problems, and they give the stopper-in-a-bottle example (below) as an illustration.

opposite is found for disciplines such as nursing and the arts. Bernardi (1993) compared the mix of field independent and field dependent managers and seniors (again using GEFT) from the offices of the then “Big Six” accounting firms. He compared his results to those of Pincus’ (1985) study, and found that, for both men and women, there was a significant shift towards field independence for both managers and seniors. Gul (1984) investigated the impact of both field dependence (measured by GEFT) and tolerance for ambiguity on managers’ decision making and found that while tolerance for ambiguity on its own explained no significant effects, when combined with field dependence, significant effects were observed. Specifically, individuals whose tolerance for ambiguity was high had higher confidence levels in decision making as long as they were also field dependent; there was no difference in confidence between field independent and field dependent individuals whose tolerance for ambiguity was low.

Within the general student population, research indicates that the difference between field independence and field dependence is evident at least by the time students attend university. Murphy et al. (1997), using GEFT, report that Canadian business undergraduates are “moderately” field independent and that students in their upper years of the business program were more field independent than field dependent. Lusk and Wright (1981a), also using GEFT, reported that business undergraduates, while found to be less field independent than science and engineering undergraduates, were more field independent than arts students. Desanctis and Dunikoski (1983), Lusk and Wright (1981b), McRae and Young (1988), and Young et al. (1989) have all characterized business administration students as moderately field independent using the GEFT instrument.

Beyond the general student population, researchers have also studied field dependency among accounting students. In Gul et al.’s (1992b) study, accounting students in their final year were asked to indicate the relative importance of a dozen factors influencing their choice of accounting as a career. These factors included peer influence, instructor influence, previous work experience, job satisfaction, earning potential and aptitude for the subject matter. In general, the results indicated that field dependent students (measured by GEFT) considered advice given by parents, peers and instructors to be more important than field independent students when selecting accounting as a career. Bernardi (2003) investigated third-year accounting majors’ understanding of financial accounting, and while students’ effort, SAT verbal scores and perceptions of stress were the most significant variables, he found that the results depended on whether the student was field dependent or field independent (based on GEFT). For example, while “Effort” explained 24% of the variation in performance for field dependent students, it explained 36% of it for field independent students. Similarly, “Stress” accounted for 10% of the variation in performance for field dependent students, but only 2% for field independent students. Moreover, Chen and Macreadie (2002, p. 4) suggest that:

Field-Independent individuals tend to adopt an analytical approach to problem solving, sample more cues inherent in the field, and are able to extract the relevant cues necessary for the completion of a task. Conversely, Field-Dependent individuals take a passive approach, are less discriminating, and attend to the most salient cues regardless of their relevance.

In experiments that attempt to flesh out differences in performance between FI and FD individuals, it has been found that FI learners, when faced with a limited amount of unambiguous task-relevant information, will frequently outperform their FD-learner peers (Rollock, 1992). In fact,

Davis and Cochran (1989) indicate that research generally shows that “field-independent students reflect higher levels of achievement than field-dependent students do” (p. 41).

O’Brien et al. (2001) summarizes the distinction between field dependent and field independent subjects succinctly:

Field independent learners are highly analytical in perceiving and processing information; in fact they are often referred to in the literature as “analytical thinkers”. They exhibit a tendency to organize information into manageable units and appear to possess a greater capacity for the retention of information. These individuals prefer and typically use problem-solving techniques, organization, analysis and structuring when engaged in learning and working situations. Field dependent learners are more global and holistic in perception and information processing; in the literature they are frequently referred to as “global thinkers”. They tend to accept information as it is presented or encountered and rely to a great extent on memorization. They also manifest a clear tendency to use social frames of reference to determine their own attitudes, feelings and beliefs. (p. 90).

In a New Zealand study, Au (1997) used field dependency, as measured by GEFT, to capture the concept of cognitive style. Au found that the examination performance of FI students was significantly better than FD students in a first-year marketing management course. In a New Zealand-based study, Gul et al. (1992b) looked at cognitive styles (using GEFT) as predictors of success on multiple-choice questions for final-year financial accounting students, and found that FI students outperformed FD students. The argument here is that how students approach learning, especially the way they handle ambiguity when faced with subjective material, may well affect their choice of and subsequent performance in their major.

We have selected field dependency and GEFT to examine cognitive style because of its frequent use among accounting researchers as discussed above. It is considered to be one of the more well-established and widely researched models of cognitive style (O’Brien and Wilkinson, 1992) and has continued to be used in accounting (see, for example, Bernardi, 2003; Awasthi and Pratt 1990; Gul et al., 1992a; and Gul 1984; 1990).

RESEARCH DESIGN AND HYPOTHESES DEVELOPMENT

Research Design

Because the current study investigates students in introductory financial accounting, not all of them will be business students (it is a required course in the BComm degree), and of those who are, not all will desire to major in accounting. Further, those who have indicated initially that they intend to major in accounting, not all of them will find the discipline to their liking and some will subsequently switch to another major. For these reasons, it is reasonable to expect that there would be more of a mix of cognitive styles among these students than one would likely find among students in their final accounting year (where one would expect a more homogenous [i.e. FI] sample), based on the research of Murphy et al. (1997). We argue therefore that the GEFT instrument should be a suitable tool to investigate introductory students’ ultimate choice of major. Moreover, because field independent individuals exhibit greater analytical skills than field dependent individuals (Bernardi, 1993), we can expect that performance on accounting exams will

depend on students' level of field independence. This follows because such exams are typically more analytical than those of many other business courses.³

In the current study, we include other factors as control variables which might affect performance in introductory financial accounting and the decision to major in accounting. One is a student's prior exposure to accounting in high school. A number of papers have been published in the accounting literature that compare the performance of students in university-level accounting courses who have completed high-school level accounting (or bookkeeping) courses with those who have had no such prior exposure (e.g., Baldwin and Howe, 1982; Eskew and Faley, 1988; Stice et al., 1997; Wooten, 1998). These studies are warranted for several reasons. For example, academics are interested in knowing whether prior accounting exposure confers an advantage (in terms of higher grades) once students are at university, or indeed, if it confers a disadvantage – perhaps as a result of students being too self-assured when they are presented with what appears to be a repeat of high-school material. This last point is particularly interesting if the first-year university accounting course is more semantic than syntactical (i.e. deemphasizing bookkeeping skills and focusing more on the needs of users of accounting) – a distinct possibility if most high school accounting courses have adopted a bookkeeping approach (the “high school bookkeeping group,” to use Baldwin and Howe's [1982] terminology). However Baldwin and Howe (1982) found that there was no overall difference in final examination performance in the first college-level accounting course between those who had and had not taken accounting in high school. Nevertheless, Eskew and Faley (1988) found that while previous accounting experience in high school accounted for a significant portion of the variance in examination performance, aptitude and effort accounted for the majority of the explained variance. Bergin (1983) and Keef (1988) found no significant difference in performance between students who studied accounting in high school and those that did not. On the other hand, several other researchers did find significant differences between the two groups (e.g., Swanson and Brooks, 1984; Mitchell, 1985; Schroeder, 1986; Farley and Ramsay, 1988; Auyeung, 1991; Keef and Hooper, 1991).

Another factor which might affect performance is student motivation or commitment. Lee (1999) found that motivation, as proxied by the intention to major in accounting, was significantly associated with the grade in the first introductory accounting course in Hong Kong. It is also likely that this initial intention to major in accounting would affect the final choice of major upon graduation. For this reason, we measure both what affects the initial intention to major in accounting (where the intention is treated as a dependent variable) and then in subsequent analysis (performance on introductory financial accounting and major at the time of graduation), we use the initial intention as a control variable as it affects other outcomes.

When investigating student performance, especially when it is combined with other cognitive measures, it is typical to consider GPA. A study of abstract reasoning among accounting students by Shute (1979) indicated that there was a significant relationship between cognitive level (CL) and GPA, despite the fact that only 7 percent of the variance in CL could be explained by GPA. Although they only found significance at the 10 percent level when they used GPA as a control variable, Amernic and Beechy (1984) controlled for it in their study of cognitive complexity and the

³It should be noted that the GEFT instrument is also widely used in other fields (e.g., Sisco and Leventhal, 2007; Chapman and Calhoun, 2006; Liu, 2006; Guillot and Collet, 2004; Cakan, 2003; Chao and Huang, 2003; McMorris et al., 2002; O'Brien et al., 2001; Salbod, 2001; and Huang and Chao, 2000).

performance of accounting students in introductory financial accounting. Similarly, Jones and Davidson (1995) found that GPA was significant only for concrete-operational questions (as opposed to formal-operational ones) when they tested the performance of high and low reasoning-level students. Using end-of-textbook questions as a measure of performance ability in a physics class, Bonham et al. (2003) found that GPA was a significant predictor of performance. Accordingly, we control for grade-point average.

A final factor that we control for in the study is the course instructor. The seven sections of introductory financial accounting were taught by three different instructors having different academic and professional qualifications. Maudlin et al. (2000) found that of all the factors affecting the decision to major in accounting, the instructor in the accounting principles course received the highest ranking. Cohen and Hanno (1993) also found that accounting educators influence the choice of major. Lee (1999) found a significant effect on student performance in the first two accounting courses at the Chinese University of Hong Kong. The effect of an instructor has been studied in other fields as well. Tuckman (1975) compared graduate students to experienced faculty teaching a macroeconomics course. He found that while the experienced faculty did a better job teaching the skills required for exams, the graduate students had a more positive effect on student attitudes. Saunders (2001) looked at instructors' native language as a factor that might affect student learning. He found that student learning was not significantly different between instructors whose first language was and was not English. However, Saunders's study looked at graduate instructors rather than long-term faculty appointed instructors for his study. In contrast, Borjas (2000), also using graduate teaching instructors, found that foreign-born instructors negatively impacted the final grade of undergraduates. In this study, we control for the instructor through the use of dummy variables.⁴

Hypotheses

The study first assesses whether field dependency, after controlling for taking accounting in high school and incoming GPA affects the initial decision by students whether or not to major in accounting. Research findings indicate that accountants tend to be more field independent than others. For example, Bernardi (1993) reported that practising accountants have shifted to a more field independent (analytical) style, and Lusk and Wright (1981a) found that business undergraduates, while less field independent than science and engineering undergraduates, were nevertheless more field independent than arts undergraduates. Also, Kelleher (1997) showed that marketing and accounting majors are more field independent than management majors. Consequently, we posit that field independent students will tend initially to select accounting as their major compared to those who are field dependent. We state the hypothesis in the null form rather than in our unidirectional expectation for GEFT as follows:

H₁: Whether students are field dependent or independent, after controlling for taking accounting in high school and incoming GPA, does not affect the initial decision to major in accounting.

⁴Initially it was thought that the course load in the semester the introductory financial accounting course was taken would impact performance and should be included as another control variable. However, because 95 percent of the students were taking a full load, we suspected that it would have no effect. Subsequent analyses confirmed that the statistics were unaffected by whether or not we included course load, so we have omitted it.

The second hypothesis concerns the actual performance outcome in introductory financial accounting as measured by the letter grade achieved in the course. It is argued that in addition to the same factors in the previous hypothesis, the instructor and the initial decision to major in accounting could also affect the actual performance achieved. The effectiveness of the instructor should have a measurable effect on performance given the findings of Tuckman (1975), Saunders (2001) and Borjas (2000) cited earlier, and it is further argued that if a student initially decides to major in accounting, then there should be some intrinsic factor that is motivating the choice which, inter alia, should lead to superior performance. Given the research findings previously noted regarding the superior performance of field independent students, we again expect that field independent students should obtain higher letter grades than field dependent students. We state the hypothesis in its null form rather than in our unidirectional expectation for GEFT as:

H₂: Whether students are field dependent or independent, after controlling for taking accounting in high school, incoming GPA, instructor, and the initial decision to major in accounting, does not affect the letter grade in the course.

The final hypothesis considers factors which may affect the final choice of majoring in accounting or not at the time of graduation. (This may or may not be the same major as the initial major at the beginning of the course.) Field independent students are more likely to select accounting as their graduating major for the same reasons as noted previously for the initial decision to major in accounting. It is also likely that the grade received in introductory financial accounting will affect the choice of major upon graduation, since a high grade, in addition to increasing motivation, reinforces in the student's mind that the initial choice of accounting was a sensible one. Consequently, the grade in introductory accounting must be controlled for, along with taking accounting in high school, incoming GPA and instructor. However, since there are likely to be a number of exogenous factors that could affect the final choice of major (e.g. the reality of pursuing an accounting major compared to something different; actual performance compared to anticipated performance in subsequent accounting examinations, etc.), it is possible that the eventual major selected may not be the same as the initial one. Nevertheless, while it is impossible to control for the effects of these subsequent events, theory would suggest that after controlling for the above initial factors, field independent students should be more inclined to graduate in accounting than field dependent students. We state the hypothesis in its null form, rather than in our unidirectional expectation for GEFT, as:

H₃: Whether students are field dependent or independent, after controlling for taking accounting in high school, GPA, instructor, the initial decision to major in accounting, and the grade in introductory financial accounting, does not affect the major upon graduation.

Experimental Design

Sample

The subjects for this study are 142 volunteer students (out of approximately 340 registered) taking introductory financial accounting at a large university in Western Canada. This course is required for all students pursuing the undergraduate business degree and students take it in the second year of their four-year program. Moreover, as mentioned earlier, nonbusiness students also

take this course. As this is a high-demand course, it is offered in both the fall and winter semesters in section sizes of approximately 55 students. Seven sections were run in the fall semester, the semester chosen for the study. In order to run these multiple sections, three different instructors were assigned to teach the course, one of whom being the course coordinator who ensured (through frequent meetings throughout the semester) that each instructor was not falling behind with the material being taught. All sections had a common syllabus as well as common quizzes, mid-term and final examination. Two classes and a tutorial were held each week.

The Instrument

At the first tutorial of the semester, students were asked to complete a questionnaire and the GEFT instrument. The GEFT involves a number of complex figures within which are hidden (“embedded”) simpler figures, and the student is required to identify the simpler figure by tracing its outline. Field independent students are able to identify more figures than are field dependent students in the allowed time limit. The questionnaire asked students: (i) if they took accounting in high school, and (ii) if they intended to major in accounting in their commerce degree. Data was also collected from university records on the students’ cumulative grade point average (GPA) immediately prior to the semester in which they took the introductory financial accounting course, the numeric mark out of 100 in the course, the letter grade received in the course, their instructor, and their actual major upon graduation.

Variables

We investigate the effect of the one independent variable (cognitive style measured with GEFT) and the three control variables discussed earlier on three dependent variables (outcomes): the students’ initial intention to major in accounting (MAJOR), the letter grade obtained (GRADE), and the major upon graduation (GRADMAJOR). MAJOR, is coded as 1 if the student indicated an initial intention to major in accounting and is coded as 0 otherwise. GRADE, is the numeric equivalent of the letter grade achieved in introductory financial accounting (a letter grade of “B” is equivalent to a 3.0 on the 4.0 system and a letter grade of “B+” is equivalent to a 3.3). This measure was chosen over the actual numeric score earned in the course because students are more focused on their letter grade.⁵ GRADMAJOR is coded as 1 if the student actually graduated with a major in accounting and coded as 0 otherwise. We use linear regression for the continuous dependent variable of GRADE and logistic regression for the dichotomous dependent variables of MAJOR and GRADMAJOR. It should be noted that MAJOR is used as a dependent variable in the first analysis, and thereafter it is used as a control variable in subsequent analysis. Similarly, GRADE is used as a dependent variable initially and then it is used as a control variable in the subsequent analysis of GRADMAJOR.

GEFT was coded as 1 if the student is above the median score on the GEFT instrument, indicating they are field independent, and as 0 if the student is below the median score on the GEFT instrument, indicating they are field dependent (this approach is consistent with Gul [1984] and Daniels and Moore [2000]). The control variables were coded as follows: HS, coded as 1 if the

⁵This is because students make academic decisions based on the letter grade, not the numeric mark. A mark of 70%, for example, could translate to a grade of “A” if the exam were set too “hard” or, conceivably, to a grade of “C” if it were set too “easy”.

student took accounting in high school and as 0 otherwise; GPA, measured as the cumulative grade point average at the university prior to the semester in which the introductory financial accounting course was taken; and INSTRUCTOR coded as two dummy variables. As there were three instructors who taught the various sections, n-1, or two, dummy variables were required. Arbitrarily setting Instructor A to be the base case allowed a comparison to be made between Instructors A and B (dummy variable labeled INSTRUCTOR AB), and between Instructors A and C (dummy variable labeled INSTRUCTOR AC).

RESULTS

The demographic profile of the subjects is presented in Table 1. As can be seen, almost 39 percent of students took accounting in high school and over 33 percent of all the students intended to major in accounting. Table 1 also shows that only 14.8 percent of students graduated with an accounting major and, of the 33 percent who initially intended to major in accounting, only 34 percent of them actually did so. The correlation coefficients are presented in Table 2. There is a moderately high correlation between two of the dummy variables used to measure the instructor, and there is a high correlation between GPA and GRADE (which are both used as control variables in the test of the last hypothesis); however, they are less than 0.70 which indicates that multicollinearity is not a concern.⁶

The first hypothesis concerns the initial decision to major in accounting and is assessed using logistic regression, as the dependent variable is binomial. The results are shown in Table 3 and indicate that GEFT is not significant⁷ and one of the control variables is significant – accounting in high school. Clearly, having taken accounting in high school had a significant positive effect on the initial decision to major in accounting, but being field independent had no effect in our sample of students. Of the 142 students in the study, 47 originally intended to major in accounting. As will be discussed below, this number dropped to only 16 by the time of graduation.

TABLE 1
Descriptive Statistics

Incoming GPA (average)	3.10
High school accounting (%)	38.73
Intend to major in accounting (%)	33.10
GEFT (maximum 18) mean (median)	14.36 (16)
Mark in Introductory Financial Accounting (average %)	68.55
Letter Grade in Introductory Financial Accounting (average - using 4.00 scale)	2.62
Graduated with major in accounting (%)	14.8
Stayed in accounting (%)	34.0

⁶If there were a multicollinearity problem, it would potentially lead to imprecise estimates of the beta coefficients and it would increase the standard error of the coefficients, thus reducing the tests of significance and making it more difficult to obtain statistically significant results.

⁷The power of the test was assessed to determine if it is too low to detect a significant difference. The resulting analysis indicates that the power of the test for GEFT in this logistic regression is 0.57. This is below a common rule of thumb threshold of 0.80, although there is no well-established rule.

TABLE 2
Correlations

	<u>GPA</u>	<u>MAJOR</u>	<u>GEFT</u>	<u>GRADE</u>	<u>GRADMAJOR</u>	<u>INSTRUCTOR AB</u>	<u>INSTRUCTOR AC</u>
HS	-0.258* (0.002)	0.209* (0.013)	-0.135* (0.109)	-0.030* (0.725)	0.117* (0.167)	0.090* (0.286)	0.074* (0.382)
GPA		-0.169* (0.046)	0.154* (0.070)	0.621** (0.000)	0.145* (0.088)	-0.175* (0.039)	-0.255* (0.002)
MAJOR			-0.105* (0.215)	-0.073* (0.389)	0.381* (0.000)	-0.021* (0.802)	0.107* (0.205)
GEFT				0.077* (0.365)	0.161* (0.055)	-0.023* (0.788)	-0.135* (0.110)
GRADE					0.158* (0.060)	0.097* (0.249)	-0.364* (0.000)
GRADMAJOR						0.013* (0.881)	-0.198* (0.018)
INSTRUCTOR AB							-0.416* (0.000)

* Spearman correlation (2-tailed significance level in brackets)

** Pearson correlation (2-tailed significance level in brackets)

TABLE 3
Logistic Regression Model for MAJOR

Dependent Variable: Initial decision to major in accounting

Chi Square: 9.805

Significance: .020

-2 Log Likelihood: 168.878

	<u>B</u>	<u>SE</u>	<u>Wald</u>	<u>Exp (B)</u>	<u>Significance</u>
Constant	0.578	1.175	0.250	1.799	0.617
Independent Variable:					
GEFT	-0.357	0.374	0.911	0.700	0.170*
Control Variables:					
HS	0.825	0.382	4.669	2.283	0.031
GPA	-0.464	0.365	1.618	0.629	0.203

* 1-tailed test, since the hypothesis is directional

MAJOR: 1 = originally intended to major in accounting; 0 = otherwise

GEFT: 1 = field independent; 0 = otherwise

HS: 1 = took high school accounting; 0 = otherwise

GPA: Cumulative grade point average at the university prior to the semester in which the introductory financial accounting course was taken

The second hypothesis relates to the letter grade achieved in introductory financial accounting. The independent variable (GEFT) is the same as for the previous hypothesis but with the addition of MAJOR as another control variable for this analysis. The results are presented in Table 4.⁸ The results illustrate that GEFT had no impact on the grade achieved.⁹ For the control variables, high school accounting ($p = 0.042$), and GPA ($p = 0.000$) significantly affected the grade received in the course, with those who took high school accounting and having a higher incoming GPA performing better. In contrast, the initial decision to major in accounting (MAJOR) and the two INSTRUCTOR dummy variables had no impact.

The last hypothesis concerns the choice of major upon graduation. The same independent variable and control variables are included in this analysis as for the previous hypothesis with the addition of GRADE. This is tested using logistic regression with GRADMAJOR as the dependent variable. As can be seen in Table 5, GEFT significantly affects the final decision to major in accounting ($p = 0.026$), meaning that field independents are more likely to major in accounting upon

⁸The analysis was replicated using the numeric mark out of 100 for the course and, as expected, the results were identical with that using the GRADE.

⁹As with the previous hypothesis, the power of the test was assessed to determine if it is too low to detect a significant difference. The resulting analysis indicates that the power of the test for GEFT in this regression is only 0.057.

TABLE 4
Logistic Regression Model for MAJOR

Dependent Variable: Letter grade in introductory financial accounting course measured as the numeric equivalent

R-Square: 0.679 Adjusted R-Square: 0.436 Model F: 18.931 Significance: 0.000

	<u>Unstandardized Beta</u>	<u>Standard Error</u>	<u>t</u>	<u>Significance</u>
Constant	-0.296	0.367	-0.806	0.422
Independent Variable:				
GEFT	-0.024	0.098	-0.241	0.405*
Control Variables:				
HS	0.214	0.104	2.052	0.042
GPA	0.927	0.104	8.958	0.000
MAJOR	-0.028	0.105	-0.270	0.787
INSTRUCTOR AB	0.244	0.132	1.854	0.066
INSTRUCTOR AC	-0.220	0.118	-1.868	0.064

* 1-tailed test, since the hypothesis is directional

GRADE: Measured as the numeric equivalent grade

GEFT: 1 = field independent; 0 = otherwise

HS: 1 = took high school accounting; 0 = otherwise

GPA: Cumulative grade point average at the university prior to the semester in which the introductory financial accounting course was taken

MAJOR: 1 = originally intended to major in accounting; 0 = otherwise

INSTRUCTOR AB: 1 = Instructor B (Instructor A as reference)

INSTRUCTOR AC: 1 = Instructor C (Instructor A as reference)

graduation.¹⁰ Of the control variables only MAJOR ($p=0.000$) was significant. INSTRUCTOR AC ($p = 0.052$) was just outside the conventional 0.05 significance level. However, it should be noted that only 21 students of the 142 students who participated in the study graduated with a major in accounting. (Of these 21, 16 originally intended to major in accounting and 5 switched into accounting.)

We conducted a follow-up analysis of the subset of students who initially planned to major in accounting to determine whether they ultimately majored in accounting at the time of graduation. This was conducted using logistic regression and the same set of variables as for hypothesis 3 but without MAJOR included as a dummy variable, because the analysis only included those students who had initially intended to major in accounting. The results (which are not presented in a table) indicate that GEFT ($p = 0.039$, 1-tailed), GPA ($p = 0.034$) and the INSTRUCTOR AC dummy

¹⁰To test the sensitivity of the median (score of 16) used for the cut-off between FI and FD subjects, we also investigated cut-offs of 15 and 17. GEFT was still significant at 15 (0.013) but not at 17 (0.293).

TABLE 5
Logistic Regression Model for GRADMAJOR

Dependent Variable: Major at time of graduation

Chi Square: 39.982

Significance: .000

-2 Log Likelihood: 78.377

	<u>B</u>	<u>SE</u>	<u>Wald</u>	<u>Exp (B)</u>	<u>Significance</u>
Constant	-8.837	2.880	9.417	0.000	0.002
Independent Variable:					
GEFT	1.275	0.654	3.804	3.579	0.026*
Control Variables:					
HS	0.866	0.661	1.718	2.377	0.190
GPA	1.791	0.965	3.447	5.996	0.063
MAJOR	2.920	0.681	18.400	18.541	0.000
GRADE	-0.288	0.570	0.255	0.750	0.613
INSTRUCTOR AB	-0.083	0.756	0.012	0.920	0.913
INSTRUCTOR AC	-1.620	0.835	3.765	0.198	0.052

* 1-tailed test, since the hypothesis is directional

GRADMAJOR: 1 = graduated with an accounting major; 0 = otherwise

GEFT: 1 = field independent; 0 = otherwise

HS: 1 = took high school accounting; 0 = otherwise

GPA: Cumulative grade point average at the university prior to the semester in which the introductory financial accounting course was taken

MAJOR: 1 = originally intended to major in accounting; 0 = otherwise

GRADE: Measured as the numeric equivalent grade

INSTRUCTOR AB: 1 = Instructor B (Instructor A as reference)

INSTRUCTOR AC: 1 = Instructor C (Instructor A as reference)

variable ($p = 0.013$) are significant factors affecting the decision to remain in accounting. That is, FI students, those with a higher GPA, and those taught by one of the three instructors were more likely to stay in accounting than were FD students, those with lower GPA, and those taught by the other two instructors.

DISCUSSION AND CONCLUSION

Control Variables

Of the control variables, (i) taking accounting in high school was significant for the intended major (where it positively affected the decision) and the letter grade achieved; (ii) GPA was found to be significant in explaining the course grade; (iii) the instructor marginally affected the grades obtained in introductory financial accounting; and (iv) the students' initial decision to major in accounting affected the major at graduation. In the follow-up analysis of the subset of students who initially planned to major in accounting, accounting in high school (HS) was not significant in predicting whether they ultimately stayed by the time they graduated. This lack of significance is

consistent with the findings for the initial decision to major in accounting and the eventual choice of major upon graduation.

Independent Variable

We found that cognitive style was significant for the major upon graduation but not significant for the initial decision to major in accounting or the grade in introductory financial accounting. Similarly, the results for the effect of cognitive style on the selection of accounting major and performance are mixed. The most important finding is that field independent students are more likely to graduate in accounting than field dependent students. A related matter, which we discuss later, is the high attrition rate among students whose initial intention is to graduate in accounting. We find that cognitive style plays a role here in that FI students are significantly less likely to drop accounting than their FD counterparts.

Conclusions

The principal findings are that while the initial decision to major in accounting is a statistically significant variable in predicting whether students will graduate with an accounting degree, FI students in a typical introductory financial accounting class – which is taken by both business and nonbusiness students – are statistically more likely to graduate with an accounting degree than their FD counterparts; however, neither GPA nor having taken accounting in high school is a statistically significant predictor.

The implications of these findings for accounting educators are both interesting and problematic, at least for the finding that FI students are more likely to graduate with an accounting degree. The “obvious” solution to this problem is that, in order to swell the ranks of accounting graduates, educators should somehow screen the introductory class so that as many of them as possible exhibit FI behavior. Educators already discriminate students on the basis of GPA, so why not add the extra requirement that accounting concentrators also be “more FI”?

Such a solution raises ethical issues, however, since it would exclude students simply on the basis of their preferred approach to problem solving. Perhaps a more satisfactory approach would be to accept both FI and FD students of comparable GPA and then proceed to develop in the FD students some of the higher cognitive skills demonstrated by FI students. This type of approach has been suggested before: Amernic and Enns (1979) discussed the feasibility of offering a different accounting curriculum (e.g. by gradually increasing the number of less-directed testing material, such as cases) for students whose “cognitive complexity” was low in an attempt to raise it. However, as the authors pointed out, such an exercise is labor intensive, and with financial budgets strained at most institutions, it would probably not be acceptable. Besides, in our view, there is something amiss with this Pygmalion-esque process, since it ignores the fact that both FI and FD students “bring something to the table”. While FI students demonstrate greater ability in problem solving than FD students, FD students are more adept in handling ambiguous information (Witkin and Goodenough, 1977; Gul, 1984). Since an objective of the Accounting Education Change Commission is to train students so that they develop an “ability to identify and solve unstructured problems...” (AECC 1990. p. 311), we believe that educators should focus on developing accounting curricula that capitalize on the attributes of both types of cognitive style. That is, course material should be introduced that not only challenges students to think analytically for problem solving, but also encourages them to develop skills in handling ambiguity.

There are three possible explanations for the lack of significant findings for cognitive style on the other (dependent) variables of interest. One is that field dependency is not the appropriate measure of cognitive style to explain student performance in introductory financial accounting and the initial decision to major in accounting. That is, an alternative concept of cognitive style or an alternative measure of individual differences would be better predictors. The second is that the power of the test was too low to detect if there was a significant underlying difference between the groups. The third is that the students in our sample averaged 14.36 out of 18 on the GEFT and that, as a whole, the sample is more field independent than the population in general.¹¹ Nevertheless, prior research, as mentioned earlier, indicates that business students, and accounting students in particular, are more likely to be field independent. Moreover, in our sample, we had a mixture of business and nonbusiness students, so we expected, *ex ante*, that GEFT would be a suitable predictor variable. These explanations are possible limitations in our study.

The observation that prior (i.e. high school) experience in accounting/ bookkeeping positively affected the examination performance is consistent with the findings of Eskew and Faley (1988) and those of Rohde and Kavanagh (1996), but inconsistent with those of Baldwin and Howe (1982), although in the latter case, results were based on the final exam rather than the course grade. Because taking accounting in high school positively affects performance, this suggests that there may not be a large difference in orientation between the two. Moreover, even if there is a large difference, it still confers an advantage to the students who took accounting in high school.

The initial decision to major in accounting (MAJOR) positively affected the decision to graduate in accounting. However, the actual performance in the introductory course was not affected, implying that other factors (such as incoming GPA) are more important in determining the actual grade than the intention to major in accounting.

The positive effect of GPA on performance is not surprising as it is consistent with findings by other researchers (see, for example, Eskew and Faley, 1988). The effect on the decision to remain in accounting (from our follow-up analysis) is also perfectly reasonable: students with higher GPAs would be expected to maintain those GPAs and, *ceteris paribus*, would have no need to switch majors.

We suggest these lines of research should be extended to investigate the possible effects of work experience, explicitly measured motivation, and the demands of part-time jobs on performance in order to learn more about the factors affecting the decision to enter a business degree program and eventually to graduate with an accounting designation. The ultimate goals should be to attract students to the accounting profession who will clearly perform at a superior level and to achieve this result as efficiently as possible. At the present time, there are too many students initially intending to graduate with an accounting degree, who eventually pursue other interests. As can be seen from Table 1, 33.1 percent (47 students) who took the course initially intended to graduate with an accounting designation. However, a follow up after graduation indicates that only 16 of the 47 (34 percent) actually did so. The reasons for the high attrition rates need to be investigated, since high rates represent missed opportunities. In the present study, we note that GPA, an instructor effect and cognitive style were found to be successful in explaining the attrition, with FD students more likely to drop than their FI counterparts. Given other cognitive style research (e.g. that of Hicks et al, 2007)

¹¹However, we do not believe this invalidates the findings because when we reran the results omitting the middle third of the sample, the significant findings for GEFT were exactly the same as before.

that showed there is a preponderance of FI individuals in the accounting profession, this result is not surprising.

As with most research of this type, the usual caveats apply: since this study was conducted over just one semester and at one institution, the results may not be generalizable to other settings. Moreover, the research depended on volunteers, and 42 percent of eligible students chose to participate in the survey which may have affected the results.

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