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CROSS-CULTURAL COMPARISONS
Using Expectancy Theory to Assess Student Motivation

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ABSTRACT: This study uses Vroom's (1964) expectancy theory to assess accounting students' motivation to exert academic effort. Using a within-persons decision-modeling approach, the valence model of expectancy theory was found to accurately predict individuals' valence decisions (mean adjusted R^2 = .72) associated with increased grades, and the force model was found to accurately predict student's effort level decisions (mean adjusted R^2 = .69) to strive for academic success. The results also support the three second-level outcomes of: 1) increased GPA, 2) superior post-college job performance, and 3) increased self-esteem as motivational forces affecting students. The results indicate valence decisions were more influential than expectancy of improved grades in determining a student's effort levels. Increases in effort due to increased expectancy of success rose at a marginally declining rate. Significant individual differences were also found regarding both expectancy models, which reaffirms the need for a within-persons analysis of expectancy theory. Implications for teaching and avenues for future research are offered.

INTRODUCTION

INSTRUCTORS are constantly attempting to discern what causes or enables students to excel in their courses. Is it the right aptitude, a fondness for the subject matter, the application of a significant amount of effort, or some judicious combination of these factors that result in outstanding student performance?

Recent studies in the accounting education literature have examined student motivation and performance by analyzing differences in student values (Baker 1976; Goldwater et al. 1992), attitudes (Geiger 1989–90), cognitive styles (Americ and Beechy 1984), personal needs (Belkaoui 1986; Harrell and Stahl 1983) learning styles (Brown and Burke 1987; Togo and Baldwin 1990; Geiger 1992), gender (Mutchler et al. 1987; Tyson 1989; Carpenter et al. 1993) and instructional pedagogy (Battista 1978; Stout et al. 1991; Geiger and Boyle 1992). However, very few extant accounting education studies have examined specific motivational factors potentially influencing students to perform academically. This study utilizes

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Vroom's (1964) expectancy theory, in conjunction with the decision modeling approach developed by Stahl and Harrell (1981, 1983), to examine student motivation and effort decisions to increase course grades. Specifically, this study examines the effect of three potential motivating influences on students' perceptions of the attractiveness of academic success and their decisions to exert academic effort.

Although most conscientious educators would acknowledge that motivating students to exert effort in their course is of paramount importance for students to attain academic success, relatively little accounting research has examined this crucial aspect of college classroom performance. While some recent non-accounting research has assessed student performance in terms of goal-setting ability (Dweck 1986; Tubbs 1986; Wicker et al. 1990, 1991) or expectancy of success (Vollmer 1986; Weiner 1986; Hayamizu and Weiner 1991), most studies on student performance in accounting have generally not examined specific motivational forces potentially influencing students. One study by Harrell et al. (1985), however, has begun investigation of motivational forces acting on accounting students using Vroom's (1964) force model from expectancy theory. A primary purpose of the present study is to extend this initial effort by demonstrating the applicability of Vroom's full expectancy theory model, as well as improving the research instrument employed by Harrell et al. (1985) based on recent research findings on student motivation.

USE OF VROOM'S EXPECTANCY THEORY OF MOTIVATION

Valence Model

As originally developed by Vroom (1964), expectancy theory is comprised of two related models—the valence model and the force model. The valence model attempts to capture the perceived attractiveness, or valence, of an outcome by aggregating the attractiveness of all associated resultant outcomes. More specifically, the model posits that the valence of a first-level outcome is equal to the summation of the products from all associated second-level outcome valences with the perceived belief (or instrumentality) the first-level outcome will result in the second level outcome. Thus:

$$V_j = \sum_{k=1}^{n} (V_k I_{jk}) \qquad (1)$$

where V_j = the valence of the first-level outcome;
V_k = the valence of the second-level outcome;
I_{jk} = the perceived instrumentality, or belief, that V_j will lead to V_k;
n = the number of potential second-level outcomes.

In the context of this study, the valence model is expected to accurately explain a student's assessment of the attractiveness of academic success in terms of course grade (e.g., to earn a grade of "A" in any particular course). The second-level outcomes related to academic success examined in this study were: (1) increasing one's overall GPA, (2) allowing one to perform at a superior level in his/her initial post-college job, and (3) obtaining a strong feeling of personal satisfaction. These second-level outcomes were derived from prior research on student motivation and are discussed further in a subsequent section of the paper.

Force Model

The force model of expectancy theory attempts to capture motivational force to act by associating the expectancy of resultant outcomes and their in-

dividual valences. The model more formally posits that the motivational force influencing a person to perform an act is equal to the sum of the products of the valences of first-level outcomes multiplied by the expectancy that the act will result in these outcomes. Thus:

$$F_i = (E_{ij}V_j) \quad (2)$$

where F_i = the motivational force to perform act i;
E_{ij} = the expectancy that act i will result in outcome j;
V_j = the valence of outcome j.

In the context of this study, the force model implies that a student's motivational force (F_i) to achieve academic success (e.g., earn a grade of "A") is explained by the attractiveness of academic success (V_j) and the expected probability that increased effort will lead to academic success (E_{ij}).

One issue raised in the literature concerning the force model is the type of subconscious cognitive processing individuals use with respect to the valence and expectancy measures. Some recent findings have found individuals employ additive processing models rather than the multiplicative form depicted in equation 2 (Stahl and Harrell 1981; Rynes and Lawler 1983; Harrell and Stahl 1984; Butler and Womer 1985; Griffin and Harrell 1991; Snead 1991). However, other researchers (Harrell and Stahl 1986) have found primarily multiplicative subconscious processing models employed by individuals in some groups when reaching effort level decisions. Accordingly, this study will also examine whether individual students seem to have employed the simpler additive cognitive model as suggested by recent empirical findings or the multiplicative processing model originally espoused by Vroom (1964).

Studies by Matsui et al. (1981) and Harrell and Stahl (1986) have also provided some evidence that the valence, or attractiveness, of an outcome may motivate individuals to perform more than does the expectancy of success. Hence, the attractiveness of getting a higher course grade in this study may motivate students more than the actual attainability of getting a higher grade.

Prior research has additionally posited that as the expectancy of success of an outcome increases, motivational force (i.e., effort level) rises at marginally decreasing rates (Rynes and Lawler 1983; Harrell et al. 1985; Harrell and Stahl 1986). That is, effort levels may increase more dramatically for the lower range of expected success (i.e., from low to moderate levels) than for the upper range of expected success (i.e., from moderate to high levels). This study will examine this possible disparity in effort level increases across the range of expected success.

THE PRESENT STUDY

The present study attempted to assess the valence of academic success through the use of three different second-level outcomes: (1) increasing one's overall GPA, (2) allowing one to perform at a superior level in his/her initial post-college job, and (3) obtaining a strong feeling of personal satisfaction. These second-level outcomes represent recent research findings of Hayamizu and Weiner's (1991) examination of achievement goals and expectancy of success. They found that American university students can generally be described as having three kinds of achievement goal tendencies. The first two are types of performance goals: one to gain approval/demonstrate ability and one for later advancement. The second-level outcome for increasing one's GPA is a reflection of the first performance goal and the second-level outcome of superior future job performance is related to Hayamiza and

Weiner's (1991) second performance goal. The third type of achievement goal tendency found by Hayamizu and Weiner (1991) was a learning goal. This last goal type is based on setting academic goals for the personal reward of using one's intellectual capacity and learning new and interesting things, or solving difficult problems. The third second-level outcome of a strong feeling of personal satisfaction is reflective of this last type of achievement goal. Hence the three second-level outcomes examined in this study are supported by recent motivation research and are an attempt to represent three different motivational aspects of a student's academic success.

Earlier expectancy research by Harrell et al. (1985) found increased GPA and personal satisfaction second-level outcomes to predict a student's overall valence responses in equation 1. However, their third second-level outcome for "increased esteem in the eyes of classmates" was found to be a lesser influence on individual valence indications. Accordingly, this study has utilized post-college job performance as a second-level outcome in accord with recent research and as an attempt to improve and extend this area of motivational research involving college students.

In addition, the research by Harrell et al. (1985) assessed the student's motivation to go from a grade of "C" to a grade of "B." Although an increase in grade from a "C" to a "B" is evidence of improved academic performance, it is not believed to be as motivational as improving from a "B" grade to an "A" grade. For a large number of students, attaining a final grade of "B" would, in reality, not increase their overall GPA,[1] and, thus, presents an unrealistic scenario to some students. Accordingly, assessing the motivation of students to go from a grade of "B" to "A" was evaluated in this study. In support of this view, the increase from "B" to "A" was used by Harrell and Stahl (1986) in a later motivation study that included students and various other non-student groups.

Therefore, the valence model is expected to accurately predict the overall attractiveness to individuals of increasing their academic performance and is our first research hypothesis.

H_1 The valence model explains a student's perception of the attractiveness of attaining a higher course grade.

Additionally, based on the preceding discussion of the force model, three resultant hypotheses are examined in this study:

H_2 The force model explains a student's motivation to exert more effort in an attempt to attain a higher course grade.

H_3 The perceived valence of increasing one's grade motivates students more than the attainability of increasing one's grade.

H_4 Increases in the level of expectancy will result in declining marginal increases in motivational force.

Within-persons Modeling Approach

While most early expectancy theory studies in accounting used an across-persons methodology (Ferris 1977; Dillard 1979; Jiambalvo 1979), more recent studies have employed a more theoretically sound within-persons approach (Stahl and Harrell 1981; Rynes and Lawler 1983; Harrell et al. 1985; Griffin and Harrell 1991; Snead 1991). The use of an across-persons methodology is fundamentally incongruent with Vroom's (1964) expectancy theory which is formulated on an individual decision-making basis. These early across-persons

[1] This is likely a joint effect of minimum grade requirements as well as grade inflation.

methodologies to study expectancy theory have been criticized in the literature (Mitchell and Beach 1977; Zedeck 1977; Stahl and Harrell 1981; Wolf and Connolly 1981) and, more importantly, have been shown to produce misleading results (Kopelman 1977; Kaplan 1985; Murray and Frazier 1986). This study has applied the within-persons decision modeling approach developed by Stahl and Harrell (1981, 1983) and subsequently used by Rynes and Lawler (1983), Harrell and Stahl (1984, 1986), Butler and Womer (1985), Harrell et al. (1985), Griffin and Harrell (1991) and Snead (1991) to examine expectancy theory applications in a wide variety of contexts.

METHOD

Judgment Exercise

Judgment modeling, as previously developed and employed in this study, involves multiple decision-making cases, each requiring separate decisions based on varying combinations of values for instrumentality and for expectancy of success. The judgment modeling approach uses individuals' decisions as operational measures of valence and motivation. The three second-level outcomes were presented at two levels of instrumentality—low (10 percent) and high (90 percent)—and expectancy of increasing course grade was set at three levels—low (10 percent), moderate (50 percent) and high (90 percent). This design resulted in 24 different cases ($2 \times 2 \times 2 \times 3 = 24$) presented to every subject. A full factorial design was incorporated with cases randomly ordered to reduce any possible response bias. Each case presents a unique mix of hypothetical values to students for evaluation. An example decision case is presented in exhibit 1.

Students were instructed to assume they were half-way through a hypothetical course (which was actually the case at the time of data collection) and were currently earning a grade of "B." The first decision in each case, Decision A, asked students to indicate the overall valence, or attractiveness, of increasing their grade in the hypothetical course from a "B" to an "A" based on the specific instrumentalities (i.e., 10 percent and 90 percent) presented for the three second-level outcomes in each case. Decision A represents the first-level outcome valence (V_i) in equations 1 and 2.

The cases then provided "Further Information" on the likelihood that increased effort would result in an increased grade for the course (i.e., 10 percent, 50 percent and 90 percent). Then students were asked to indicate the level of effort they would exert in an attempt to increase their grade from a "B" to an "A" based on this expectancy information. This second decision, Decision B, corresponds with the motivational force decision (F_i) in equation 2 and provides a measure of student motivation to increase academic performance. Students responded to each of the 24 case scenarios individually.

Participants

Eighty-seven students (45 male, 42 female) from a large public university participated in the study by properly completing all case scenarios. Students were enrolled in their first introductory accounting course and were half-way through the semester at the time of data collection. This course is designed to be given to, and is typically taken by, sophomore business administration students. Both written and oral instructions were presented to students at the time the decision-making exercises were distributed. The researchers were not the course instructors, but administered all instruments to participants at regularly scheduled class meeting times.

EXHIBIT 1
Sample Case from the Set of 24 Decision Cases
(Expectancy Theory Model Elements Indicated in Margin)

Second-Level Outcomes	If you receive an "A" in this course, the likelihood this will result in ...an improved overall Grade Point Average (GPA) is ..... Low (10%)* ...superior performance in your first job after college is ..... High(90%) ...a strong feeling of personal satisfaction is ..... Low (10%)***
Valence of First-level Outcomes (V_j)	DECISION A. With the factors and likelihoods shown above in mind, indicate the attractiveness to you of receiving an "A" in this course. –5 (Very Unattractive) –4 –3 –2 –1 0 +1 +2 +3 +4 +5 (Very Attractive)
Expectancy of Success (E_{ij})	FURTHER INFORMATION. If you exert a great study effort during the remainder of this semester, the likelihood you will earn an "A" in this course is moderate (50%).
Motivational Force (F_i)	DECISION B. With the attractiveness and likelihood information above in mind, indicate the study effort you will exert for this course during the remainder of this semester. 1 (Low Effort) 2 3 4 5 6 (Average Effort) 7 8 9 10 11 (Great Effort)

* It seems likely so much effort is required to earn an "A" in this course that doing so means your grades in other courses will suffer, resulting in no improvement to your overall Grade Point Average (GPA).

*** Earning an "A" in this particular course is no indication of real accomplishment, therefore no feeling of personal satisfaction would result from doing so.

RESULTS

H_1

The first hypothesis was that the valence model would accurately predict the attractiveness of increasing one's grade in any given course from a "B" to an "A." To address this hypothesis, the first step involved performing 87 multiple regressions with each participant's valence decision (Decision A) as the dependent variable and the instrumentalities (probabilities) associated with the three second-level outcomes, the independent variables.[2] Separate regressions for each participant are necessary, given the within-person foundation of expectancy theory. Additionally, the resultant standardized regression (beta) coefficients (or beta weights) have been shown to accurately represent the valence individuals place on the respective second-level outcomes in arriving at their valence decision for Decision A (Stahl and Harrell 1983).

Of the 87 students, all but five had significant ($p<.05$) regression models.[3] Table 1 presents a summary of the individual models for the remaining 82 students. As depicted in table 1, the average adjusted R^2 value of the 82 significant regressions is .72. This generally high level of explanatory power is evidence that the valence model presented by Vroom (1964) has a high degree of relevance and stability in this student achievement context, and is in support of H_1.

An examination of the individual second-level outcomes indicates that all three have very high mean standardized beta weights. As also found in Harrell et al. (1985), the mean standardized beta weight for GPA was the highest for these students (at .59), indicating that increasing one's GPA was the most salient influence in their assessment of the attractiveness of increasing their course grade. The next highest mean standardized beta weight was for increased job performance (mean of .40). Additionally, the third second-level outcome, an increased feeling of personal satisfaction, also appears to have a high degree of attractiveness for the students in this study (mean of .34). Hence, all three second-level outcomes appear to have been successful in capturing attractive aspects of striving to raise one's grade from a "B" to an "A."

The aggregate regression results of table 1 also indicate that considerable diversity exists between individuals as to which of the second-level outcomes is most attractive. In fact, as measured by their beta weights, 55 individuals had increased GPA as the highest influence on their valence decisions, while 18 had post-college job performance and nine held increased personal satisfaction as the highest influence on their indications of the attractiveness of academic success.

As another technique to examine the independence of the valence measures, the standardized beta weights from the 82 regressions for each of the three second-level outcomes have been correlated. The correlation results are presented in the second panel of table 1.

All three correlations indicate significantly strong negative associations ($p < .01$). Thus, it appears individuals were selecting one of the second-level outcomes as most attractive to the relative exclusion of the other two. An ex-

[2] In analyzing the data, students were assigned control numbers. Their responses to each of the 24 case scenarios, along with the respective levels of expectancy for the first and second level outcomes, were entered as separate observations in a SAS data set. Regression models were run using the SAS GLM procedure by control number to produce individual models. The individual's regression model results were then put into another SAS data set for further analysis (i.e., means, etc.).

[3] The average adjusted R^2 for the five non-significant regressions was .15, with a range of .11 to .19.

TABLE 1
Aggregate Regression Results from the Valence Model
(n=82)

	Mean	Standard Deviation	Range
R^2(adj)	.72	.15	.21–.99
Std. Beta weight			
GPA	.59	.21	.14–.97
JOB	.40	.20	–.07–.88
SAT	.34	.20	–.13–.85

Std. Beta weight Correlation Results

	JOB	SAT
GPA	–.56*	–.37*
JOB		–.29*

GPA = standardized beta weight for increase in overall GPA
JOB = standardized beta weight for ability to perform exceptionally well in first post-college job
SAT = standardized beta weight for increased feeling of personal satisfaction
*p < .01

amination of the individual beta weight patterns would support the conclusion that individuals seldom viewed two of the second-level outcomes similarly, and rarely were all three held in the same regard. Strong positions were taken on the valence of the individual potential second-level outcomes. These results both support H_1 and reaffirm the need for a within-persons decision modeling approach when utilizing expectancy theory in the examination of a subject's perceptions.

H_2

The second hypothesis examined Vroom's (1964) force model of expectancy theory and posits that the force model can accurately predict a student's effort level, or motivational force, to achieve academic success. Again a multiple regression approach was used to evaluate this hypothesis with student effort level decision (Decision B) the dependent variable and their individual valence assessments (Decision A) and the expectancy of success as independent variables. The force model uses the output from the valence model—student's individual indications of the attractiveness of each case scenario—and couples it with the likelihood that increased effort would actually lead to the first-level outcome (i.e., the probability of an increased course grade).

Of continuing issue is whether individuals use a multiplicative, as originally posited by Vroom (1964), or an additive processing model (see Stahl and Harrell 1981 for a discussion). To address this issue, a hierarchical regression analysis was performed on a subject-by-subject basis (Arnold 1981; Dillon and Goldstein 1984). Accordingly, regression models were first calculated using only an additive main effects model for the two in-

dependent valence and expectancy variables. Next, the multiplicative interaction term was forced into the original model and the regressions were recalculated to obtain new R^2 values for each individual. If the additive model's explanatory power, as revealed in the R^2, was significantly improved (F test, $p<.05$) by including the interactive term, then the individual was considered to have employed a multiplicative processing model. If not significantly improved, then the more parsimonious additive model is presumed to have been employed.

The results of the regression analyses indicate 69 students used an additive processing model, while 13 of the 82 students appeared to use a multiplicative form of the force model as presented in equation 2. However, the average increase in R^2 for these latter 13 individuals employing multiplicative models was only .08. These results are congruent with prior empirical research that has found individuals primarily employ additive force models and that increases in R^2 for individuals employing multiplicative models is minimal (Stahl and Harrell 1981; Rynes and Lawler 1983; Butler and Womer 1985; Harrell et al. 1985; Snead; 1991). Accordingly, the additive form of the force model appears to have adequately captured these students' effort level decisions and was used to evaluate H_2.

Additive force model regressions for all but one individual were significant ($p<.05$), leaving 81 individuals for analysis of H_2. The aggregate results of the individual multiple regressions are summarized in table 2.

The mean adjusted R^2 for all 81 regression models was relatively strong at .69. These collective results support H_2 and attest to the ability of the force model to explain effort level decisions by utilizing individual valence and expectancy measures.

H_3

The third hypothesis posits that the valence, or attractiveness, of an outcome motivates individuals to exert more effort than the expectancy of achieving the outcome. As depicted in table 2, the average standardized beta weight attributed to the valence of increasing one's grade from a "B" to an "A" was .64 for the group. However, the group's average standardized beta weight attributed to the expectancy of attaining this outcome was only .41. To test to see whether individuals placed more weight on valence than on the expectancy of success, a within-persons t-test was run to determine if the standardized beta

TABLE 2
Aggregate Regression Results from the Force Model
(n = 81)

	Mean	Standard Deviation	Range
R^2 (adj)	.69	.15	.31–.98
Valence	.64	.21	.06–.99
Expectancy	.41	.28	–.11–.89

Valence = beta weight placed on valence of academic success
Expectancy = beta weight placed on expectancy of academic success

weight for valence minus the standardized beta weight for expectancy is greater than zero (i.e., BW(valence) – BW(expectancy) > 0). The results indicate a highly significant overall dominance of valence as a motivating factor ($t = 4.46$; $p < .001$). Additionally, 52 of the 81 students were noted to have had higher individual standardized beta weights for valence than for expectancy, and a substantial minority (29 out of 81 students) appeared more motivated by the expectancy of success than the perceived attractiveness of the outcome.

This finding of considerable individual differences in students' motivations to achieve academic success is readily apparent when examining their individual regression results. For example, most students attribute almost all explained effort level decision variance to only one of these two motivational forces, to the relative exclusion of the other. Thus, while valence in the aggregate appears to be a better motivator for students to strive for academic success, the expectation of increasing one's grade is also perceived as a prime motivator for a large portion of students. Without the use of a within-persons methodology, these disparate individual differences would be obscured and not easily, if at all, discernible. Nonetheless, the overall results support prior research findings in the expectancy theory literature that have touted the general dominance of valence over expectancy as a motivational force (Matsui et al. 1981; Harrell and Stahl 1986).

H_4

The last hypothesis addressed in this study was the relative increase in effort level with increases in expectancy of success. Prior expectancy theory researchers have found diminishing increases in effort as expectancy levels rise. Accordingly, the increase in effort level decisions going from a low expectancy (10 percent) to a moderate expectancy (50 percent) is hypothesized to be greater than the increase in effort level decisions going from a moderate expectancy to a high expectancy (90 percent).

Prior to empirically testing this potential effect, however, it must first be established that the students were not "reading ahead" to the expectancy information before making their valence judgments and were treating the sets of cases similarly across levels of expectancy. The experimental design presented students with three identical sets of eight cases differing only on the level of expectancy of attaining a higher course grade. Accordingly, the mean valence judgments for these sets of eight cases were compared using a multiple paired-samples t-test with Dunnett's correction to maintain a constant .05 alpha level. No significant differences were found, indicating students were equally valuing the sets of second-level outcomes without regard to level of expected success. Thus, differences in individual effort decisions between the three levels of expectancy cannot be attributed to differences in valence decisions. With this precondition met, H_4 can appropriately be addressed.

To assess differences in effort decisions across varying levels of expectancy, a multiple paired-samples t-test was again performed using Dunnett's correction to maintain a constant alpha level. The results indicate that the students had larger increases in effort level decisions when expectancies increased from 10 to 50 percent than from 50 to 90 percent. In the aggregate, the average effort level decision for the 81 students increased from 6.20 to 7.54 when going from 10 percent to 50 percent expectancy of success. This increase of 1.34 was significantly larger ($p<.01$) than the

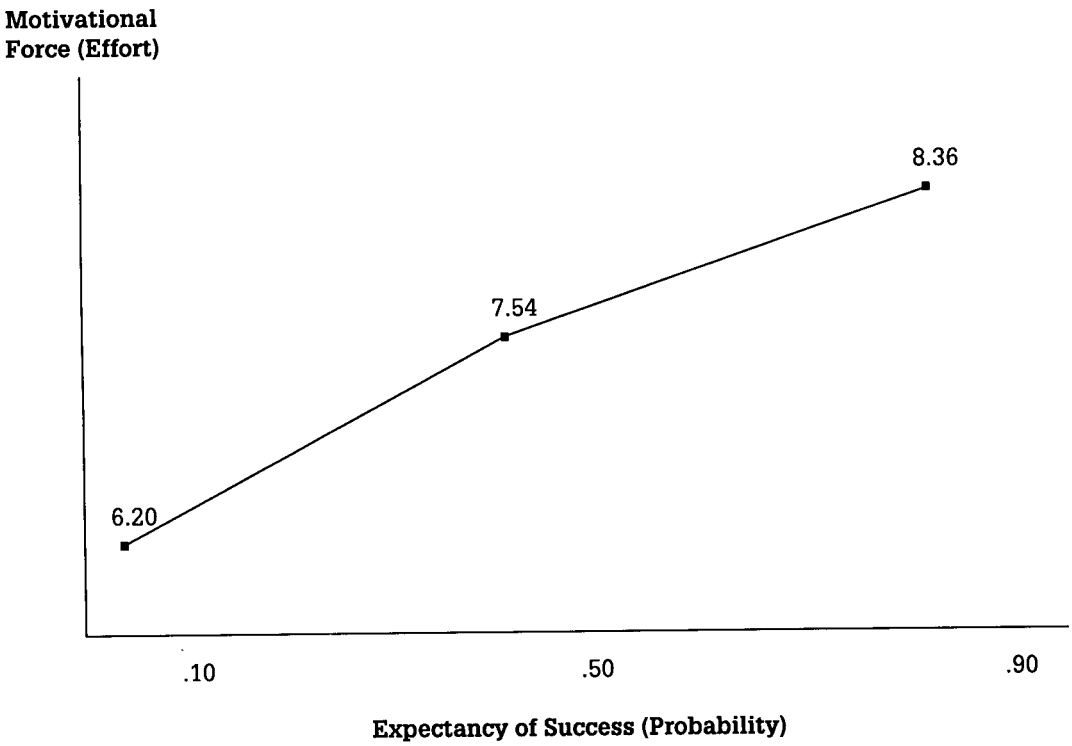
.82 increase from 7.54 to 8.35 going from 50 to 90 percent expectancy levels. These aggregate results are graphically depicted in figure 1.

The results strongly support H_4. Students demonstrated a distinct and consistent general pattern of more rapidly increasing academic effort levels when the expectancy of success went from low (i.e., 10 percent) to moderate (i.e., 50 percent), and more temperate increases in effort when expectancy moved from moderate to high (i.e., 90 percent). These findings are in support of earlier expectancy theory research that found declining marginal increases in effort levels as expectancy of success increased (Harrell et al. 1985; Harrell and Stahl 1986).

Gender Differences

Based on findings of other researchers on student motivation and the growing literature in this area, all the variables discussed in this paper were analyzed to see if there were any differences due to gender. The only significant ($p < .10$) difference identified was for the standardized beta weight for superior post-college job performance ($t = 2.36$; $p = .02$). Males exhibited higher mean beta weights (.44) than females (.33) for this variable, indicating that males in

FIGURE 1
Relationship Between Motivational Force and Expectancy[a]



[a] The differences in motivational force (effort) between levels of expectancy are significant at $p<.01$ for all group comparisons.

this group put more weight on whether a particular course would benefit them on the job than did female students. No other gender differences were found, evidencing that the findings in this study are equally representative of males and females.

SUMMARY AND DISCUSSION

The findings of this study have uniformly supported the applicability of a within-persons application of expectancy theory to evaluate a student's valence and effort level decisions in an academic setting. The study addressed four hypotheses. First, the valence model component of expectancy theory was found to accurately predict (mean adjusted R^2 of .72) students' valence, or attractiveness, decisions regarding increasing their course grades. Further, a closer analysis of the average valences of the three second-level outcomes indicated that improved GPA contributed most to the attractiveness of an increased grade, followed by the applicability of the course to enhance post-college job performance. The third second-level outcome examined, a strong feeling of personal satisfaction, also contributed substantially toward the prediction of a student's valence decisions. Additionally, while all three second-level outcomes appeared to adequately operationalize distinct aspects of achieving academic success, considerable differences existed between subjects as to which second-level outcome was most important in reaching their individual valence decisions.

This was the first expectancy theory study to use job performance as a second-level outcome. The results support the contention that the anticipation of enhancing post-college job performance is a significant influence on valence evaluations for a considerable number of students.

These results also tend to support the findings of Hayamizu and Weiner (1991) regarding the existence of three types of academic achievement goal constructs which are represented by the three second-level outcomes used in this study. The second-level outcomes appear to have adequately operationalized Hayamizu and Weiner's (1991) separate goal constructs and have been found to be accurately reflective of three diverse aspects of the attractiveness of academic success as manifest in final course grades.

Second, the force model component of expectancy theory was found to accurately predict (mean adjusted R^2 of .69) students' choice of academic effort level given their individual valence decisions and expectancy of success (i.e., the probability of an increased course grade) information. The study also found that a majority of students used a more parsimonious additive processing model when arriving at their final effort level decisions.

Third, the study found that, in general, students considered their individual attributions of attractiveness (i.e., their valence decisions) more highly than the probability of an increased grade when arriving at their academic effort level decisions. While, in the aggregate, the valence of an outcome was considered relatively more influential than expectancy of success in determining students' level of academic effort, considerable individual differences were also found with regard to valence or expectancy dominance in effort level choices. This general finding of valence dominance in effort decisions, however, is congruent with findings in non-student settings (Matsui et al. 1981; Harrell and Stahl 1986) and begins to build a body of findings in support of valence dominance in a variety of effort and non-effort decision contexts. It also lends

support to the observance of the "lottery phenomena," where the expected payoff (i.e., expectancy) is almost zero; however, individuals still participate because of the extremely high valence associated with a successful outcome.

The final issue addressed in this study was that of marginally declining increases in academic effort level when expectancy of success increases. Accordingly, this study found that increased expectancy of success going from low to moderate resulted in significantly larger increases in effort than going from moderate to high expectancy of success. Thus, raising students' expectations of improving their course grade may be most beneficial for those students perceiving a very remote initial possibility of an increased grade. These findings are also consistent with those in other effort decision contexts (Harrell et al. 1985; Harrell and Stahl 1986).

The findings of this study, coupled with those of prior research, provide accounting educators with a useful framework with which to view and understand aspects of student motivation. The research findings also indicate, however, that although some generalities can be derived, there exists considerable individual difference with regard to specific motivators. While most students consider increased GPA a prime motivator, not all students share that view. For some, an enhanced feeling of personal satisfaction from doing well in a learning situation is the prime motivation to achieve. Still others consider the course's applicability to their future jobs a significant motivator to perform well. Also, while the perceived valence of academic success appears to be a stronger motivator of most students (and others) than expectancy of success, this is not true for all students. Accordingly, even though expectancy theory, and the component models, have proved to be empirically reflective of student motivation, each individual employs his/her own "model" and gross generalities applied to all individuals should be used with caution.

The application of expectancy theory has been undertaken in a variety of contexts. A limitation of this study, however, is the use of a relatively small group of introductory students from a single university. Although our findings are generally supported by prior research, the limitation of sample size and non-random selection of individuals on the ability to generalize the results must be acknowledged. However, as discussed in general by Swieringa and Weick (1982), and specifically in regard to expectancy theory by Harrell et al. (1985), the ability to generalize research using an explanatory or predictive theory depends on the ability to generalize the theory. The growing body of research demonstrating the applicability of expectancy theory in a broad range of settings suggests that the restricted sample selection in this study is not a severe limitation regarding the ability to generalize the results to other student populations.

This study has presented evidence that students are affected differently by various factors relating to academic performance and in their assessments of the attractiveness of improving course grades. College instructors, then, are in a position to motivate students by stressing different aspects of improved performance. For example, along with mentioning a heightened GPA that follows from increased course grades, instructors should also stress the applicability of the course to future employment, or future courses, and the personal satisfaction attained by mastering challenging material. Individual students differ on what specifically motivates

them, which requires instructors to emphasize a variety of possible benefits derived from achieving academic success. Thus, instructors can not just tout the merit of one potential motivator (i.e., improved GPA) in an attempt to fully motivate every student.

Likewise, instructors need to structure their courses to provide ample opportunity for students to improve their grade throughout the course and particularly near the end of the course. In this way students are provided with an incentive to put forth academic effort throughout the entire course and are also given a high relative probability of improving their final grade with increased effort. Increased probabilities of improving course grades was found to result in increased effort, albeit at a marginally declining rate. Hence, raising students' perceived chance of increasing their course grade from a low probability to a moderate or high probability will also encourage them to exert higher levels of academic effort.

This research is one of only a few studies in accounting education that examines student motivation. A review of the summaries of accounting education research by Williams et al. (1988) and Rebele et al. (1991) evidence a noticeable lack of research on accounting student motivation. As one of the initial attempts to fill this void, the study also points to the need for further examination. The use of various second-level outcomes as potential motivators (e.g., to please my instructor or please my parents/guardians) should also be evaluated in an effort to expand the insights gained from expectancy theory. Additionally, the use of other motivational models from educational psychology promises to add considerable insight to our knowledge of accounting student behavior and motivation. Also, as posited by Rebele et al. (1991), if accounting students do differ from other college students in terms of cognitive or behavioral factors, this line of research should compare findings using accounting students to other college student samples in order to build consensus or explore disparities. Lastly, with increased international programs, a cross-cultural comparison of students' motivations could be enlightening as programs are designed for international students and for study abroad.

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Note: Cross-Cultural Comparisons is a section of *Issues in Accounting Education* committed to facilitating replications of research. Authors Geiger and Cooper will make a copy of the research instrument available upon request; contact Marshall A. Geiger at the University of Rhode Island. In planning replications, contact the authors to coordinate analysis of combined data sets.