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ABSTRACT

The ability of Vroom's expectancy motivation theory to predict student satisfaction with the college environment, student participation at school, and student academic performance was studied. Specific objectives of the study were as follows: to test the ability of Vroom's valence model to predict student satisfaction, to test the ability of Vroom's force model to predict student effort toward the achievement of certain academic and personal development goals, to test the ability of Vroom's performance model to predict academic motivation, and to predict student grade point averages from the interaction of ability and motivation. The study populations were 210 students from an urban, commuter campus and 152 students from a residential multiversity. Moderate to high support was found for the expectancy theory models as predictors of college student satisfaction, participation, and achievement (as indicated by grade point averages). The data suggest that students who expended more effort into academic work, and into personal development activities, felt a greater sense of satisfaction with the environment than did students in a below-average effort group. Additional findings and a bibliography are presented. (Author/SW)

EXPECTANCY THEORY AS A PREDICTOR OF GRADE-POINT AVERAGES, SATISFACTION, AND PARTICIPATION IN THE COLLEGE ENVIRONMENT*

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JULY, 1983

ABSTRACT

The issues of student satisfaction, persistence and achievement within the college environment have been explored extensively over the past forty years, predominantly with correlational studies utilizing a variety of academic, sociological and economic descriptors. But the exploration of variables within a unified theoretical framework has not occurred. Vroom's expectancy (motivation) theory, which has been tested in industrial settings extensively, shows great promise for being applicable to student satisfaction and motivation, and the related issues of attrition and student retention.

Therefore, the objectives of the study were to test the ability of Vroom's valence model to predict student satisfaction with the college environment; to test Vroom's force model to predict student effort toward the achievement of certain academic and personal development behaviors, to test Vroom's performance model to predict motivation levels of students toward performance in academic tasks; to predict student grade point averages from the interaction of ability (as measured by high school achievement test scores) and motivation; and to test differences between students who attend an urban, predominantly commuter campus, and students attending a non-urban residential campus.

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Expectancy Theory as a Predictor of Grade-Point Averages, Satisfaction, and Participation In the College Environment

Introduction

Traditionally, students, parents, faculty and administrators have been interested in the factors most related to college persistence, achievement and success. With a broader student constituency than ever before and spiralling costs in the educational sector, interest in finding, isolating and understanding factors related to college academic success and persistence has become more intense in recent years. Rising costs in particular have spurred the search for ways in which colleges might lower attrition rates. Postsecondary institutions make heavy investments in the education of freshmen and sophomores, and losing 10, 20, or upwards of 50 per cent of this group or more signifies not only economic loss, but trained manpower loss by the society, and an image loss for the institution itself.

While students may have good reasons for dropping out, they nevertheless, represent lost income and flexibility for institutions, and are a potential waste in terms of what they themselves might not realize educationally. For that reason, to understand persistence and its interaction with motivation, ability and other factors becomes interesting and potentially useful.

Problem Statement

The problem of who will succeed in college has no known solution. Students for whom the prediction was not sanguine have

done well, and the reverse has occurred. In efforts to answer this question, however, students have filled out questionnaires (Cross, 1974); been interviewed (Astin, 1978); and had secondary analyses done on data they have provided in longitudinal, multi-generational studies (Cross, 1974). From these studies have emerged lists of variables or descriptors which appear to describe what kind of student will be most successful in a college experience and what kind of student will be most likely to have trouble with traditional studies. What has not surfaced is a significant application of a theoretical framework to student college achievement. Rather, the variables are typified as academic, sociological, economic and other descriptors (Astin, 1971, 1977; Cross, 1974; Pantages and Creedon, 1978; London, 1978).

In past studies of student persistence and achievement, high school academic factors consistently have been determined as having the strongest relationship to college achievement (Astin, 1971; Cross, 1974; Pantages and Creedon, 1978). These factors include high school grade point average, class rank, and scores on traditional national tests of academic aptitude (e.g., SAT, ACT). Showing a weaker, although often significant, relationship to college achievement have been sociological and socio-economic descriptors such as age, sex of student, racial or ethnic group, and socio-economic status of parents.

There is, in addition, a growing body of literature which suggests that commuter students may possess attitudes and skills significantly different from those of residential students (Chickering, 1974); that traditional and non-traditional students differ on a

wide variety of academic, racial, ethnic and socioeconomic characteristics (Cross,. 1974); and that students who may be designated "non-traditional" assign very different values and instrumentalities to the college experience (London, 1978).

It would seem fruitful, in light of the empirical interest in studies of academic persistence, satisfaction and achievement, to explore variables within a theoretical framework which might add a new dimension to the understanding of college student achievement. An area which has generated much interest, but little extensive research thus far is a motivational explanation of behavior in the academic setting. Pantages and Creedon (1978) note a dearth of studies which try to incorporate motivation as it relates to college success. They have suggested that assessment and methodological problems are possible explanations for insignificant findings to date.

Recently, Victor Vroom's expectancy motivation theory has aroused interest from the educational sector, although little research has yet been conducted (Constantinople, 1967; Polczynski and Shirland, 1977). Expectancy theory has been used extensively by psychologists and industrial sociologists in the industrial setting to predict performance, effort, and job satisfaction. The theory appears adaptable as a predictor of behaviors in other than just industrial settings, however, and application to the college environment appears promising.

Review of the Related Research

In general, "the study of motivation has to do with analysis of the various factors which incite and direct an individual's

actions" (Atkinson, 1964). Although early motivational studies had their roots in concepts of hedonism, most have evolved beyond that simplistic origin into more complex content and process theories of behavior (Campbell, Dunnette, Lawler and Weick, 1970; Miner and Dachler, 1973; Luthans and Kreitner, 1975). Content theories of motivation are largely concerned with the specific identity of that within an in individual or his environment which motivates or sustains behavior. Principal proponents of this theoretical bent are Murray (1938); McClelland (1951); Maslow, with his hierarchy of needs, (1954); Atkinson (1957); and the two-factor theory of Herzberg (1959). Process models on the other hand, attempt to explain and describe the process of how behavior is energized, how it is directed, how it is sustained, and how it is extinguished. Process model theories include Hull's drive theory (1943); Skinner's operant conditioning or behaviorism (1953); equity theory as derived by Adams (1963); and Vroom's expectancy theory (1964).

Expectancy theory is a term used to identify a process motivation theory of behavor applied most extensively in the area of organizational and industrial psychology. The theory shares common elements with other researchers in general psychology including Tolman (1932), Lewis (1938), Georgopoulos, Mahoney and Jones (1957), and Atkinson (1964). However, Vroom made the first explicit theoretical formulations of expectancy theory as they might apply to organizational behavior.

Vroom's expectancy theory places emphasis on the cognitive aspects of motivation. That is, the theory assumes that individuals have cognitive, or comprehended, expectancies concerning the

outcomes that are likely to occur as the result of what they do and individuals have preferences among alternative outcomes. In other words, an individual has an idea about possible consequences of his acts and makes conscious choices among consequences according to their probability of occurence and their preferential value to him (Vroom, 1964; Campbell, Dunnette, Lawler, and Weick, 1970). It should be noted that expectancy theory emphasizes individual motivation, since desired outcomes are likely to be different for each person (Steers and Porter, 1975).

Expectancy theory, as it relates to the area of industrial and organizational psychology, has been used to describe and predict a long list of work-related criterion variables. Some of these variables have been job effort, job performance, job satisfaction, managerial motivation, occupational choice, importance of pay, pay effectiveness, leadership behavior, leader effectiveness, and coalition-formation in organizations (House, Shapiro and Wahba, 1974). Organizational theorists have found moderate, although sometimes inconsistent, support for the theory (Heneman and Schwab, 1972; Mitchell, 1974; Mitchell and Biglan, 1974; Locke, 1975; Salancik and Pfeffer, 1977; and Alderfer, 1977).

In the few studies which have applied expectancy theory to various student attitudes and behaviors (Constantinople, 1967; Mitchell and Knudsen, 1973; Mitchell and Nebeker, 1973; Henson, 1976; Polczynski and Shirland, 1977; and Graham, 1980), moderate support has been found for the predictive uses of the model. What is more important is that now clearly expectancy theory is adaptable to the educational setting in a variety of ways in the

prediction of college student satisfaction, effort and performance. In addition, the theory construct should add to the explained variance when combined with other traditional independent variable and correlational studies of the prediction of satisfaction, effort and performance. The educational equivalents of satisfaction, effort and performance for this study were defined as satisfaction with the college experience, participation in the college environment, and college grade-point average.

Theoretical Framework

Three concepts are essential to expectancy theory: valence, defined as an "affective orientation toward particular outcomes...An outcome is positively valent when the person prefers attaining it to not attaining it...an outcome has a valence of zero when he prefers not attaining it..." (Vroom, 1964); instrumentality, defined as the degree to which a person sees an outcome in question as leading to the attainment of other outcomes (Mitchell, 1974); and expectancy, defined as "a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome" (Vroom, 1964). Valence refers to the anticipated satisfaction associated with an outcome and is distinguished from the value of an outcome, which is the actual satisfaction resulting from the attainment of an outcome, while instrumentality relates an outcome to another outcome and expectancy relates an effort or action with an outcome.

Vroom's three theoretical models follow. The valence model states that the "valence of an outcome to a person is a monotonically increasing function of the algebraic sum of the products of the valences of all other outcomes and his conceptions of its instrumen-

tality for the attainment of these other outcomes" (Vroom, 1964, p. 17). In equation form the valence model is as follows:

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

where:

V_j = the valence of outcome j;

I_{jk} = the cognized instrumentality of outcome j for the attainment of outcome k;

V_k = the valence of outcome k; and

n = the number of outcomes.

The model may be used to predict the valence of any outcome; it has been applied to the prediction of job satisfaction, occupational preference, or the valence of good performance. The model says that the worker's satisfaction with a job or anticipated satisfaction with an occupation results from the instrumentality of the job for attaining other outcomes and the valence of those outcomes (Mitchell, 1974). In the college setting, the model was used to predict satisfaction and therefore persistence, depending on how instrumental the student sees the college experience for attaining other outcomes such as a well-paying job or social position, and the valence (desirability) of those outcomes to the student.

Vroom's second model predicted the force toward behavior. In equation form, the force model is as follows:

$$F_i = f^n \sum_{j=1} (E_{ij} V_j),$$

where:

F_i = the force on the individual to perform act i;

E_{ij} = the strength of the expectancy that act i will be followed by outcome j

V_j = the valence of outcome j; and

n = the number of outcomes.

Vroom used the force model to predict choice of occupation, remaining on the job, and effort on that job. The model suggests that the force on an individual to exert a given amount of effort result from the sum of the products of that person's expectancy that the given level of effort will lead to outcomes and the valence of those outcomes. Note that the amount of effort, not the actual performance, is predicted by the model (Mitchell, 1974). In the college setting, the model was used to predict the effort of students exerted toward study time depending on the strength of the expectancy that studying would result in good grades, and the valence of good grades to the student (e.g., do good grades lead to other desirable outcomes?).

Finally, the third model -- the performance model -- hypothesized that job performance (P) is a function of the interacton between ability (A) and motivation (M). This relationship is depicted by the following formula:

$$P = f(A \times M),$$

where

P = performance,

A = ability, and

M = motivation.

Performance is defined as an outcome of work with varying degrees or levels relative to an established standard. Ability is defined as the "potential for performing some task" (Vroom, 1964, p. 198). Motivation is defined by Vroom as measured by his force model.

The performance model suggests that "when ability has a low value, increments in motivation will result in smaller increases in performance than when ability has a high value. Furthermore, when motivation has a low value, increments in ability will result in smaller increases in performance than when motivation has a high value" (Vroom, 1964, p. 203). Primary interest is in the motivational determinants of performance. The measurement of these variables are difficult as they do not lend themselves to interval or ratio measurement scales; therefore, a precise determination of the nature of this functional relationship is not possible, according to Vroom (p. 205). However, the function does maintain that performance does increase with motivation level. In a higher education setting, the model was used to predict student grade point averages from the interaction of ability, as measured by achievement test scores, and the student's motivation as measured by the force model. A significant assumption of this research is that ability levels do not vary significantly, except upward. In other words, college students are presumed to have at least average ability (rising possibly to high ability), and that none of the students in either of the two sample populations had ability significantly below average.

Methodology

Hypotheses

Assuming a similarity between the job satisfaction a person

reports relative to the degree to which the job is instrumental for valued outcmes and the satisfaction with college a student reports because he or she sees the college experience as instrumental for his or her valued outcomes, the outcome valence model (Σ IV) will be a predictor of satisfaction with the college experience. Therefore:

1. H_t: College Student Outcome Valence and academic, demographic, socioeconomic and other student variables will be a positive significant predictor of satisfaction with the college experience.

2. H_t: College Student Force Toward Effort -- along academic and personal development dimensions -- when coupled with academic, demographic, socioeconomic and type of student variables, will be significant positive predictors of satisfaction with the college experience.

The effort model (Σ EV) combines the affective orientation toward a desired outcome with the cognized level of how instrumental the outcome will be in the attainment of other outcomes, and weights this with a measured perception of whether a behavior will be followed by a valued outcome. The final product of the model is a measure of motivated force toward effort. If behaviors are related to the strength of the affective orientation, the effort model should be a predictor of student participation in the college environment.

Therefore:

3. H_t: College Student Force Toward Effort -- for both academic and personal development behaviors--when coupled with

other student variables, is a positive significant predictor of participation in the college environment.

Vroom's performance [P = f (Ability x Motivation)] model has been applied to the prediction of performance with moderate support for the model (Heneman and Schwab, 1972). In the higher education setting, the grade point average typifies academic performance (Astin, 1971; 1977). If the performance model has been successful in the work setting for the prediction of "good" performance, then it would seem to follow that the model, adapted to outcomes relatives to the college experience, would be a significant predictor of variation in college academic achievement (grade-point averages), while controlling for other independent variables. Therefore:

4. H_t: College Student Performance Motivation, when coupled with academic and other student variables is a positive significant predictor of college grade-point average.

The literature suggests that major differences in behavior and motivation exists between commuter and resident students (Chickening, 1974) and between traditional and non-traditional students (Cross, 1974). Indeed, often these groups are the same or overlapping to a high degree, and great correspondence may be established between commuters and non-traditional students and between residential and traditional categories. Therefore:

5. H_t: Differences between urban, commuter-campus students and residential, non-urban students will exist for outcome valence, effort and performance model scores and for satisfaction, participation and performance means.

Independent Variables.

1. Academic variables: high school grade point average, defined as the numerical average of letter grades received in high school. The letter grade "A" was assigned a numerical value of 4, while an "F" was assigned the value of zero (0). Reviews of over 125 studies of college attrition found this academic variable the best predictor of attrition or persistence (Pantages and Creedon, 1978).

2. Demographic variables: age, sex, and marital status are defined respectively as age in years, male or female, and single or married. Race or ethnic group membership was defined by students: Caucasion, Black or Afro-American, American Indian, Oriental or Asian-American, Hispanic, Jewish or other, to be specified by the student. Residence was defined as the student's principal place of residence for the majority of the school year (e.g., parent's home, with legal guardian, in university residence hall, in sorority or fraternity, with spouse, children or both, in off-campus non-university housing).

3. Socioeconomic Status Variable: socioeconomic status is defined as the occupational status score of the student's parents from a scale which ranged from zero to 100 for nearly 600 occupations and classes of occupations (Nam and Powers, 1968). Socioeconomic status variables have shown a limited relationship to college grades.

4. College Major Variable: college major is defined as the student's specific course of study within a division, school, or college. Astin (1971) and Schoenfeldt and Brush (1975) found

some differences in grade-point averages attributable to college major, although they tended to disappear when controlled for student ability.

In order to look at the widest possible sample, students were selected from the range of academic majors in the two-institution sample, including English, mathematics, accounting (business administration), music and fine arts, education, psychology, gerontology, speech and communication, sociology and engineering.

5. Type of Student Variable: the type of student variable had two values -- traditional and non-traditional. Since non-traditional students are not precisely defined in the literature (Gould, 1973), the discriminating characteristics chosen for this study meant that traditional students were 25 year of age or younger, worked fewer than 20 hours per week, were enrolled in 12 or more credit hours, planned to graduate by age 25, were in the upper 2/3 on their ACT or SAT scores, and took at least a portion of their courses during the day rather than the evening. Non-traditional students were defined as those students not falling into one or more of the above categories.

6. Motivation: motivation was measured by the instruments developed for this study (Graham, 1980) which were field tested during the summer of 1979 and 1980.

Reliability and validity ratings were established for instruments (except for the self-report instruments). Reliability of the valence and instrumentality measure was estimated by a test-retest correlation over a 3-week period with 32 students. The r for this test-retest correlation was .75. Since the instrument was measur-

ing perceptions, reliability could be expected to vary over time (Mitchell, 1974). Reliability of the four components of the effort model instrument was estimated in the same manner. Reliability coefficients and levels of significance were as follows: above average effort, academic behavior-$\underline{r}$ = .68; below average academic behavior - $\underline{r}$ .70; above average effort personal development behavior - $\underline{r}$ = .74; and below average effort, personal development - $\underline{r}$ = .81. The use of the $\underline{r}$ for the correlation between self-rank of ability and actual ACT percentile has received some support (Henson, 1976), and it was determined to be .63, < .01.

Items on the instruments have been drawn from and grounded in a variety of sources including the extensive research on the correlation between high school grade-point averages and college admission tests (Astin, 1977); Hollock's definition of job satisfaction (1935); socioeconomic variables (Fishman and Pasanella, 1960); racial and ethnic group variables (Cross, 1974); the review of Pantages and Creedon (1978); and outcome statements (Constantinople, 1967; and Bowen, 1977). Possible college outcomes from these latter sources have been compiled into a list of statements relevant to the college student. The outcome list described was field tested on two dozen college students chosen randomly, who were asked to make comments, to add to the list, or to suggest changes from their own experiences (Graham, 1980). The final list of possible college outcomes appeared on the instrument and from this list, each student could choose the ten (10) outcomes most relevant (or most desired) for himself.

Dependent Variables

1. Satisfaction with the College Experience: satisfaction with the college experience was defined by Astin (1977) as the student's subjective rating of his/her experience during the college years. For this study, satisfaction with the college experience was defined as any combination of psychological, physiological, and/or environmental circumstances that caused a person to say, "I am satisfied with my college experience".

2. Participation in the College Environment: participation in the college environment was defined as the level or self-observed frequency of behaviors representative of the college experience.

The Inventory of College Activities (ICA) developed by Astin (1968) provided useful categories for the shortened instrument used to ask a student to rate how often he or she participated in the following activity: studying, using the library, use of student services, engaging in athletics (or attendance at athletic events), student government and university committees, talking with the faculty, and attendance at university events in general. Students were also asked to give an overall rating of participation in the college environment.

3. College Grade Point Average: this variable was defined as the numerical average of letter grades received in college, with the letter "A" equivalent to a 4.0.

Sample

There were two target populations: the first, a random sample of students from a large, urban, largely commuter-type university, and the second, a random sample reasonably matched

(i.e., within majors and across levels, e.g., freshmen, sophomores, juniors, and seniors), from a large, non-commuter, residential, non-urban state university. In both samples the target sample size was 250 students for each campus. From the urban commuter campus, 210 of 250 responses were usable, for a return rate of 84%; from the residential multiversity, 152 of 250 questionnaires were usable, for a return rate of 61%.

The unit of analysis for the study was the college student (a within-subjects model), but both within and between subjects analyses were completed. Few research studies have used the within-subjects approach. Matsui, Kagawa, Nagamatsu and Ohtsuka (1977), however, used a similar contingency table to test their within-subjects model. Classes from both universities were stratified so that a representative sample could be matched by major and selected from the population. Criteria used to guide the stratification included the following: type of course (lower division, upper division); estimated age and sex of the student; major of student attending the course; location of the class (on or off-campus); and time of day the class was conducted (before 4:30 p.m., or after). The on-line class information computer capabilities of each university were utilized to help ensure a representative sample. Once the classes were stratified, the samples were drawn randomly within the stratifications. However, each class chosen was kept intact in the sample as it provided the basic contact point for data collection purposes.

The breakdown of students by campus is shown below in Table 1.

Table 1

Traditional and Non-traditional Students by Campus

Type of Campus	Urban, commuter campus		Residential, Rural Campus	
Type of Student	Number	Per cent	Number	Per cent
Traditional	46	21.9%	148	97%
Non-traditional	164	78.1	4	3%
Total N	210	100	152	100

Instrumentation

The instruments used in this study (Appendix A) provided measures of Vroom's three expectancy theory models, demographic variables, socioeconomic status, college major, type of student, satisfaction with the college experience, and kinds of participation in the college environment. The students responded to each of these two instruments. High school grade-point averages, aptitude test scores and college grade-point averages were taken from university records after obtaining permission from each student in the two samples.

The research team administered all instruments in regularly scheduled classes, except for the "time spent on academic and personal development behaviors" instrument, which students took home and self-administered. The latter instruments were collected from the class the following week. Social security numbers were used as the sole identifier. Students were asked to keep a daily

record for a week of time (mid-semester) spent on academic and personal development behaviors and to return the instrument the following week.

Analysis Procedures

Major output statistics from the stepwise multiple regression program included the multiple regresson coefficient (R), and an R^2, which indicates the amount of explained variance in the dependent variable by the independent variables. Also included in each step was an F-ratio for each variable entered, which indicated the significance of the regression of the independent variable on the dependent variable. A beta-weight or partial regression coefficient was caclulated and available for each variable entered, as well as for those variables not yet entered. The beta-weights were indicators of the expected difference in the criterion variable with a change in the predictor variable, while holding other predictor variables constant. Also available were standard error measures, means, medians, and standard deviations for each variable and a simple correlation matrix.

Further analyses included a t-test of the significance of differences between means calculated for twelve (12) means, and a discrimant analysis on means. Those means included expectancy theory variables, dependent variables (satisfaction, participation and college grade-point average), and on other demographic variables. Results of the tests are reported in Table 2.

The within-subjects effort model (Σ EV) was subjected to an additional analysis. According to Vroom, the effort model should predict the level of effort chosen by each subject. The model, as

TABLE 2

Means and Standard Deviations for the Two Campuses

INDEPENDENT VARIABLES	Commuter Campus Sample N=210 Mean	Commuter Campus Sample N=210 Standard Deviation	Residential Campus Sample N=152 Mean	Residential Campus Sample N=152 Standard Deviation	t-test	Discriminant Analysis
Expectancy Theory Variables						
(1) Valence Model	13.30	10.25	12.46	8.78	.87	
Effort Model						
(2) Academic Behavior	48.55	18.70	44.10	37.10	1.36	
(3) Personal Development Behavior	27.28	22.81	39.36	37.30	3.54**	
(4) Performance Model	3229.42	1972.26	3105.18	3557.81	.38	
Academic Variables						
(5) High School Grade Point Average	3.06	.59	3.35	.43	4.83**	
(6) Ability - ACT Percentile	65.63	24.42	58.09	25.82		
Demographic Variables						
(7) Age in Years	26.98	8.44	22.20	6.02		
(8) Sex	1.56	.50	1.45	.50		
(9) Marital Status	1.56	.50	1.89	.31		
(10) Race or Ethnic Group	1.16	.67	1.10	.55		
(11) Religious Heritage	1.49	1.15	1.75	1.46		
(12) Residence	3.04	1.02	1.82	.81		
Socioeconomic Status Variables						
(13) Nam and Powers-Father	71.45	20.57	74.30	24.84		
(14) Nam and Powers-Mother	64.40	19.18	45.90	36.74		
(15) Percent Student Provides	75.54	35.29	53.02	37.38	5.79**	
(16) Hours Worked Per Week	26.14	16.82	8.53	11.63	11.77**	
College Major Variables						
(17) Major/Undecided	1.89	.32	2.00	0		

Type of Student Variable					
(19) Type of Student	1.78	.42	1.30	.49	
DEPENDENT VARIABLES					
(20) Satisfaction	29.87	3.86	31.31	3.82	2.46*
Participation					
(21) Academic	1.95	1.34	.25	.11	16.92**
(22) Personal Development	.57	.94	1.53	.50	12.61**
Performance					
(23) Overall College Grade Point Average	3.19	.64	2.79	.72	5.44**
(24) Grade Point Average (Spring, 1980)	3.17	.77	2.74 (Fall, 81)	.87	4.87**

* = Significant at the .05 Level
** = Significant at the .01 Level

operationalized for this study, provides a ΣEV score for high effort and a ΣEV score for low effort in each of two modes of behavior: academic and personal development. The total hours spent on academic behavior and personal development (respectively and separately) were divided by the number of hours in which the student was enrolled. These per-credit hours measures were arranged from high to low and divided into two groups at the median number of hours for the ANOVA procedure. The mean number of hours for academic behaviors for the urban, commuter, large non-traditional students was 1.95 per credit hour, and for personal development, .57 per credit hour; for the traditional, residential college, the mean numbers of hours per credit-hour were .25 and 1.53, respectively. These figures are shown in Table 2.

If a person in the high group had a ΣEV score that was highest in the above average effort level, a score was recorded in the upper left grid of a two-way contingency table (see Figure 1). The same procedure was used for the low-per credit-hour number of hours group for both behavior modes. The contingency tables were tested for significant differences (2 x 2 ANOVA). The model should predict that a high ΣEV score is related to a high per-credit-hour number of hours, and it was modestly successful. Conversely, low effort should be related to a low number of per-credit-hours spent, and that was found to be the case also.

Since the effort had four ΣEV scores for each subject, it seemed most parsimonious to choose the higher Σ EV score for academic behavior as the independent variable measure for the effort

Figure 1
[illegible] Tables for Effort and Per-Credit Hours

[illegible]	ΣEV score	ΣEV score	ΣEV score
[illegible]			
[illegible]			

Academic Behavior [illegible] Personal Development Behavior

[illegible] and for the multiple regression across-subjects component of the analysis.

[illegible] four ΣEV scores for each subject. [illegible] to choose the higher Σ EV score for academic behavior as the independent variable measure for the effort [illegible] and for the multiple regression across-subjects component of the analysis.

<u>Results and Conclusions</u>

The means and standard deviations of most variables used in the study are found in Table 2. The Valence Model score for each subject was obtained by multiplying the valence by the instrumentality for <u>each outcome</u> and summing across the ten outcomes. Two scores comprised the results of the Effort Model. Originall , four scores were calculated, two for academic--above and below average effort levels--and two for personal development. The higher of the two scores each became the basis for Effort Model scores reflected in Table 2. Specifically, the effort scores were determined by multiplying the expectancy by its valence for academic

behaviors and for personal development behaviors and summing for an above average effort score and a below average effort score.

The Performance Model score for each subject was calculated by multiplying the highest academic effort score by the ability score which was read into the equation as a whole number rather than as a percentage with two decimal places. Therefore, the mean performance model score could be read as 32.2942, for the commuter campus.

The Satisfaction score was determined by summing across the eight responses made by each subject. The mean for the commuter sample was 29.87 and 31.31 for the residential campus, both of which were higher than 24, the projected conceptual mean.

Participation was calculated as the per credit hour time spent on academic behaviors and personal development behaviors.

A correlation matrix of the twenty-four variables used for the within-subjects analysis of variance and the multiple regression equations was generated. Seventy-four (27%) of the correlations were significant for the commuter campus, and 68 for the residential campus. For some of these significant relationships, there are no interpretive difficulties, because the variables were posited to have positive relationships (for example, the college grade point average and the performance model). Other variables posited to be significantly correlated never show up in the same equation.

There are other significant relationships among the independent variables, however, where the problem of multicollinearity may exist. The academic variables, high school grade point average and ability as measured by the ACT percentile score, are signifi-

cantly correlated to each other, for instance. This relationship was expected to be significant, however, since ability was one of the components of the performance model score. The simple correlations between theoretical independent variables and dependent variables in each regression equation is shown in Table 3.

Regression equation results.

Tests of the first form hypotheses were conducted using SPSS, program REGRESSION. The results were examined for each hypothesis for significant independent variables, which possessed the following characteristics: 1) the correlation, r, with the dependent variable was significant; 2) the F for the individual variable was significant in the equation; and 3) the overall regression equation F was significant (Graham, 1980).

Hypothesis One: In the commuter-college sample, the R for the overall equation of .18 was indicated with an R^2 of .03 which explained 3% of the variance. The only variable with a significant beta weight was the expectancy theory valence model score, which entered on the first step. The F was 5.79, which was significant at <.05 (df 1, 173). The overall equation, (with an F of 5.79) was significant at the .05 level. Moderate support was found for the test hypothesis, (Graham, 1980).

In the residential college sample, the R for the overall equation was .30, with an R^2 of .09 which explained 8% of the variance. The only significant variable in this equation was the valence model score, which also entered on the first step. The F was 11.676, which was significant at the <.01 (df 1, 118). Strong support was found for the hypothesis in this equation.

TABLE 3

Correlations of Expectancy Theory
Independent Variables and Dependent Variables

Hypothesis	Dependent Variable	Independent Variable	r	
			commuter	resident
One	Satisfaction	Valence Model	.18	.43
Two	Satisfaction	Effort Model:		
		Academic Effort	.29	.21
		Per. Devel. Effort	.17	.10
Three	Participation, Academic	Effort Model: Academic	-.05	.15
	Participation, Pers. Development	Personal Devel.	.25	.095
Four	Overall College Grade-Point Average	Performance Model	.36	.30

Hypothesis Two: For the commuter-campus sample, the academic effort score entered the equation for academic force toward effort first and was significant at the .01 level. The overall equation was significant at the .01 level, with an F of 15.80, and an R and R^2 of .29 and .08 respectively. The test hypothesis for the expectancy theory variable found support.

The personal development effort score was the single significant independent variable to enter the second regression equation in the test. This variable had an F of 5.16, significant at the .05 level. With only one significant variable, the overall equation F was also 5.16 (Graham, 1980).

For the residential campus sample, the highest academic effort score entered the equation first and was significant at the .05 level (df 1, 119). No other variable was significant. The overall equation was not significant at the .05 level. Thus the test hypothesis for academic force toward effort variable found only moderate support.

The effort score was first to enter the second (personal development) equation, and was significant at the .05 level (F = 6.60, df 1, 119). Also entering the equation were the Nam and Powers occupational score for the mother (F = 4.125, df 2,118, significant at the .05 level), and student major (F = 3.17, df 3,117, significant at the .05 level). Thus, support was found for part 2 of the second hypothesis.

Hypothesis Three: For the commuter campus sample in the test of hypothesis 3, the hypothesized expectancy theory variable,

academic effort score, did not enter the equation until the thirteenth step and was a non-significant predictor of participation. However, the overall equation, with an F of 6.09, was significant at the .01 level (df 3, 171). Three individual variables were significant. They were: the Nam and Powers socioeconomic score for the mother, hours worked per week, and race or ethnic group. The R for the equation was .31 and 10% of the variance was explained by the equation. Partial support was found for the test hypothesis.

Three independent variables were significant predictors of personal development participation in the college environment, including the expectancy theory variable, personal development effort score. The overall equation was significant at the ,01 level with an F of 8.50. The R and R^2 for the equation were .36 and .13 respectively (Graham, 1980).

For the residential campus sample, the academic effort score did not enter the equation until the fifth step, and was not significant at the .05 level. Entering the equation on the first step was the racial or ethnic group with an F of 7.422 which was significant at the .01 level (df 1, 119). Entering second, third and fourth were the Nam and Powers occupational score for mother, significant at the .05 level (dr 2, 118); the number of hours worked per week (.05-level significant, df 3,117); and high school grade-point average (< .05, df 4, 116).

Two independent variables were significant predictors of personal development participation, including age in years and racial on ethnic group, significant at the .01 and .05 levels respectively (df 1, 119; 2, 118). The highest personal development

score did not enter the equation until step 6 and was not significant. Thus, little support was found for either effort score's contribution to the prediction of participation in the college environment, although personal development effort was significant for the commuter college sample for personal development participation.

Hypothesis Four: In the commuter campus sample, the performance model score entered the equation on the second step, and was significant at the .01 level. Four other independent variables were significant at the .01 level and one was significant at the .05 level. The overall equation explained 40% of the variance in overall grade point average and was significant at the .01 level with an F of 18.31 and an R of .64.

In the residential college sample, the performance model did not enter the equation until the fourth step (behind the ability score, the high school grade point average, and the academic major), but it was still significant at the .01 level (df 4,111). Therefore, support for the test hypothesis was found in both samples.

Hypothesis Five: Selected means were subjected to a t-test for differences in means and to a discriminant analysis. The results of that test are shown in Table 2. Differences significant at the .01 level on the t-test existed for personal development behavior (among the expectancy theory variables), for the high school grade point average, for the per cent of support the student provides, for academic and personal development participation, and

for the performance model variables (overall college grade-point average, and grade-point average for the semester data were collected), although not for the valence model scores. The satisfaction variable was significant at the .05 level. Therefore, support was found for the hypothesis that some differences will exist between different types of student populations. For the discriminant analysis, significant differences were found on the following variables: ....

DISCUSSION

The study attempted to address the question of whether Vroom's expectancy theory was useful in a statistically significant way as a predictor of satisfaction, participation and performance in a post-secondary setting. More specifically, would Vroom's theoretical constructs, in conjunction with generally recognized, traditional variables of a descriptive or demographic nature, add anything to the explanation in variation of college satisfaction, participation and performance, and would that addition tell us anything about different types of students (specifically, urban, commuter, and predominantly non-traditional students versus a non-urban, residential and predominantly traditional group)?

Moderate to high support was found for the expectancy theory models as predictors of college student satisfaction, participation and achievement (as indicated by grade point averages). In the commuter college sample, the expectancy theory variables entered the equations in the first, second and fourth hypotheses and were

significant in each of them. For the residential college sample, expectancy theory variables entered and were also significant in the regressions for hypotheses one, two and four. It appears that the variable of force toward effort for both the commuter and residential campus samples was non-significant as a predictor for academic participation, although the force toward effort model exhibited some mild predictive powers with the commuter campus sample with respect to personal development participation. Since this was a group which may be classified as predominantly non-traditional, it is not unexpected that effort and participation were linked because other factors (marriage, household responsibilities, children, and heavy number of working hours) mean that there are many calls on the time of students. Therefore, time spent in personal development behaviors would require planning and effort, and would occur in the face of, or despite, other responsibilities.

The force toward effort model exhibited no predictive powers in the residential college sample with respect to personal development participation, but racial and/or ethnic group did enter on the first step, which suggests that writers who contend that racial and ethnic minorities on predominantly white campuses find themselves sufficiently isolated to want to spend additional time in socializing and spending time with significant referent groups may be correct.

Coupling expectancy theory variables with other variables which have been used as predictors allowed some observations to emerge with respect to the utility of both expectancy theory and the other variables. For instance, moderate support was found for the predictive power of the Nam and Powers occupational score for

mothers (Tumin, 1970); for student academic major; for racial or ethnic group (Cross, 1974); for the number of hours worked per week to support college attendance; high school grade point averages; and, with relation to older students, age in years and performance were linked (indicating that studies which show older students to generally work harder at grades may be essentially correct).

Modest implications may be drawn from the study, although the results might also be used to verify earlier findings concerning the utility of using high school grade point averages and ability scores as significant predictors of college achievement. For one, it would seem clear that a student's outcome valence, or the expectation that one outcome will be related to another desired outcome, has some effect on his or her overall satisfaction with the college experience. Barring financial or family difficulties, students who are satisfied with their college experience tend to remain to complete their studies. Furthermore, the outcomes of college -- grades and graduation -- are at least modestly linked in students' minds with other desired outcomes -- good job, or good pay upon graduation. The extent to which colleges and universities might link these outcomes more closely (for instance, by reducing grade inflation and thereby making grades more of an indicator of achievement, and therefore more closely tied with placement after graduation) might have an effect on overall student outcome valence, and therefore on satisfaction.

The force toward academic effort is linked to satisfaction also, and might be considered along with the outcome valence in encouraging a more "academic" environment on campus. The support of

this academic environment might include regularized and enforced "study hours" in residence halls on residential campuses, and longer hours for libraries to be open on all campuses. The data suggest that those students who put more effort into academic work (and indeed, into personal development activities), feel a greater sense of satisfaction with the environment than those who are in the below-average effort group. One strategy which colleges and universities might employ is to devise additional rewards for those whose effort is demonstrable, and, once again, to address the grade inflation effect on campus today. If effort is a major contributor to satisfaction (or enjoyment of the fruits of labor), then effort ought to be part of major achievement in the study process.

The motivation to perform (performance score) is a function of both desire to perform (motivation) and ability. One way, of course, to raise performance (and thereby raise the overall grade-point average for any class of students) is to raise admission standards, and indeed, Iffert (1957) has suggested that this is one means to cut attrition rates (because high-ability students typically exhibit lower dropout rates than low-ability students). On most campuses, however, a more or less egalitarian or even open-door policy exists, and limiting admissions on the basis of ability alone (as opposed to limiting them on the basis of resources, residence hall space, etc.) is unacceptable, and probably sensibly so. A second way in which performance might be raised is to inspect more closely a student's motivation levels for academic work, and when marginal decisions are being made regarding

admission, admit only those students whose motivation levels are high.[2]

Differences between those students who typically choose an urban, commuter-type campus and those who choose a residential, non-urban campus do exist, and Vroom's theory lends some support to other assertions (Chickering, 1974; Cross, 1974; Rich and Jolicoeur, 1978) about the differences. Typically non-traditional students work, and expect to work, longer hours to support their college attendance, and frequently have other responsibilities which compete for time with academic tasks and even personal development tasks. The two groups generally have significantly different means for personal development behavior effort scores (although not for valence, academic effort, or performance scores), and significant differences exist for scores in satisfaction level, participation in the college environment and college grade-point averages. The statistically significant differences suggest that faculty, administration and student personnel staff need to be concerned with developing ways in which non-traditional students might be more involved in the academic environment. Since 25 years of research suggests that students in the residential environment tend to change the most on selected personality variables (liberalism, reduced dogmatism, reduced ethnocentrism), opportunities for students to participate in this liberalizing environment ought to be persistently sought.

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[2]Ability scores also do not take in account cultural disadvantages which, when remediated, would cause ability scores to rise significantly. The problem of inadequate schooling contributes to hard decisions regarding admission, and compensatory measures can lend assistance in bringing ability scores where they would be if the student were not economically or culturally disadvantaged.

Suggestions for Further Research

Several specific recommendations with respect to the multiple regression analysis were suggested by this research. First, more work needs to be done with the regression equations by selecting the best combination of variables and deleting others. Many were chosen by this study for the simple reason that in earlier studies, each variable had at some time turned out to have predictive value. A careful study of the correlation matrices could indicate which independent variables to save for further analysis and which to delete in subsequent studies. According to Graham (1980), "Two improvements might result. The expectancy theory variables might show up as more significant predictors than was the case in the present study... [and] the problem of multicollinearity or overlap in explanation of variance, often inherent in multiple regression and analysis, would be reduced."

A second refinement which was suggested by the results might be the introduction of the sex of the respondents into the regression. If that were done, the separate effects of this variable could be determined. This particular variation is suggested by earlier research which demonstrates that women typically make better grades both in high school and college (Cross, 1974).

A third refinement in the study which has not been attempted would be to collect data from a community college sample. The urban, commuter campus used for the first sample in this study was not a community college, but rather a true urban university, with a full four-year study program in thirty majors, and some graduate training programs. Such a sample could not reasonably

[illegible] sample since both groups tested here (traditional and nontraditional) were stratified over all four years (freshman, sophomore, junior and senior), and also contained, from both campuses, first year master's students in matched programs. But a comparison of two year students with a sample of freshmen and sophomores at a university might prove telling with respect to [illegible] academic effort scores and performance [illegible]

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APPENDIX A: INSTRUMENTS