To the Graduate Council:

I am submitting herewith a dissertation written by Charles Curtis Worth entitled "The Prediction of Voluntary Attrition of College Freshmen: A Test of Certain Hypotheses from Industrial-Organizational Psychology." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Organizational Psychology.

John M. Larsen, Jr.
Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research

Thesis
79 b
.W678
cop. 2

THE PREDICTION OF VOLUNTARY ATTRITION OF COLLEGE FRESHMEN: A TEST OF CERTAIN HYPOTHESES FROM INDUSTRIAL-ORGANIZATIONAL PSYCHOLOGY

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Charles Curtis Worth

June, 1979

1390863

Copyright by Charles Curtis Worth 1979
All Rights Reserved

ACKNOWLEDGEMENTS

I wish to acknowledge the contribution of my doctoral committee chairman, Dr. John M. Larsen, to this work and to my professional development. Words cannot adequately convey my gratitude for his friendship, encouragement, and support over the years. I wish to thank the other members of my doctoral committee, Dr. Gerald Whitlock, Dr. Dudley Dewhirst, and Dr. John Philpot, for their generous provision of time and guidance.

I would like to offer my thanks to the Office of Institutional Research of California State University, Chico, and in particular, to its Director, Dr. John G. Safarik, for supporting this research endeavor by providing time and resources. I also thank Dr. Safarik for his substantial contribution to my professional development. To Ms. Judith Zachai and Ms. Anne Russell-Hinton I extend my thanks for their assistance in the data preparation programming. Acknowledgement is also due Ms. Russell-Hinton who competently typed the numerous, lengthy drafts of this manuscript. I wish to thank Mr. Peter Watson of the Learning Activities Resource Center, California State University, Chico, for his assistance in conducting an ERIC search for materials relevant to attrition in higher education. I also wish to thank Dr. William Owens of the University of Georgia and Dr. Warren Willingham of the Educational Testing Service for their correspondence and provision of source materials.

I wish to acknowledge the patience and the total unflagging support from my parents, siblings, and friends as I pursued my education. While too legion to list individually, they have enriched my existence beyond belief. Finally, I would like to thank my wife, Dr. Denise Meredith Worth, for her contribution to my professional and personal development. While perhaps not the best teacher I have encountered (after all, the competition was awesome), there is not one iota of doubt that I have learned more from her than anyone else, and have enjoyed myself more in the process. Her support has been crucial in the accomplishment of this dissertation.

ABSTRACT

This study has tested, in the prediction of voluntary attrition in college student populations, several hypotheses derived from empirical research in the field of Industrial-Organizational Psychology. An ancillary purpose was the integration and synthesis made of the existing literature concerning the prediction of voluntary attrition in college student populations, and the prediction of voluntary turnover in industry. This review of research on turnover and attrition pointed out a number of striking similarities between the two domains. In both domains, there are serious and similar criterion definition problems which confound the comparison and interpretation of studies.

In both education and the industry, studies using the individual as the unit of analysis have been more common than studies which use the organization as the unit of analysis. Satisfaction (both overall and facet-specific) has been more often focused upon in industrial research on turnover. Industrial models of voluntary withdrawal have focused primarily upon motivational components, however, those models in education have focused upon the interaction of the individual with the institutional environment in determining voluntary withdrawal.

The hypotheses tested in this research were primarily concerned with the improvement of the prediction of attrition. Questionnaires, which acquired biographic and other

data such as attitudes and aspirations, were administered to two groups of entering college freshmen. Students were followed over a one-year period to determine whether they had persisted into their sophomore year, and performance data (first semester college GPA) were also gathered. The questionnaire and performance data were then used to predict attrition. The data from the first group were used in a cross-validation procedure with the data from the second group, and a significant cross-validated validity coefficient was demonstrated.

It had been hypothesized that the expressed intention to drop out would better predict an attrition criterion than would a predictor set composed of biographical variables. No support was found for this hypothesis. It was also hypothesized that attrition/persistence would relate to the extent to which expectations concerning grades were met in the college environment. It was expected that those students with large negative discrepancies (the actual reception of low grades and the expectancy of high grades) would be more likely to drop out. This study revealed that the met expectation variables did indeed relate to the criterion. It was also shown that no apparent disadvantage accrued with the use of this "difference" variable compared with the simple use of the two variables from which it was computed in multiple regression analysis.

Personality variables have not consistently been shown to relate to voluntary withdrawal. As an explanation of

this phenomenon, it was hypothesized that personality variables relate in a curvilinear fashion to a withdrawal criterion. Support was found for this hypothesis in that those characterized as extremely high or extremely low on the Short Dogmatism Scale were more likely to drop out. Curvilinear relationships with the criterion were not shown for several other "personality" variables which had been created for exploratory purposes.

Finally, it was hypothesized that the mean differences between the persisters and dropouts on a given predictor variable were not necessarily the same for groups at high and low performance levels. Support was found for this hypothesis. The implication of this finding is that the relationship of a predictor variable with the attrition criterion will be different at different performance levels. In a statistical sense, there may be said to be an "interaction" of performance level with certain predictors of attrition.

The support for the latter two hypotheses generated the conclusion that the prediction of attrition might be substantially improved if "complex" terms (i.e., interaction and curvilinear terms) were entered into the prediction equations of voluntary withdrawal.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	INTRODUCTION	1
	Rationale	1
	Statement of the Problem	7
	Utility and Scope of the Study	16
	Importance of the study	16
	Limitations of the study	17
	The research milieu	18
	Organization of the Study	18
II.	REVIEW OF LITERATURE	21
	Research on Turnover	21
	Content Theories of Turnover	26
	The turnover/absenteeism relationship	27
	Job satisfaction and turnover	28
	Job context and turnover	30
	Job content and turnover	33
	Personal characteristics and turnover	35
	The prediction of turnover	40
	Process Theories of Turnover	48
	Turnover as a result of exchange/inequity	49
	Turnover as a function of expectancy instrumentality-valence	52
	Turnover as a function of commitment	61
	Research on College Attrition	67
	Content Theories of College Student Attrition	71
	Personal characteristics and attrition	72
	Bio-social background	73
	Ability/academic factors	78
	Personality factors	80
	Motivation	84
	Educational context/environment	89
	Characteristics of the college	89
	Financial aid and employment	92
	College environment	95
	The prediction of attrition	101
	Process Theories of Attrition	107
	Tinto's model of dropout	109
	Integration-Synthesis of Research on Turnover and Attrition	113
III.	METHODOLOGY	122
	Overview of the Design	122
	Instruments	122
	Student Information Form (SIF)	122
	The Enrollment Reporting System (ERSS)	123

CHAPTER PAGE

Source of Sample. 124
The 1975 cohort. 124
The 1976 cohort. 126
Operational Definitions 128
Biographical predictors. 128
Additional predictor items from SIF. . . . 128
Expressed intention to drop out. 130
Met expectations 130
"Personality" variables. 130
Performance. 135
Analyses. 135

IV. RESULTS. 137

Hypothesis 1: Intention to Drop Out. 137
Hypothesis 2: Met Expectations 142
Interlude 148
Hypothesis 3: Bipolar Relationships. 151
Hypothesis 4: Mean Differences Between Persisters and Dropouts at High and Low Performance Levels 159

V. DISCUSSION 165

Limitations 165
A Cross-Validated Prediction of Attrition . . 168
Hypothesis 1: Intention to Drop Out. 171
Hypothesis 2: Met Expectations 177
Hypothesis 3: Bipolar Relationships. 180
Hypothesis 4: Mean Differences Between Persisters and Dropouts at High and Low Performance Levels 183

VI. SUMMARY AND CONCLUSIONS. 187

REFERENCES 194

APPENDICES 208

A. 1975 Student Information Form, Cover Letter, and Supplemental Questions 209
B. 1976 Student Information Form, Cover Letter, and Supplemental Questions 215
C. Intercorrelations of Biographic, Intention, and Met Expectation Items. 221
D. Biographic and "Affective" Variables Not Included in the Step-Wise Multiple Regression on Attrition - 1975 Cohort. 223

CHAPTER PAGE

E. Tables for Group Means (on Attrition) of Personality Variables Not Found to Have a Quadratic Relationship with Attrition. . . . 225
F. Formulas and Values Used in the Example Analysis of Covariance Presented in the Discussion 229

VITA 230

LIST OF TABLES

TABLE		PAGE
1.	Biographical Predictors and SIF Item Numbers . . .	129
2.	"Affective" Predictors and SIF Item Numbers. . . .	131
3.	Summary of Results of Factor Analysis of Self-Reported Personality Items (Item 24, 1976 SIF) (N = 1355).	133
4.	Simultaneous Multiple Regression of Biographical Predictors, Intent and Met Expectation on Attrition--1975 Cohort (N = 512)	139
5.	Simultaneous Multiple Regression of Biographical Predictors, Intent and Met Expectation on Attrition--1976 Cohort (N = 957)	140
6.	Biographic, "Affective" and Performance Variables Included in the Step-Wise Multiple Regression of These Variables on Attrition (Inclusion Level at 1.0)--1975 Cohort (N = 335). .	149
7.	One-Way Analysis of Variance with Test for Quadratic Component: Dogmatism with Attrition - 1975 Cohort.	153
8.	One-Way Analysis of Variance with Test for Quadratic Component: Dogmatism with Attrition - 1976 Cohort.	153
9.	Dogmatism Group Means on Attrition - 1975 Cohort .	154
10.	Dogmatism Group Means on Attrition - 1976 Cohort .	154
11.	One-Way Analysis of Variance with Test for Quadratic Component: The Sum of 17 Goal Importance Items with Attrition - 1975 Cohort. . .	155
12.	One-Way Analysis of Variance with Test for Quadratic Component: The Sum of 17 Goal Importance Items with Attrition - 1976 Cohort. . .	155
13.	Importance-Item-Sum Group Means on Attrition - 1976 Cohort.	156
14.	One-Way Analysis of Variance with Test for Quadratic Component: "Popularity" Factor with Attrition - 1976 Cohort.	157

TABLE PAGE

15. One-Way Analysis of Variance with Test for Quadratic Component: "Confidence" Factor with Attrition - 1976 Cohort. 157

16. One-Way Analysis of Variance with Test for Quadratic Component: "Defensiveness" Factor with Attrition - 1976 Cohort 158

17. One-Way Analysis of Variance with Test for Quadratic Component: "Cheerfulness" Factor with Attrition - 1976 Cohort 158

18. One-Way Analysis of Variance with Test for Quadratic Component: "Conservatism/Liberalism" Factor with Attrition - 1976 Cohort. 159

19. t-Tests Between the Mean Predictor Scores (For Identified Predictors) of High Level Performers Who Persist and Those Who Leave, and Low Level Performers Who Persist and Those Who Leave - 1975 Cohort. 162

C-1 Intercorrelations of 22 Biographic, 1 Intention, and 1 Met Expectation Predictor Variables 1975 Cohort (N = 512). 221

C-2 Intercorrelations of 22 Biographic, 1 Intention, and 1 Met Expectation Predictor Variables 1976 Cohort (N = 957). 222

D-1 Biographic and "Affective" Variables Not Included in the Step-Wise Multiple Regression on Attrition - 1975 Cohort (see Table 6) 223

E-1 Importance-Item-Sum Group Means on Attrition - 1975 Cohort (See Table 11, in Text). 225

E-2 "Popularity" Factor Group Means on Attrition - 1976 Cohort (See Table 14, in Text). 226

E-3 "Confidence" Factor Group Means on Attrition - 1976 Cohort (See Table 15, in Text). 226

E-4 "Defensiveness" Factor Group Means on Attrition - 1976 Cohort (See Table 16, in Text). . 227

E-5 "Cheerfulness" Factor Group Means on Attrition - 1976 Cohort (See Table 17, in Text). . 227

TABLE PAGE

E-6 "Liberal/Conservatism" Factor Group Means on Attrition - 1976 Cohort (See Table 18, in Text). . 228

F-1 Analysis of Covariance 229

LIST OF FIGURES

FIGURE PAGE

1. A Conceptual Schema for Dropout from College (from Tinto, 1975, p. 95). 110

2. Composite Intention to Drop Out Item's Relationship with Attrition Status at Two Performance Levels for 1975 Cohort 175

CHAPTER I

INTRODUCTION

Two purposes have been addressed in this study. First, several hypotheses were derived from empirical research on turnover in the field of industrial-organizational psychology. These hypotheses were then tested in the prediction of voluntary attrition in college student populations (i.e., "dropouts"). Second, an integration and synthesis has been made from the existing literature concerning the prediction of voluntary attrition in college student populations and the prediction of voluntary turnover in industrial situations.

Rationale

The primary assumption made in this study was that many, if not all, of the processes and variables which explain and/or predict voluntary turnover in industrial and military organizations are the same as the processes and variables which explain and/or predict voluntary attrition in higher education. Evidence for the validity of this assumption emerged in the following review of turnover research in industry and attrition research in education. Furthermore, to the extent that the hypotheses derived from turnover research in industry and tested in this study in a higher educational milieu were confirmed, additional support for this assumption was provided.

A second assumption made was that it is beneficial to test hypotheses derived from industrial-organizational psychology in as broad a manner as possible, both across a wide variety of organizations and subject groups. The beneficiality of such breadth in research has been well recognized within the discipline. Quinn and Kahn (1967), in their Annual Review of Psychology article on organizational psychology, stated:

> A profitable use of investigative resources is noticed in the increased range of research sites and populations . . . . Organizations other than business firms are being studied more often, and the chapter in the Handbook of Organizations (March, 1965) on unions, political parties, public bureaucracies, military organizations, government, hospitals, schools and persons should serve as a constant reminder that organizational psychology is not simply industrial psychology by another name (pp. 460-461).

The underlying notion for such an emphasis upon breadth has been that of empirical confirmation (Kuhn, 1962). Broadly speaking, empirical confirmation suggests that the more often a factor or theory is confirmed, using different methodologies and different research milieus, the more likely that fact or theory is "true."

Porter and Steers (1973) specifically stated similar concerns in their review of turnover and absenteeism research:

> Similarly, it should prove useful if future studies made use of cross-validational and cross-organizational designs for both turnover and absenteeism. If we are to use the knowledge we have gained in any meaningful way, it is important to have some idea of its generalizability across work environments (p. 170).

A third assumption was that attrition of members is costly: i.e., recruitment, selection, induction, etc. represent non-trivial costs to organizations. Furthermore, leaving an organization usually involves real and psychological costs to the departing member. This "assumption," actually a well-confirmed finding, provided a substantial rationale for the study of turnover. Examples of the cost of turnover in industry abound, although given inflation, any dollar figures are less than precise. For bank employees, Gannon (1971) indicated a conservative estimate of $1000 per employee turnover. Fournies (1970) estimated organizational costs of $500 to $2000 per "technical" employee turnover. The estimates escalate rapidly as employee entrance requirements go up. It has been estimated that the replacement of a staff accountant by an entry level applicant exceeds $10,000 (Sorensen, Rhode, & Lawler, 1973). Perhaps the ultimate in replacement costs has been the $312,000 replacement estimate for each experienced U. S. Air Force combat pilot (Atchison & Lefferts, 1972).

As with employee turnover in industry, there are associated costs with student attrition in higher education, both to the institution and to the individual. There are also costs to society, such as the waste of competent manpower (Iffert, 1957). It is difficult to estimate in dollars the costs of dropouts to higher educational institutions. However, even if it was assumed that the institutional costs of recruiting, selecting, and registering

potential dropouts were small on an individual basis, the magnitude of the dropout problem has been such that the total costs may still be undesirable. Hackman and Dysinger (1970), summarizing previous dropout prevalence reports, noted:

> Student withdrawal from college has become a problem of national concern. Summerskill (1962) has determined that only 40 percent of entering students graduate within a normal four-year term; an additional 20 percent complete their studies at a later date. Iffert (1957) has given a similar figure and has noted that *about half of those who withdraw do so by the end of their first year of college work* (pp. 311-312, emphasis added).

Far more recent research (Astin, 1975; Astin, 1972; Astin & Panos, 1969) suggested that current dropout prevalence rates were still comparably high.

Astin (1975) noted another cause for concern: declining enrollments due to declining college age populations (primarily due to the end of the post-World War II "baby boom"). He pointed out that a 10% decline in enrollment would usually be accompanied by a 10% decrease in institutional revenue, but may <u>not</u> necessarily be accompanied by a 10% reduction in costs. This is germane to the dropout problem since enrollment levels may be maintained through increased recruiting <u>or</u> decreased attrition.

Even if the costs to the institutions of student attrition could be ignored, there are still substantial negative consequences to the individual associated with dropping out. Astin (1975) identified research suggesting the consequences of dropping out of college were: (1) delay, at best, of

occupational entry, and (2) a lessened increase in interpersonal and intellectual self-esteem, tolerance, intellectual skill and confidence, etc.

The fourth assumption, again more a confirmed finding than an assumption, was that turnover in industry, as well as dropouts in education, may, to some degree, be prevented. There has been excellent support for this proposition within industry. Wanous (1977) summarized six experiments on the effects of realistic job previews on turnover and concluded that such previews were consistently shown to reduce turnover. Goodman and Salipante (1977), in a multi-organization study of the hard-core unemployed, demonstrated that organizational rewards (in this case pay and the structure of raises) could be manipulated to positively affect retention. Hulin (1968) manipulated job satisfaction and discovered that as it increased, turnover decreased. French et al. (1958), in an elaboration upon the classic case study by Coch and French (1948) on the effects of worker participation in management, pointed out that one concomitant of increased participation was decreased turnover. Porter and Steers (1973) identified a number of organization-wide factors, job-related factors, and work environment factors known to be associated with turnover. While experimental evidence has been weak or lacking, it seems likely that many of these factors could be manipulated to decrease turnover.

Within the domain of higher education, there is substantial support for the notion that organizations can control some kinds of attrition. Brown (1970) demonstrated that group counseling lowered attrition rates of freshmen. Nelson (1966), in a study of the characteristics of colleges associated with high freshman attrition levels, suggested that a number of institutional characteristics (such as selectivity, institutional size, student affluence, etc.) could conceivably be manipulated to decrease turnover. Prescriptive statements, many of which have little experimental support, abound in the field of higher education concerning the prevention of dropouts (e.g., Summerskill, 1962; Feldman & Newcomb, 1969; Astin, 1977).

In summary, the rationale for this study was predicated upon the propositions, documented above, that turnover/attrition is both costly to organizations and preventable, to some degree. Therefore, an increased ability to explain and/or predict withdrawal behavior in organizations would be valuable. Further justification for this study came from the extension of the empirical findings from industrial-organizational psychology across different institutions and subject pools. Finally, it is easily shown that a substantial body of research has been accumulated on college attrition (Summerskill, 1962; Astin, 1975; Tinto, 1975), and on industrial turnover (Brayfield & Crockett, 1955; Herzberg, Mausner, Peterson, & Capwell,

1975; Vroom, 1964; Porter & Steers, 1973). Thus, the final justification for this study was the expectation that the integration of these findings would lead to a better understanding of withdrawal behavior in organizations.

Statement of the Problem

As previously stated, the general intent of this study was to test certain hypotheses, derived from empirical research on turnover in the field of industrial-organizational psychology, in a higher education milieu. More specifically, this study tested these hypotheses in the prediction of "voluntary" college attrition of first-time, full-time freshmen enrolled in a public, western university.

"Voluntary college attrition" has been defined, in this study, as a first-time, full-time freshman who left, or failed to enroll for a second or third semester (sophomore year), as a matter of choice. This definition, then, excluded those freshmen leaving the institution for reasons of academic or disciplinary dismissals ("involuntary" withdrawal). The terms "voluntary withdrawal," or "voluntary dropout," were herein used synonymously with "voluntary college attrition," and for convenience and brevity, these terms were abbreviated to "attrition," "withdrawal," or "dropout." "Persister" has been defined as a first-time, full-time freshman who enrolled for both a second and third semester (first semester of sophomore year).

Three points should be made. First, the operational definition given for "attrition/withdrawal/dropout" in this study was somewhat arbitrary, although still generally consistent with other research. The reader should be aware that the definition of these terms is by no means consistent within the research literature (Summerskill, 1962; Astin, 1972). This definition problem was further explored in the literature review.

The second point concerned the rationale for the focus upon early attrition, i.e., dropping out prior to the sophomore year. Astin (1972) presented national persistence rates indicating that slightly less than half of all entering college and university freshmen graduated in four years. (These estimates were reasonably close to the ones given ten years earlier by Summerskill (1962) and tended to reinforce Summerskill's conclusion that national dropout rates were fairly stable.) Of the half that did not persist four years to graduation, slightly less than one-half did not return for a second year. This clearly implied that a major portion of the "dropout problem" occurs in the freshman year, thus the focus upon freshman dropouts. It was assumed that the early identification (prediction) of a subgroup of dropout-prone students could increase the probability of success of an intervention, and possibly decrease the cost of intervention as well.

The third point concerned the focus upon the "voluntariness" of freshman attrition. There were several reasons

for this focus. Dropout research has often been divided on the basis of voluntary and involuntary withdrawals (Summerskill, 1962; Hill, 1966; Tinto, 1975; Astin, 1975). Differentiation between voluntary and involuntary turnover has also existed in industrial research (Van der Merwe & Miller, 1971; Porter & Steers, 1973). In both education and industry, the reason for differentiation has been due to the assumption that the causes of voluntary withdrawal were different than those for involuntary withdrawal. It was expected, too, that organizations were less likely to be interested in a member forced to leave for performance or disciplinary reasons (involuntary withdrawal). A practical reason for the focus on voluntary withdrawals was that the involuntary withdrawals represented a very small proportion, perhaps 2%, of the undergraduate population at the institution under study.

Given the hypotheses to be tested, an important intermediate step in this study was the development of a prediction schema, i.e., the selection and weighting of predictors. Furthermore, the selected predictors with their respective weights were cross-validated (Guion, 1965) on a second sample, thus providing further evidence on the effectiveness of predicting attrition/persistence. As Schuh (1967) pointed out in his review of the prediction of turnover, cross-validation " . . . is just a good but often neglected experimental procedure (p. 149)."

Several general types of predictors were used in the development of the prediction schema: biographical data, self-assessed personality characteristics, self-reported aspirations/attitudes/intentions, and a limited set of academic performance data. A full elaboration of these predictors, along with the data acquisition procedure, has been given in the method chapter. With the exception of the academic performance data, all data were gathered using questionnaires (Astin, King, & Richardson, 1975, 1976) administered to freshmen immediately prior to or directly after enrollment for their first, full-time semester at the institution under study.

The hypotheses tested have been stated below, along with brief explanations of the relevant research. The general methods to be followed have also been very briefly outlined herein. Full explication of the relevant research and methods employed in this study may be found in later chapters.

From the point of prediction, Schuh's (1967) review of turnover predictors suggested that biographical data have been consistently effective in predicting turnover. Job satisfaction was also shown to be positively related to tenure. (Note that job satisfaction is a post-hiring phenomenon and therefore is not useable as a selection criteria.) Six years later, in their review on the factors involved in employee turnover, Porter and Steers (1973) similarly summarized that " . . . overall job satisfaction

was found to be consistently and inversely related to turnover (p. 151)." They suggested, however, that " . . . expressed intentions regarding future tenure may be an even better predictor [than job satisfaction] (p. 153)." This contention has been supported in industrial (Kraut, 1975) and military situations (La Rocco, 1977), demonstrating the utility of expressed intention over biographical data in the prediction of attrition/retention. The first hypothesis, then, tested the effectiveness of expressed intentions in the prediction of attrition/persistence of college freshmen.

Hypothesis 1: *The expressed intention to drop out best predicts attrition, by the start of the second year, when compared to various biographical predictors.*

This was tested in two ways. First, the expressed intention to drop out was expected to be the highest correlate with attrition when attrition was compared singly with each biographical predictor. Second, this expressed intention was expected to be the most important in the composite set of predictors (formed from itself and all biographical data items).

Porter and Steers (1973) have suggested that future turnover research should be focused on (1) differential expectations at the time of organizational entry, and (2) the extent to which these expectations are met (met expectations). They have defined the concept of met expectations as " . . . the discrepancy between what a person

encounters on the job in the way of positive and negative experiences and what he expected to encounter (p. 152.)" The second hypothesis tested this proposition. Since grades have been the major index of performance at colleges, this hypothesis tested whether met expectations concerning grades predicted attrition. Since there were two aspects to the concept (the original expectancy and the extent to which the original expectancy is met), the second hypothesis took both into account.

> Hypothesis 2: *The extent to which expectations concerning grades were met would predict attrition/persistence in the following manner: those students with large negative discrepancies (the actual reception of low grades and the expectancy of high grades) were expected to be more likely to drop out; furthermore, it was predicted that use of the best linear combination of expectancy and performance in predicting attrition would not be different from the use of the single met expectation variable.*

As with the first hypothesis, this was tested in two ways. These two predictors were combined into a single variable (performance minus expectation) which was tested for its correlation with attrition and as part of a composite set of predictors (formed from itself and all biographical data items).

The third hypothesis stemmed from research concerning the prediction of turnover using personality characteristics.

Porter and Steers (1973) suggested that members who left an industrial organization were more likely to be placed near polar positions on various personality trait continua:

> For example, those who are fairly unstable emotionally or exhibit high anxiety, tend to withdraw. Similarly, employees demonstrating a very high degree of independence, self-confidence, and aggressiveness, as well as those with high career aspirations, also appear to leave more often (p. 166).

Such findings have led these authors to formulate a "bipolar hypothesis" concerning the relation between certain personality characteristics and organizational turnover.

The bipolar hypothesis was in accord with an observation made by Schuh (1967):

> Look for curvilinear relationships in the data. There is ample evidence that non-linear relationships exist for . . . personality tests with various tenure criteria (p. 148).

Since this study exploits an existing, limited collection of data, only a few specific personality characteristics have been assessed in terms of their possible relationship with a dropout criteria. These were: (1) the Short Form Dogmatism Scale (Troldahl & Powell, 1965; items 39-48, Appendix B), (2) the sum of seventeen importance items (item 37, Appendix B) [note that the sum of these importance items could be considered an index of the personality characteristic of need achievement (Cofer & Appley, 1964); alternately, this sum could be conceived as the valence of outcomes and thus fit within valence-instrumentality-expectancy theory (Vroom, 1964; also see Campbell &

Pritchard, 1976)], and (3) fourteen self-reported personality-type items were selected and factored (see all items not ending in "ability," item 24, Appendix B). From the meaningful principal factors identified in this process, factor scores were computed and these factors' relationship with attrition was explored.

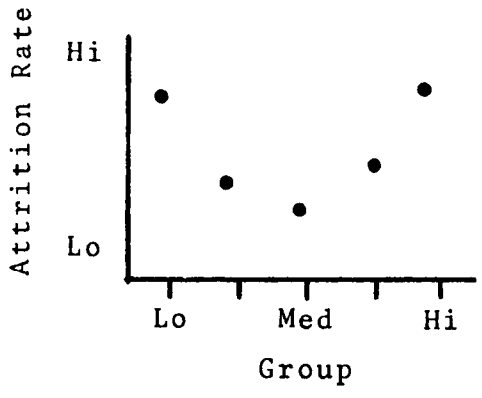
Hypothesis 3: *Those students characterized as very high on the selected personality scales, or very low, were expected to be more likely to withdraw from the institution.*

This hypothesis was tested as follows: one-way analysis of variance was conducted (groups by attrition) and a test for a polynomial quadratic trend computed.[1]

---

[1]To the reader not experienced with such analyses, the following was implied: one-way analysis of variance tested the hypothesis that the group means on a given scale were different. If such a hypothesis were confirmed (say for five groups) in the pattern specified in hypothesis 3, a simple plot of the group means might look grossly like example A:

Example A



Quadratic polynomial trend analysis was simply intended to test whether a curved function, with one point of inflection

The fourth and final hypothesis tested stemmed from a conclusion voiced by Porter and Steers (1973) in their review of employee turnover and absenteeism. They suggested that " . . . some attention be given to the study of differentially valued employees in relation to withdrawal (p. 173)." Faris (1971) gave the following example from his own research:

> Thirty-five percent of the professionals who left their organizations were judged to be among the top half in usefulness to their organizations, and in one organization, 23% of those who left were judged to be among the top 10% in usefulness (p. 311).

It seemed obvious that an institution of higher education would have similar concerns in desiring to retain their more promising students among the pool of dropouts, and would be less desirous of retaining poor performers.

Hypothesis 4: *The mean differences between persisters and dropouts were expected to be the same for both high and low performance groups for each significant predictor variable of attrition/retention.*

The final hypothesis was tested in a manner consistent with Faris' research (reviewed in full in the next chapter, and, incidentally, the only test conducted so far on this phenomenon). Performance, for college students, was operationalized as grade point average (GPA). This variable was treated as a dichotomous variable (upper and lower 27% high/low groups [Kelley, 1939]). Two t-tests were made

---

(such as imposing a U-shaped curve through the five points of example A), would significantly decrease the proportion of unexplained variation. For further reference, see Hays (1973) and Nie, Hull, Jenkins, Steinbrenner, and Bent (1975).

for each significant predictor identified in the process of developing the prediction equation: the first between the means of the persisters and dropouts in the high performance group, and the second between the means of persisters and dropouts in the low performance group. Simply stated, this hypothesis predicted that if a significant difference existed between persisters and dropouts at a particular performance level (high or low) for a given predictor variable, then a similar significant difference should have existed between persisters and dropouts at the other performance level.

Utility and Scope of the Study

Importance of the study. From a general, or theoretical, perspective, this study made several contributions. First, it attempted to extend the finding from industry that expressed intentions have been important predictors of voluntary withdrawal across a different organization (university), and a different population (student). Second, the last three hypotheses, while derived from empirical findings in industrial-organizational psychology, were still by no means well demonstrated. This study, then, represented an investigation to test these hypotheses concerning voluntary withdrawal in an organization and population different from those traditionally studied in industry. Third, one important aspect was the integration of findings from educational research concerning voluntary dropouts

with findings from the industrial study of the prediction of voluntary turnover. Finally, in a period of steady-state or declining enrollments, the retention of students was of paramount value to an institution budgeted on an enrollment basis. Thus, this study had a practical purpose of demonstrating the effectiveness of the prediction of freshman attrition at the institution under study. There was also a more general contribution to higher education made by this study. As Larsen (1970) stated:

> Institutions of higher learning are constantly looking for a means of identifying those students who are potential dropouts. Any differences found between those graduating and nongraduating groups, while applicable to this study alone, may provide direction for future research on other groups. The identification of differences may lead to insight regarding means to decrease the probability of dropouts and to increase the probability of graduation (p. 5-6).

Limitations of the study. The limitations may be conceived of in a hierarchical fashion. At the most specific level, the predictor orders, weights, precise relationships, etc. should be generalized only to nearly identical organizations and populations, if any. At a somewhat less specific level, since the students at the particular university under study were similar to many other students, if not representative of all, it should be possible to approximate grossly the general predictor orders, relationships, etc. to other university situations. At the broadest level, the study demonstrated that findings concerning voluntary withdrawal in industrial and military organizations

could be expanded to university organizations as well, implying that such findings might apply to voluntary withdrawal from other types of organizations (unions, hospitals, prisons, etc.).

The research milieu. California State University, Chico (CSU, Chico--the "target" institution) is one of the fourteen universities and five colleges comprising the California State University and Colleges (CSUC) system. The CSUC system-wide enrollment is approximately 300,000 students--with CSU, Chico's enrollment approaching 13,000. CSU, Chico provides undergraduate and graduate instruction, the latter leading to a master's degree.

CSU, Chico, along with her sister campuses, has been classified as being of medium selectivity. Astin (1971, p. 27) reported one-year persistence rates of 77% for higher education institutions of this selectivity. In the CSUC system, 71% of new (first-time) freshmen returned for a second year to their original college (California State University and Colleges, Office of the Chancellor, 1976). Data from this reported indicated that CSU, Chico has a higher than system average (76%) for the retention of freshmen.

Organization of the Study

This study consists of four major chapters, exclusive of this introduction.

Chapter II, "Review of Literature," has been organized in two major sections. The first section concentrates on

an extensive examination of voluntary turnover-related research. This review was organized around several major theoretical approaches to the explanation/prediction of the turnover phenomenon. In the second section, the research from higher education concerning explanation/prediction of voluntary dropouts is explored. This review was also structured around major approaches to the attrition phenemenon.

Throughout Chapter II, any major inconsistencies and/or conflicts in observed findings or theories have been noted, and, where possible, directions for future research indicated. After completing the reviews of these two major research domains (industrial turnover and educational attrition), some comparisons have been made, as well as an attempt at integration/synthesis. One additional goal of this chapter was to fully explain and document the relevant empirical findings concerning the hypotheses tested.

Chapter III, devoted to the explanation and development of the methods employed in this study, was organized around three sections: (1) a description of the subjects along with justifications for the various "screens" used in selecting the subject group, (2) presentation of the measures as well as the rationale behind inclusion of specific measures, and (3) presentation of the analyses used in testing the hypotheses.

In Chapter IV, the results have been presented. The results of the tests of the hypotheses have been presented in both narrative and tabular form. Other results from the

study, such as the prediction equations developed to test the first, second, and fourth hypotheses, have also been enumerated.

The discussion of the results has been presented in Chapter V. Hypotheses have been discussed in terms of the extent to which they were supported/refuted by the results. Results have been further related to previous empirical research and theory, and the implications for organizational practice and future research have been drawn.

CHAPTER II

REVIEW OF LITERATURE

This chapter, as previously indicated, has been organized in three sections. The first examines voluntary turnover-related theory and research. The empirical and theoretical bases for the hypotheses tested have been developed here also. The second examines the theory and research concerning voluntary college student attrition. The third section presents an attempt to integrate/synthesize the material from these two domains, as well as to indicate contradictions and inconsistencies of research and theory, both within and between these domains.

Research on Turnover

There has been substantial agreement in the perception of turnover as a perennial organizational problem. The cost data alone, presented in the Rationale section previously, seemed sufficient to justify this conclusion. Prevalence data, i.e., the extent of turnover, also affirmed this conclusion. However, the examination of prevalence data immediately brings up a number of definitional problems. Gaudet (1960) has presented no fewer than 25 conceptualizations of turnover rates. Turnover rates may be conceived of on a national basis, or a broad occupational grouping basis (e.g., manufacturing, service, professional, etc.), or a specific industry-wide basis (e.g., hospital employees,

accountants, etc.), or on a sub-organizational basis (e.g., units or occupational groupings within a specific organization), or on an individual basis (e.g., each employee's status as a "turnover/non-turnover"). Since all but the last of these measures are composites of finer-grained ones, they are naturally realted. Obviously, too, those measures based on composites are less volatile than more specific measures (e.g., industry vs. firm, work group vs. individual), although even the national annual quit rates [such as for all manufacturing employees, described as a "smooth, well-behaved series" (Armknecht & Early, 1971, p. 31)] have varied substantially in recent history (1% to 5%). Since it was not the intention of this article to review various aggregate turnover rates, the reader is referred to the Bureau of Labor Statistics' fine monthly series of reports on labor turnover (see Monthly Labor Statistics, Bureau of Labor Statistics, U. S. Dept. of Labor).

This review has focused on the concepts of firm turnover and individual turnover. Firm turnover has been defined as the frequency of hirings and departures in an individual firm or organization. Individual turnover has been defined as the employee's decision, and concomitant behavior, to participate/non-participate in the organization. This choice was made because one incidental goal of this study was to provide managers with evidence to increase their control of turnover. It seemed obvious that firms or individuals were the unit of analysis which could be

controlled by managers to reduce turnover. This has led to the following general definition of turnover which was adopted and thus served as a focus for this review. "Turnover" was defined as referring to controllable turnover.

> Controllable labor turnover is the avoidable loss of personnel--avoidable because management action could have been taken to reduce, minimize, or prevent such loss-the loss being the result of the interaction between the characteristics of the employee and the employing organization (Van der Merwe & Miller, 1971, pp. 234-235).

The major reason for the differentiation between firm and individual turnover, since the former has usually been defined as the sum of the latter, was epistemological. Studies using the organization as the conceptual unit have had a somewhat different interpretation and import than have studies conducted with the individual as the unit of analysis. It has appeared overwhelmingly reasonable to use the individual as the unit of analysis when studying individual processes such as the personal decision to participate, and a substantial body of research has done this. Likewise, the use of organizations as the analysis unit to discern the effects of organizational factors has seemed to be logical, although there have been few such studies. An example of these two approaches has been given in the following paragraph. Much more frequently, with far less apparent justification, inferences have been drawn about the effects of organizational factors on turnover from intra-organizational studies which have employed the individual as the level of analysis. For example, it has seemed to be

the rule rather than the exception to correlate individual satisfaction with pay and individual termination decisions within an organization and then to infer that pay was a trans-organizational factor affecting turnover.

There exists ample evidence that turnover rates vary substantially between organizations within an industry. Van der Merwe and Miller (1971) provided a demonstration of this with nine footwear manufacturing plants from one region where the yearly quit rates ranged from 15.7% per annum to 63.3%. Very few researchers have exploited these existing variabilities in studies, using organizations as the unit of analysis, to determine cross-organization correlates of turnover. One such study was conducted by Ingham (1970) with eight British firms relating organization size to turnover (weakly) and absenteeism (strongly).

While there has been a clear need, then, for cross-organizational studies to determine correlates of turnover, there may be even greater benefit from attempts to manipulate various organizational factors to determine causal factors of turnover. Actually, given the problems of experimental control in organizations, most, if not all, such research would be more accurately described as quasi-experimental (Campbell & Stanley, 1963). Several noteworthy attempts have been somewhat successful, albeit within single organizations, in manipulating organizationally controllable factors to decrease turnover (Hulin, 1968; French, Ross, Kirby, Nelson, & Smyth, 1958). These studies have

been examined later in this text, as part of the review of organizational context factors' effects upon turnover.

Probably because turnover has been an expensive and extensive problem for organizations, there appeared to be a frequent, but largely unstated, assumption that the reduction of all turnover was desirable. As Porter et al. (1973) noted, this may be questioned on the grounds that the individual may benefit from the procurement of a "better" job, and that the organization may benefit from the departure of the ineffective performer. This latter point, fully addressed later, suggested the necessity of differentiating between effective and ineffective performers leaving the organization.

Having considered some descriptive and definitional problems above, the review of turnover research has been presented in the following fashion. (The reader must recognize first that there have been two general approaches within industrial-organizational research toward turnover: explanatory and pure predictive [i.e., atheoretical prediction]. These approaches have overlapped substantially since almost by definition any explanation of a phenomenon implies the ability to predict, although not necessarily the opposite.) The conceptualization of two general classes of theory suggested by Campbell and Pritchard (1970) from previous work by Campbell has been used to organize the presentation of this review. Content theories have been presented first. Such theories have attempted to identify

variables that influence behavior and have not been concerned with the underlying process(es). Research attempting to assess the factors associated with turnover has often been of this type. Pure predictive, or atheoretical research, has also been considered within this section since such work has attempted to simply identify those variables which discriminate between groups or individuals. Process theories . . .

> . . . attempt to provide a generalized explanation of the processes involved which lead to choices among varying alternative courses of varying degrees of effort expenditure, and *persistence over time* (Campbell et al., 1976, p. 65, emphasis added).

Examples have been equity or expectancy theories. It should be noted that some concepts, such as job satisfaction, have been so universal that they might apply to both content and process theories.

Content Theories of Turnover

Content theories . . .

> . . . suggest the specific identity of variables discussed in general terms by the process models outlined earlier. As such, the theorizing is mainly of a taxonomic sort, although considerations of dynamic relationships are not completely absent (Campbell et al., 1976, p. 96).

This review has been built upon five major reviews of turnover research (Porter & Steers, 1973; Schuh, 1967; Vroom, 1964; Herzberg, Mausner, Peterson & Capwell, 1957; Brayfield & Crockett, 1955). The interested reader is referred to Porter et al. because of their comprehensiveness and relative recency, and to Schuh for his focus on the

prediction of turnover. Their conclusions have been given on extensive bodies of research and more recent evidence has been added to these summaries.

The turnover/absenteeism relationship. One important and frequent approach to turnover has been that it is an extreme form of withdrawal behavior, implying that an underlying continua of withdrawal behavior exists. Absence has been usually conceived as a less extreme form, and negative attitudes/satisfactions as a very mild manifestation of withdrawal. Withdrawal has been commonly defined as a defense mechanism. This mechanism removes the individual from an anxiety-provoking situation (Hilgard, ATkinson & Atkinson, 1975) or a frustration-provoking one (Wrightsman, 1977). A great deal of turnover research has, therefore, been conducted simultaneously with absenteeism research because of the assumed continua. However, this point has not been well agreed upon. Brayfield et al. (1955) concluded that absenteeism and turnover were manifestations of the same behavior. March and Simon (1958) hypothesized that the factors causing absenteeism and turnover were the same. Herzberg et al. (1957) conceived absenteeism as a predictor of turnover, preceding turnover as a milder form of withdrawal. Hill and Trist (1955) suggested that turnover and absenteeism were alternate forms of withdrawal.

Recent research seems to have clarified the absenteeism/turnover relationship. Lyons (1972) and Waters and Roach

(1973) reported very little evidence supporting a presumed relationship. Burke and Wilcox (1972) indicated that studies using the individual as a unit of analysis found relationships, while those using the organization as the unit of analysis found no such relationship (perhaps due to intervening group dynamic variables).

Porter et al. (1973) concluded that important differences must exist in the causes of absenteeism and turnover. They have pointed out that absenteeism has different consequences than turnover, such as less negative reinforcement. It seems fairly clear that absenteeism has a weak relationship to turnover and is likely to predict turnover behavior only within constrained situations (e.g., homogeneous groups and work situations such that "all other things being equal . . . ," absenteeism will predict turnover). Nicholsen, Brown, and Chadwick-Jones (1977), in their review of the absence/job satisfaction relationships, have further pointed out that absence may be caused by a host of diverse factors beyond the voluntary control of the individual (e.g., real illness, accident, etc.).

Job satisaction and turnover. The notion that withdrawal was a reaction to job-related anxiety produced by frustration-provoking job factors has led a large number of researchers to explore job satisfaction as a determinant of turnover. Lawler and Porter (1967) have objected to this approach, noting that satisfaction and motivation are not interchangeable terms. Such objections have not deterred

satisfaction researchers. Two major approaches have been used: general job satisfaction and facet-specific job satisfaction.

The negative relationship between general or overall job satisfaction and turnover has been consistently demonstrated since the earliest reviews of this topic. Recent research has affirmed this with Navy groups (La Rocco, Pugh & Gunderson, 1977), psychiatric technicians (Porter, Steers, & Mowday, 1974), and college professors (Nicholson & Miljus, 1972). While the relationship has been of interest, it has contributed very little to the understanding of controllable factors related to turnover. One additional and obvious, but seldom made, criticism of job satisfaction, whether a general or facet-specific approach is taken, is that job satisfaction is by definition always a post-hiring phenomenon and thus has no utility as a selection predictor.

The second approach employed by satisfaction researchers has been to look for specific facets of job satisfaction related to turnover. This approach has been commonly attributed to Herzberg (Herzberg et al., 1957) and is termed "two-factor theory." This theory posits two general classes of satisfaction factors: first, intrinsic, "motivator," or job content factors are concerned with the individual's relation to the job and meeting certain higher order needs (achievement, recognition, advancement, etc.), and second, extrinsic, "hygiene," or job context factors are conceptualized as those needs and rewards mediated by the

organization and less under direct individual control (pay, supervision, job security, etc.). The following presentation of turnover research has been divided into three sections: job context factors, job content factors, and personal characteristics. The studies presented in these sections are concerned with aspects of jobs or individuals, and include both job facet satisfaction research and studies which related measured variation in organizations to turnover (the difference, for example, is between studying how attitudes toward pay, i.e., pay satisfaction, covary with turnover and how pay itself covaries with this criterion).

Job context and turnover. Porter et al. (1973) have summarized the recent research and concluded that the variables of pay and promotion represent significant factors in the termination decision. Armknecht et al. (1972) have shown that wages and salaries are negatively related to turnover rates. Hellriegel and White (1973) obtained six attitude measures toward salary and reported that "turnovers" were less satisfied on all six scales. Over half of all turnovers reported 20% or larger salary gains at the time of turnover. Nicholson et al. (1972) concluded promotion and salary, as well as administrative practices, were related to faculty turnover. Several process theories (expectancy, equity, etc.) have attempted to link compensation with turnover behavior--these process theories have been addressed in later sections.

Size, either organization-wide or work group, has shown, at best, a tenuous relationship to turnover. Porter and Lawler (1965) summarized the research pertaining to work group size's relation to turnover and concluded that a weak positive relationship between size and turnover existed. However, they suggested a stronger size-absenteeism relationship existed and further suggested socioeconomic class might moderate this relationship (i.e., a stronger relationship for blue-collar workers and virtually no such relationship for white-collar workers). A recent study by Longest and Clauson (1974) with eleven hospitals concluded that organizational size was not related to turnover. Since this corresponds with the only other such study of organizational size (Ingham, 1970), it seems reasonable to conclude that this variable has not been an important determinant/correlate of turnover.

Peer group interaction has been another factor often found to be related to turnover in less than a compelling fashion. Porter et al. (1973) concluded that the majority of studies point to the importance of satisfaction with coworkers for retention, although they also indicated that several recent studies contradict such a conclusion (e.g., Waters & Roach, 1971; Waters, Roach, & Waters, 1976). Several points can be made about such research. First, the inconsistency of findings may alternately be explained by suggesting that individuals' and groups' affiliation needs may vary. Variability in need for affiliation may

explain the existence of the demonstrated finding of a work group size-turnover relationship for blue-collar workers. Second, with one apparent exception (Evan, 1963), all research on the coworker-turnover relationship have either focused on satisfaction (Hulin, 1968) or need affiliation (Atchison & Lefferts, 1973) invariably assessed by paper and pencil measures. Evan's (1963) research suggested that a trainee in a department with two or more other trainees was less likely to turnover because of the support from his peers. There exists an obvious need for research relating coworkers' interaction behaviors and withdrawal behavior. There has been, additionally, a need to consider the effects of peer group interaction in the context of individuals' or groups' relative affiliative/social needs. In any event, the conclusion that coworker dissatisfaction cannot be overlooked as a determinant of turnover seems tenable.

Six of seven studies reviewed by Porter et al. (1973) reported a negative relationship between satisfaction with supervisory relations and withdrawal. All such studies investigated satisfactions as opposed to behavior. Fortunately, the Ohio State leadership studies have provided an alternate framework to job satisfaction research. Two general dimensions of leadership are posited: initiating structure and consideration. Research by Fleishman and Harris (1962), Skinner (1969), and others has consistently demonstrated the centrality of supervisory consideration

as a determinant of turnover.

Job content and turnover. Content factors are concerned with the duties/activities/roles/responsibilities, etc. required by a job. Depending on the job-individual interaction, these factors may lead to personal fulfillment or continual problems (e.g., conflict, dissatisfaction, and frustration).

Overall satisfaction with job content has been shown to be usually related to turnover (Porter et al., 1973). La Rocco, Pugh, and Gunderson (1977) have recently reviewed over a dozen unpublished studies from military research, several of which affirmed the conclusion that overall reaction to job content is related to retention (i.e., reenlistment). However, it must be noted that job content, in itself, is a multi-faceted concept.

One facet is the repetitiveness of tasks. While it would seem simple to rate or scale occupational groups (or possibly industries or work units) on the repetitiveness of tasks, and then to examine the relationship to group turnover rates, no such examinations have been made. The research in this area has been fraught with methodological problems. For example, Guest (1955) interviewed industrial workers after termination, and, based on workers' post-hoc reports (quite likely biased by factors such as social desirability), concluded routine and the fractionated nature of jobs (i.e., specialization) were reported causes of turnover. While the preponderance of evidence suggests a

mild positive relationship between task repetitiveness and turnover, it is probably safe to also conclude, as have a number of researchers (Kilbridge, 1961; Hulin & Blood, 1968), that the relationship is complex.

A clearer relationship has existed between role clarity/ambiguity and turnover. The process assumed has been that ambiguous work/role requirements produce confusion, feelings of futility and frustration, and ultimately withdrawal. Porter et al. (1973), summarizing the four pieces of research on perceived role clarity, concluded that a positive relation exists. Wanous (1976, 1977) has presented substantial evidence that realistic job previews decrease turnover. The implication has been that such previews contribute to role clarity. (Note, realistic job previews have also been effective because they have allowed an individual to balance inputs/outcomes prior to employment, and to increase the correspondence between expectations and actual experience.) Research is needed about the effects on turnover of those factors hypothesized to create role ambiguity (rapid organizational change, organizational complexity, ineffective managerial communication behavior, etc. [Katz, Wolfe, Quinn, Snoek, & Rosenthal, 1964]).

Job autonomy and responsibility, as facets of job content, have been approached from several directions. The individual needs for autonomy and responsibility have been discussed in the following personal characteristics section. Three other approaches have been expressed

satisfaction with these facets (Guest, 1955), the extent to which the individual's expectations are reported to be met by the work environment (Ross & Zander, 1957), and perceived level of responsibility and autonomy as predictors of turnover (Waters et al., 1971). All approaches have led to the conclusion that job responsibility and autonomy are negatively related to turnover rates. Again there is a need for naturalistic research on the relationship of measurable autonomy/responsibility with group turnover rates (such research would have to be carefully controlled, perhaps with statistical techniques such as analaysis of covariance, since many significant dimensions such as age, education, occupation, etc. are undoubtedly related to job autonomy/responsibility).

Personal characteristics and turnover. A vast number of personal characteristics have been explored to determine whether they are correlates of turnover. Age is one of the few personal characteristics which has shown a consistent (negative) relationship to turnover. Interestingly, absenteeism has usually been found positively related to age, again suggesting that the determinants of these behaviors are different, and implying the underlying assumption of a withdrawal continua is untenable.

Little attention has been paid to the variable of sex, at least in turnover research. This oversight is likely due to the focus of many researchers on homogeneous (same sex) work groups. This oversight, however, is not

fortuitous since early research by Shott, Albright, and Glennon (1963) strongly suggests tenure is differentially predictable for male and female employees. This had led Schuh (1967) to conclude that separate validity studies should be conducted for male and female workers. Several possible differences in causes of termination seem intuitively obvious (males are not likely to terminate for pregnancy, and seem less likely to terminate for marriage, family problems, or conflicts with spouse's occupation). Recent work by Waters et al. (1976) and Federico, Federico, and Lundquist (1976) has supported this contention. Research on family size and responsibilities also seems to have supported the notion of differential sex-related determinants of turnover. Porter et al. (1973) noted studies that demonstrated that negative relationships exist for male workers' family size and turnover, while the opposite was true for women. When the variable of family responsibility (being responsible for meeting a family's needs) was examined, an inverse relationship with turnover was evidenced for both groups.

Tenure on the job has been related to turnover in two ways: first, tenure on the previous job has been shown to predict turnover, and, second, tenure on the current job has also been shown to predict turnover. Van der Merwe et al. (1971) have plotted "percent survivors" against "months of service" and have concluded the relationship between these two variables is curvilinear (hyperbolic). They have

suggested that since turnover rates decrease over tenure, that an index of turnover should take this into consideration (median length of service is suggested). They have also indicated that the curvilinearity of the relationship varies with cohort group age. This finding seems consistent with those of Kreidt and Gadel (1953) who noted that the validity coefficients were higher for predicting three-month separators than for twelve-month separators. It seems possible that the determinants of early turnover have not been the same as those for later turnover. Schuh (1967) suggested that one explanation of observed findings was that the importance of the social aspects of the work group to the individual changed with job tenure. As with job satisfaction, a problem with using current tenure as a predictor has been that it is a post-hiring phenomenon and thus an impossible selection measure.

Research in the domain of personality characteristics' relationships to turnover has been confusing because of its breadth and lack of integration. Schuh's (1967) review indicated that intelligence and aptitude are not related to turnover. No further research to date has suggested any reason to contradict these findings.

One of the better studies to date, on the relation of personal needs to turnover, was conducted by Ross and Zander (1957) over 20 years ago. They demonstrated that no differences were to be found between turnover/non-turnover groups on the need strengths for recognition and

feedback. Atchison and Lefferts (1971) found slight support for a negative need achievement-turnover relationship, and none for the variables of need affiliation or need recognition with an Armed Forces pilot sample. Faris' (1971) research contradicted this and suggested, for professional employees, a positive relationship between high achievement orientation and turnover. The Atchison and Leffert and Faris research suffered from having very homogeneous employee groups. Lyon's research (1971) with registered nurses indicated an interaction between role clarity and need for clarity in relation to turnover (i.e., a role clarity/turnover relationship existed for those with high needs for role clarity, but not for those with low needs).

Porter et al. (1973) noted other personality factors were positively related to turnover. Among these factors were: (1) aggression, (2) self-confidence, (3) sociability, (4) independence, (5) ascendance, (6) manifest anxiety, (7) neuroticism, (8) authoritarianism, and (9) emotional stability. It should be noted that high levels on the first five of these variables, as well as achievement orientation, might be characterizied as "very positive," while high levels on the last four variables might be characterized as "very negative." The observation that employees who turnover have tended to manifest polar characteristics on some personality continua has led Porter et al. to suggest a "bipolar hypothesis" concerning certain personality traits and turnover. There has been a certain intuitive appeal

to this notion. It suggested that the turnover-prone employee has been either a confident, goal-directed, emotionally stable person, or an emotionally unstable, anxious, authoritarian person. (Note, the characterization of the confident, stable, etc. type of turnover-prone employee sounds very much like a description of assertiveness [Alberti & Emmons, 1974]. The variable of assertiveness has apparently not been tested in its predictivity of withdrawal behavior, suggesting a potential future line of research.)

Only one recent study (Bernardrin, 1977) has attempted to directly test the bipolar hypothesis. Bernardrin used the Sixteen Personality Factors (16PF) with small samples of male sales employees. Results indicated only the anxiety factor was related to turnover. The bipolar hypothesis was not supported for other factors such as independence, self-confidence, instability, aggressiveness, and ambition. Bernardrin's research is laudable in its use of a measure of established validity and reliability (i.e., the 16PF). It could be argued, however, that the sample sizes (about 50 terminators and 50 non-terminators) were not large enough to provide a sensitive test of the hypothesis.

The studies presented in the previous section of "content theories" have been considered in terms of their explanatory import. Before turning to the general domain of "process theories," some consideration has been given to the prediction of turnover. There is naturally some overlap

since most studies are both predictive and explanatory. Much of the research presented in the following section seemed to lack theoretical grounding and was simply concerned with the prediction and validity of prediction of turnover. The following section focuses primarily on the size of the predictive relationship, rather than the previously discussed explanatory variables.

The prediction of turnover. Schuh's (1967) specialized and thorough review of the prediction of turnover is still the only summary of this domain. Schuh's conclusions have been briefly summarized herein, and more recent research added.

As stated previously, a great deal of the empirical research on the prediction of turnover has been atheoretical. While many research studies lack theoretical grounds in their conceptualization and execution, such studies still have utility for description and for post-hoc confirmation of other theories.

A great number of the studies cited in this section have used biographical data as predictors of turnover. The author does not wish to imply that the usage of biodata in prediction is necessarily atheoretical (with full apologies to Dr. William Owens, perhaps the "father" of biographical data prediction, and his colleagues). As Owens (1976) has pointed out, biodata may contribute substantially to theory. For example, biodata may be used as an exploratory device to suggest hypotheses or it may contribute to causal models since it assesses prior inputs and experience. Furthermore,

a basic axiom, or theory, underlies biodata usage: essentially the notion that the past (or present) is an excellent predictor of the present (or future). (As an aside, this has naturally implied that there is consistency of behavior. Recent work in social psychology has suggested that people attribute more consistency to the behavior of others than actually exists [Wrightsman, 1977]. The conflict between these points of view might be profitably explored in the domain of biodata.)

While biodata research need not necessarily be atheoretical, it seems fair to conclude that most such research on the prediction of turnover has been divorced from theory. In defense of the atheoretical biodata approach to the prediction of turnover, it is also fair to conclude, as did Owens (1976), that " . . . biodata is an efficient, robust, and highly valid predictor . . . (p. 612)."

One point which should be briefly reiterated concerning predictive studies of turnover has been consistently noted from the earliest review to the most recent (Brayfield et al., 1955; Porter et al., 1973 respectively) as well as by practitioners of prediction in other areas (Guion, 1965; Owens & Jewell, 1969; Owens, 1976). That point concerns the absolute necessity of cross-validation in predictive research. It is still safe to conclude, as did Schuh (1967) ten years previously, that this has been an often neglected experimental procedure. One reason for cross-validation or replication is to assess whether the original prediction

schema had capitalized on chance. This has been quite probable in many studies where large numbers of predictor variables are coupled with small sample sizes in multiple regression-type analyses. A casual inspection of turnover prediction research leads to the rapid identification of significant, but neither validated nor replicated, predictors. For example, Barton & Cattell (1972) reported a measure, "practical and down to earth," taken from a counseling study associated with lower incidences of turnover, and Schuh (1967) reported church attendance to be negatively related to turnover.

Schuh's (1967) review, briefly summarized, suggested that job satisfaction and biographical data were consistent with predictors of turnover. Personality tests and interest inventories were found to be less consistent, but still promising as predictors. Intelligence and ability tests were found to be fairly consistent in not predicting turnover. Cronbach (1960) characterized aptitude and intelligence tests as measures of maximum performance versus measures of typical performance such as biodata, attitudes, personality characterstics, etc. Lent, Aurbach, and Levin (1971), reviewing over 400 predictive studies of many different job behaviors, concluded that maximum performance predictors were, in general, markedly better at predicting job behaviors than were typical performance measures. Since this has simply not been true for the prediction of turnover,

profitable research might be conducted concerning why this relationship has failed to apply. One possible explanation, advanced by Schuh (1967), has been that these maximum performance measures were related to turnover in a curvilinear fashion, thus their predictivity in a linear prediction model would be less than optimal. The third hypothesis in this study was derived, in part, from Schuh's hypothesis that curvilinear (bipolar) relationships exist between the criterion of turnover and its personality predictors. Essentially, the bipolar hypothesis (in other words, the proposition that those on the extremes of certain personality traits, such as anxiety, are more turnover-prone) has suggested that the reason why personality characteristics have proved to be less than consistent predictors of turnover has been due to most researchers' use of personality characteristics in prediction models where linear relationships have been assumed. Note, Bernardrin's (1977) research, discussed previously, specifically tested the hypothesis that personality characteristics (from the 16PF) were not related in a bipolar manner to turnover. While Bernardrin generally rejected this hypothesis, his research has simply contributed more evidence that such variables have been less than consistent in their relationship to turnover. Clearly more evidence has been needed.

Since substantially different statistical techniques have been used in the prediction of turnover (e.g., discriminant analysis, weighted application blanks, chi-square),

comparisons between studies' relative predictive power has proven to be very difficult. Darlington (1968) has discussed some of the problems of evaluating the relative importance of predictors in regression. The problem has been particularly acute with highly correlated predictor variables.

Several recent studies have attempted to test the relative importance of different types of predictor variables. Waters et al. (1976) demonstrated with female clerical employees that even a very short (four items--age, marital status, job grade, company tenure) biographical data set could contribute as much, or more, to the prediction of termination when compared to job satisfaction measures (five subscales of the Job Description Index). Perhaps of greater import, however, was the finding that a single "intent to remain" item was the single highest correlate of termination. This variable contributed to the prediction of termination even after partialling out the relationships of all other predictors with the criteiron. This finding confirmed Krauts' (1975) conclusion drawn from research with salesmen " . . . that an employee's intent to remain with an organization is a more powerful predictor of his later turnover than are other measures of job satisfaction (p. 240)." Alley and Gould (1976), in a large sample study (N = 50,000 plus) of Air Force re-enlistment, concluded that career intent was substantially related to career decisions. Job attitudes were also found to be substantially related

to career decisions, however, they did not add to the prediction of career decisions when used in conjunction with career intentions. The research of La Rocco et al. (1977) similarly concluded that expressed intention to re-enlist was an excellent predictor of re-enlistment behavior in a large scale study of Navy enlisted men. While it may be concluded that expressed intention is a fine predictor of termination, the relative importance of this variable, in comparison to biographical items, has not been clear. The Waters et al. (1976) study suffered from a small biodata set, both Kraut's (1975) and Alley and Gould's (1976) research compared intent to remain only with satisfaction measures, not biographical data, while La Rocco et al. (1977), in their presentation of data, suggested that the single intent to re-enlist item may be a better predictor than either an extensive pre-service (i.e., biodata) item set, or an extensive set of in-service experience (i.e., satisfaction and performance) measure.

In part due to the lack of clarity in regard to the relative importance of this variable, the first hypothesis of this study tested whether expressed intention to leave an organization was a better predictor than biographical items, taken singly, or as part of a composite predictor set. This line of research has import, too, because it seems likely that when used as an employment selection measure, intent to remain may be highly subject to faking. Faking or falsification of data, as Owens and Henry (1966),

and more recently Cascio (1975), have noted, has not usually been a significant problem with biographical data, thus there has been some utility to discovering whether biodata can predict as well as a potentially fakable intent item.

The importance of gaining further understanding of the withdrawal process was underscored when recent multiple regression studies of turnover were examined. While significant multiple regressions have been produced in such studies, they are rarely as large as might be desired. Alley and Gould (1975), predicting re-enlistments of Air Force enlisted personnel with career intent and job attitude responses, reported a multiple correlation coefficient of .36. The career intent item proved almost as predictive as the combination of intent/attitude items. In a similar study of Navy enlistee retention, Sands (1975) reported a multiple point-biserial validity of .31. Significant predictors included years of schooling, mental aptitude, age, and number of dependents.

Bernardrin's (1977) research with the 16PF on a sample of male sales organization employees produced multiple correlation coefficients of .39 and .47 for two samples. Upon double cross-validation, the correlations between predicted values and tenure were .31 and .38. The personality factors of conscientiousness and anxiety accounted for two-thirds of the variance.

Waters et al. (1976) reported three variables contributing to a multiple correlation of .50. The variables, in

order of estimated contribution, were intent to remain, work scale satisfaction (from the JDI), and company tenure. The sample was drawn from a pool of non-supervisory female clerical employees. Federico et al. (1976) had somewhat more success in predicting turnover of female employees in a variety of non-supervisory jobs in a credit union operation. Six of thirteen biographical variables contributed to the multiple correlation coefficient of .87. The cross-validity was calculated at .74. It is important to note that the extent to which salary expectations were met was among the significant predictors (the others were marital status, age at application, number of children, age of youngest child, and education). Two other points may be made about this research: first, a larger biographical data was employed than in most of the previously mentioned research, and, second, the criterion was tenure on the job of those who had terminated, a somewhat different criterion than simple termination/retention behavior.

A conclusion that there is room for improvement in the prediction of turnover seems reasonable. As previously stated in the discussion of the third (bipolar) hypothesis, curvilinear relationships may have been muddying the prediction of turnover. Another possible effect, confounding such prediction, may be explained in the fourth hypothesis which has suggested that the predictors for highly effective terminating employees may be different from the predictors of ineffective terminating employees. Only one piece of

research has addressed this question in industry--which seems surprising given that the most troublesome aspect for managers concerning turnover has been the departure of their effective employees. (It should be noted that while the departure of a valued employee is important, it has also been true that poorer performing employees actually leave in higher proportions [Faris, 1971; Proctor, Lassiter, & Sayars, 1976].)

Faris (1971), in a study of scientists in organizations, found eleven significant predictors of turnover for a high performing group, Furthermore, he found only three such predictors for a low performing group. Most importantly, only one predictor (age) was shared by both groups. Faris went on to conclude that such findings should not be extended without replication. Since such replications have not emerged, it may be construed as an important void in turnover research. This, then, has been the focus of the fourth hypothesis.

Process Theories of Turnover

Two broad theories have been examined in terms of their ability to explain turnover behavior. Equity/exchange theories were examined first, then expectancy/instrumentality theories. Finally, some developing notions concerning the relationship of turnover to organization commitment have been discussed.

Turnover as a result of exchange/inequity. Two similar theories have contributed to the understanding of turnover behavior: exchange theory and equity theory. Thibaut and Kelley (1959) developed exchange theory as a way of generally predicting behavior in human interactions. A person's tendency to maintain an interaction is said to be a function of the rewards he/she receives from such an interaction (e.g., money, social recognition, etc.), balanced against the costs of maintaining the interaction (e.g., time and effort spent, frustration, etc.). Equitable exchange, from such a person's orientation, has occurred when costs are exceeded by rewards in the interaction. When costs exceed rewards, inequitable exchange has occurred, and it is predicted that the person will try to dissolve the interaction. Proponents of exchange theory (March & Simon, 1958) have stated that a person's perception of inequitable exchange with his employer will result in turnover.

The process described by equity theory (Adams, 1963; Pritchard, 1969) is similar to that of exchange theory with a special emphasis on the "fairness" (i.e., equity) of the exchange interaction. When equitable exchange has occurred, the person should have received outcomes in proportion to his/her inputs. Note, exchange theories have stated that behavior is maintained when rewards exceed costs by any amount, while equity theory has suggested that inequitable exchange has occurred (and behavior will not be maintained)

when rewards are either significantly greater than (over-compensation inequity) or less than (under-compensation inequity) costs. Inequity has been assumed to create a state of dissonance (Festinger, 1957) and thus pressure to relieve the tension generated by such dissonance. Various forms of withdrawal behavior, including turnover, have been proposed to be among the ways such dissonance-generated tension may be reduced.

Research developed to test the equity and exchange theories on turnover behavior has been generally supportive. Telly, French, and Scott (1971), in a study of hourly employees in an aerospace company, found significantly fewer perceptions of inequity in lower turnover shops than in higher turnover shops. Five areas were identified where respondents from high turnover shops had feelings of greatest inequity: the supervision, the leadmen, working conditions, intrinsic aspects of jobs, and social aspects of jobs.

Dansereau, Cashman, and Graen (1973), in a study of managers, demonstrated that, under certain conditions, equity theory accurately predicted the interaction of two leadership dimensions (structure and consideration) with turnover rate. When leadership employed a medium level of structuring (a failure to communicate performance-outcome contingencies), high performers were more likely to leave and low performers to stay. This was in remarkable opposition with the results from leadership situations high or low on structure, where the high performers remained and

the low perfomers left. Two points emerged from this research. First, leaders have played a key role in providing equitable performance-outcome contingencies. Second, when performance-outcome contingencies have been ambiguous, the individual has had difficulty attributing his rewards (correctly) to performance, thus the high performers have been more likely to experience inequity.

The research has suggested that of the two inequity conditions, over- and under-compensation, the effects of under-compensation have been clearly more demonstrable (Pritchard, 1969; Campbell & Pritchard, 1976). The effects of over-compensation have not been consistently shown and a number of methodological problems with the inducement of overpayment compensation in experimental settings have been noted (e.g., overpayment inequity is often induced by attacking a subject's self-perceived qualifications, thus concomitantly attacking the subject's self-image). A substantial body of evidence has been accumulated to support the contention that overpayment and underpayment inequities have different effects. Andrews and Valenzi (1970; Valenzi & Andrews, 1971) found that individuals in over-compensated groups were less likely to quit or to think about quitting than were members from under-compensated groups. Weick and Nesset (1968) had reported previously that subjects in underpayment inequities were more likely to adjust by quitting than did subjects in overpayment inequities.

Lawler (1971) has posited one explanation for the disparity between the effects of under- and overpayment compensation on turnover behavior. While overpayment inequity induces tension to reduce the inequity, he has argued that the financial inducements confound, or compete with, the need to reduce the tension.

It seems simpler, however, to suggest that exchange theory better "fits" turnover behavior than does equity theory. Exchange theory has stated that inequity exists only if costs exceed rewards (analogous to underpayment inequity). Under such circumstances, it has been predicted that turnover behavior will occur. Equity theory has predicted that, in overpayment conditions, turnover behavior will also occur, while exchange theory has predicted that the individual will not leave the organization. Exchange theory, then, has appeared to provide a more accurate picture of turnover behavior than has equity theory.

An alternate group of theories, called by many names but often valence-instrumentality-expectancy theory (VIE), may encompass both equity and expectancy theories. Essentially, VIE and similar theories have been proposed as broad theories of human motivation (Campbell & Pritchard, 1976).

Turnover as a function of expectancy-instrumentality-valence. Instrumentality has referred to the notion that a person's behavior is determined by his/her expectations that specific actions lead to outcomes and his/her evaluation

of those outcomes. This notion was first developed in the 1930's as part of Tolman's cognitive theory and Lewin's field theory. This general notion has since been widely applied to areas such as learning theory, motivation, attitudes, and work motivation. Lawler (1971, p. 88) has presented seven variations of expectancy theories of motivation.

Georgeopoulos, Mahoney, and Jones (1957) were perhaps the first to apply the instrumentality hypothesis in an industrial setting. The hypothesis, that worker's perceptions of the "path" (instrumentality) between productivity and attaining personal goals would predict productivity, was confirmed.

Vroom (1964) proposed the first formal statement of instrumentality theory applied to work motivation. He theorized that effort was a function of the expectancy that effort would lead to a certain level of performance multiplied by the valence of that performance (defined as the value of the outcomes multiplied by the instrumentality of task accomplishment for obtaining/avoiding task outcomes). While VIE theory was itself derived from earlier research, many variations have been proposed from Vroom's original model (Campbell, Dunnette, Lawler, & Weick, 1970; Graen, 1969; Porter & Lawler, 1968).

Since it was not the purpose of this paper to review all the variations of VIE theory, the reader is referred to the following detailed treatments: Vroom, 1964, 1965; Campbell et al., 1970; Dachler & Mobley, 1973; Campbell &

Pritchard, 1976) as well as to several critical reviews (Heneman & Schwab, 1972; Schmidt, 1973; Wahba & House, 1975). As a brief summary of VIE theory, it seems reasonable to conclude that while the empirical results have not been all that strong, the theory has considerable value as an organizational framework for integrating various theoretical approaches and empirical results.

VIE theory, and its variations, have been broad theories of human motivation in work environments. Several recent studies have focused on applications of VIE theory to turnover behavior. Essentially, the approach has been through the notion that the overall attraction of a job is a function of the instrumentality of the position for the attainment of desired outcomes. Vroom (1966) had master of science candidates in Industrial Management rate the desirability of outcomes (goals), then the instrumentality of an organization (for attaining outcomes), and the attractiveness of the organization for each of three organizations to which the candidate had applied. The ratings were repeated after the candidate had been accepted into one employing organization. The attractiveness of an organization was found to be positively correlated with the goal-instrumentality index of that organization (the degree of correspondence of goals and instrumentality). This index was found to increase at the second rating (after a choice of employers was made) for the employing organization and decrease for the other two organizations.

Vroom and Deci (1971) reported on a follow-up of the previous study (Vroom, 1966). The same kinds of ratings were obtained three and one-half years after entering the employing organization. They found that the mean instrumentality-goal index continued to increase for those individuals who continued to see their organization as more and more attractive. These two studies have been valuable because they first demonstrated that the instrumentality-goal relationships were corresponding with preference/attraction for an organization both before and after joining the organization. However, the relationship between attraction and turnover behavior had not yet been tested.

Mitchell and Albright (1972) conducted a study with two squadrons of naval aviation officers on the relation between attraction and intentions. They found that an individual's turnover intentions could be predicted from an individual's expectancy that effort leads to successful performance times the attractiveness of the work role (defined as the sum of the perceived attraction of each role outcome times the instrumentality of work role for the attainment of each outcomes). The correlation with turnover intention was .47 ($p < .01$). Their study noted that intrinsic satisfaction (Graen, 1969) appeared more important in determining retention behavior than did extrinsic satisfaction. They further noted that satisfaction with one's position seemed more important than did satisfaction with the organization.

Schneider (1976), similarly employing the notion that organizational attraction is a function of work role instrumentality, conducted a study of Navy enlistees' re-enlistment intentions. He hypothesized that participation was the result of the process in which individuals evaluate their current circumstances and alternatives.

> The relevance of alternatives and their impact on behavior have been stressed by Thibaut and Kelley (1959) in their monograph which examined the interpersonal transactions among two people (a dyad). They proposed individuals can employ two standards to judge the acceptability of a dyad. The first standard, the comparison level (CL), is a criterion against which an individual may judge the attractiveness of a relationship . . . . The comparison level for alternatives (CL_{alt}) on the other hand references a standard which the individual employs to decide *whether to stay* in a relationship. CL_{alt} represents the level of outcome an individual could expect in his best alternative relationship (Schneider, 1976, p. 313).

Subjects were asked to rate the outcome desirability of 30 outcomes and the instrumentality of being in the Navy for obtaining each outcome. Ratings were also collected on the instrumentality of being a working civilian for obtaining each outcome. The index of attraction (sum of the desirability of each outcome times the rated instrumentality) of the Navy was correlated .41 ($p < .01$) with intentions to re-enlist, while the index of attraction of being a working civilian was correlated -.24 ($p < .01$) with re-enlistment intention. It was hypothesized that consideration of both contexts (Navy and civilian) would improve the relationship between attraction and re-enlistment intentions. Difference scores were computed (Navy attraction scores

subtracted from civilian attraction scores). The partial correlation (a technique used to compensate for statistical bias in difference scores) between the difference scores and re-enlistment intentions, adjusting for the initial level of Navy attraction, was reported as -.40 (p .01). Schneider concluded that the consideration of both contexts (CL = Navy, and CL_{alt} = working civilian) increased the prediction of participation/withdrawal intentions. Schneider also concluded, as had Lawler and Suttle (1973) earlier, that weighting instrumentality measures by outcome disirability did not increase the ability of such measures to predict behavior. Schneider reported that the attraction indices (instrumentality x desirability) were not more strongly correlated with re-enlistment intentions than were the instrumentality indices alone.

Perhaps due to the inability of valence to contribute to the prediction of turnover behavior, a number of recent studies of turnover have focused on the notion of expectancy. Rather than use Vroom's (1964) original definition of expectancy (the perceived relationship between a given degree of effort and a given level of performance), such work has employed the definition of expectancy used by Porter and Lawler (1968). This definition of expectancy has focused on the effort-reward contingency, or the expectation that rewards will be met (in Vroom's terminology this would be the combination of expectancy and instrumentality). This focus on expectancy to the exclusion of

valence and instrumentality seems reasonable in light of recent evaluations of VIE theory. As Locke noted in a recent Annual Review of Psychology monograph, " . . . there are no consistent findings regarding which components are the best predictors of performance. Sometimes V works best (77). Sometimes I works best (67). More often E works best (3, 29, 85) (Locke, 1975, p. 458)."

This formulation was used by Porter and Steers (1973), in their recent review of turnover behavior, as an attempt, theoretically, to bridge the well established relationship between satisfaction and turnover. They conceptualized job satisfaction as the sum total of an individual's met expectations on the job, i.e., the more expectations of an individual that were met on the job, the greater would be the satisfaction and the less would be the force to withdraw from an organization. It was recognized that different employees have different "expectation sets" focused on different factors of jobs. "In general, then, the decision to participate or withdraw may be looked upon as a process of balancing received or potential rewards with desired expectations (Porter et al., 1973, p. 171)."

Two lines of earlier research have tended to support the importance of employee expectations in influencing turnover. First, Dunnette, Arvey, and Banas (1973), in a study of turnover of college graduates in a large organization, and earlier Katzell (1968), in a study of dropouts in a school of nursing, reported that at the time of

organizational entrance there were no differences in expectational levels between those who would later leave and those who would stay. Both reported, however, that as time went on, those who left reported their expectations had not been met, while those who stayed generally perceived their original expectations as met by the job.

A second similar line of research, recently summarized by Wanous (1977), has found that when prospective employees are furnished with realistic previews of the job environment prior to employment, their job expectation levels apparently adjust downward to more realistic levels. These lowered levels were more readily met by the job, thus reducing turnover.

Only one recent study has been found that directly tests Porter and Steers' (1973) hypothesis concerning met expectations. Federico, Federico, and Lundquist (1976) reported such a study conducted with voluntarily terminated female employees of a credit union. These authors reasoned that salary, for most if not all employees, was a highly salient dimension of expectation. Thus they explored the effect of expected salary, at organizational entry, and the extent to which expectations were fulfilled, during employment, on turnover behavior. Their measure of met salary expectations was the difference between the highest salary earned during employment in the organization, and the salary expected at the time of employment. This variable, with twelve other biodemographic items, was used in a

multiple regression on the dependent variable of length of company tenure prior to termination. Along with five biodemographic items (marital status, age at application, number of children, age of youngest child, and years of education), the met salary expectation variable contributed to the significant prediction of tenure ($R = .87$, $p < .01$, with cross-validity estimated from a second holdout sample of .74). A second regression analysis, which entered original salary expectations and highest attained salary, rather than the difference, as well as the biodemographic items, demonstrated that both achieved and expected salaries contributed (significant regression coefficient beta weights) to the final regression function along with the previously identified five biodemographic items.

The second hypothesis of this dissertation was intended to assess, in a fashion somewhat similar to that employed by Federico et al. (1976), Porter and Steers' hypothesis concerning the effects of met expectations. Following the reasoning of Federico et al., it was assumed that grades were one highly salient dimension of student expectations. Thus, the extent to which such expectations were met would predict attrition/persistence. Those students with unmet grade expectations (i.e., the expectancy of high grades and the reception of low ones) would be expected to be more likely to leave than those with met grade expectations.

The contribution of this line of research was two-fold. First, it provided additional empirical support by confirming/disconfirming the importance of met expectations in predicting withdrawal behavior in a different organizational milieu (i.e., educational). And, second, it provided perhaps the first direct test of met expectations in predicting attrition since Federico et al.'s study has not been above methodological criticism (they predicted length of tenure of those who voluntarily terminated, not which subjects would terminate).

Turnover as a function of commitment. A body of recent research has begun to accumulate concerning the relationship of turnover with organizational commitment. The earliest such work might be better included within the content theories section, presented earlier, since this research, like similar research on intent-to-remain attitudes, has simply tested the empirical relationship between the organizational commitment attitude and turnover. For example, Porter, Steers, Mowday, and Boulian (1974) found organizational commitment to better predict "stayer/leaver" status than did the JDI job satisfaction components. Recent articles have proposed models of turnover behavior that have suggested that organizational commitment was an intermediate linkage between turnover and its causal factors (Steers, 1977; Mobley, 1977).

Most of the previous research about organizational commitment seems to have focused upon the effect of this

variable upon performance, and the causes of commitment attitudes. This focus has arisen from a definition, still current, that commitment is an orientation toward an organization which links the identity of the individual to it, with the primary effect of causing an intent to work toward the goal(s) of that organization (Sheldon, 1971). Steers (1977) has noted that there are other outcomes of organizational commitment as well as performance, e.g., intent to remain, retention, and attendance. Given the relationship of organizational commitment attitudes to retention, previous research on the "causes" of such attitudes has lent added insight to the understanding of turnover.

The relationship of organizational commitment to turnover was first demonstrated by Porter et al. (1974) with a sample of psychiatric technician trainees. Measures of commitment were given at four intervals--two prior to training completion and two after. Only the latter two intervals, two and six weeks after beginning full-time work, predicted turnover. They suggested that the commitment attitude most accurately predicts turnover as the individual approaches the termination point.

Porter, Crampon, and Smith (1976) have extended this work with a sample of managerial trainees. Again, the results of the longitudinal study have demonstrated that a decline in commitment precedes termination. Those who terminated early experienced early declines in commitment,

while those who terminated later showed later declines. They suggested, in discussion, that research was needed concerning the causes of commitment levels. However, a substantial body of research may be said to exist concerning commitment attitudes. It will be argued here that there is some generalizability to the commitment-turnover domain from the research on the commitment-performance relationship.

Sheldon (1971), in a study of the commitment attitudes of scientists and engineers, concluded that age, tenure, hierarchical position, and social involvement with peers were related to commitment. Her work differentiated between professional and organizational commitment and suggested that, in particular, the social involvement dimension increased the commitment to the organization.

Tenure, managerial relations, and sense of work accomplishment were reported by Lee (1971) as determinants of organizational identification, a primary component of commitment. For the study group of 170 research scientists, perceived prestige of the profession and personal prestige within the organization were also found to be determinants of organizational identification. Organizational identification was shown to be negatively related to the propensity to leave the organization and positively related to productivity as rated by a superior.

Hrebniak and Alutto (1972) discovered that tenure, role tension, and bases of organizational advancement were the most effective predictors of commitment. They have

interpreted these findings within an inducements-contributions framework (i.e., exchange). They also noted that dissatisfaction and sex were related to expressed commitment in their studies of teachers and nurses.

Buchanan (1974), examining the socialization process that builds commitment in work organizations with a managerial sample of five governmental agencies and three manufacturing concerns, found tenure, social interaction with peers and superiors, and personal importance (a concept subsuming job achievement and hierarchical advancement) to be determinants of commitment. An additional, important finding was the revelation that the experiences affecting commitment attitudes vary with increasing organizational tenure.

Three points may be made about these four studies. First, several common themes may be seen in determining commitment: tenure, social relations, and achievement/advancement opportunities. Second, as will be recalled, all three of these themes have been identified in previous sections, as well, as correlates of retention/termination. Finally, all of these studies have focused upon the organizational commitment of professionals, thus future research might focus on other occupational strata within organizations.

Steers (1977) has proposed, and tested, a model of the antecedents and outcomes of organizational commitment with two diverse samples of research scientists/engineers and technical/non-technical hospital employees. Commitment was found related to the outcomes of intent and desire to

remain, and somewhat less related to attendance and turnover. Commitment was also demonstrated to be related to three clusters of antecedents: personal characteristics, job characteristics, and work experiences. Of these three clusters, work experience was found most closely associated with commitment. The significant presence of the other two clusters, however, indicated to some degree the causal complexity of organizational commitment, and ultimately turnover. Steers' effort has represented an important step forward in the attempt to develop a model of the withdrawal process since it has spanned several domains known to be related to turnover.

Mobley (1977) has presented a conceptual model of an even broader nature concerning the withdrawal process. He has envisioned a nine-step model leading to termination behavior. Each step both leads to the next and may feed back to previous steps in a recursive fashion. First comes evaluation of the existing job, which then leads to satisfaction/dissatisfaction. He suggested a number of models have already been proposed for these first two steps, for example, VIE, met expectations, contribution/inducement ratios, etc. The third step is thoughts of quitting (a notion previously discussed as a relatively mild step along the withdrawal continua). This is followed by an evaluation of the utility of search and cost of quitting. This step is, essentially, a perceived ease of movement concept, and allows a consideration of external conditions such as

labor markets. The fifth step, intention to search for alternatives, also allows a consideration of non-job factors such as transfer of spouse. The next step is the actual search for alternatives. Depending on the success/failure of this step, as with the others, it may lead forward, or feed back to a re-evaluation of previous steps, or lead to other forms of withdrawal behavior, such as absenteeism. The seventh and eighth steps are the evaluation of the alternatives and the comparison of the alternatives versus the present job. Perhaps in a fashion suggested by Schneider (1976, after Thibaut & Kelley, 1959) of comparison level and comparison level for alternatives. The ninth, and last step, which leads to termination behavior, is the intention to stay-quit. This last may be subject to impulsive behavior as well as to the preceding influences.

Mobley has presented this model without sustaining research of his own. He has stated that the model is heuristic rather than descriptive; furthermore, he has argued that different numbers and sequences of steps should exist for different individuals. While the sustaining research has been lacking, it may be said that a number of the posited relationships have been demonstrated, e.g., satisfaction with thoughts of quitting, intention to quit and termination behavior, etc.

The primary weakness of Mobley's model would appear to be its agglomeration into the first step of all three of Steers' (1977) antecedent clusters to commitment: personal

and job characteristics and work experience. Steers' model seems lacking, by comparison, in its failure to consider external factors and comparison processes of alternatives. Both models seem to have value in that they may guide research toward an ultimately more valid model of the withdrawal process.

Research on College Attrition

Consensus has existed within the research literature that college student attrition presents a problem to institutions of higher education. Interestingly, while industry has focused on both the costs and prevalence of turnover as major concerns, the research literature within the field of higher education has tended to ignore costs in defining the extent of the problem and has focused primarily upon prevalence data. Astin (1975) has identified, among the consequences of dropping out of college, delay of occupational entry, waste of limited resources, loss of talent, personal and psychological setbacks from a futile expenditure of time and effort, and so forth.

Cost data, however, has not been necessary to demonstrate the extent of the problem. Prevalence data alone has been more than sufficient. However, as in industry, examination of prevalence data immediately brings up definitional problems. Iffert (1957), in the first major study of the retention and withdrawal of college students, recognized that there were differences among types of dropouts.

He used ten different categories of dropouts and non-dropouts. Since that time many different classification schemas have been used (Tinto, 1975; Hackman & Dysinger, 1970) and some researchers have argued that no differentiation among dropouts is preferable (Pantages & Creedon, 1978). The lack of agreement concerning the classification of dropouts has inordinately complicated both reviews of the literature, and, more importantly, the integration of studies and the ultimate development of a theory of the withdrawal process. As Tinto (1975) has noted,

> Inadequate attention given to definition has often led researchers to lump together under the rubric of dropout, forms of leaving behavior that are very different in character. It is not uncommon to find, for instance, research on dropouts that fails to distinguish dropouts resulting from academic failure from that which is the outcome of voluntary withdrawal. Nor is it uncommon to find permanent dropouts placed together with persons whose leaving may be temporary in nature or may lead to transfer to other institutions of higher education (p. 89).

It was the purpose of this particular review to explore the causes of voluntary attrition and such was the focus of this review. Even so, there have been variations among the definitions of voluntary attrition, such as definitions describing dropouts as (1) those leaving an institution at any point regardless of their future actions, such as returning to that institution or to a transfer institution, (2) those who do not graduate within a certain time period, or (3) those lost to all colleges. Such definitional differences have been noted throughout the course of this review since they influence the interpretation of the results of studies.

Iffert's (1957) landmark study of college attrition rates has been quite consistently reaffirmed in the following years. He noted that half of an entering class would graduate from some institution in four years. Of this half, 20% will graduate from different colleges while the remainder will graduate from the college they entered. Of the half that are "lost," 20% will graduate from some other institution in a period greater than four years. Summerskill (1962), in a major review of the persistence literature, confirmed these findings and suggested that the "lost" rate of 50% had not changed significantly in four decades. Summerskill also noted that there were tremendous variations among individual institutions in attrition rates. However, the differences among these institutions in attrition rates may reflect methodological differences in the 35 studies he reviewed. Astin (1975) confirmed, in a study using data from over 300 institutions, that the national withdrawal rates have not markedly changed in recent years.

Finally, some very recent data from a national probability sample (Peng, Ashburn, & Dunteman, 1977) has provided data concerning freshman withdrawal. Their data suggested that about 17% of all freshman withdrew from four-year institutions before starting a second year. Of these, slightly more than one-quarter did so for academic reasons (determined by a self-report of a grade point average below a "C" or a self-report of failing work). It is interesting to note that the results obtained by Peng

et al. suggested a freshman dropout rate only about two-thirds of that estimated by the National Commission on the Financing of Post-Secondary Education (1973). These latter estimates, based on the entering class of 1967, suggested that about one in four students who entered four-year colleges or universities would not return for their second year. This apparent decrease in freshman attrition patterns, nationally, may have reflected increased activities on the part of colleges and universities to lower their dropout rates.

In a fashion similar to industry, there is ample evidence that attrition rates vary substantially between institutuions of higher education (Summerskill, 1962). However, unlike industry, a number of researchers have exploited these existing variabilities in studies to determine cross-organization correlates of student attrition. Such studies (e.g., Panos & Astin, 1968; Kamens, 1971) have been examined under organizational context factors in a later section. It must be noted, however, that, as in industry, there have been few attempts to manipulate organizationally controllable factors to better understand the determinants of student attrition, either in an experimental or quasi-experimental fashion.

The conceptualization of two general classes of theory employed in the review of turnover have been used in the presentation of the review of college student attrition. First, data relevant to content theories have been presented, followed by research relevant to process theories.

Content Theories of College Student Attrition

This review has been built upon two major recent reviews of college student attrition research and theory (Tinto, 1975; Pantages & Creedon, 1978). Interested readers are especially referred to the Pantages and Creedon article because of its comprehensiveness and recency. Readers are also referred to the Peng et al. (1977) research from the National Longitudinal Study of the High School Class of 1972. This research has been particularly important because of its timeliness and the excellent representativeness of the sample employed in the study. The conclusions from these reports have been given on extensive bodies of research and more recent evidence has been added. Readers interested in techniques alleviative of college dropouts are referred to Astin's (1975) recent book and the conclusions expressed by Pantages and Creedon (1978).

Several points should be made concerning major differences between college research on attrition and industrial research on turnover. First, unlike industry, there has been no significant body of literature which has conceptualized the withdrawal processes as a continua in a fashion similar to that employed in industry for the absenteeism/turnover continua. It is clear from industrial research that the causes of absenteeism and the causes of turnover have not been necessarily the same. However, it would seem that some additional information might be gained in higher education through examining whether or not the apparent

causes of college attrition were also associated with various forms of withdrawal behavior, such as absenteeism, failing performance, or negative attitudes.

A second major difference between these two fields has been the substantial lack of research attempting to relate overall satisfaction with college and voluntary college attrition. This could be conceived of as analogous to industrial attempts to study overall job satisfactions' relationship with turnover. This seems surprising since satisfaction measures have been relatively easy to assess. Somewhat more work has been done assessing the relationship of various facets of college satisfaction, such as satisfaction with faculty or peers and college attrition. Furthermore, since college populations have traditionally been relatively accessible to researchers, it seems that some opportunities to study the dynamic correlations of satisfaction and attitudes with attrition behavior would be possible.

Personal characteristics and attrition. Substantially more research on the relationship between personal characteristics and college student attrition has been generated in the field of higher educational research than has been generated on the analogous problem in industry. Furthermore, substantially more research has been generated concerning the interactions of various personal characteristics with each other and other variables in relation to dropouts. Due to the amount of such research, this section has been divided

into four subsections.

Bio-social background. Most of the large-scale empirical research on college student attrition has found no difference in attrition rates for college men and women (Iffert, 1957; Astin, 1972; Peng et al., 1977). These findings, among others, have led the major reviewers of attrition research to conclude that sex has not been a significant determinant of persistence or attrition (Summerskill, 1962; Pantages et al., 1978). However, other research has tended to contradict this conclusion (Tinto, 1975; Spady, 1970). Such contradictory evidence has primarily come from multivariate research which suggests that, as other factors are taken into consideration, the significance of sex as a determinant becomes more important.

The results that have examined the relationship of age with attrition have been equivocal. Summerskill (1962) noted that some studies showed no differences in attrition rates for older or younger classmates, while other studies indicated older students were somewhat less likely to graduate. Sexton (1965) more recently concluded that students closer to the median age of entering students had a better chance of persisting. However, she, like Summerskill, concluded that age was not a crucial factor in causing attrition. The reason for such a conclusion was that it was expected that those factors determining early or late entrance for a student would also be involved in the later

determination of attrition.

Earlier studies found significant differences in attrition among ethnic groups. However, as Pantages and Creedon (1978) have noted, most studies failed to take into account other factors related to ethnicity and attrition, such as SES. Astin (1972), in a major study of fall, 1966 freshmen, found that being black had a significant negative zero-order relationship with persistence. He reported, as well, that as other predictor variables were controlled, the relationship of ethnicity to persistence tended to disappear. Research from the National Longitudinal Study of the High School Class of 1972 (Peng & Fetters, 1978) concluded " . . . that race differences can largely be accounted for by variables such as rank in class, high school program (academic preparation), and SES. Race itself has little effect on college persistence or on entry (p. 367)."

Summerskill's (1962) review of relevant studies indicated " . . . that a student's hometown is sometimes and somehow related to success or failure in college (p. 633)." He stated that positive correlations between dropping out and the distance between the student's hometown and college and negative correlations between the hometown and dropping out have been found. Furthermore, he noted that students from rural or out-of-state areas had higher attrition rates. However, Pantages et al. (1978) noted that Iffert's (1957) landmark study indicated just the opposite. They pointed to other studies that supported the conclusion of Iffert's

that the location of a college in relation to a student's home cannot have affected the student's chances of graduation. Summerskill, too, questioned whether location and size of home communities were themselves determinants of persistence. He suggested that hometown environments could be correlated with size, location, and attrition, among other variables.

Pantages et al. (1978) reported that while there was some evidence that students from small high schools were more likely to drop out, the research findings were generally consistent with the notion that there was little relationship between high school size and attrition. The research concerning high school type (private vs. public) has been contradictory. An early review of the research (Sexton, 1965) concluded that students from public high schools had a better chance of persisting than did students from private high schools. More recently, Astin (1973) found that attrition rates were higher for graduates from public high schools. However, Astin (1972), in another study, determined that high school type was not an important variable in the prediction of persistence in college.

While the role of high school type has been unclear, it has been somewhat clearer that the characteristics of a high school, such as facilities and staff, have been important in determining individual achievement. Dyer (1968) has suggested that these characteristics would affect performance, which in turn would affect persistence. Peng et al. (1977) have demonstrated that high school curricular program,

i.e., college preparatory vs. non-preparatory, was associated with college persistence. They have speculated that college preparatory programs increase commitment to higher education and integration into the college system.

The two major recent reviews of college attrition research have drawn similar conclusions on the import of socio-economic status (SES) in determining attrition. Tinto (1975) concluded that dropping out was inversely related to the student's family's SES. He cited specific findings on family attributes related to students' persistence. "To summarize these findings it appears that college persisters are more likely to come from families whose parents are more educated . . . are more urbane . . . and are more affluent . . . (p. 100)." He cited a particular study by Astin (1972) that concluded that "family income alone is becoming increasingly less a determinant of college persistence."

The SES construct has included a number of different dimensions. Early research (Summerskill, 1962) suggested that fathers' occupation was related to students' persistence. However, Pantages et al. (1978) noted that more recent research has not supported such findings. They suggest that earlier research failed to control for other variables associated with fathers' occupation, such as high school GPA. Most research has seemed to be consistent with the notion that parental education is associated with persistence rates (Astin, 1973, 1975). It has not appeared, however, that parental education has been a major factor in the

determination of attrition. Summerskill (1962, citing other research by Farnsworth) suggested that the link between education and persistence came through the family's determination of educational values.

Tinto cited additional research on other factors, associated with family background, which affect educational attainment and performance in college and thus may affect attrition. Among these were the quality of relationships within the family and the involvement and expectations about students' education held by parents. The evidence suggested that students who persist were more likely to come from open, democratic, supportive families where parents express interest in the student's college experience, give advice, praise, and so forth. Furthermore, there has been evidence (Hackman & Dysinger, 1970) that parental levels of expectation influence a student's persistence as much as his own expectations. Again, it has been suggested that parental effects on students' values are the most important component. While quite a bit of research on family influence on college attrition has been conducted, there has been no research concerning high school peer group influence on attending college. Considering that the impact of peer groups on teenagers has been well documented (Hilgard et al., 1975), this lack seemed surprising.

It has appeared clear that there has been some relationship of SES and similar variables with attrition. Pantages et al. (1978) concluded, however, that the strength

of such relationships was low and that there was little value in predicting attrition with SES variables. It must be speculated that the reason why such relationships have been weak is that SES variables have not directly affected persistence insomuch as they have indirectly affected it through affecting relevant attitudes, expectations, motivation, and commitment.

Ability/academic factors. There has been ample support from research that by far the greatest predictive factor of attrition has been the student's academic ability. Demitroff (1974) has gone so far to conclude that academic factors were the only variables that could be usefully employed as predictors of attrition. Less extreme were conclusions such as those stated by Sewell and Shah (1967) that social status was only about half as important as ability in predicting dropouts.

Academic ability has usually been operationally defined in two ways: first, in terms of high school GPA or class rank, and, second, in terms of measures scholastic aptitude. These two aspects have assessed slightly different components of ability: grades have reflected the individual's ability to achieve in an educational setting, while measured aptitude has tended to assess ability more broadly. The research has been fairly consistent in finding that grades were better predictors of persistence than was measured scholastic aptitude. Peng et al. (1977), in the National Longitudinal Study of the High School Class of 1972, found,

as have others, that high school grades were more predictive of academic withdrawals than non-academic withdrawal. Finally, it should be noted that ability measures have generally been better able to predict college achievement than they have been able to predict college persistence. This has probably been due to the fact that most dropouts have not left college for academic reasons. Peng et al. (1977) have suggested that perhaps one in four will do so. It is fair to conclude, as have Pantages et al. (1978),

> Whereas these measures are the most significant predictors of attrition, they only account for a small proportion of the students who do drop out . . . other factors must also be included to yield even stronger results (p. 64).

The findings concerning the effects of first-semester college grades on persistence have been similar to the findings for high school GPA. Summerskill's (1962) review, based on 35 studies, reported significant relationships between first-semester college grades and attrition. Later reviews confirmed his finding. Pantages et al. (1978) have speculated that good grades have important reinforcement properties which decrease the likelihood of a student's dropping out. They also noted a finding quite similar to that for high school GPA's: poor grades were more predictive of dropping out than good grades were predictive of persistence.

Astin's (1972, 1973, 1975) research has consistently demonstrated that aspects of study habits are related to persistence. Essentially the linkage was that those students

who had poor study habits withdrew because of poor scholastic performance. Students' ability to organize their time and schedule their work seemed to be related to persistence, while the inability to concentrate or to complete assignments on time contributed to dropping out. Demitroff (1974) has noted that dropouts self-assess their own study habits as below average.

It may be concluded that this general ability/academic factor, including study habits, has the greatest import in predicting persistence.

Personality factors. Personality characteristics, the patterns of behavior and modes of thinking that determine a person's adjustment to the environment, have been broadly studied in attrition research. The usual hypothesis has been that personality factors influence the use of one's mental abilities, and thus influence achievement with obvious implications for college attrition. However, as Sexton (1965) noted, the relationship between personality and academic achievement has not been conclusively demonstrated in spite of the number of studies.

While the literature has been less than consistent in identifying personality characteristics associated with attrition, there has been some consensus with " . . . the ubiquitous conclusion that dropouts are less 'mature' than persisters (Spady, 1971, p. 73)." Maturity itself has usually been broadly defined as encompassing motivation, independence, impulse control, responsibility, rationality,

self-confidence, adjustment, and so forth. A large number of personality traits relevant to maturity have been examined vis-a-vis dropouts. The characteristics of dropouts might be described as negative.

> It has been shown that dropouts are more unable to adapt to the 'college milieu,' aloof, assertive, critical, disagreeable, immature, impulsive, impetuous, non-conforming, and unconventional, likely to over-emphasize personal pleasures, rebellious against authority, resentful of college academic and social regulations, self-centered, lacking self-sufficiency, uncertain about the future, and more uncooperative . . . (Pantages et al., 1978, p. 71).

Two well known personality tests have been used with some frequency and success in discriminating between those who persist and those who drop out. Heilbrun (1965, citing earlier work by Gough) reported that persisters scored higher on the socialization and responsibility scores of the MMPI. Similar research by Vaughan (1968) confirmed these findings; however, Pandey's (1972) research with a racially mixed group of university students found no significant differences on the MMPI scores between persisters and dropouts. A substantial amount of research has been done with the Omnibus Personality Inventory (OPI). Cope (1968) found that the Religious Liberalism Scale, the Aestheticism Scale, and the Theoretical Orientation Scale distinguished dropouts from persisters. Subsequent research on the OPI demonstrated that personality differences exist between dropouts and persisters (Rossman & Kirk, 1970; Hannah, 1971; Cope, 1971; Rose & Elton, 1966).

Some successes, and some failures, in predicting dropouts have been reported for other personality tests, or for the specific scales within certain personality tests. Pantages et al. (1978), citing work by Williams, suggested that the Bell Adjustment Inventory, and the Guilford-Zimmerman Temperament Survey, were among the personality tests that have not been found useful. On the other hand, Heilbrun (1965) has reported some success with the Adjective Checklist, and Daniel (1967) has reported some success with the Gordon Personal Profile and the Gordon Personality Inventory. Several points may be made in drawing conclusions about the role of personality factors in attrition. First, it has been suggested that part of the problem in detecting differences among dropouts and persisters using personality measures as predictors may lie in these tests' reliabilities. There may be some truth to this proposition since there has been some success using longer, more reliable, personality instruments such as the MMPI. A particular problem arises because longer tests have usually been more costly to administer and thus the research has tended to be based on smaller sample sizes, thus decreasing the ability to detect differences. It seems reasonable to conclude, however, as did Pantages et al. (1978), that given the breadth and the amount of research on the relationship between attrition and various personality factors, it appears unlikely that any major main effects have been overlooked. They concluded that a significant relationship between personality

and attrition did not exist.

This conclusion, however, seems to be somewhat overstated, leading to a second point. There has seemed to be a substantial amount of evidence that supported the proposition that there were personality differences between types of dropouts and non-dropouts. For example, Vaughan (1968) reported that students who were dismissed were more apt to be emotionally disturbed and to manifest more pathology, while students who withdrew for non-academic reasons failed to manifest these characteristics. He found that students who withdrew for non-academic reasons were more suspicious, over-sensitive, and egotistic. Other work has also indicated that those who withdrew voluntarily tend to be more like those who stay, than do those who withdrew for academic reasons (Rossman & Kirk, 1970; Suczek & Alford, 1966; Rose & Elton, 1966).

Aside from the finding that personality factors may be differentially related to different types of dropouts and non-dropouts, a second set of findings has suggested that interactions may exist between personality factors and other factors. For example, Heilbrun (1965), in testing a value-conformity hypothesis, found that dropouts were more assertive and less task-oriented than persisters, but only at the highest of three ability levels. Cope's (1968, 1971) research suggested that the factors of the OPI interacted with sex. For example, his 1968 study suggested that the Religious Liberalism Scale was related to dropping out among

males, while the scales of Aestheticism and Theoretical Orientation were related to dropping out among females. In this research, high scores on the Social Maturity Scale for both sexes tended to be related to persisting.

Finally, it must be pointed out that it is unlikely that personality measures will ever be made part of college entrance qualifications. Sexton (1965) noted that if such measures were used, real talent would be excluded from colleges that should be developed. Pantages et al. (1978) indicated that for methodological reasons alone, it would be unwise to use such measures for admission purposes. They concluded " . . . that although personality variables should be included in any analysis of persistence or withdrawal in college, they cannot yet be regarded as predictive factors (p. 75)."

Motivation. As Summerskill (1962) noted, "Attrition owing to motivational causes has been wide-spread and essentially irreducible (p. 643)." It has appeared fairly clear that the irreducible aspects of motivational factors in relation to attrition still exist. No "umbrella" theory of motivation, like VIE in industrial-organizational psychology, exists in the field of attrition research. This lack of an integrated motivation theory was the reason why motivational factors have been discussed uder content theories here, whereas they were discussed under process theories in the previous review of industrial-organizational research on turnover.

While the research on motivational factors cannot be clearly integrated, there has been little doubt that such factors were related to attrition. Iffert (1957) noted there was strong evidence to support the proposition that the stronger the student's motivation, the better the chances of persisting. Summerskill (1962) noted that motivational factors were prominent among the reasons given by dropouts for leaving an instituion. As an aside, it should be noted that this review has not explored student reports of reasons for withdrawal. This was done partly to keep this review to a reasonable length, and partly because, as Hackman and Dysinger (1970) have warned, students' stated reasons for withdrawal should be regarded skeptically since students who do not withdraw tend to share the same problems as those who do. Also, as in industry, there has been some tendency to give socially desirable reasons for one's withdrawal.

One of the earliest areas of motivational research explored was into students' reasons for attending college. Iffert's (1957) landmark study, while finding sex differences in the reasons for attending college, could find no differences between dropout and persister groups in the reasons for attending. No subsequent research has appeared that has contradicted these findings.

Iffert noted, however, that vocational goals might interact with a particular type of institution to have a significant effect on persistence. For example,

> High ratings on item 15, I wanted to explore several lines of work to see what I would be most interested, were associated with good persistence records for students in technological institutions but with poorer records of persistence for students in liberal arts college (Iffert, 1957, p. 31).

Subsequent research has been equivocal. Pantages et al. (1978) cited four studies supporting the proposition that having vocational goals was conducive to persistence, and cited four other studies where research has not demonstrated a significant relationship between vocational goals and attrition. They suggested that the primary cause of such anomalous data may be inadequate measures of vocational goals and interests.

One broad area of research under the rubric of personal motivation has been the exploration of the relationship of attrition with educational goals and interests. Two points can be made about this relationship. First, it has been in this domain (of educational goals and interests) where parental influence has been likely to have its greatest effect on attrition behavior. In a previous section examining SES, it was suggested that, while SES had little predictive value for persistence, it could be speculated that SES's effect was indirect and operated through affecting relevant attitudes, expectations, motivations, and commitments. Sexton's (1965) review strongly supported this position. The second point to be made is that educational goals and interests have been apparently sex-linked. Spady's (1970) review cited a substantial body of research supporting this proposition.

Educational aspirations seem unequivocably related to persistence in a positive fashion. Sewell and Shah (1967) demonstrated that after controlling SES and intelligence, educational plans during the senior year had by far the strongest independent influence on college graduation. Spady (1970) has cited two other highly similar studies which have arrived at the same conclusion (by Trent & Medsker and Astin). More recently, Peng et al. (1977), with the National Longitudinal Study of High School Class of 1972, have also arrived at the same conclusion. Furthermore, they have noted that the influence of educational aspiration was apparently independent of high school grades, and both were necessary in the prediction of attrition. Spady (1970) has suggested that having unrealistic aspirations may have a negative influence on persistence. This proposition is consistent with other research in social psychology on level of aspiration.

Another body of research has attempted to assess the relationship of motivational level and attrition through the construct of goal commitment. Tinto's (1975) review suggested that educational plans and expectations, or career expectations, in one sense were simply operational definitions of goal commitment. Thus the research cited above (e.g., Hackman & Dysinger, 1970; Sexton, 1965) on these areas is relevant to the domain of goal commitment. Marks (1967) demonstrated that those students who were most uncommitted to college were most likely to drop out. His

research is also of interest, from the standpoint of the first hypothesis of this dissertation, in that he demonstated that those students who expected or intended to drop out actually did have higher attrition rates.

Hackman and Dysinger (1970), in a multi-institutional study of the expectations and commitments of freshmen and their parents, have significantly advanced the understanding of the relationship of commitment with attrition. They suggested there was an interaction between academic competence and commitment in determining persistence. They found that persisters were both competnet and committed, while there were three distinguishable routes to withdrawal. High competence and low commitment tended to lead to transferring or to stopping out. High commitment and low competence tended to lead to forced academic withdrawal. Low competence and low commitment were likely to lead to dropping out with a small probability of ever re-enrolling in college. They suggested a third factor, besides commitment and competence, concerning

> . . . the *congruence* of the needs and goals of the student with the demands in resources of the college environment . . . . This factor should help specify the overall valence of the college environment for the student, and, therefore, the degree to which a high level of commitment would be required for persistence (p. 322).

The importance of student-institution fit has been explored in a later section on educational context/environment.

It is reasonable to conclude, concerning motivational factors in attrition, that the relationships among the

various factors cited above have not been well established. Pantages et al. (1978) have suggested two alternative interpretations for such a conclusion. First, the problems may be blamed on inadequate motivational assessment tools. Alternatively, they suggested that motivational factors may not have as great an effect in determining persistence as had previously been expected.

Educational context/environment. Summerskill (1962) noted that there was a tendency in the research on prediction of dropouts to take institutional variables for granted or to treat them as constants. Pantages et al. (1978) have noted that while this is a relatively new area of research in the study of attrition, the body of research on this subject matter is already very large. It is clear, however, that more research exists relating personal characteristics to attrition than does research on the effect of institutional characteristics. Furthermore, as Tinto (1975) noted, much of the research on institutional characteristics' relation to attrition has been too simplistic, especially failing to control for other institutional characteristics. This section has been divided into three subsections: characteristics of the college, financial aid and employment, and college environment.

Characteristics of the college. Higher withdrawal rates have been observed for students from two-year colleges (39% vs. 24%) than have been observed for those from four-

year colleges (Peng et al., 1977). Differences among student inputs for these two types of institutions have been suggested as the cause for these differential rates. However, work by Astin (1972) has found that, while the major portion of the difference between these two rates may be attributable to differences in students' abilities and background, the persistence rates at four-year colleges were still somewhat higher than might be expected, based on the characteristics of their students alone.

The major reviews of attrition research were unanimous in their conclusion that students maximize their chances for persisting by attending a private university. But it has not been clear that the lower attrition rates for private institutions have been simply a function of their control. One college characteristic often associated with private control has been the selectivity of the institution. It has been shown that institutional selectivity was associated positively with student persistence rates (Astin, 1972, 1975), and it was clear from this research that private institutions were more selective, in general, than were publicly-controlled institutions.

Kamens (1971) has argued that one reason why private institutions have had more "holding power" was because they were more prestigious. Prestigious institutions, he argued, exert a greater holding power over students because they provide a wider variety of programs, social activities, and linkages to the broader social milieu. These tend to increase

commitment to the institution which, in turn, leads to lower withdrawal rates. Kamens found, in a nationally representative sample of colleges, that students at higher quality institutions were more likely to graduate than were students from lower quality institutions, even after controlling for levels of achievement ability and aspiration. Astin's (1971) work also demonstrated that the quality of the college influenced persistence. Nelson (1972) has suggested a social status hypothesis to explain the higher persistence rates at the private colleges. He argued private colleges have an average social status composition higher than that of public institutions, and that the higher the social status becomes, the higher would be the perceived value of an education from that institution to an individual.

It is difficult to point directly at the underlying dimension. However, it may be concluded that some sort of college quality dimension has been associated with college persistence rates. Associated with this dimension has been variables such as control, selectivity, student body composition (in term of social status), and other components of college quality such as percentage of faculty with doctorates, income per student, and so forth.

The size, or enrollment, of the institution has not been consistenly related to persistence rates: Nelson (1966) reported that smaller institutions had lower dropout rates. Peng et al. (1977) found that size was not relevant

in explaining withdrawal behavior. However, in both of these studies, no attempt was made to control for institutional quality or type when examining the effects of size. Kamens (1971), after controlling for institutional quality and characteristics of the students, reported that larger institutions had lower dropout rates than did smaller ones. Recent work by Astin (1975) has led to a similar finding that small institutions with fewer than 500 students had higher than average dropout rates. The equivocal results from the effects of institutional size on dropouts rates have suggested that more research is necessary. We must agree with Tinto (1975) that what is known about the effects of institutional characteristics upon dropouts is at present quite crude.

Financial aid and employment. Financial difficulty has long been known to be an important cause of college attrition. Iffert (1957) noted that financial difficulties were ranked third in importance by men and women as a reason for leaving college. In 16 of 21 studies reviewed by Summerskill (1962), financial reasons were rated among the top three most important factors in attrition. More recently, Peng et al. (1977) found that financial difficulties ranked first among the reasons for freshman withdrawal among those who voluntarily left four-year colleges. In this research, 32% of voluntary withdrawals indicated financial difficulties as their reason for their actions; however, these statistics should be taken with a grain of salt,

since, as Spady (1970) noted, students tend to exaggerate their financial difficulties.

While it is clear that financial difficulties are an important stated reason for withdrawal, it is less clear what effects different sources of financial aid have upon attrition. A number of problems make difficult the exploration of these relationships. For example, college costs vary from institution to institution, it is important to control for academic ability in examining the relationship of scholarhips to attrition since better students are more likely to get such financial aid, and so forth.

Astin's research has consistently demonstrated that a student's chances of persisting were significantly increased if financial support was received from parents or spouse (see, for example, Astin, 1972, 1973, 1975). Even so, his most recent research suggested that there may be differential effects of such support upon specific subgroups. For example, Astin (1975) concluded there was no beneficial effect of parental support for women who come from high income brackets, and, when students received only minor support from a spouse, it contributed to attrition, whereas major support contributed to persistence.

Astin (1972, 1973, 1975) has also consistently found that receiving support from a scholarship or a grant was related to persistence. His results were equivocal on the effect of loans on attrition; Astin (1973) suggested that no relationship exists, and later, he suggested (1975) that

reliance on loans was associated with increased attrition. Blanchfield's (1971) research found no relationship between receiving loans and attrition, and confirmed Astin's finding that receiving a grant or scholarship increased persistence. Both Blanchfield's and Astin's research have demonstrated that the relationship between type of financial aid and attrition was not simply an artifact, i.e., a result of more able students, who would persist anyway, getting more financial aid and support.

Astin (1973) has argued from his research that financial aid funds should be used solely for scholarship or grant programs. However, the results from the work of Peng and Fetters (1978) did not support these claims. These authors found that neither scholarships nor loans had a significant relationship with college attrition. The contradictory nature of these results has argued strongly for the need for a greater understanding of the impact of various financial aid packages on attrition rates since it has been clear that receiving some sort of financial aid from the college increases persistence.

The results from studies on the effect of employment, as a financial factor affecting a student's chances of finishing college, have not been entirely uniform. Astin (1972), in a nationally representative study of the entering freshman class of 1966, reported that students had less chance of persisting at college if they were employed during the school year. Data from the National Longitudinal Study

of the High School Class of 1972 (Peng et al., 1978) also found working associated with four-year college withdrawal. This latter study has been important because of its excellent control for relevant variables such as SES and ability. Iffert (1957) concluded that the relevant variable was not how one supported one's self, i.e., working vs. scholarship vs. etc., but rather the amount of time per week spent working. More recently, Astin (1975), while studying a nationally representative sample of the entering freshman class of 1968, observed that having a job increased a student's chances of graduating if employment was less than full-time. He found the negative effects of employment were more pronounced among those who were employed full-time. Pantages et al. (1978) have cited several other studies which have concluded that persistence was not adversely affected by students working less than 15 hours per week.

College environment. As early as 1962, Summerskill noted an eminent need for research on institutional variables associated with attrition. He further noted that

> Environmental pressures are both formal, e.g., the stated academic requirements of the institution, and informal, e.g., the opportunities for daily contact, for casual association with faculty and advisors, and arrangements for housing and dining (p. 648).

He also suggested that the attrition rate itself might be an environmental factor causing dropouts as well as being the outcome of other environmental factors.

Since Summerskill's review, a substantial body of research has grown concerning the effects of college environments. This growth has been a result, in part, of increasingly sophisticated techniques for measuring college environments. These techniques all seem to share in common an underlying theoretical basis derived from Murray's personology theory of personality (often referred to as "need-press" theory). These techniques usually assess the environmental "press," or demands-constraints, as well as measure student "needs" or motives. It has usually been hypothesized that a high congruence, between a college press and a student's needs, affects a number of college outcomes, including retention and performance. Among the environmental assessment techniques which have been used, have been the College Characteristics Index (Pace & Stern, 1958), the Environmental Assessment Technique (Astin & Holland, 1961), and the College and University Environmental Scales, a hybrid of the former two measures (Pace, 1963).

Research with these measures has demonstrated two clear effects of the college environment. First, it influences the differential selection of students in respect to attitudes, values, and dispositions, and, second, it influences the development of occupational-vocational goals and vocational choices among students (Astin & Holland, 1961; Astin, 1965). As Pantages et al. (1978) noted, " . . . subsequent research has provided considerable evidence that the college environment plays a major role in

determining the persistence or withdrawal of enrolling students (p. 75)." They cited a string of research from Pace and Stern which found " . . . that a high congruence between a student's needs and college press increases the probabilities of retention of the student . . . (p. 76)."

An outcome of these studies has been the documentation that there were different types of institutional environments, and these appeared to select differentially the students who attended them. This finding led to a series of hypotheses that might be called "college fit" theories (Hackman & Dysinger, 1970; Starr, Betz, & Menne, 1972; Spady, 1970; Astin, 1965; Tinto, 1975). These theories shared in common the supposition that the greater the congruency that existed between the values and attitudes promulgated by an institution and those held by the student, the less likely attrition would become. It has been noted that a variety of studies testing this supposition have been supportive (Pantages et al., 1978).

There has been less agreement as to what comprises the domain of college environment. Most authors have agreed that at least two major dimensions of college environment were relevant to attrition: the academic and social. This review has already examined, in an earlier section, the effects of academic ability upon attrition. It was apparent from the research that a student's integration into the academic milieu was a powerful determinant of persistence. Academic integration might be defined as the congruence

between the academic press/demands/milieu and the student's relevant needs/abilties/values. It has been demonstrated that various aspects of social integration, such as friendships or interpersonal orientations, have been generally associated with persisting as well.

Research on the effects of extracurricular activities upon attrition has been fairly clear. Iffert's (1957) landmark study found no relationship between participation in extracurricular activities and dropping out. More recently, Spady (1970) has cited five studies all demonstrating that persisters were more likely to participate in some form of campus activities than were dropouts. Sexton's (1965) review concluded similarly; however, she noted that inferior students were usually at the extremes on participation measures. More recently, Astin (1975) has generated additional support for the proposition that the degree of personal involvement in campus life and environment affects persistence. He found that membership in social fraternities or sororities in particular, and participation in extracurricular activities in general, were significantly related to persistence.

The findings concerning the importance of friendships in determining attrition have been similar to those for extracurricular activities. There has been some evidence that an excessive amount of socializing and/or a large number of casual acquaintances is associated with dropping out (Astin, 1965; Trent & Medsker, 1967). But a large number

of studies have demonstrated that the presence of a close friendship is definitely associated with persistence (see Spady, 1970). Spady noted that the negative effects of a lack of close friendships were particularly pronounced among women. He has also arrived at an interesting hypothesis, concerning the importance of interpersonal relations in determining attrition, derived from some research exceptions to the general rule that close friendships are associated with persistence. He hypothesized a dimension underlying interpersonal relationships that ranged from the "profane" to the "profound." Profane relations were characterized by excessive socializing and superficial acquaintances. This pattern was thought to be related to attrition. Profound relationships were conceived as close and having significant meaning to the person, and were associated with persistence. No direct test seems to have been made of this proposition, however.

While the quality of friendships has been an important factor in attrition, some authors have argued that the influence of the peer group in determining values, attitudes, and goals was more important. Newcomb (1962) has strongly supported this viewpoint. He argued that the main effect of the college experience was due to the socialization process of peers that determine attitudes and values toward education. These values and attitudes, in turn, contribute to the determination of attrition. Research by Panos and Astin (1968) has supported this proposition.

They found that individuals who belonged to groups with negative attitudes toward higher education were more likely to drop out.

Much of the effect of faculty upon student persistence must come from the socialization process, too. Sexton (1965) noted that instructors could influence attitudes toward assignments, and that poor student attitudes were particularly conducive to failure, and thus to attrition. Pantages et al. (1978) cited six studies concerning student/faculty relationships that indicated "A positive interaction facilitates the development of healthy attitudes toward learning and toward the college . . . (p. 79)." Given that faculty influence student satisfaction with the institution, and that this, in turn, influences attrition,

> . . . it is not surprising that a number of studies have found that social interaction with the colleges' faculty is related to persistence in college . . . (Tinto, 1975, p. 109, citing four studies different from those mentioned by Pantages et al. above).

Spady (1970) has argued that interaction with faculty was particularly important since it influenced both integration into the social milieu of the institution as well as integration into the academic milieu.

The National Longitudinal Study of the High School Class of 1972 (Peng et al., 1977) demonstrated that satisfaction with social life on campus was related to withdrawal behavior. They found higher withdrawal rates for those dissatisfied with social integration (.43) than they found for those who were satisfied with this dimension (.34),

after controlling for SES and educational aspiration. While their data strongly supported the importance of this variable, they cautioned that the results might have reflected a dropout's rationalization of his behavior, given the way the data were collected.

In summarizing the results of research concerning the effects of college environment upon attrition, two conclusions seem to stand out. First, social integration has been an important determinant of persistence, especially in the domain of interpersonal relationships with peer and faculty. Second, there has been an apparent interaction between student and institutional characteristics which has influenced persistence and attrition. This interaction has appeared particularly dependent upon the "fit" of the student's and institution's attitudes and values. A circularity exists in this student-institution interaction: institutions, in part, preselect their students through the institution's image, and this image, in turn, has been determined from the type of student attending the institution.

The prediction of attrition. Similarities have existed between education and industry in the prediction research on voluntary withdrawal. For example, a great deal of the empirical research on the prediction of attrition in both domains has been atheoretical; biographical data have been broadly used in both domains; cross-validation and replication have been, unfortunately, the exceptions rather than the rule; and the problems of evaluating the relative importance of

highly correlated predictor variables has existed in both domains. Another common difficulty has arisen in comparing studies using different statistical techniques. A clear example of this has come from the research by Blanchfield (1971) who argued strongly for the use of multiple discriminant analysis since it proved highly successful (69-87% correct classification) in identifying dropouts at a college (Utica) where multiple correlation coefficient analyses had yielded coefficients around .08. While Blanchfield's advocacy may be justifiable on other bases, such a comparison was non-sensical since Huberty (1975) has noted that it is highly important in multiple discriminant analyses that the prior probabilities of group membership be taken into account in considering the percent of correct classification.

One major difference between educational research on attrition and industrial research on turnover has been in the scope of the studies conducted in the educational milieu. Many studies in education have been based on extremely large sample sizes when compared to comparable research in industry, although significant exceptions were found in military research (e.g., La Rocco et al., 1977, and other studies cited therein). For the sake of brevity, this review focused only upon the major large sample research that has been conducted on attrition in higher education.

Astin (1964), in a study of high aptitude college freshmen, found that the effects of 38 student input variables accounted for only about 10% of the variance in his

dropout criterion. In a nationally representative study of 1961 college freshmen, Panos and Astin (1968) examined the effects of 120 student input variables and 36 college environment variables. They reported that the multiple correlation of the significant student input variables (44 of 120) accounted for only 9% of attrition variance. They further reported partial correlation coefficients of environmental measures with the dropout criterion after controlling for student input. Twenty-one of 36 college variables were significantly associated with this criterion, independent of student characteristics; however, no partial correlation coefficient of college variables with the residual criterion greater than .08 was reported. They concluded that the results of their study supported the view that attrition was determined both by the individual's personal characteristics and by the environmental context.

Panos and Astin (1968) noted, too, that while the zero order correlation of sex with attrition was not significant, the variable of sex did enter into their multiple regression equations significantly. A substantial amount of research since their report has subsequently developed prediction equations separately for men and women. For example, Bayer (1968), in a follow-up study of 8,567 Project Talent student, reported greater success for predicting attrition among women than among men. He examined 38 student input variables (personal and background) and found that these variables in a multiple regression prediction equation

accounted for 20% of the variance in dropping out for men and 30% of the variance in dropping out for women.

More recent research by Astin (1972), with a nationally representative sample of the entering freshman class of 1966, reported step-wise multiple regression correlation coefficients no greater than .34. Since he was examining 134 predictive variables, and four different definitions of dropout, using an excellent nationally representative sample, it was unlikely that many, if any, significant predictor-criterion relationships were overlooked. Similar results were reported by Peng et al. (1978). Based on research and theory on college attrition, they selected eleven variables from among those examined by Peng et al. (1977) from the National Longitudinal Study of the High School Class of 1972. They reported that "the total variance of withdrawal behavior accounted for by the 11 variables is about 10% for four-year college students . . . (1978, p. 367)."

The results from the large-scale studies on the prediction of dropouts cited above have seemed to be consistent, and have lent themselves to several conclusions. Personal-background data will not be likely to be found to account for much more than 10% of the variance in an attrition criteria in future research. The inclusion of college environment variables with personal-background variables has increased the prediction of attrition; however, environment variables have not accounted for any more variance in attrition than personal-background factors. Given the extent

of the research on biographical variables' relation to attrition, it seems unlikely that any significant variable has been overlooked. While biographical data have shown no more predictive effectiveness than traditional ability measures such as GPA, biographical data may still be valuable in that they reflect student characteristics not found in ordinary measures of academic ability, and may have prognosticative utility (Willingham, 1965).

A recent trend in predictive analyses of attrition may increase the amount of criterion variance accounted for. This trend has been toward the greater use of subgrouping. Owens (1978) has argued this position, while acknowledging the difficulties of such research. He cited a recent paper by Schoenfeldt to illustrate his argument. This research used a scored autobiographical data form to cluster subjects into 24 groups of individuals with similar profiles. Substantially different dropout rates were reported among these 24 groups, ranging from a low of 7% to a high of 50%. A recent study by Nutt (unpublished, see reference note 1), under the direction of Owens, supported a subgrouping approach. Students were classified into subgroups, 15 female and 13 male, according to similarity of their profiles. For both sexes, significant differences in the overall rate of leaving were observed among the groups.

Astin (1975) reported somewhat greater multiple stepwise correlation coefficients than might be expected from his previous research, after subgrouping students by race

and sex (as high as .54, p. 29).

Another finding relevant to the prediction of attrition has recently been introduced by Kohen, Nestel, and Karmas (1978). They employed a sample drawn from the national longitudinal surveys of men attending college in the 1960's. Twelve predictor variables were selected from a broader set, based on a review of theories and empirical evidence. They then examined hypotheses concerning whether the predictors of persistence were invariant at different stages of the undergraduate career. They reported, not surprisingly, that attrition during the first two years was more predictable from student input characteristics than was attrition during the junior and senior years (about twice as much variance was accounted for in the prediction of attrition in the first two years--about 17%). They also noted that a number of variables had differential effects upon the likelihood of successfully completing a specific year of college. For example, they found that measured mental ability and high school curricular program, while contributing to the determination of persistence during the freshman year, had little effect upon the successful completion of later years. They noted that students who worked while attending college during the freshman and sophomore years were less likely to graduate than those who did not work; however, working was found not to be a significant determinant of persistence among juniors and seniors. These authors concluded that the importance of factors in

determining persistence varied with the stage of the undergraduate career.

One final similarity between the prediction of industrial turnover and educational attrition may be noted. In both areas there has been room for the improvement in the prediction of the criterion.

Process Theories of Attrition

A number of explanatory theories of attrition have been developed in recent years. The development of these theories has been fortunate since, as Tinto (1975) noted, a major shortcoming in the work on attrition has been the development of theoretical models. His comment may be particularly noteworthy since his own model of attrition process has been by far the most advanced. This review has briefly described earlier explanatory models of the attrition process, and then reviewed Tinto's model in some detail. This has been done because there exists a high degree of similarity among these theories: they all have focused upon the interaction of the individual with the institution.

Spady (1970) was the first to develop an interactional model of attrition. He hypothesized that the personal attributes of the student, including skills, abilities, interests, attitudes, and dispositions, would interact with the college environment, including its demands, influences, values, etc. to affect the student's assimilation into the environment. Spady proposed, following work by McClelland,

that a need for assimilation exists. He placed his greatest emphasis upon the importance of integration into the social environment in determining attrition. His model predicted that when a rewarding, successful, assimilation into the social system had been made by a student, the likelihood of withdrawal decreased.

Kamens (1971) has taken a different approach to the college fit orientation. He has argued that

> . . . colleges have much of their effect on students because of their linkages to the wider social order. . . . larger colleges may develop more control over students' commitments, and hence may lower dropouts, because of their superior status-allocating capacity (p. 293).

His theory predicts that a student with specific occupational goals attending a university with clear structural networks to relevant occupational and economic groups in the larger society would be more likely to persist. Such a university is likely to be larger, more prestigious, often private, and so forth.

Two theories were presented in 1972 which focused on the congruence of the person with the institutional environment. Starr et al. (1972) stated that student-institutional congruency occurred when the demands of the institution could be met by a student's skills and abilities. The model was based on the assumption that the college environment did affect motivation. It was perceived as important that the student's needs be adequately met by the reinforcement structure of the institutional environment.

A similar theory was put forward by Rootman (1972) who focused on the relationship between the normative environment of the institution and the individual. His approach was role-oriented. Congruence occurred when the "person-role" played by the student fitted into the normative environment of the college. A lack of congruence produced a dissonance-like tension which provided motivation for withdrawal.

Tinto's model of dropout. Tinto's (1975) model of the dropout process is highly similar to that of Spady's (1970), from which it was drawn, in part. Spady's, in turn, was derived from Durkheim's (1961) sociological theory of suicide. Tinto's model differed from Spady's in that it roughly equated the importance of both social and academic integration as determinants of attrition. Spady paid only passing service to the importance of academic ability in determining attrition. This seemed to have been an important oversight, given that academic ability has usually been found to be the most predictive among all variables of attrition.

Tinto's theory also has important similarities with, and owes a debt to, a hypothesized set of relationships put forth by Hackman and Dysinger (1970). These authors posited that there was an interaction between commitment to college and academic competence (integration) in determining types of persistence: high competence and high commitment led

to persistence, high competence and low commitment led to transfers-stopouts, low competence and high commitment led to academic dismissal, and low competence and low commitment led to voluntary withdrawal.

Figure 1 presents Tinto's (p. 95) model. The model is complex. Essentially the model has stated that a student's background, including family, experience, abilities, and attributes, influence both commitment to the goal of higher education and commitment to a particular institution. Commitment to the goal of a higher education, and all that it implies, determines the student's integration into the academic system, including grade performance and intellectual development. Academic integration is also influenced by such obvious individual attributes as ability. The extent

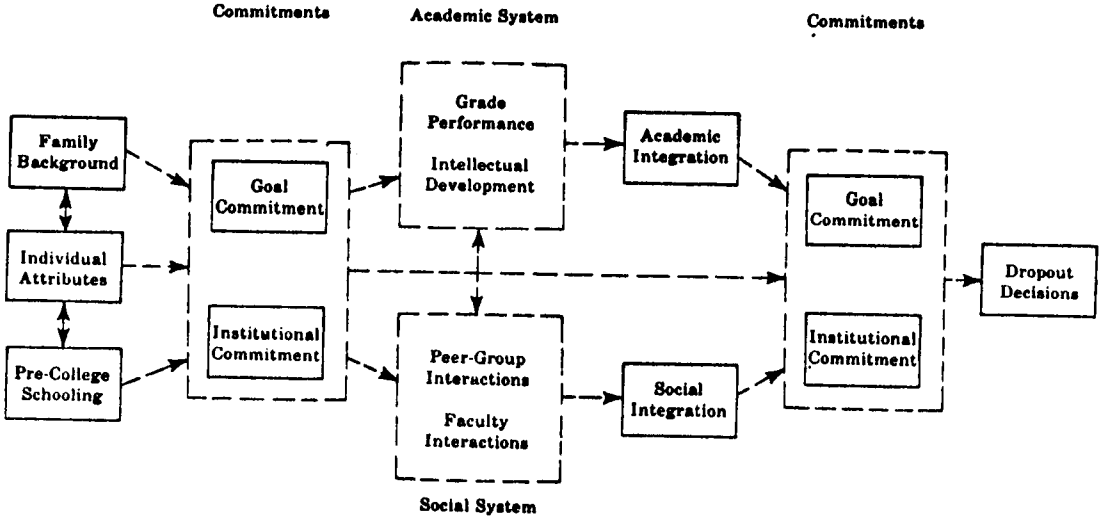


Figure 1. A conceptual Schema for Dropout from College (from Tinto, 1975, p. 95).

of academic integration ultimately influences the continued commitment to the goal of higher education. A student not integrated into the academic milieu of the institution (i.e., failing), by necessity, has to re-evaluate a goal of attaining an education. Institutional commitment runs a somewhat different course. It affects interactions of all sorts and ultimately integration into the social system. To the extent that the student was well integrated into the social system, institutional commitment was enhanced.

The theory leads to the prediction of four kinds of dropout outcomes based upon the four-fold possibilities of academic integration (goal commitment) and social integration (institutional commitment). High academic and social integration will lead to persistence, and low on these two dimensions will lead to dropping out. High academic integration with low social integration will increase the likelihood of transferring or stopping out. High social integration with low academic integration will increase the probability of involuntary, academic withdrawal.

Tinto's model has been compelling, in part, because of the excellent synthesis of the recent research on dropping out which he presented to support the various elements of his model. Since all of the elements in the theory have been discussed previously in this review, no further elaboration will be made. Two recent studies, conducted since the publication of Tinto's model, will be reviewed.

Peng et al. (1977) have found support for Tinto's theory. They reported that the quality of faculty-student interactions and students' social integration were both predictive of withdrawal, after controlling for socio-economic status and educational aspiration. They also reported that intellectual integration was related to withdrawal status. This research also found other personal characteristics related to attrition as the model suggested and was consistent with previous research, i.e., various ability, aspirational, and personal background variables were found to be related to attrition. This research has been particularly important because it has been the first longitudinal test of Tinto's model.

Terenzini and Pascarella (1977) have constructed a cross-sectional approach to test Tinto's model. Their study, too, supported this theory, although the study was limited in scope to one institution. They developed two sets of separate factor scores derived from subjects' adjective rating scale responses to the following domains: academic program and non-academic program. They then tested whether the factor scores from each domain were able to differentiate significantly between groups of stayers and voluntary leavers. Their analyses indicated that the academic and social integration sets could predict attrition independent of each other. Their results also tended to confirm that Tinto was correct in setting approximately equal weights to both social and academic integration.

An additional finding of particular interest from the research by Terenzini and Pascarella (1977) was the role of faculty contact. "Stayers" ranked faculty members highly as an important influence on both intellectual and personal development. Informal interaction with faculty was found to be an important predictor of attrition. The authors suggested that informal contact with faculty may be as important for academic integration as it is for social integration--a notion differing from Tinto's consignment of faculty to the social integration domain.

The conclusions drawn by Terenzini and Pascarella (1977) seem reasonable. "In the main, the Tinto model appears to represent a useful conceptual tool for understanding and explaining student attrition (p. 41)." It is relatively clear that more research is necessary on the model. It is also likely to be true that the model might be modified profitably.

Integration-Synthesis of Research on Turnover and Attrition

There have been a number of striking similarities between the domains of research on turnover and research on attrition. It has been clear that there were similar criterion definition problems in both areas (Gaudet, 1960; Iffert, 1957). Problems in criterion definition have led to problems in the interpretation of studies in both areas.

The extent of the problem of voluntary withdrawal in both domains has been well documented, both in terms of prevalence and in terms of cost to the institution. However, it appeared that a better understanding of the costs of withdrawal and alternative behaviors to the individual has been needed.

Two general research approaches have been used in both areas to study withdrawal behavior. The approach using the individual as the unit of analysis has been more prevalent. There has been a clear need for more research using the organization as the unit of analysis. Authors in both domains have noted the natural variability among organizations and suggested that this might be used to study differences in organizational characteristics related to attrition (Van der Merwe & Miller, 1971; Summerskill, 1962). Besides the need for cross-organizational studies to determine correlates of turnover, there may be even greater benefits from attempts to manipulate various organizational variables to determine causal factors of withdrawal.

One difference between educational research on attrition and industrial research on turnover has been the lack of an assumption concerning a withdrawal continua in the former. Since little success has been made in demonstrating the presence of a withdrawal continua in industrial research, this does not seem to be an important deficit. Another difference between these two bodies of research has been the lack of an analog in the educational research to the

substantial body of industrial research on the effects of satisfaction upon turnover. The research from the educational milieu on satisfaction's relationship with attrition has generally been consistent with that found on turnover in the industrial milieu: a negative relationship between general or overall satisfaction and withdrawal (i.e., high satisfaction associated with low withdrawal ratios, etc.). Research on specific facets of satisfaction in education has also yielded results similar to those found in industry. For example, in both domains peer satisfaction has been found to be related to attrition.

In both domains a substantial amount of research has been conducted on the effects of personal characteristics upon withdrawal behavior. However, this research has been more extensive in education and has been better developed in very large-scale settings. Biographical data have been successfully demonstrated in both research domains as predictive of withdrawal behavior. While there has been evidence that biographical data may be the most predictive of turnover among predictor sets in industry, it has been clear that ability as a predictor was more important in the prediction of attrition in education. Substantially more research has been done concerning the interactions of various personal characteristics with each other and other variables in the domain of higher educational research on attrition. There was substantially more sophistication in higher education research in considering the interactions

among personal characteristics with organizational variables.

When specific biographical variables were compared across the two domains, only a few similarities evidenced themselves. This suggested that the determinants of college withdrawal and organizational turnover were not necessarily identical. In both realms, sex has not been found to have a significant direct relationship with withdrawal behavior. However, in both domains evidence has suggested, from multivariate research, that as other factors were taken into consideration, the significance of sex as a determinant became more important. In both areas, as well, it has been common practice to subgroup by sex in prediction studies. One similarity in terms of background characteristics has been that pregnancy among women is clearly a determinant of organizational withdrawal. In both domains tenure at the institution has been known to be related to persistence. It has been demonstrated in both domains that the determinants of early withdrawal are different than the determinants of later withdrawal (Van der Merwe, 1971; Kohen et al., 1978).

While there was little doubt that biographical data contributed importantly to the prediction of withdrawal from institutions, it was not clear that biographical data, as a set, was the most predictive of this criterion. The first hypothesis of this research tested whether the expressed intention to drop out better predicted attrition when compared to various biographical predictors. Research from industry (Waters et al., 1976; Alley & Gould, 1976; La Rocco

et al., 1977) has supported this proposition. Research in education (Marks, 1967; Astin, 1972) also has tended to support this proposition, although it has not been clear from this research that the expressed intention would exceed biographical data in terms of its relationship to the criterion.

Research on the relationship of personality characteristics with organizational withdrawal has been extensive in both domains. However, the results cannot be described as consistent or integrated. The research has been broad enough that it may be concluded that no significant personality variables were likely to have been overlooked. While it might also be concluded that a significant relationship between personality characteristics and attrition does not exist, there has appeared to be a substantial amount of evidence that supported the proposition that there were personality differences between various types of withdrawals. Furthermore, there has been evidence that personality characteristics interact with environmental factors in determining withdrawal. The third hypothesis of this research has examined a suggestion made by Porter and Steers (1973), who surmised that the reason why personality characteristics have failed to relate significantly with attrition criteria was because of curvilinear-like relationships in the data. They posited a "bipolar hypothesis" which stated that those individuals at the extremes of various personality traits would be more likely to withdraw. There has been

no direct data from the educational research to support or contradict this surmise. However, another interpretation of these "curvilinear-like" relationships would be to conclude that interactions have existed between personality and other variables in the determination of attrition. There has been ample evidence from the educational research that personality characteristics do indeed interact with other variables to produce differential effects on the criterion.

The fourth hypothesis of this research was also concerned with the presence of interactions: performance level with other predictors. This hypothesis, derived from a suggestion by Faris (1971), tested whether the mean differences between persisters and dropouts were the same for both high and low performance groups for each significant predictor variable. Faris' research suggested that given predictor variables predict attrition differentially by performance groups. Some evidence concerning this proposition, although not directly stated as such, has existed in the field of educational research (probably because the performance criteria such as GPA are easy to define). It is clear from the research (e.g., Heilbrun, 1965; Tinto, 1975) that certain variables, such as personality characteristics, have interacted with ability level in the determination of persistence.

Less research exists in either domain on the effect of institutional characteristics than exists on the effects

of personal characteristics. There has been little doubt, however, in either domain, that institutional characteristics do influence withdrawal. The evidence was better developed in the educational research milieu. In neither domain do characteristics of the institution, such as size or control, seem to have had major effects upon attrition. It was clear in both domains that peer group interaction and supervisorial interactions (faculty interactions for students) were important determinants of withdrawal behavior. More has been made of this fact in education (e.g., Tinto, 1975) than has been made in industry.

The importance of financial factors in determining withdrawal behavior has been demonstrated in both domains as well. Several industrial-organizational process theories (expectancy, equity, etc.) have attempted to link compensation with turnover behavior. No similar theories have been advanced in education to link financial aid with attrition behavior. It seems likely that a process such as comparison level for alternatives, suggested by Schneider (1976), could be useful in understanding the decision process which an individual goes through in evaluating financial and work factors prior to withdrawal.

Educational research has evidenced a definite superiority in the development of measures of institutional environments. This undoubtedly has explained why the effects of different institutional environments have been more clearly documented in dropout research. The educational

research has been relatively agreed that there are at least two major dimensions of college environment relevant to attrition: the academic and social. It has been clear from the research that a student's integration into the academic milieu has been a powerful determinant of persistence, just as it has been clear in industry that a worker's integration into the demands of the job also determines persistence. As stated above, it has also been clear that social integration has been associated with organizational persistence as well.

The experience in the prediction of organizational withdrawal in both domains has been remarkedly similar. While institutionally specific studies have reported, on occasion, a substantial ability to predict dropouts, the general experience has been disappointing. Few studies have been able to predict more than 20% of the criterion variance. There has existed a definite need for research in both domains to be cross-validated. There has also been growing agreement, among experts in the field, that some advantage may accrue to subgrouping subjects to improve the prediction of withdrawal.

It was in the realm of process theories that these two domains differ from each other the most. The process theories in industry have been focused on motivational concerns. Those in education have been focused on the interaction of the individual with the institutional environment. It has seemed that the VIE approach would be quite useful

in education for integrating research relevant to motivation. The second hypothesis of this research, about met expectations, has been concerned with such a motivational component. It has posited that the more the grade expectations of an individual were met at an institution, the greater would be the satisfaction and the less would be the force to withdraw from an organization. There was some support for this notion from the educational milieu. Pantages et al. (1978) suggested that grades have important reinforcement properties which decrease the likelihood of a student's dropping out. From another viewpoint, met expectations concerning grades have been viewed as indicative of a student's academic integration (Tinto, 1975).

Finally, the development of models of the withdrawal process in both the educational research on attrition and the industrial research on turnover has been fortuitous. It has been clear that models such as Tinto's (1975), Mobley's (1977), and Steers' (1977) are important antecedents to the development of a better understanding of attrition.

CHAPTER III

METHODOLOGY

Overview of the Design

To reiterate, this study's purpose has been to test certain hypotheses, derived from empirical research on turnover in the field of industrial-organizational psychology, in a higher education milieu (specifically the prediction of "voluntary" college attrition of first-time, full-time freshmen). To this end, questionnaires were administered to two groups of entering college freshmen prior to their first year at college. The students who completed the questionnaires were followed over a year period to determine whether they had persisted into their sophomore year. Performance data (first semester college GPA) were also gathered.

The data were then used to test several hypotheses. The main analytic technique was a series of multiple regression analyses. The data from the multiple regression analyses, based on the first of the two groups, were used in a cross-validation procedure with the data from the second group.

Instruments

Student Information Form (SIF). The primary instrument used to acquire biographic and other data was the Student Information Form (SIF), developed by the American

Council on Education, and used annually in nation-wide surveys of college freshmen (Astin, Panos, & Creager, 1966; Astin, King, & Richardson, 1975; Astin, King, & Richardson, 1976). The SIF has been widely used in educational research (Astin, 1977). A report on the item reliability has been made available (Borach & Creager, 1972).

It is important to note that a minor proportion of the SIF items have changed from year to year. Thus the questionnaires employed in this study and administered to two different groups (in different years) were not identical. The first of these two questionnaires has been presented as Appendix A (1975 SIF form). The second questionnaire has been presented as Appendix B (1976 SIF form). The SIF questionnaire has allowed for the inclusion of ten locally-constructed items as well. In both years, the Short Dogmatism Scale was administered (Troldahl & Powell, 1965). The items in this scale have been presented as part of Appendices A and B.

A consequence of the changes in the SIF questionnaire from year to year for this study should be noted. Since one aspect of this study was cross-validation, no variable which was not employed on both forms could be used for the development of the prediction equations.

The Enrollment Reporting System (ERSS). At the institution under study, a computerized record has normally been prepared at the beginning of each semester for each student enrolled during that semester. This record has contained

a variety of information, but a particular concern in this study was the fact that this record contains grade point averages from the previous semester. Since all participants in this study were first-time, full-time students, this GPA was solely the result of Chico academic experience/performance. Besides its importance in providing the performance variable of freshman GPA, this record was used in the definition of attrition status. The presence of an ERSS record in any given semester indicated that a student had persisted into that semester. The absence of such a record indicated a student had left the institution.

Source of the Sample

The subjects in the present investigation were full-time freshman students at CSU, Chico who completed the SIF in the fall of 1975 (75 cohort) or in the fall of 1976 (76 cohort).

The 1975 cohort. All full-time CSU, Chico freshmen entering college for the first time (with no previous college experience) were requested to participate. One group of 50 freshmen completed SIF as part of the summer orientation activities conducted by the Advising Office. Another group of 565 freshmen completed SIF in dormitory administrations where resident advisors requested freshmen to take the SIF immediately after dorm orientation sessions held during the first weeks of the fall semester. All remaining freshmen were mailed the package containing an invitation to participate

in the study, a SIF form, and a postage-prepaid return envelope. This mail-out, along with the follow-up letter several weeks later, secured an additional 247 responses.

The procedure followed was the same for each participant. Each participant received a printed cover letter (Appendix A) inviting their participation and guaranteeing the confidentiality of their responses. The reverse side of the cover letter contained the ten locally-constructed items allowed by the SIF. These ten items formed the Short Dogmatism Scale (Troldahl & Powell, 1965). Participants were also asked to identify themselves by social security number, and to permit the Office of Institutional Research to use this identification for future research. After allowing a period of time for the mailed questionnaires to be returned, all forms were sent to the Cooperative Institutional Research Program (CIRP, a Division of the American Council on Education that developed the SIF questionnaire). The CIRP scored the questionnaires and prepared a computer tape of the responses which formed the primary data base for this study.

The 1975 cohort (N = 862) participants represented 73% of the fall, 1975 first-time, full-time freshmen. Of the participant group, 72% (N = 623) identified themselves by social security number. The data from those students who did not identify themselves by social security number were not used in this study since they could not be followed up to determine their attrition status. The participant group was known to differ from the population of 1975 CSU, Chico

first-time, full-time freshmen in that females were over-represented. Other differences existed as well. The procedure and results of the 1975 SIF administration at CSU, Chico may be found in Worth and Safarik (1976).

After excluding those subjects who were academically disqualified prior to the start of their second year (i.e., those for whom attrition was not voluntary), and those subjects who had supplied inaccurate social security numbers, the final participant sample contained data on 612 individuals. Twenty-five percent (N = 155) dropped out prior to the start of their sophomore year.

The 1976 cohort. The administration procedures used with the 1976 cohort were different from those employed with the earlier group. All new freshmen were required to report to a SIF administration center as a prerequisite to registration during the fall, 1976 semester. Freshmen were not required to complete the SIF form, however. Since all freshmen could be contacted in a milieu which encouraged the completion of the SIF form, the response rates were very high. Aside from the method of contacting the students, the procedures employed with the 1976 group were the same as those used with the earlier group. Samples of the cover letter, supplemental dogmatism questionnaire, and SIF questionnaire have been given as Appendix B.

Due to the substantial differences in administration, the 1976 participant cohort (N = 1592) was fully

representative of the 1976 first-time, full-time freshman class. Eighty-four percent of the participants were identified by social security number.

After exclusions were made for (a) those who never enrolled at CSU, Chico, (b) those without social security numbers or inaccurate social security numbers, and (c) for those who were academically disqualified prior to the start of their second year, 1274 participants remained. Thirty-one percent of these (N = 391) dropped out prior to the start of their sophomore year.

It is important to point out that, for both groups, a "screen" was run on the variable of academic disqualification (from the ERSS). This was done so that the remaining participants would represent students for whom withdrawal was voluntary. The removal of these students had negligible impacts on sample sizes. A second screen was conducted to remove minority group members. This was done because Astin (1972) has presented research which suggests that the dropout patterns are different for different minority groups. This screen also had little effect since almost all CSU, Chico freshmen in these years were white/Caucasian. Finally, the two cohort groups were kept separate. While statistical power might have been enhanced by pooling the two groups, thus increasing sample size, the separation was necessary for the purpose of cross-validation. To summarize, subjects were white/Caucasian, full-time, first-time freshmen from two groups (75 and 76 cohorts) who were identified

by social security number when taking SIF, and were not academically disqualified prior to their third semester. The 1976 cohort was considered to be representative of the 1976 full-time, first-time freshman class at CSU, Chico. The 1975 cohort was not considered to be representative of its respective freshman class.

Operational Definitions

Biographical predictors. Table 1 presents the set of biographical predictors from the SIF questionnaires used in the prediction of attrition. The item numbers from the 1975 and 1976 questionnaires (Appendices A and B) have also been presented.

Essentially all the variables from SIF which could not be considered to be attitudinal were placed within this set. Some variables were excluded because they lacked any variance; for example, item 2 (Appendices A and B). Some variables were excluded because they did not appear on both years' questionnaires; for example, item 19 (Appendix A). Finally, some variables were excluded, such as father's occupation, because they would have required a substantial number of additional variables to be added to the multiple regression analyses (in the example of father's occupation, one variable would have been required for each occupational category, minus one).

Additional predictor items from SIF. The term "affective" has been used to describe all non-biographical variables.

TABLE 1

Biographical Predictors
and SIF Item Numbers

Predictors	Item # 1975	1976
Sex	1	1
Age	3	3
High school program	5	5
Miles: home to college	11	11
Planned college residence[a]	25	26
Parental income	29	30
Mother's education	30	31
Father's education	30	31
High school GPA	6	6
High school preparation:		
Math skills	7	7
Reading & composition	7	7
Foreign languages	7	7
Science	7	7
History/social sciences	7	7
Vocational skills	7	7
Musical & artistic skills	7	7
Study habits	7	7
Financial support:		
Parental	18	17
Basic educ. opportunity grant	18	17
State scholarship or grant	18	17
Part-time work	18	17
Savings	18	17

[a]Dichotomized, where: 0 = off-campus residence; 1 = campus residence.

These included attitudinal, expectancy, aspirational, and similar items. The items with their respective SIF item numbers have been presented in Table 2.

Expressed intention to drop out. This variable was operationalized, a priori, as the sum of three items from the SIF questionnaires: drop out of this college temporarily, drop out permanently, and transfer to another college before graduation (see items 36 and 38 in Appendices A and B respectively).

Met expectations. There were two aspects to the concept of met expectations (the original expectancy and the extent to which the original expectancy has been met). This study specifically concerned expectations concerning academic performance. The original expectancy concerning grade performance was operationalized, a priori, as the single item from the 1975 and 1976 questionnaires (see items 38 and 36 respectively): make at least a "B" average.

The extent to which the original expectancy was met, in other words the performance, was defined as the first semester GPA from the student's records. The met expectation variable was then operationalized as the standard score of the performance (i.e., GPA) minus the standard score of the expectation.

"Personality" variables. The third hypothesis of this study concerned the specific relationship of personality

TABLE 2

"Affective" Predictors
and SIF Item Numbers

Predictors	Item # 1975	1976
Highest planned degree	24	25
Concern for financing education	27	28
Political views	28	29
Reason for attending college:		
Relatives	23	33
Teachers	23	33
Academic reputation	23	33
Financial assistance	23	33
Advice from previous attendee	23	33
Special programs	23	33
Low tuition	23	33
Advice from guidance counselor	23	33
Live at home	23	33
Advice from friend	23	33
College recruiting	23	33
Expectation:		
Change major field	36	38
Change career choice	36	38
Fail one or more courses	36	38
Graduate with honors	36	38
Elected to student office	36	38
Join a fraternity	36	38
Live in a coed dorm	36	38
Elected to academic honor society	36	38
Make a "B" average	36	38
Need extra time for degree	36	38
Need tutoring	36	38
Work during college	36	38
Seek vocational counseling	36	38
Seek individual counseling	36	38
Get a bachelor's degree	36	38
Drop out temporarily	36	38
Drop out permanently	36	38
Transfer before graduating	36	38
Be satisifed with college	36	38
Find a job in field	36	38
Get married in college	36	38
Get married after college	36	38

characteristics with the criterion of turnover. Only one "established" personality measure was administered: the Short Dogmatism Scale (Troldahl & Powell, 1965). Several other personality-like variables have been defined, for the purpose of exploring the hypothesized relationships.

The second personality measure consisted of the sum of the 17 goals, or life outcomes, listed as items 35 and 37 on the 1975 and 1976 questionnaires respectively. Ard (1976) used an identical operational definition and termed the resultant measure the valence of goals. As indicated in the introduction to this study, such an operationalization might also exist for the personality characteristic of need achievement (Cofer & Appley, 1964).

Finally, 14 self-reported personality-type items were factor analyzed to determine if any meaningful principal factors emerged which could be used to test the expected relationship between personality variables and attrition. These were the 14 items from the 1976 SIF questionnaire (item 24) which did not end in the word "ability." The "ability" items were excluded because the relationship of ability and attrition has been demonstrated, and it was expected that other measures relevant to ability (such as high school and college grade performance) adequately represented the ability variable. Results of this factor analysis have been presented in Table 3. The analysis was based on all original 1976 SIF respondents who completed the entire set of items. The principal factors program

TABLE 3

Summary of Results of Factor Analysis
of Self-Reported Personality Items
(Item 24, 1976 SIF) (N = 1355)

Items	Varimax Rotated Factor Loadings[a]					
	I	II	III	IV	V	h^2
Cheerfulness	24	10	-09	60	-07	44
Defensiveness	08	03	53	00	-03	27
Drive to achieve	14	39	18	24	-09	27
Originality	18	29	02	22	17	19
Attractiveness	55	23	10	09	-05	38
Conservatism	09	17	08	-00	-47	27
Liberalism	05	15	05	06	52	30
Popularity	69	16	04	26	-00	58
Popularity with opp. sex	87	10	07	14	02	80
Confidence-intellectual	22	80	00	07	02	70
Confidence-social	47	46	-00	26	-06	50
Sensitivity	-01	-01	44	04	-00	19
Stubbornness	05	06	52	09	01	30
Understanding others	11	13	01	50	14	30
Eigenvalues after rotation	3.02	.82	.65	.56	.42	

[a]Decimals omitted; five factors with initial eigenvalues > 1.0.

contained within the Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) was used in this analysis.

From this factor analysis, five scales have been created. This was accomplished for a factor by taking each item which loaded greater than an absolute value of .35 as the basis of a factor. The items were equally weighted and a negative weight was used if the item had a negative factor loading. Thus the first scale consisted of the popularity

with the opposite sex, popularity, social competence, and attractiveness items and was termed the "popularity" factor. The second item was comprised of the intellectual confidence item, the social confidence item, and the drive to achieve. This was called the "confidence" factor (although Ard, in 1976, termed a similar factor self-esteem). The third factor was comprised of the defensiveness, stubbornness, and sensitivity items and was termed "defensiveness." The fourth factor was comprised of the cheerfulness and understanding of others items and was called "cheerfulness." The fifth factor was a "conservatism/liberalism" factor comprised of these two items, with conservatism weighted negatively.

From the standpoint of factor analysis, it may be extremely questionable whether or not to include the second through fifth factors. It may also be debated whether the factor names given above really apply to the factors to which they were attached. The author agrees that such practices, from a factor analytic standpoint, were not particularly sound. However, such a factor analysis was not the primary intent of this research. These factors, as grossly defined, allowed the exploration of curvilinear relationships with the attrition criteria as intended. One countervailing force to criticisms of this factor analysis has simply been the size of the sample upon which the factor analysis was based. This large size has lent more substance to the results obtained.

Performance. The final hypothesis posed by this research was concerned with whether predictors differentially discriminated between persisters and leavers in the same fashion in a high performance group and a low performing group. Performance was operationalized as the first-semester college grade point average.

Analyses

The data from the administration of the SIF and the Enrollment Reporting System were concatenated and prepared as a SPSS file (Nie et al., 1975) for each of the two cohorts. All statistics were computed using the SPSS programs from Version 7.2.

The primary data analytic technique employed in this research was multiple regression. Multiple regression has been both an important inferential technique as well as an important predictive technique. The relationship between multiple regression and analysis of variance and covariance has been explicated by Cohen (1968) and Darlington (1968). Huberty (1975), citing Tatsuoka, has pointed out that multiple regression with a dichotomous dependent variable is proportionally equivalent with discriminant analyses with a similar (i.e., two category) variable.

While not all tests of the hypotheses were made using multiple regression analyses (for example, the third hypothesis was tested with one-way analysis of variance), the results from such analyses were related to the multiple

regression model.

It should be pointed out, in regard to multiple regression, that all multiple regressions presented in the results were computed on the basis of list-wise deletion of missing data. List-wise deletion of missing data was employed to avoid the problems of missing data in multiple regression analyses discussed by Cohen and Cohen (1975) and others. List-wise deletion (which removed a subject from the computation of a multiple regression if that subject was missing data on any of the variables employed in that multiple regression) has the consequence, however, of decreasing the size of the sample upon which the multiple regression was computed. This was unfortunate, since the decrease in the sample size causes a decrease in the power of the multiple regression procedure to detect a multiple regression correlation significantly different than zero. However, since the sample sizes were relatively large in this study, this did not present an overwhelming disadvantage. A discussion and explication of the data analytic techniques used has been presented with the results.

CHAPTER IV

RESULTS

Results have been presented, for each hypothesis in turn, in this chapter.

Hypothesis 1: Intention to Drop Out

As will be recalled in this hypothesis, it was stated that the expressed intention to drop out would best predict attrition, by the start of the second year, when compared to various biographical predictors. It was expected that the expressed intention to drop out would be the highest correlate with attrition when compared singly with each biographical predictor. It was also expected that this expressed intention would be the most important in a composite set of predictors formed from itself and all biographical data items.

Expressed intention was operationalized as the sum of three items where students estimated their chances of leaving the institution: dropping out of college temporarily, dropping out permanently, and transferring to another college. The biographical predictor items were stated in Table 1. To test the hypothesis, the 22 biographical variables and the intent variable were entered in a simultaneous multiple regression analysis. The met expectation variable (from the second hypothesis) was also entered in this analysis. The simultaneous multiple regression model allowed

each independent variable to compete on an equal footing. The simultaneous model was appropriate since the hypothesis suggested that expressed intention would best predict attrition when freely competing with other variables. Table 4 has presented the simultaneous multiple regression of biographical predictors with the intent and met expectation items on attrition for the 1975 cohort. Presented in this table are the simple correlations of the predictor items with the attrition criterion, the standardized regression coefficients (labeled "Beta"), the multiple correlation coefficient, and the F values from the significance tests of the partial coefficients. These F values have been used to determine whether a single independent variable's regression coefficient significantly differs from zero (the null hypothesis tested was that the particular regression coefficient was zero in the population).

Before examining the specific relationships between the variables and the attrition criteria in this regression, it must be pointed out that the multiple R, .279, obtained in this regression of the 1975 cohort was significant ($F = 1.71$, $p < .05$, $df = 24, 487$). It was concluded that the multiple R was not likely to be zero. The finding of a significant multiple correlation increased the confidence that could be put in the detection of significant individual independent variables. (This procedure was akin to requiring a significant overall F in analysis of variance before beginning the exploration of significant individual group

TABLE 4

Simultaneous Multiple Regression of Biographical Predictors, Intent and Met Expectation on Attrition--1975 Cohort (N = 512)[a]

Predictors	Simple R	Beta	F
Sex of student	.019	-.012	.06
Age of student	-.099	-.082	2.96
Type of high school program	-.071	-.062	1.82
Average grade in high school	.042	.035	.49
Mathematical	-.060	-.048	1.05
Reading & composition	.064	.083	3.19
Foreign languages	-.004	-.020	.20
Science	-.040	-.029	.39
History/social sciences	.000	-.012	.06
Vocational skills	.043	.071	2.29
Music & artistic skills	-.045	-.066	1.99
Study habits	-.037	-.047	.90
Miles from home to college	.014	-.038	.59
Residency during fall term	.122	.121	5.66*
Parental or family aid	.060	-.008	.02
Basic educ. oppor. grant	-.078	-.081	2.50
State scholarship	.050	.115	5.35*
Part-time work	-.016	-.033	.49
Savings	.026	.028	.36
Estimated parental income	.076	.070	1.81
Father's education	.031	.017	.09
Mother's education	.027	.001	.00
Intention to leave	.009	-.033	.50
Met expectation	.111	.127	7.56**

[a]Listwise deletion of missing values will cause sample sizes to vary.

*$p < .05$.

**$p < .01$.

differences and thus "protected" the detection of such differences).

Table 5 has presented identical information obtained from the 1976 cohort. Again, the multiple correlation coefficient .30 was determined to be significantly different from zero ($F = 4.20$, $p < .05$, $df = 24, 939$).

TABLE 5

Simultaneous Multiple Regression of Biographical Predictors, Intent and Met Expectation on Attrition--1976 Cohort (N = 957)

Predictors	Simple R	Beta	F
Sex of student	-.026	-.054	2.43
Age of student	-.036	-.013	.14
Type of high school program	-.024	.019	.30
Average grade in high school	.043	-.023	.38
Mathematical	-.012	-.030	.80
Reading & composition	-.043	-.041	1.46
Foreign languages	.012	-.002	.00
Science	.046	.035	1.08
History/social sciences	-.048	-.043	1.68
Vocational skills	.021	.014	.17
Music & artistic skills	.018	.030	.81
Study habits	.023	.029	.70
Miles from home to college	.089	.019	.28
Residency during fall term	.198	.160	7.86**
Parental or family aid	.102	.032	.63
Basic educ. oppor. grant	-.083	-.027	.52
State scholarship	.023	.058	2.71
Part-time work	.030	-.006	.04
Savings	.098	.069	4.31*
Estimated parental income	.098	.038	.84
Father's education	.076	.015	.14
Mother's education	.056	.010	.07
Intention to leave	-.035	-.054	2.78
Met expectation	.174	.182	29.72**

*$p < .05$.

**$p < .01$.

The first part of hypothesis 1 was tested by simply examining the columns in Tables 4 and 5 labeled "Simple R." It was clear that for neither cohort was the intention to leave the largest single correlate with the attrition criterion.

The standardized regression coefficients (betas) can perform as estimates of the importance, or usefulness, of variables in a multiple regression equation. Darlington

(1968) has pointed out that if all the predictor variables were uncorrelated, the standardized regression coefficients would be a perfect indicator of the importance of predictor variables in multiple regression. Unfortunately, in the social sciences, uncorrelated predictors have not usually been the case. Darlington (1968) has discussed some of the implications of correlated predictor variables (this problem is sometimes termed a multi-collinearity problem). As may be seen in the examination of the intercorrelation matrices of the variables presented in Tables 4 and 5 (see Appendix C), many of the predictor variables were correlated with each other, although not highly. Since they were not highly correlated, the standardized regression coefficients served as indicators of the importance of the predictor variables.

An examination of the standardized regression coefficients (betas) in Tables 4 and 5 revealed that the intention to leave item was not the most important item in the prediction of attrition. Based on the evidence contained in Tables 4 and 5, and considering the way the first hypothesis was stated, it was concluded that the data did not support the hypothesis that the expressed intention to leave was the most important predictor of attrition when included in a biographical data set.

The significance of an individual standardized regression coefficient can be tested to determine whether it differs significantly from zero. The formula for this test

may be found in Cohen and Cohen (1975), Nie et al. (1975), and other statistics books concerning multiple regression. As used in the SPSS program, the test has been expressed as an F-ratio (although it could also be expressed as a t-ratio). The degrees of freedom for the F-test for each independent variable in the equation were 1 and n - k - 1, where n was the sample size and k was the number of independent variables in the multiple regression equation. In either Table 4 or 5 for the beta to be considered significantly different from zero, the F value would have had to exceed 3.85 (for $F_{.05}$). It was concluded, upon examination of Tables 4 and 5, that the beta weights for the intention to leave item were not significantly different from zero.

Hypothesis 2: Met Expectations

This hypothesis was tested in a fashion similar to that of the previous one. This hypothesis predicted that the extent to which expectations concerning grades were met would predict attrition/persistence in the following manner: those students with large negative discrepancies (the reception of low grades and the expectancy of high grades) would be more likely to drop out. Expectation was operationalized as the self-reported likelihood of making a "B" average (a high score corresponds with a high reported likelihood). Received first semester college grade point average (using the traditional five-point scaling: A = 4, . . . , F = 0) comprised the performance variable. The

met expectation variable was created by subtracting the standardized expectation item from the standardized grade point average.

Examination of Tables 4 and 5 revealed that the met expectation item was the second highest simple correlate of attrition. In both cohorts, the dichotomous residency variable (off-campus, on-campus) was more strongly correlated with attrition.

When the standardized regression coefficients (betas) were examined (Tables 4 and 5), it was clear that the met expectation item was the most important in contributing to the multiple correlation in the composite formed from itself and the biographical items. In both cohorts, the beta for met expectation was the largest among all variables.

As with the previous hypothesis, it was possible to test the individual betas for met expectation to determine whether they significantly departed from zero. Recall that this was an F-test and would have degrees of freedom of 1 and n - k - 1. It was clear from the F-test that the coefficients from both cohorts were highly significant.

It was obvious that there was substantial support for the second hypothesis: that met grade expectation was the largest single correlate with attrition and the most important predictor of attrition when included with the biographical data sets. A more conservative test, of the importance of the met expectation variable, was to determine if this variable supplemented the biographical variable

set. In other words, the biographical variables were entered as a set and their multiple regression computed with the attrition criterion, then the new variable, met expectation, was added and a test was conducted to see if the multiple correlation coefficient had significantly increased.[2]

In the 1975 cohort, the 22 biographical variables produced a multiple correlation coefficient of .252. When the met expectation item was added to this equation, the multiple correlation coefficient was .277 (the specifics of this regression have not been presented since the analysis was supplementary to the hypothesis as stated; however, the specifics are available from the author). Given this, the N (512), and the formula given in footnote 1, the computed F-ratio was 6.99. The likelihood of an F of such magnitude occurring by chance was substantially less than one in 100.

---

[2]The formula for the F-test to determine whether an additional variable(s) increments another set of variables has been given by Cohen and Cohen (1975, p. 135):

$$F = \frac{(R^2_{Y.AB} - R^2_{Y.A})/k_B}{(1 - R^2_{Y.AB})/(n - k_A - k_B - 1)}$$

where $R_{Y.AB}$ was the squared multiple correlation coefficient for the biographical predictor set and the met expectation item; and $R_{Y.A}$ was the squared multiple correlation coefficient for the biographical data set alone; n was the number of subjects in the regression equation; k_A was the number of variables in the biographical predictor set (i.e., 22); and k_B was the number of variables in the met expectation set (i.e., 1). The degrees of freedom were k_B (numerator), and $n - k_A - k_B - 1$ (denominator).

The multiple correlation coefficient in the 1976 cohort for the biographical data set with the attrition criterion was also .252, while the multiple correlation coefficient, when the met expectation item was included, was .301. The sample size for this group was 957. When combined, these figures produced an F for the increment of met expectation to the biographical predictor set of 23.89. Again, an F of this size was highly unlikely to occur by chance. The result of the foregoing exercise was the conclusion that the met expectation variable was important not only when it was allowed to compete freely with biographical predictor items, but also significantly incremented a set of biographical data items.

Finally, it was asked whether there was an advantage that accrued with using a concept such as met expectation (performance minus expectation) versus simply entering the expectation and the performance singly into the regression equation.

It should be noted that multiple regression analysis will select the best linear combination of the expectation and performance variables. Conversely, it could be said that the use of the met expectation variable, which employs a specific a priori linear combination of these two variables (performance minus expectation), cannot lead to a multiple correlation coefficient larger than the one obtained using the two variables which comprise it. This was why the second hypothesis predicted no difference in the use of

the met expectation variable versus the use of its two components.

There were two reasons why the met expectation variable could be of interest in multiple regression even though its two components would contribute more. First, and most importantly, the use of the met expectation variable may have conceptual advantages for the practitioner as opposed to the separate use of its components. Second, the combination of the two variables into one variable (assuming the single variable performs nearly as well as its components) saves one degree of freedom (Cohen & Cohen, 1975) which could be considered a slight statistical advantage.

The following test, then, assesses whether the met expectation variable can serve as well as its components in the prediction of attrition. It might be noted, as an aside, that the expectation variable was significantly correlated with performance in the 1975 cohort ($r = .178$, $p < .01$, $N = 512$) and in the 1976 cohort ($r = .229$, $p < .01$, $N = 957$). Recall, as stated in the previous paragraph, when the 22 biographical variables were entered simultaneously, a multiple correlation coefficient of .252 was produced, and the subsequent inclusion of the met expectation item raised this multiple correlation coefficient to .277. An identical analysis was performed (again, the specifics are available from the author); however, in this analysis the expectation item and the performance (GPA) were entered instead of the met expectation item. The 22 biographical

variables naturally again produced a multiple correlation coefficient of .252 when entered simultaneously. The inclusion of the performance and expectation item raised this multiple correlation coefficient to .297. The preceding was based on the computation from the 1975 group. Similar results were found when the 1976 cohort was examined. The analyses for both cohorts excluded the intention to leave item, which produced slightly different results than those presented in Tables 4 and 5. Because of the listwise deletion of missing data and the exclusion of this intention variable, the sample sizes were also slightly larger (1975 cohort N = 514, and 1976 cohort N = 961). The 22 biographical variables originally produced a multiple correlation coefficient of .252, and when the met expectation variable was included, the correlation coefficient was raised to .301. When the procedure was repeated, employing the expectation and performance variables, the multiple correlation coefficient for the 22 biographical variables was again .252, and the multiple correlation coefficient with the inclusion of the expectation and performance variables was .302.

These results suggested that there was no disadvantage to the creation of a met expectation variable compared to using both its components separately in multiple regression. This confirmed the latter part of the second hypothesis. When both the 1975 and 1976 results were examined for the multiple regressions with the expectation and performance

items entered singly, it was quite clear that the variable contributing to the increase in the multiple correlation coefficient was the performance variable.

Interlude

One task of this study was to develop a cross-validated prediction schema which could be employed by the institution to predict attrition. This prediction schema was also used to identify the predictors which were tested in the fourth hypothesis. The results from this multiple regression with cross-validation have been presented here.

A step-wise multiple regression was computed on all predictor variables identified in Table 1 (p. 129) and Table 2 (p. 131). Since the composite intention item and the composite met expectation item were not demonstrated to increase the prediction of attrition beyond their individual items, the items from which these composites were formed were entered separately into the multiple regression. The partial F inclusion level was set at 1.0 (Wesolowsky, 1976, p. 81).

The results of this step-wise multiple regression have been presented in Table 6 (for those variables which reached the inclusion value of 1.0) and Appendix D (for those variables which failed to reach this inclusion value). As Cohen and Cohen (1975) have pointed out, attempts should not usually be made to interpret the results post hoc of step-wise multiple regression since these statistics may

TABLE 6

Biographic, "Affective," and Performance Variables Included in the Step-Wise Multiple Regression of These Variables on Attrition (Inclusion Level at 1.0) --1975 Cohort (N = 335)

Variables	Simple R	Beta	Mult. R	F
First semester college GPA	.159	.235	.159	16.34**
Residency during fall term	.103	.100	.191	2.95
Vocational skills	.077	.118	.217	4.86*
Advice from friend	-.090	-.155	.236	6.56*
Age of student	-.120	-.077	.253	2.07
Concern for financing education	-.082	-.088	.266	2.75
State scholarship	.070	.100	.282	3.66
Study habits	-.056	-.045	.294	.66
Type of high school program	-.106	-.107	.305	4.08*
Drop out permanently	.073	.124	.314	4.08*
Drop out temporarily	-.031	-.118	.325	3.69
Get married in college	-.072	-.142	.334	4.90*
Get married after college	.037	.130	.345	4.13*
College offers special programs	.066	.105	.353	3.97*
Average grade in high school	.020	-.119	.361	3.86
Foreign languages	-.062	-.080	.368	2.35
Mathematical	-.064	-.067	.375	1.61
Seek vocational counseling	-.047	-.079	.381	2.24
Savings	.068	.083	.386	2.60
Need extra time for degree	.021	.073	.392	1.80
Reading & composition	.065	.067	.397	1.58
College recruiting	-.049	-.091	.401	3.01
Miles from home to college	-.025	-.084	.406	2.16
Advice from previous attendee	.009	.091	.412	2.21
Make a "B" average	-.021	-.081	.416	2.07
Get a bachelor's degree	.052	.072	.421	1.81
Fail one or more courses	-.057	-.080	.426	1.86
Political views	.013	.068	.429	1.72
Highest planned degree	-.062	-.072	.433	1.92
Music & artistic skills	-.037	-.065	.437	1.51
Join a social frat. or dorm	.071	.063	.441	1.40

*$p < .05$.

**$p < .01$.

capitalize substantially upon chance. They have pointed out that the ad hoc order obtained from a set of independent variables in a given sample may not be found in other samples. This has pointed to the necessity of cross-validation in such research.

Thirty-one variables entered into the computation of the multiple correlation coefficient of .441. The overall F for the entire multiple regression was 2.59, a value whose occurrence by chance would be expected less than one in 100 times (given the degrees of freedom, i.e., 31 and 333). The multiple correlation coefficient squared was .194, which was the proportion of the dependent variables' variance shared with the weighted independent variables. When the multiple R^2 was adjusted for the number of variables and the number of subjects in the regression equation, the adjsuted R^2 was equal to .119. In other words, about 12% of the proportion of the dependent variables' variance was shared with the weighted 31 independent variables which entered into the equation. The formulas used to adjust R^2 may be found in Nie et al. (1975, p. 358).

To cross-validate the step-wise multiple regression obtained with the 1975 cohort, the standardized regression coefficients (betas) found in Table 6 were multiplied by the standardized values for their respective variables in the 1976 cohort. These vlaues were then summed for each subject and the correlation of the score with persistence was computed. The resulting correlation was the cross-

validated validity coefficient. The maximum size of this correlation was expected to be no larger than .346 (the square root of the adjusted R^2 computed on the 1975 cohort). The actual cross-validated validity coefficient was .223, which was significant ($p < .001$, $N = 731$). While the validity coefficient was highly significant statistically, it must be pointed out that the amount of variance in the attrition criterion found associated with the predictor set for the 1976 cohort was only 5%.

Hypothesis 3: Bipolar Relationships

The third hypothesis, stemming from research on the prediction of turnover using personality characteristics, predicted that those students characterized as very high, or very low, on selected personality scales would be more likely to withdraw from the institution. Seven personality variables were defined: the Short Dogmatism Scale, the sum of 17 goal importance items, and five "personality" factors.

For each of these variables, a one-way analysis of variance with a test for quadratic component was computed. This procedure, in effect, tested first whether a linear relationship existed between the variables (i.e., personality) and the criterion (attrition). The test for quadratic term then followed, which tested whether a curve with one point of inflection significantly reduced the unexplained variation.

Table 7 presents the results from the one-way analysis of variance with test for quadratic component of dogmatism with attrition for the 1975 cohort. Table 8 presents an identical analysis based on the 1976 cohort. Examination of these two tables revealed that a significant quadratic term existed for both cohorts. Tables 9 and 10 present the group means for the 1975 and 1976 cohorts respectively. The dogmatism scores in both cohorts were grouped into ten groups of approximately equal size. The means presented in Tables 9 and 10 were actually persistence rates rather than attrition rates, and were computed by setting persistence status equal to 1 and dropout status equal to 0. (To compute the attrition rate, subtract the persistence rate from 1.0.) It was obvious from the examination of Tables 9 and 10 that the groups at the extremes (GRP01 and GRP10 in both tables) had higher attrition rates than other groups.

Tables 11 and 12 present the one-way analyses of variance with test for quadratic component of the sum of the 17 goal importance items with attrition for the 1975 and 1976 cohorts respectively. Note that a significant quadratic term was found in the 1976 cohort. The 1976 group means (again divided into ten groups) on attrition have been presented in Table 13. Again, it may be noted that the two groups at the extreme had the highest attrition rates of all groups. Since no quadratic term was found in the 1975 cohort, the group means were not presented here; however, they may be inspected in Table A of Appendix E.

TABLE 7

One-Way Analysis of Variance with
Test for Quadratic Component:
Dogmatism with Attrition - 1975 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	9	4.702	2.83**
Linear term	1	.089	.48
Deviation from linear	8	4.613	3.13
Quadratic term	1	.833	4.52*
Deviation from quadratic	7	3.780	2.93
Within groups	401	73.960	
Total	410	78.662	

*p < .05.

**p < .01.

TABLE 8

One-Way Analysis of Variance with
Test for Quadratic Component:
Dogmatism with Attrition - 1976 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	9	2.092	1.17
Linear term	1	.000	.00
Deviation from linear	8	2.092	1.31
Quadratic term	1	.858	4.54*
Deviation from quadratic	7	1.188	.85
Within groups	1003	199.616	
Total	1012	201.708	

*p < .05.

TABLE 9

Dogmatism Group Means on
Attrition - 1975 Cohort

Group (Dogmatism Scores)	Count	Mean	Std. Dev.
GRP01 (19-27)	36	.639	.487
GRP02 (28-30)	42	.762	.431
GRP03 (31-32)	45	.844	.366
GRP04 (33-34)	47	.830	.380
GRP05 (35)	32	.594	.499
GRP06 (36)	43	.674	.474
GRP07 (37-38)	53	.830	.379
GRP08 (39-40)	40	.900	.304
GRP09 (41-42)	40	.625	.490
GRP10 (43-50)	33	.606	.496
Total	411	.742	.438

TABLE 10

Dogmatism Group Means on
Attrition - 1976 Cohort

Group (Dogmatism Scores)	Count	Mean	Std. Dev.
GRP01 (15-26)	97	.629	.486
GRP02 (27-29)	126	.754	.432
GRP03 (30-31)	109	.734	.444
GRP04 (32)	55	.800	.404
GRP05 (33-34)	134	.769	.423
GRP06 (35)	75	.720	.452
GRP07 (36)	82	.683	.468
GRP08 (37-38)	140	.757	.430
GRP09 (39-40)	89	.719	.452
GRP10 (41-50)	106	.679	.469
Total	1013	.726	.446

TABLE 11

One-Way Analysis of Variance with
Test for Quadratic Component:
The Sum of 17 Goal Importance Items
with Attrition - 1975 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	5	.772	.80
Linear term	1	.155	.80
Deviation from linear	4	.617	.80
Quadratic term	1	.044	.23
Deviation from quadratic	3	.573	.99
Within groups	592	114.053	
Total	597	114.824	

TABLE 12

One-Way Analysis of Variance with
Test for Quadratic Component:
The Sum of 17 Goal Importance Items
with Attrition - 1976 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	9	2.105	1.16
Linear term	1	.005	.02
Deviation from linear	8	.262	1.31
Quadratic term	1	.958	4.77*
Deviation from quadratic	7	.163	.81
Within groups	1007	202.145	
Total	1016	204.250	

*$p < .05$.

TABLE 13

Importance-Item-Sum Group Means
on Attrition - 1976 Cohort

Group (Importance Sum Scores)	Count	Mean	Std. Dev.
GRP01 (17-28)	90	.633	.485
GRP02 (29-31)	100	.740	.441
GRP03 (32-33)	112	.750	.435
GRP04 (34)	69	.739	.442
GRP05 (35)	65	.800	.403
GRP06 (36-37)	139	.748	.436
GRP07 (38-40)	162	.691	.463
GRP08 (41-42)	75	.773	.422
GRP09 (43-45)	96	.729	.447
GRP10 (46-66)	109	.661	.476
Total	1017	.721	.448

Tables 14 through 18 present the results of the one-way analyses of variance with test for quadratic components for the five personality factors with attrition. These personality factors, in the same order as Tables 14 through 18, were "popularity," "confidence," "defensiveness," "cheerfulness," and "conservatism/liberalism."

Significant quadratic terms were not found for any of these five "personality" factors. The group means (group by factor scores) on attrition have been presented in Tables B through F of Appendix E, since significant curvilinear relations were not found.

Overall, the results of this study seem to have provided equivocal support for a bipolar hypothesis. Clearly, a replicated bipolar relationship exists for the Short Dogmatism

TABLE 14

One-Way Analysis of Variance with Test for Quadratic Component: "Popularity" Factor with Attrition - 1976 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	11	1.942	.87
Linear term	1	1.192	5.90*
Deviation from linear	10	.750	.37
Quadratic term	1	.075	.37
Deviation from quadratic	9	.675	.37
Within groups	1036	209.142	
Total	1047	211.083	

*p .05.

TABLE 15

One-Way Analysis of Variance with Test for Quadratic Component: "Confidence" Factor with Attrition - 1976 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	8	1.338	.83
Linear term	1	.276	1.38
Deviation from linear	7	1.052	.75
Quadratic term	1	.037	.19
Deviation from quadratic	6	1.015	.84
Within groups	1045	209.330	
Total	1053	210.658	

TABLE 16

One-Way Analysis of Variance with Test for Quadratic Component: "Defensiveness" Factor with Attrition - 1976 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	9	1.234	.68
Linear term	1	.415	2.07
Deviation from linear	8	.819	.51
Quadratic term	1	.000	.00
Deviation from quadratic	7	.818	.58
Within groups	1040	208.222	
Total	1049	209.456	

TABLE 17

One-Way Analysis of Variance with Test for Quadratic Component: "Cheerfulness" Factor with Attrition - 1976 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	5	.764	.76
Linear term	1	.010	.05
Deviation from linear	4	.754	.93
Quadratic term	1	.104	.52
Deviation from quadratic	3	.650	1.07
Within groups	1060	214.370	
Total	1065	215.134	

TABLE 18

One-Way Analysis of Variance with Test for Quadratic Component: "Conservatism/Liberalism" Factor with Attrition - 1976 Cohort

Source	D.F.	Sum of Squares	F-ratio
Between groups	7	2.763	1.97
Linear term	1	.174	.87
Deviation from linear	6	2.589	2.15
Quadratic term	1	.261	1.30
Deviation from quadratic	5	2.328	2.32
Within groups	1045	209.592	
Total	1052	212.355	

Scale with attrition. The results for the other variables suggested that no bipolar relationship existed with the possible exception of the sum of the 17 importance items. This sum was found to be curvilinearly related to attrition in the 1976 cohort, but not in the earlier cohort.

Hypothesis 4: Mean Differences Between Persisters and Dropouts at High and Low Performance Levels

This hypothesis suggested that if one examined a group of students defined as high performers (by first semester college GPA), the mean differences between persisters and dropouts on predictor variables would be approximately the same as the mean difference between persisters and dropouts from a low performance group on the same variables. This hypothesis was tested by visually inspecting the means between dropouts and persisters in the low performance

group and the means between dropouts and persisters in the high performance group. The high and low groups were defined as the upper and lower 27% on first semester GPA (Kelley, 1939). If the mean differences between dropouts and persisters had been approximately the same, one would have expected the t-values on the test between the means of dropouts and the means of persisters in the low performance group to have been approximately of the same magnitude and sign as the t-tests of dropouts and persisters from the high performance group. For the purposes of the visual inspection of these means, any difference between the absolute value of the t for low performers (dropouts vs. persisters) greater than an absolute value of 1.0 was termed of interest. Any such absolute difference greater than 2.0 was termed of substantial interest.

The predictors examined were those with partial F's greater than or equal to 2.71 and found in Table 6 (p. 149). This particular F value was chosen as a way to screen the 31 variables found in Table 6 so that some smaller subset could be reasonably examined. This particular F value indicated that the probability of obtaining such a beta weight by chance was less than one in ten. Fourteen variables were thus identified for examination; however, one variable, the first semester college GPA, was necessarily excluded since it was the basis for the identification of the low performance and high performance groups.

An alternate decision rule using eta (alternately called the correlation ratio) was also employed to select variables for inclusion which may have been related to the attrition criterion in a curvilinear fashion. Eta may be considered a relative measure of the magnitude of a curvilinear relationship. If a perfect linear relation prevailed between the variable and the criterion, then the product moment correlation would equal eta. If eta significantly exceeded the product moment correlation, then a curvilinear fit better describes the predictor-criterion relationship than does a linear fit. F-ratios were computed that tested the degree that eta exceeded the correlation coefficient for each variable in its relation with the criterion (Hays, 1973). This led to the identification of two additional variables for examination: age and the Basic Educational Opportunity Grant financial support variable.

Table 19 presents the results from the t-tests. Of the 13 variables, six demonstrated reasonable consistency in the size and magnitude of the t-test between dropouts and persisters at the low performance and high performance levels. These were the variables of:

(1) vocational skills;

(2) advice from a friend;

(3) getting married after college;

(4) special programs;

(5) the reception of a state scholarship; and

TABLE 19

t-Tests Between the Mean Predictor Scores (for Identified Predictors) of High Level Performers Who Persist and Those Who Leave, and Low Level Performers Who Persist and Those Who Leave - 1975 Cohort

Predictors	Low Performers			High Performers		
	Dropouts $\bar{X}$ (N)	Persisters $\bar{X}$ (N)	t	Dropouts $\bar{X}$ (N)	Persisters $\bar{X}$ (N)	t
Vocational skills	1.82(48)	1.92(107)	- .78	1.50(24)	1.73(134)	-1.58
Advice from friend	1.96(49)	1.72(109)	1.84	2.04(26)	1.71(132)	2.07*
Type of high school program	1.12(49)	1.06(111)	1.27	1.04(25)	1.03(139)	.26
Drop out permanently	1.30(50)	1.44(113)	-1.51	1.50(26)	1.49(136)	.11
Get married in college	2.29(49)	2.29(109)	- .05	2.46(26)	2.23(134)	1.19
Get married after college	2.56(50)	2.57(112)	- .06	2.85(26)	2.75(133)	.46
Special programs	1.68(50)	1.77(111)	- .63	1.46(24)	1.60(132)	- .90
High school GPA	5.31(51)	5.11(115)	1.10	6.65(26)	2.26(138)	1.69
Planned college residence	.57(51)	.79(115)	-3.02**	.65(26)	.70(139)	- .44
Concern for financing education	1.78(49)	1.63(111)	1.28	1.73(26)	1.77(136)	- .24
State scholarship	1.18(51)	1.10(115)	1.04	1.15(26)	1.14(139)	.20
Drop out temporarily	1.82(49)	1.81(110)	.05	2.31(26)	1.97(138)	1.93
College recruiting	1.06(49)	1.16(108)	-1.29	1.17(24)	1.04(131)	2.05*
Age	3.31(51)	3.22(114)	.89	3.08(26)	3.28(138)	- .96
Basic educ. oppor. grant	1.33(51)	1.27(115)	.51	1.11(26)	1.18(139)	- .55

*$p < .05$.

**$p < .01$.

(6) high school grade point average (scaled one to eight with a high value equal to a high GPA).

Seven variables had large enough differences in the difference in t-values to be of interest (an absolute difference of at least 1). These were:

(1) type of high school program;

(2) dropping out permanently;

(3) getting married in college;

(4) concern for financing education;

(5) dropping out temporarily;

(6) age; and

(7) Basic Educational Opportunity Grant.

Two variables had substantial differences in the absolute values of their t's between dropouts and persisters at the low and high performance levels. These were planned college residence and college recruiting.

Based on this visual inspection of means, it was concluded that the mean differences between dropouts and persisters at the low performance level did not appear to be invariably the same as the mean differences between dropouts and persisters at the high performance level. In less than half of the chosen variables were the differences between dropouts and persisters of approximately the same size and direction. The implications and interpretations of this finding have been discussed in the following chapter. Both variables that were selected with

the alternate decision rule (eta significantly greater than the product moment correlation) had large enough differences in the difference of the t-values to be of interest.

CHAPTER V

DISCUSSION

The implications of the findings have been discussed in this chapter. Based on the findings, and the interpretation thereof, suggestions have been made for further research. First, however, the limitations of this investigation were reviewed.

Limitations

Campbell and Stanley (1966) have enumerated two general threats to the validity of experiments: internal and external validity. The former is concerned with the internal control of extraneous factors in an experiment which might account for the obtained results (i.e., factors other than the experimental variable[s]). External validity is concerned with the generalizability of results to other situations.

It should be noted at the outset that this particular research was not intended to be experimental, rather it was concerned with predictive relationships. Thus concern for internal validity (in the sense of concern for the experimental and control variables) was less necessary than in other forms of research. There were, however, several factors which could be considered as aspects of internal validity since they influenced the interpretation of the results.

Both the first and second hypotheses suggested that specific predictors (met expectations and intentions) had as strong, or stronger, relationships with an attrition criterion than did a biographical predictor set. It may be pointed out that, to the extent that the chosen biographic predictor set (see Table 1, p. 129) underrepresented the biographic domain, then the effects of intention and met expectation were overestimated. To the extent that the biographic predictor set included variables not appropriately belonging to biographical data, then the effects of met expectations and intent were underestimated. The biographic set was broadly defined, such that if an error occurred, it would have tended to underestimate the intent and met expectation effects.

Another internal factor which influenced the interpretability of the findings was the multicollinearity among predictor variables. If all predictor variables had been uncorrelated, the regression "test" employed with the first two hypotheses would have presented a fair test of the relative importance of the predictor variables (Darlington, 1968). To the extent, for example, that met expectation and/or intent were correlated with other biographic predictors, the regression approach used with these two hypotheses may have tended to underestimate the effects. The avoidance of multicollinearity problems was, in part, the rationale for the pooling of the three items which formed the composite intent predictor variable.

The limitations which restrict the external validity, or generalizability, of this research have been presented in the Introduction. These limitations were conceived of in a hierarchical fashion. It was suggested that the specific orders, weights, relationships, and so forth would only generalize to nearly identical organizations and populations, if at all. At the broadest level, it was suggested that the study would demonstrate that the findings concerning voluntary withdrawal in industrial and military organizations could be expanded to university organizations as well, and vice versa.

The most serious threats to the external validity of this experiment concerned the representativeness of the samples. It should be recalled that the 1976 cohort was essentially representative of all first-time, full-time freshmen at the target institution in that year, while the 1975 cohort was no so representative. Another influence, which may have affected the representativeness of the results, could have been an "interaction" of missing data with the attrition criterion. Recall that a case was deleted from the regression equations if any of the variables in the prediction equation were missing data. To the extent that the omission of data on any particular variable was correlated with attrition status, this may have biased the results. The assumption made in this research was that the omission of data was random. Since the proportion of dropouts did not appear to change appreciably when cases

were deleted in the conducted regressions, it seemed reasonable to expect that there were no substantial relationships between the omission of data for any given variable and attrition.

While this research lacked experimental control which thus jeopardized the interpretation of the results, the generalizability of the results was enhanced by the non-artificiality of the milieu. By acquiring data "in the field," with the attendant extraneous and natural error, the practical significance of the findings could be demonstrated.

A Cross-Validated Prediction of Attrition

The multiple correlation coefficient produced by the step-wise regression of all predictor variables on attrition in the 1975 cohort was .44. The multiple correlation coefficient squared was thus .19, which is the proportion of the dependent variables' variance shared with the weighted independent variables. However, a more appropriate statistic was the R^2 adjusted for the number of variables and the number of subjects in the regression equation. This adjusted R^2 is equal to .12. At first blush, accounting for 12% of the proportion of the dependent variables' variance with the weighted independent variables seemed inadequate. However, this finding was in line with most national research which has attempted to predict attrition. For example, in national studies, Astin and his colleagues (1964, 1968, 1972) have found that the predictor variables

generally account for only about 10% of the variance in the dropout criterion.

The expected maximum size of the cross-validated validity coefficient was about .35 (the square root of the adjusted R^2 computed on the 1975 cohort). The actual cross-validated validity coefficient (using the regression weights developed on the 1975 cohort to predict attrition status in the 1976 cohort) was .22. This coefficient was highly significant in a statistical sense, however, it was disappointing since, in effect, it indicated that the amount of variance in the attrition criterion found associated with the predictor set in the 1976 cohort was only 5%. While this was less variance than has usually been accounted for in studies of attrition, it should be noted that most studies have reported squared multiple correlation coefficients which have neither been adjusted for the number of predictor variables and sample size, nor cross-validated (and have therefore been most directly comparable to the multiple correlation coefficient of .44 found with the 1975 cohort).

The obtained cross-validated validity coefficient may have been smaller than expected for two reasons. First, the regression weights, for some reason or other, may have been particularly unstable and thus less efficacious when applied to the validation cohort. The possible instability of the regression coefficients were a major determinant of the need for cross-validation (Cohen & Cohen, 1975;

Darlington, 1968). The second reason why the smaller than expected cross-validated validity coefficient was obtained may be found in the differences between the two samples. Recall that the 1976 cohort was representative of all first-time, full-time freshmen at the target institution in that year, while the 1975 cohort was not representative of the same group in the previous year. In essence, the 1975 group could not have been representative of the later group. Thus, the predictor sets developed in the 1975 group would have been less than optimal for the 1976 group.

The step-wise multiple regression had as one of its purposes the determination of particularly significant predictors to be examined in the fourth hypothesis (concerning differences between high level and low level performers). The predictors that were identified as of particular interest tended to correspond to those usually found in the prediction of attrition (see the section on the prediction of research on attrition in "Review of Literature," in this paper). Undo credence should not be given to the particular ordering or weights found in this step-wise multiple regression, since experts in step-wise multiple regression have pointed out that the technique has tended to capitalize upon chance (Darlington, 1968; Cohen & Cohen, 1975).

One additional purpose of this multiple regression was to demonstrate that attrition could be predicted at the target institution. The results from this study indicated that this prediction was possible, although the

practical significance of such a prediction may be small. The inability to predict a substantial and meaningful portion of the attrition variance suggested that more sophisticated predictive techniques might be employed in the future. One such technique might be the use of subgrouping to increase the amount of criterion variance accounted for (Owens, 1978).

Hypothesis 1: Intention to Drop Out

The results of this study did not support the hypothesis that the expressed intention to drop out would better predict attrition, by the start of the second year, when compared to a biographical predictor set. The expressed intention to drop out (formed as a composite of three items) was not the highest single correlate with attrition, nor did it contribute as the most important in a composite set of predictors formed from itself and all biographical data items.

The failure of expressed intention to relate to the attrition criterion was the most surprising finding of this study. The finding was especially surprising when one considers that expressed intention to leave has been well demonstrated to predict turnover in industry (Waters et al., 1976; Kraut, 1975; Alley & Gould, 1976), and that similar expressed intentions have been demonstrated at least once in education to predict attrition from college Astin, 1972). There are a number of reasons that may be

speculated upon as to why this finding may have occurred.

One possible cause of the failure of intention and attrition to relate may have been the creation of the composite intent item. It is conceivable, although not likely, that one or two of the items which formed the composite may have been pure error and have accidentally masked the effect of the other item(s). As a check against this possibility, a multiple regression similar to that presented in Table 4 (p. 139) was performed, substituting the three items which formed the composite intention item for the intention item (the analysis is available from the author). None of the three items forming the intention composite was found to have a significant partial F for inclusion. The three-item set did not significantly increment the multiple correlation coefficient when added to the biographical data set. It seems very improbable that the failure to relate to attrition was a fault of the creation of the composite.

The simplest possible interpretation of this finding has been that, in the particular milieu, intention had no relationship to attrition. In effect, this implied that one's intentions did not determine one's behavior. This seemed patently non-sensical, and contradicted the research in education on attrition which had demonstrated some relationship between intention and dropping out (Astin, 1972; Marks, 1967). It has seemed safer to speculate that intention was simply a far less important determinant of

attrition when compared with other variables, and that intention only predicted attrition after the effects of more important predictors had been partialled out. In other words, what one intends to do probably has a less immediate influence upon one's outcomes than do other factors of the situation, such as one's motivations, financial status, ability, and specific aspects of the environment (such as type of residency). Some indication of this may be seen in Astin's (1972) research where it may be noted that the intention to drop out item has entered into the prediction of attrition, but only after other variables had been taken into account. The same type of evidence may be seen in Table 6, for example, where the intention to drop out permanently was found to contribute to the step-wise multiple regression of all predictor variables on attrition, although it entered as the ninth step in this prediction equation. The implication of such a speculation has been that greater understanding must be developed of the conditions which may influence the relationship between intention and attrition. As pure speculation, an example of one possible condition which might influence this relationship has been given.

The fourth hypothesis of this research, from work by Faris (1971), suggested that some predictors may have had differential predictivity at different performance levels. When high and low performance was operationalized as the upper and lower 27% on first semester college GPA, then

the mean for low performing dropouts on the intent item was 5.6, while the mean for low performing persisters was 5.9. The mean on intent to drop out for high performing dropouts was 7.1, while the mean for high performing persisters was 6.4. When these means were graphed (see Figure 2), the pattern appeared to be a classic interaction pattern. Actually, the mean difference between persisters and dropouts on the intention variable among low performers was not statistically significant, while the mean difference between persisters and dropouts from the high performance group on the intent item was statistically significant ($t = 2.04$, $p < .05$). In effect, the intent to leave predicted attrition status among the high performing group and predicted attrition among a group that actually persisted in the low performing group. Furthermore, the high performance group, in general, had higher intention to leave scores than the low performance group; thus this variable in effect predicted that the high performers would leave and the low performers would stay, a consequence not necessarily advantageous for the university.

An analysis of covariance was conducted after a fashion suggested by Nie et al. (1975, p. 381-383). This procedure used the squared multiple correlation coefficients as substitutes for sum of squares. Performance (first semester college GPA) was the covariate and persistence the criterion. As might be expected from Figure 1, there was no main effect due to intention, while there was a

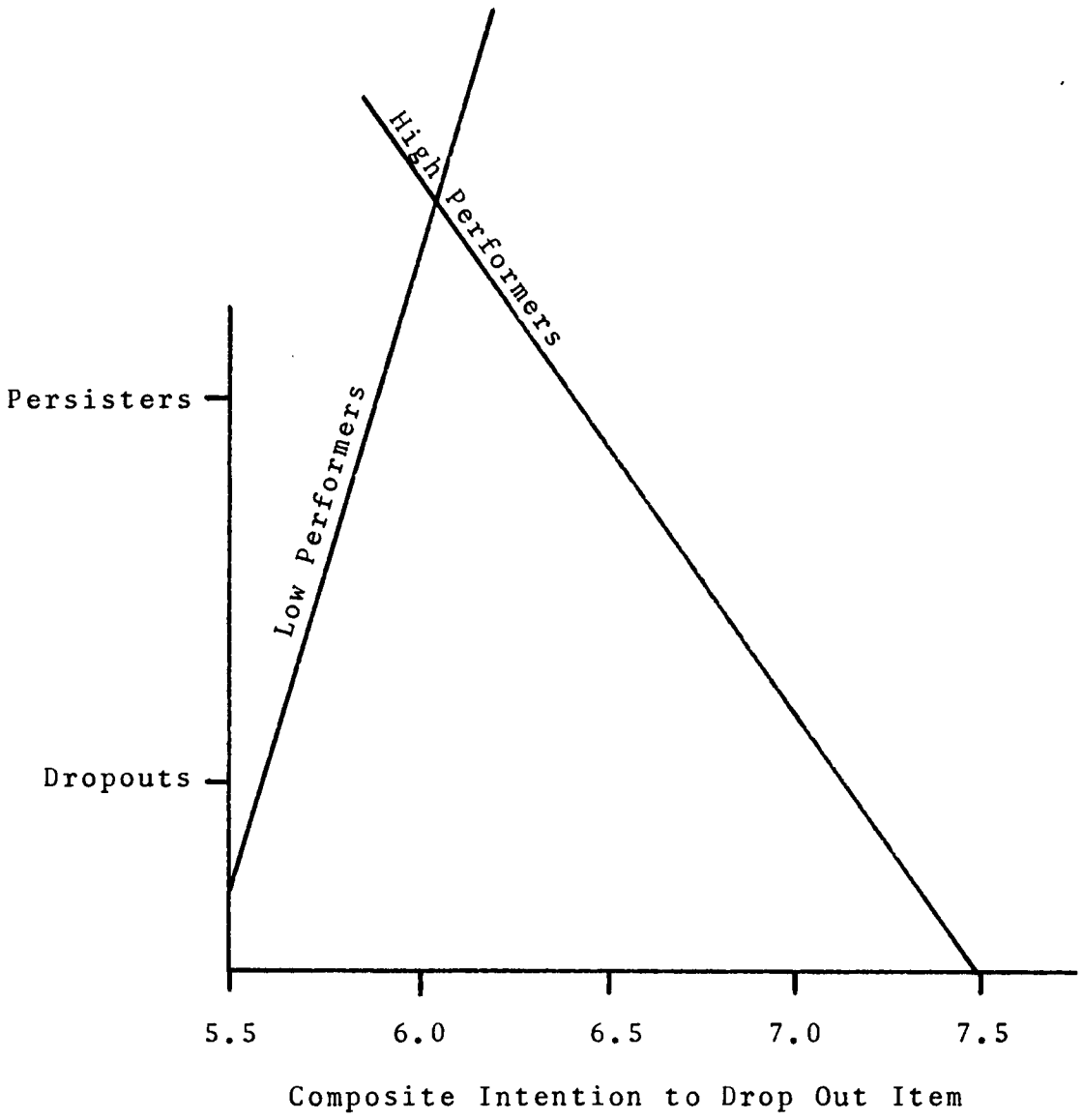


Figure 2. Composite intention to drop out item's relationship with attrition status at two performance levels for 1975 cohort.

highly significant main effect of the covariate. The interaction term was not statistically significant ($f = 3.77$, $df = 1, 316$; the formulas and values used in this computation have been presented in Appendix F), although this term approached significance.

If a statistically significant interaction term had indeed been found, it would have meant that there was a lack of homogeneity in the slopes of the regression, of intent upon attrition, for each of the two performance groups. This would have indicated that the necessity for developing regression formulas for the prediction of attrition for each performance level. In practice, it is not actually necessary to develop such separate regression equations. Interaction terms may be created by multiplying the variable of interest by its alleged covariate and entering this new variable as an interaction term in a multiple regression (along with its two "parent" variables). Cohen and Cohen (1975), Wesolowsky (1976), and others have exposited upon the use of interaction terms in multiple regression models.

One final speculation as to why intention failed to relate to the criteria stems from recent research by Kohen, Nestel, and Karmas (1978). Their research suggested that the predictors of persistence were not invariant across different stages of the undergraduate career. They found that attrition during the first two years of college was more predictable from student input characteristics than was attrition during the later years. They also found that

a number of variables had differential effects upon the likelihood of successfully completing a specified year of college; for example, they found that higher school curricular program predicted persistence during the freshman year, but had little effect upon the prediction of completion of subsequent years. Thus it may be speculated that intention is not a particularly important determinant of persistence during the freshman year, but may be a substantially greater determinant of persistence in later years. Future research might profitably center on the longitudinal examination of the predictivity of intention items for different years in the college career.

Hypothesis 2: Met Expectations

Support was found for this hypothesis as stated. The extent to which expectations were met did indeed predict attrition/persistence. The met expectation variable not only was a large single correlate with attrition, and the most important predictor of attrition when included with the biographical data set, but also significantly increased the multiple correlation coefficient when added to the regression after the biographical variable set.

It was determined, as well, that there was no apparent difference with using a concept such as met expectation (performance minus expectation) versus simply entering the expectation and the performance singly and allowing the multiple regression to determine the best linear combination

of these two variables. It was quite clear that the variable contributing to the increase in the multiple correlation coefficient was the performance variable. Considering the review of the research literature above, it should come as no surprise that a student's academic ability (as measured by first semester college GPA) was a highly predictive factor of attrition (Demitroff, 1974; Sewell & Shah, 1967). First semester college GPA was a particularly relevant predictor, since it was the most recent data, and, since it was so obviously relevant to college success (even though those who were dismissed for academic reasons were not included in this research).

The finding that there was no disadvantage in using the met expectation variable in multiple regression compared to using its components separately was encouraging. It suggests that the use of a discrepancy variable such as met expectation may be acceptable if there is a conceptual advantage to the practitioner in the use of the discrepancy variable. It further suggests that there may be a slight statistical advantage in using one combined variable in multiple regression as opposed to two component variables.

Many of the speculations concerning the first hypothesis are also relevant here. It was speculated that the reason no relationship was found was simply that the discrepancy between performance and expectation had no causal influence on attrition in educational institutions. Clearly more research is needed on the environments in which the

discrepancy in performance and expectation predicts voluntary withdrawal before this speculation can be accepted. It may be with the met expectation variable, as with intention to remain, that the variable predicts attrition only when the influences of other more immediate variables can be removed or controlled for.

It is interesting to speculate why expectations concerning grades, alone, did not relate to attrition. One surmise may be that expectancy concerning grades and the discrepancy of such expectations from reality (i.e., performance) may not have been a very salient aspect to students in determining their attrition. It may be that other expectations, such as those concerning social relationships, which were not met, would indeed predict attrition status in college groups. It may be, too, using Tinto's (1975) conceptual schema for dropouts, that met expectations in the academic domain increase academic integration and thus goal commitment (i.e., to getting a college degree), whereas met expectations in the social integration realm increase institutional commitment (i.e., persisting at a particular college or university). Clearly more research is called for, both in the education prediction of attrition as well as the industrial prediction of turnover. It may well be that met expectations outside the performance domain are as important, or even more important, in the determination of voluntary organizational withdrawal.

Hypothesis 3: Bipolar Relationships

Equivocal support was shown for the third hypothesis which predicted that those students characterized as very high, or very low, on selected personality scales would be more likely to withdraw.

The dogmatism variable was shown to be curvilinearly related to the attrition criterion in both cohorts. Those participants' dogmatism scores which fell in the upper or lower 10% of the range of dogmatism scores had persistence rates which were at least 10% below the persistence rate of the total group (see Tables 9 and 10, p. 154). The finding, that those characterized as very high, or very low, on dogmatism drop out, seemed consistent with the description of the characteristics of dropouts as described by Pantages et al. (1978).

The data from the two cohorts regarding the relationship of attrition with the sum of 17 goal importance items was contradictory. A significant curvilinear term was found in the 1976 cohort, but was not found in the 1975 cohort. The data from the 1976 cohort were consistent with the hypothesis (see Table 13).

No support for the bipolar hypothesis was found when the relationships of attrition with five "personality" factors were examined. It will be recalled that these factors were defined on the basis of the factor analysis of 14 self-assessed rating items.

There were two lines of reasoning that could be followed as to why the hypothesized relationship was not found among all the "personality" variables. First, the inability to demonstrate a relationship may have been caused by the inadequacy of the personality measures in a psychometric sense. Pantages et al. (1978) speculated that the problem in detecting differences among dropouts and persisters using personality measures as predictors may have been a result of the lack of adequate test reliabilities for these measures. It should be recalled that the personality measures, with the exception of the Short Dogmatism Scale, were defined as exploratory measures at the outset. No psychometric properties have been shown for these measures. It has seemed fair to state that the inability of these variables to relate with attrition would not lead necessarily to the rejection of a hypothesis of bipolar relationships since there was no certainty as to their adequacies as personality measures. A second line of explanatory reasoning that was followed concerning the pattern of results was based on the assumption that the sum of the 17 goal importance items and the five "personality factors" had some reliability and validity as personality measures. When this assumption was followed, it led to speculation that certain personality variables were associated with attrition, while other personality measures were not. It seemed patently unreasonable to expect that <u>all</u> personality variables would necessarily affect attrition in the same

fashion. A certain amount of the confusion within the literature concerning the relationship of personality variables with attrition has appeared to stem from the unfounded assumption that all personality variables should behave in the same pattern vis-a-vis the criterion.

The immediate implication of this line of speculation was that a far greater amount of research on personality variables was perceived as necessary to explore individually their relationships with attrition. It might be expected that some personality variables will relate in a bipolar fashion as has been demonstrated with dogmatism, that other personality variables will show no relationship with attrition under any circumstances, and yet other variables will be shown to be predictive of attrition for only some groups, or only under specific conditions.

Of particular benefit would be research which specifies a priori hypotheses concerning the nature of the relationship of personality variables with attrition. As a body of evidence accumulates concerning the nature of personality variables' relation with attrition, it should be possible to improve prediction of attrition through multiple regression techniques. For example, it would be possible to include a curvilinear term of a variable in a multiple regression equation by simply entering the square of that variable as well as the original score of that variable. It would also be possible to enter interaction terms for

each variable by using the product of the predictor variable with its alleged covariate. At first blush, this appears to suggest that in multiple regression analysis one should go out and produce all possible interaction and curvilinear terms of the variables. The difficulty with such an approach has been that as more and more predictor variables were entered into a multiple regression equation (such as curvilinear and interactive terms), the statistical power of the multiple regression has declined, given that the sample sizes did not change. In essence, this has meant that the likelihood of detecting a multiple correlation coefficient that was in "reality" significantly different than zero has decreased as more and more predictor variables have been added. The reduction in power, as predictor variables have been added, has been a primary reason why many authors on the subject of multiple regression have strongly suggested carefully selecting variables for inclusion in multiple regression research (Darlington, 1968). Thus additional research on the relationship of personality predictors' relationship with attrition should provide addtional information by which to select a small subset of personality predictors to be included in multiple regression predictive research on attrition.

Hypothesis 4: Mean Differences Between Persisters and Dropouts at High and Low Performance Levels

This hypothesis suggested that the mean difference between persisters and dropouts from a high performance

group on a particular predictor variable would be approximately the same as the mean difference between persisters and dropouts from a low performance group on the same variable. While the test of this hypothesis was crude, it was clear that at least some variables behaved in the predicted fashion (e.g., see the items college recruiting, drop out temporarily, drop out permanently, planned college residence, and so forth in Table 19, p. 162). The immediate implication of such a finding, as noted by Faris (1971), was that it could be necessary to develop separate prediction equations of attrition for those students defined as high or low performers.

It should be noted, however, that Faris' statement of the problem was unsophisticated. When the problem was considered from the standpoint of analysis of variance, what was suggested was an interaction between performance and certain predictor variables in the prediction of attrition. The interaction suggested, for example, that at a particular level of performance there might be no difference between persisters and dropouts on a particular variable which predicted attrition, while at a different level of performance, there might be substantial mean differences between persisters and dropouts on the same predictor variable. Since this study was primarily concerned with the prediction of attrition via multiple regression techniques, it was worthwhile to consider the implication of this finding for multiple regression as well. It implied that if one considered

a given performance range, that the slope of the regression of a predictor variable on attrition (such as intention to leave on attrition) would be different than the slope of the same relationship at a different performance level. In other words, there was a lack of homogeneity of regression slopes (say of intention on attrition) at different performance levels. This, in effect, would violate one of the assumptions necessary to multiple regression (Cohen & Cohen, 1975; Winer, 1971).

The explanation and example given with the first hypothesis concerning the relationship of intention with attrition is relevant to the fourth hypothesis. As may be recalled, it was speculated that the reason intention to drop out failed to relate to attrition was, in essence, because at the low performance level it predicted persisters to leave and dropouts to stay (i.e., incorrectly), while at the high performance level it predicted correctly.

One consequence of these findings has been the expectation that the prediction of attrition might be substantially improved if interaction terms were entered into multiple regression equations. The difficulty lies in determining which set of interaction terms ought to be included. It may be speculated that performance was not the only variable which interacts with the predictors. Variables such as sex, age, maturation, and so forth might also have interacted with predictors of attrition. This has led to the conclusion, as with the previous hypothesis,

that more research is needed which specifies *a priori* hypotheses concerning the interactions of variables and their relationships with attrition. As a body of evidence accumulates, it should be possible to define a relatively small set of predictors with previously demonstrated relationships (including linear, curvilinear, and interactive) with attrition.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The central purpose of this study was to increase the understanding of voluntary withdrawal from organizations. Two primary tasks were addressed. First, an integration and synthesis was made from the existing literature concerning the prediction of voluntary attrition in college student populations, and the prediction of voluntary turnover in industrial situations. Second, several hypotheses, which were derived from empirical research in the field of industrial-organizational psychology, were tested in the prediction of voluntary attrition in college student populations.

To test the hypotheses, questionnaires were administered to two groups of entering college freshmen prior to their first year at college. The questionnaire used was the Student Information Form, developed by the American Council on Education. It was used to acquire biographic and "affective" data (i.e., aspirations, attitudes, expectations, etc.).

Students who completed the questionnaires were followed over a one-year period to determine whether they had persisted into their sophomore year. Performance data (first semester college GPA) were also gathered. Due to differences in data acquisition, the students from one group (1975 cohort) could not be considered representative of

all first-time, full-time freshmen at the target institution in that year. The later cohort (1976) was representative of their first-time, full-time freshman class. Using the data which had been gathered, hypotheses were tested concerning the relationships of specific predictors with the attrition criterion. The main analytic technique was a series of multiple regression analyses, and the discussion was centered around the improvement of such analytic techniques. The results from the multiple regression based on the first of the two groups were used in a cross-validation procedure with the data from the second group. The principle findings were:

(1) Intention to Drop Out

a. The expressed intention to drop out was not the single largest correlate with the attrition criterion when compared with a number of biographical variables.

b. This variable was not found, either, to be the largest contributor in the composite prediction of the criterion.

c. There was some indication that an interaction existed, between level of performance and intention to drop out, which effectively "masked" the relationship between this intention and attrition.

(2) Met Expectation

a. In both cohorts, the met expectation variable

(performance minus expectation) was shown to be the second largest single correlate with the criterion when included within a biographical set of variables.

b. In both cohorts, the met expectation variable was the most important in a composite set of predictors formed from itself and biographical variables.

c. When the met expectation variable was entered into the multiple regression on attrition, after the biographical variables, it significantly increased the multiple correlation coefficient.

d. It was shown that no apparent disadvantage accrued with the use of a concept such as met expectation compared with simply using the two variables from which it was computed.

(3) Bipolar Relationships

a. A bipolar relationship was demonstrated between the personality variable of dogmatism and attrition. This relationship was in the hypothesized direction--those at the extremes of the dogmatism scale were more likely to drop out.

b. Several "personality" variables which were created for exploratory purposes failed to show the predicted curvilinear, bipolar

relationship with attrition. This may have been due to the inadequacy of the so-called "personality" variables as measures.

(4) Mean Differences Between Persisters and Dropouts at High and Low Performance Levels

a. Support was found for the proposition that the mean differences between persisters and dropouts on a given predictor variable were not necessarily the same for groups at high and low performance levels.

(5) Cross-Validated Prediction of Attrition

a. A significant cross-validated validity coefficient was demonstrated. The predictor set accounted for 5% of the variance associated with the attrition criterion.

(6) Integration-Synthesis of Research on Turnover and Attrition

a. There were a number of striking similarities between the domains of research on turnover and research on attrition.

b. It was clear in both domains that there were serious and similar criterion definition problems. In both domains such problems have led to difficulties in the interpretation of studies.

c. Two general research approaches have been used to study withdrawal behavior: using the individual as the unit of analysis, and using

the organization as the unit of analysis. The former has been more common, while it was suggested that there has been a greater need for studies of the latter nature.

d. Industrial research has commonly made an arguable assumption that there exists a continuum concerning withdrawal, e.g., negative attitudes-absenteeism-job-search activities-withdrawal.

e. In both domains a substantial amount of research has been conducted on the effects of personal characteristics, biographical data, motivational data, and so forth on attrition.

f. A major difference between the educational and industrial research domains on voluntary withdrawal has been in the type of models that have been developed. The industrial models have focused primarily upon motivational components. Those models in education have focused upon the interaction of the individual with his institutional environment.

Within the discussion, the limitations of this study have been reviewed. One basic problem with the research techniques used, multiple regression in particular, was that they do not result in causal statements. A second limitation occurred because of the multicollinearity among predictor variables. These predictor variables were not uncorrelated,

which created difficulties in the interpretation of the findings in terms of the importance of various predictor variables. A third major limitation concerned the generalizability, or representativeness, of the results. In essence, the generalizability of the results has been limited to situations which are similar to those which were in effect when the research was conducted. The more similar the situation to be generalized to is to the original situation, the safer the generalization. The generalizability of the results may have been enhanced by the non-artificiality of the research milieu (i.e., field research).

The discussion of the implications of the results centered, in part, around improvement of the prediction of attrition. In essence, it was concluded that attrition is complexly caused, and that substantially more research is necessary to define the relationship of predictor variables with attrition. One implication of the bipolar hypothesis was that there may be some utility to the inclusion of curvilinear terms within the multiple regression prediction of attrition. An implication of the fourth hypothesis (and an explanation of why the first hypothesis failed to be supported) was that there might be some utility to the inclusion of interaction terms within the multiple regression as well. It was pointed out that the "blind" inclusion of a substantial number of interaction and curvilinear terms within a multiple regression tended to decrease the power of the statistic. This formed the basis for suggesting

that further research was necessary so that a small set of predictor items with known relationships (which need not necessarily be linear) could be selected on an *a priori* basis for inclusion into a prediction schema for accounting for attrition variance.

Finally, it has been clear that research quite relevant to industrial-organizational psychology has been conducted in organizations other than industrial or military. Further, it has seemed obvious that the integration of this evidence into the research literature of industrial-organizational psychology could have nothing but a salutory effect. It is believed that the integration-synthesis of the research from industrial-organizational psychology on turnover with the research on attrition in college student populations may have provided beneficial knowledge to both disciplines.

REFERENCES

REFERENCES

Reference Notes

(1) Nutt, J. An investigation of attrition using life experience subgroups. Unpublished paper, University of Georgia. Provided in personal communication from Professor W. Owens, University of Georgia.

References

Adams, J. S. Toward an understanding of inequity. Journal of Abnormal and Social Psychology, 1963, 67, 422-436.

Alberti, R. E. & Emmons, M. L. Your perfect right: A guide to assertive behavior. San Luis Obispo, Ca.: Impact, 1974.

Alley, W. & Gould, R. B. Feasibility of estimating personnel turnover from survey data--A longitudinal study. Air Force Human Resources Laboratory, Tex.: AFHRL-TR-75-54, 1976.

Andrews, I. R. & Valenzi, E. Overpay inequity or self-image as a worker: A critical examination of an experimental induction procedure. Organizational Behavior and Human Performance, 1970, 5, 266-276.

Ard, R. F. Level of attribution of first-year college performance as factors affecting expectancy of subsequent performance, subjective utility of college, and self-esteem. Doctoral dissertation, University of Tennessee, 1976.

Armknecht, P. A. & Early, J. F. Quits in manufacturing: A study of their causes. Monthly Labor Review, 1972, 11, 31-37.

Astin, A. W. Effect of different college environments on the vocational choices of high aptitude college students. Journal of Counseling Psychology, 1965, 12, 28-34.

Astin, A. W. Personal and environmental factors associated with college dropouts among high aptitude students. Journal of Educational Psychology, 1964, 55, 219-227.

Astin, A. W. Predicting academic performance in college: Selectivity data for 2300 American colleges. New York: Free Press, 1971.

Astin, A. W. College dropouts: A national profile. ACE Research Reports, 1972, 7(2).

Astin, A. W. Student persistence: Some stay, some don't--why? College and University, 1973, 48, 298-306.

Astin, A. W. Preventing students from dropping out. San Francisco: Jossey-Bass, 1975.

Astin, A. W. Four critical years. San Francisco: Jossey-Bass, 1977.

Astin, A. W. & Holland, J. L. The environmental assessment technique: A way to measure college environments. Journal of Educational Psychology, 1961, 52, 308-316.

Astin, A. W., King, M. R., & Richardson, G. T. The American freshman: National norms for fall 1976. University of California, Los Angeles: Laboratory for Research in Higher Education, Graduate School of Education, 1976.

Astin, A. W., King, M. R., & Richardson, G. T. The American freshman: National norms for fall 1975. University of California, Los Angeles: Laboratory for Research in Higher Education, Graduate School of Education, 1975.

Astin, A. W. & Panos, R. J. The educational and vocational development of college students. Washington, D.C.: American Council on Education, 1969.

Astin, A. W., Panos, R. J., & Creager, J. A program of longitudinal research on the higher educational system. ACE Research Reports, 1966, 1.

Atchison, T. J. & Lefferts, E. A. The prediction of turnover using Herzberg's job satisfaction technique. Personnel Psychology, 1972, 25, 53-64.

Barton, K. & Cattell, R. B. Personality factors related to job promotion and tenure. Journal of Counseling Psychology, 1972, 19, 430-435.

Bayer, A. E. The college dropout: Factors affecting senior college completion. Sociology of Education, 1968, 41, 305-316.

Bernardrin, H.J. The relationship of personality variables to organizational withdrawal. Personnel Psychology, 1977, 30, 17-27.

Blanchfield, W. C. College dropout identification: A case study. Journal of Experimental Education, 1971, 40, 1-4.

Borach, R. F. & Creager, J. A. Measurement error in social and educational research. ACE Research Reports, 1972, 7(2).

Brayfield, A. H. & Crockett, W. H. Employee attitudes and employee performance. Psychological Bulletin, 1955, 52, 396-424.

Brown, R. The effect of self-awareness classes on the attrition rate of college freshmen. (Doctoral dissertation, University of Pittsburgh, 1972). Dissertation Abstracts International, 1973, 34. (University Microfilms No. 73-1649).

Buchanan, B. Building organizational commitment: The socialization of managers in work organizations. Administrative Science Quarterly, 1974, 19, 533-546.

Burke, R. J. & Wilcox, D. S. Absenteeism and turnover among female telephone operators. Personnel Psychology, 1972, 25, 639-648.

California State University and Colleges, Office of the Chancellor. Those who stay: Student continuance in the California State University and Colleges. (Division of Institutional Research Technical Memorandum No. Six). Long Beach, Ca.: June, 1976.

Campbell, D. T. & Stanley, J. C. Experimental and quasi-experimental designs for research. Chicago: Rand McNally, 1963.

Campbell, J. P., Dunnette, M. D., Lawler, E. E., & Weick, K. E. Managerial behavior, performance and effectiveness. New York: McGraw-Hill, 1970.

Campbell, J. P. & Pritchard, R. D. Motivation theory in industrial and organizational psychology. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand McNally, 1976.

Cascio, W. F. Accuracy of verifiable biographical information blank responses. Journal of Applied Psychology, 1975, 60, 767-769.

Coch, L. & French, J. R. P. Overcoming resistance to change. Human Relations, 1948, 1, 512-532.

Cofer, C. N. & Appley, M. H. Motivation: Theory and research. New York: John Wiley, 1967.

Cohen, H. Multiple regression as a general data-analytic system. Psychological Bulletin, 1968, 70, 426-443.

Cohen, J. & Cohen, P. Applied multiple regression/correlation analysis for the behavioral sciences. Hillsdale, N. J.: Lawrence Erlbaum Associates, 1975.

Cope, R. G. Selected omnibus personality inventory scales and their relationship to college attrition. Educational and Psychological Measurement, 1968, 28, 599-603.

Cope, R. G. An investigation of entrance characteristics related to types of college dropouts: A final report. Washington University, Seattle College of Education, 1971.

Cronbach, L. Essentials of psychological testing. New York: Harper & Row, 1960.

Dachler, H. P. & Mobley, W. H. Construct validation of an instrumentality-expectancy-task-goal model of work motivation: Some theoretical boundary conditions. Journal of Applied Psychology, 1973, 58, 397-418.

Daniel, K. B. A study of college dropouts with respect to academic and personality variables. The Journal of Educational Research, 1967, 60, 230-235.

Dansereau, F., Cashman, J., & Graen, G. Instrumentality theory and equity theory as complimentary approaches to predicting the relationship of leadership and turnover among managers. Organizational Behavior and Human Performance, 1973, 10, 184-200.

Darlington, R. B. Multiple regression in psychological research and practice. Psychological Bulletin, 1968, 69, 161-182.

Demitroff, J. F. Student persistence. College and University, 1974, 49, 553-567.

Dunnette, M. D., Arvey, R. D., & Banas, P. A. Why do they leave? Personnel, 1973, 50, 25-39.

Durkheim, E. Suicide. Glencoe: Free Press, 1961.

Dyer, H. School factors and equal educational opportunity. Harvard Educational Review, 1968, 38, 38-56.

Evan, W. M. Peer group interaction and organization socialization: A study of employee turnover. American Sociological Review, 1963, 28, 436-440.

Faris, G. F. A predictive study of turnover. Personnel Psychology, 1971, 24, 311-328.

Federico, S. M., Federico, P. A., & Lundquist, G. W. Predicting women's turnover as a function of extent of met salary expectations and biodemographic data. Personnel Psychology, 1976, 29, 559-566.

Feldman, K. A. & Newcomb, T. M. The impact of college on students. San Francisco: Jossey-Bass, 1969.

Festinger, L. A theory of cognitive dissonance. Evanston, Ill.: Row, Peterson, 1957.

Fleishman, E. A. & Harris, E. F. Patterns of leadership behavior related to employee grievances and turnover. Personnel Psychology, 1962, 15, 43-56.

Fournies, F. F. Why do they quit? Supervisory Management, 1970, 15, 32-34.

French, J., Ross, I., Kirby, S., Nelson, J., & Smyth, P. Employee participation in a program of industrial change. Personnel, 1958, 35, 16-29. Reprinted in Fleishman, E. (Ed.), Studies in personnel and industrial psychology. Homewood, Ill.: Dorsey Press, 1967.

Gannon, M. J. Sources of referral and employee turnover. Journal of Applied Psychology, 1971, 55, 226-228.

Gaudet, E. T. Labor turnover: Calculation and cost. American Management Association, Research Study No. 39, 1960.

Georgopolous, B. S., Mahoney, G. M., & Jones, N. W. A path-goal approach to productivity. Journal of Applied Psychology, 1957, 41, 345-353.

Goodman, P. & Salipante, Jr. P. Organizational rewards and retention of the hard-core unemployed. Journal of Applied Psychology, 1976, 61, 12-21.

Graen, G. Instrumentality theory of work motivation: Some experimental results and suggested modifications. Journal of Applied Psychology Monograph, 1969, 53, 1-25.

Guest, R. H. A neglected factor in labour turnover. Occupational Psychology, 1955, 29, 217-231.

Guion, R. M. Personnel testing. New York: McGraw Hill, 1965.

Hackman, J. R. & Dysinger, W. S. Commitment to college as a factor in student attrition. Sociology of Education, 1970, 43, 311-324.

Hannah, W. Personality differentials between lower division dropouts and stay-ins. The Journal of College Student Personnel, 1971, 12, 16-19.

Hays, W. L. Statistics for the social sciences. New York: Holt, Rinehart & Winston, 1973.

Heilbrun, A. B. Personality factors in college dropouts. Journal of Applied Psychology, 1965, 49, 1-7.

Hellriegel, D. & White, G. E. Turnover of professionals in public accounting: A comparative analysis. Personnel Psychology, 1973, 26, 239-249.

Heneman, H. G. & Schwab, D. P. An evaluation of research on expectancy theory predictions of employee performance. Psychological Bulletin, 1972, 78, 1-9.

Herzberg, F., Mausner, B., Peterson, R. O., & Capwell, D. F. Job attitudes: Review of research and opinion. Pittsburgh: Psychological Service of Pittsburgh, 1957.

Hilgard, E. R., Atkinson, R. C., & Atkinson, R. L. Introduction to psychology. New York: Harcourt Brace Jovanovich, 1975.

Hill, A. H. Longitudinal study of attrition among high aptitude college students. Journal of Educational Research, 1966, 60, 166-173.

Hill, J. M. & Trist, E. L. Changes in accidents or other absences with length of service: A further study of their incidence and relation to each other in an iron and steel works. Human Relations, 1955, 8, 121-152.

Hrebniack, L. & Alutto, J. Personal and role-related factors in the development of organizational commitment. Administrative Science Quarterly, 1972, 17, 555-572.

Huberty, C. J. Discriminant analysis. Review of Educational Research, 1975, 45, 543-598.

Hulin, C. L. Effects of change in job-satisfaction levels on employee turnover. Journal of Applied Psychology, 1968, 52, 122-126.

Hulin, C. L. & Blood, M. R. Job enlargement, individual differences and worker responses. Psychological Bulletin, 1968, 69, 41-55.

Iffert, R. E. Retention and withdrawal of college students. U. S. Department of Health, Education, and Welfare Bulletin, Washington, D.C.: U.S. Governmental Printing Office, 1957.

Ingham, G. Size of industrial organization and worker behavior. Cambridge, Mass.: Cambridge Univeristy Press, 1970.

Kamens, D. H. The college "charter" and college size: Effects on occupational choice and college attrition. Sociology of Education, 1971, 44, 270-296.

Katz, R., Wolfe, D., Quinn, R., Snoeck, J., & Rosenthal, R. Organizational stress: Studies in role conflict and ambiguity. New York: John Wiley, 1964.

Katzell, M. E. Expectations and dropouts in schools of nursing. Journal of Applied Psychology, 1968, 52, 154-157.

Kelley, T. L. The selection of upper and lower groups for the validation of test items. Journal of Educational Psychology, 1939, 30, 17-24.

Kilbridge, M. Turnover, absence, and transfer rates as indicators of employee dissatisfaction with repetitive work. Industrial and Labor Relations, 1961, 15, 21-32.

Kohen, A. I., Nestel, G., & Karmas, C. Factors affecting individual persistence rates in undergraduate college programs. American Educational Research Journal, 1978, 15, 233-252.

Kraut, A. I. Predicting turnover of employees from measured job attitudes. Organizational Behavior and Human Performance, 1975, 13, 233-243.

Kreidt, P. H. & Gadel, M. S. Prediction of turnover among clerical workers. Journal of Applied Psychology, 1953, 37, 338-340.

Kuhn, T. S. The structure of scientific revolutions. Chicago: The University of Chicago Press, 1962.

La Rocco, J. M., Pugh, W. M., & Gunderson, E. K. E. Identifying determinants of retention decisions. Personnel Psychology, 1977, 30, 199-215.

Larsen, S. W. A comparison of graduating and non-graduating students originally enrolled at the University of Tennessee. Doctoral dissertation, University of Tennessee, 1970.

Lawler, E. E. Pay and organizational effectiveness: A psychological view. New York: McGraw-Hill, 1971.

Lawler, E. E. & Porter, L. Antecedent attitudes and effective managerial performance. Organizational Behavior and Human Performance, 1967, 2, 122-142.

Lee, S. An empirical analysis of organizational identification. Academy of Management Journal, 1971, 14, 213-226.

Lent, R. H., Aurbach, H. A., & Levin, L. Predictors, criteria, and significant results. Personnel Psychology, 1971, 24, 519-533.

Locke, E. A. Personnel attitudes and motivation. Annual Review of Psychology, 1975, 26, 457-480.

Longest, B. B. & Clawson, D. E. The effect of selected factors on hospital turnover rates. Personnel Journal, 1974, 53, 30-34.

Lyons, T. Role clarity, need for clarity, satisfaction, tension, and withdrawal. Organizational Behavior and Human Performance, 1971, 6, 99-110.

Lyons, T. F. Turnover and absenteeism: A review of relationships and shared correlates. Personnel Psychology, 1972, 25, 271-281.

March, G. & Simon, H. A. Organizations. New York: John Wiley, 1958.

Marks, E. Student perceptions of college persistence and their intellective, personality, and performance correlates. Journal of Educational Psychology, 1967, 58, 210-221.

Mitchell, T. R. & Albright, D. W. Expectancy theory predictions of the satisfaction, effort, performance and retention of naval aviation officers. Organizational Behavior and Human Performance, 1972, 8, 1-20.

Mobley, W. H. Intermediate linkages in the relationship between job satisfaction and employee turnover. Journal of Applied Psychology, 1977, 62, 237-240.

National Commission on the Financing of Postsecondary Education. Financing postsecondary education in the United States. Washington, D.C.: U.S. Government Printing Office, 1973.

Nelson, J. High school context and college plans: The impact of social structure on aspirations. American Sociological Review, 1972, 37, 143-148.

Nelson, A. G. College characteristics associated with freshman attrition. Personnel and Guidance Journal, 1966, 44, 1046-1050.

Newcomb, T. M. Student peer-group influence. In N. Sanford (Ed.), The American college. New York: Wiley, 1962.

Nicholson, N., Brown, C. A., & Chadwick-Jones, J. K. Absence from work and job satisfaction. Journal of Applied Psychology, 1976, 61, 727-737.

Nicholson, E. A. & Miljus, R. C. Job satisfaction and turnover among liberal arts college professors. Personnel Journal, 1972, 51, 840-845.

Nie, H. N., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. Statistical package for the social sciences. New York: McGraw-Hill, 1975.

Owens, W. A. Background data. In M. D. Dunnette, (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand McNally, 1976.

Owens, W. A. Moderators and subgroups. Personnel Psychology, 1978, 31, 243-247.

Owens, W. A. & Henry, E. R. Biographical data in industrial psychology: A review and evaluation. Greensboro, N. C.: The Richardson Foundation, 1966.

Owens, W. A. & Jewell, D. O. Personnel selection. Annual Review of Psychology, 1969, 20, 419-445.

Pace, C. R. CUES: College and university environment scales, technical manual. Princeton, N. J.: Educational Testing Service, 1963.

Pace, C. R. & Stern, G. G. An approach to the measurement of psychological characteristics of college environments. Journal of Educational Psychology, 1958, 59, 269-277.

Pandey, R. E. Personality characteristics of successful, dropout, and probationary black and white university students. Journal of Counseling Psychology, 1972, 19, 382-386.

Panos, R. J. & Astin, A. W. Attrition among college students. American Educational Research Journal, 1968, 5, 57-72.

Pantages, T. J. & Creedon, C. F. Studies of college attrition. Review of Educational Research, 1978, 48, 49-101.

Peng, S. S. & Fetters, W. B. Variables involved in withdrawal during the first two years of college: Preliminary findings from the National Longitudinal Study of the High School Class of 1972. American Educational Research Journal, 1978, 15, 361-372.

Peng, S. S., Ashburn, E. A., & Dunteman. Withdrawal from institutions of higher education: An appraisal with longitudinal data involving diverse institutions (NCES 77-264). Washington, D.C.: U.S. Government Printing Office, 1977.

Porter, L. W., Crampon, W. J., & Smith, F. J. Organizational commitment and managerial turnover: A longitudinal study. Organizational Behavior and Human Performance, 1976, 15, 87-98.

Porter, L. W. & Lawler, E. E. Properties of organizational structure in relation to job attitudes and job behavior. Psychological Bulletin, 1965, 64, 23-51.

Porter, L. W. & Lawler, E. E. Managerial attitudes and performance. Homewood, Ill.: Irwin, 1968.

Porter, L. W. & Steers, R. M. Organizational, work, and personal factors in employee turnover and absenteeism. Psychological Bulletin, 1973, 80, 151-176.

Porter, L. W., Steers, R. M., Mowday, R. T., & Boulian, P. V. Organizational commitment, job satisfaction and turnover among psychiatric technicians. Journal of Applied Psychology, 1974, 59, 603-609.

Pritchard, R. D. Equity theory: A review and critique. Organizational Behavior and Human Performance, 1969, 4, 176-211.

Proctor, J. Y., Lassiter, W. E., & Soyars III, W. B. Prediction of young U. S. naval officer retention. Personnel Psychology, 1976, 29, 567-581.

Quinn, R. P. & Kahn, R. L. Organizational psychology. Annual Review of Psychology, 1967, 18, 437-466.

Rootman, I. Voluntary withdrawal from a total adult socialization organization. Sociology of Education, 1972, 45, 258-270.

Rose, H. A. & Elton, C. F. Another look at the college dropout. Journal of Counseling Psychology, 1966, 13, 242-245.

Ross, I. C. & Zander, A. Need satisfactions and employee turnover. Personnel Psychology, 1957, 10, 327-338.

Rossman, J. E. & Kirk, B. A. Factors related to persistence and withdrawal among university students. Journal of Counseling Psychology, 1970, 17, 56-62.

Sands, W. Enlisted personnel selection for the U. S. Navy. Personnel Psychology, 1975 31, 63-70.

Schuh, A. J. The predictability of employee tenure: A review of the literature. Personnel Psychology, 1967, 20, 133-153.

Schneider, J. The greener grass phenomenon: Differential effects of a work context alternative on organizational participation and withdrawal intentions. Organizational Behavior and Human Performance, 1976, 16, 308-333.

Sewell, W. & Shah, V. Socioeconomic status, intelligence, and the attainment of higher education. Sociology of Education, 1967, 40, 1-23.

Sexton, V. S. Factors contributing to attrition in college populations: Twenty-five years of research. Journal of General Psychology, 1965, 72, 301-326.

Sheldon, M. Investments and involvements as mechanisms producing commitment to the organization. Administrative Science Quarterly, 1971, 16, 143-150.

Shott, G. L., Albright, L. E., & Glennon, J. R. Predicting turnover in an automated office situation. Personnel Psychology, 1963, 16, 213-219.

Skinner, E. Relationships between leadership behavior patterns and organizational situational variables. Personnel Psychology, 1969, 22, 489-494.

Sorensen, J. E., Rhode, J. G., & Lawler, E. E. The generation gap in public accounting. Journal of Accountancy, 1973, 136, 42-50.

Spady, W. G. Dropouts from higher education: An interdisciplinary review and synthesis. Interchange, 1970, 1, 64-85.

Starr, A., Betz, E. L., & Menne, J. Differences in college student satisfaction: Academic dropouts, non-academic dropouts, and non-dropouts. Journal of Counseling Psychology, 1972, 19, 318-322.

Steers, R. M. Antecedents and outcomes of organizational commitment. Administrative Science Quarterly, 1977, 22, 46-56.

Suczek, R. F. & Alfert, E. Personality characteristics of college dropouts. Berkeley, Ca.: University of California, 1966.

Summerskill, J. Dropouts from college. In N. Sanford (Ed.), The American college. New York: Wiley and Sons, 1962.

Telly, C. S., French, W. L., & Scott, W. G. The relationship of inequity to turnover in hourly workers. Administrative Science Quarterly, 1971, 16, 164-172.

Terenzini, P. T. & Pascarella, E. T. Voluntary freshman attrition and patterns of social and academic integration in a university: A test of a conceptual model. Research in Higher Education, 1977, 6, 25-43.

Thibaut, J. & Kelley, H. The social psychology of groups. New York: John Wiley, 1959.

Tinto, V. Dropout from higher education: A theoretical synthesis of recent research. Review of Educational Research, 1975, 45, 89-125.

Trent, J. W. & Medsker, L. L. Beyond high school: A study of 10,000 high school graduates. Berkeley, Ca.: Center for Research and Development in Higher Education, University of California, 1967.

Troldahl, V. & Powell, F. A short form dogmatism scale for use in field studies. Social Forces, 1965, 44, 211-215.

Valenzi, E. R. & Andrews, I. R. Effect of hourly overpay and underpay inequity when tested with a new induction procedure. Journal of Applied Psychology, 1971, 55, 22-27.

Van der Merwe, R. & Miller, S. The measurement of labour turnover. Human Relations, 1971, 24, 233-253.

Vaughan, R. College dropouts: Dismissed vs. withdrew. Personnel and Guidance Journal, 1968, 46, 685-689.

Vroom, V. Work and motivation. New York: Wiley, 1964.

Vroom, V. H. Motivation in management. New York: American Foundation for Management Research, 1965.

Vroom, V. H. Organizational choice: A study of pre- and post-decision processes. Organizational Behavior and Human Performance, 1966, 1, 212-225.

Vroom, V. H. & Deci, E. L. The stability of post-decision dissonance: A followup study of the job attitudes of business school graduates. Organizational Behavior and Human Performance, 1971, 6, 36-49.

Wahba, M. A. & House, R. J. Expectancy theory in work and motivation: Some logical and methodological issues. Human Relations, 1974, 27, 121-147.

Wanous, J. P. Organizational entry: From naive expectations to realistic beliefs. Journal of Applied Psychology, 1976, 61, 22-29.

Wanous, J. P. Organizational entry: Newcomers moving from outside to inside. Psychological Bulletin, 1977, 84, 601-618.

Waters, L. K. & Roach, D. Relationship between job attitudes and two forms of withdrawal from the work situation. Journal of Applied Psychology, 1971, 55(1), 92-94.

Waters, L. K., Roach, D., & Waters, C. W. Estimates of future tenure, satisfaction, and biographical variables as predictors of termination. Personnel Psychology, 1976, 29(1), 57-60.

Weick, K. E. & Nesset, B. Preferences among forms of equity. Organizational Behavior and Human Performance, 1968, 3, 400-416.

Wesolowsky, G. O. Multiple regression and analysis of variance. New York: John Wiley, 1976.

Willingham, W. W. The application blank as a predictive instrument. College and University, 1965, 41, 271-281.

Winer, B. J. Statistical principles in experimental design. New York: McGraw-Hill, 1971.

Worth, C. C. & Safarik, J. G. C.S.U., Chico freshman characteristics - fall, 1975. Chico, Ca.: Office of Institutional Research, CSU, Chico, 1976.

Wrightsman, L. S. Social psychology. Monterey, Ca.: Brooks/Cole, 1977.

APPENDICES

APPENDIX A

1975 STUDENT INFORMATION FORM, COVER LETTER, AND SUPPLEMENTAL QUESTIONS

431768

PLEASE PRINT: YOUR NAME _____ (First / Middle or Maiden / Last)

HOME STREET ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

When were you born?

Month (01-12)	Day (01-31)	Year

1975 STUDENT INFORMATION FORM

DIRECTIONS

Your responses will be read by an optical mark reader. Your careful observance of these few simple rules will be most appreciated.

- Use only black lead pencil (No. 2 or less).
- Make heavy black marks that fill the circle.
- Erase cleanly any answer you wish to change.
- Make no stray markings of any kind.

EXAMPLE:

Will marks made with ball pen or fountain pen be properly read? Yes ○ No ●

Dear Student:

The information in this form is being collected as part of a continuing study of higher education conducted jointly by the American Council on Education and the University of California at Los Angeles. Your voluntary participation in this research is being solicited in order to achieve a better understanding of how students are affected by their college experiences. Detailed information on the goals and design of this research program are furnished in research reports available from the Laboratory for Research on Higher Education at UCLA. Identifying information has been requested in order to make subsequent mail follow-up studies possible. Your response will be held in the strictest professional confidence.

Sincerely, Alexander W. Astin

Alexander W. Astin, Director
Cooperative Institutional Research Program

DO NOT MARK IN THIS AREA

MARK IN THIS AREA ONLY IF DIRECTED — GRP. CODE

1. Your sex: Male ○ Female ○

2. Are you a veteran? (Mark one) No ○ Yes ○

3. How old will you be on December 31 of this year? (Mark one)

16 or younger	○	21	○
17	○	22	○
18	○	23-25	○
19	○	26-29	○
20	○	30 or older	○

4. In what year did you graduate from high school? (Mark one)

1975	○	Did not graduate but	
1974	○	passed G.E.D. test	○
1973	○	Never completed	
1972 or earlier	○	high school	○

(Note: Please check that your pencil markings are completely darkening the circles. Do not use pen or make ✓'s or X's. Thank You.)

5. Was your high school program: (Mark one)

College preparatory? ○
Other? (For ex., vocational) ○

6. What was your average grade in high school? (Mark one)

A or A+	○	B+	○
A-	○	B	○
B-	○	C	○
C+	○	D	○

7. How well do you feel that your high school prepared you in the following areas:

(Mark one in each row)	Very Well	Fairly Well	Poorly
Mathematical skills	○	○	○
Reading and composition	○	○	○
Foreign languages	○	○	○
Science	○	○	○
History, social sciences	○	○	○
Vocational skills	○	○	○
Musical and artistic skills	○	○	○
Study habits	○	○	○

8. Are you enrolled (or enrolling) as a: (Mark one)

Full-time student? ○
Part-time student? ○

9. Prior to this term, have you ever taken courses for credit at this institution?

Yes ○ No ○

10. Since leaving high school, have you ever taken courses at any other institution?

(Mark all that apply in each column)	For Credit	Not for Credit
No	○	○
Yes, at a junior or cmty. college	○	○
Yes, at a four-year college or university	○	○
Yes, at some other postsecondary school (For ex., technical, vocational, business)	○	○

11. How many miles is this college from your parents' home? (Mark one)

5 or less	○	51-100	○
6-10	○	101-500	○
11-50	○	More than 500	○

12. How much financial aid are you receiving from this college for this academic year? (Write in actual dollar amounts; write "0" if none)

Grants $ _____
Loans $ _____
Work-study $ _____

13. If you are receiving financial aid from this institution, what is your understanding as to the basis on which your aid was awarded? (Mark one in each row)

	Major Reason	Minor Reason	Not a Reason
Financial need	○	○	○
Academic talent	○	○	○
Athletic talent	○	○	○
Other special talent	○	○	○

14. Is this college your: (Mark one)

First choice? ○
Second choice? ○
Less than second choice? ○

15. To how many colleges other than this one did you apply for admission this year? (Mark one)

No other	○	1	○	3	○
		2	○	4	○
5	○	6 or more	○		

Note: If you applied to no other college skip to item 18 on the next page

16. How many other acceptances did you receive this year? (Mark one)

None	○	1	○	3	○
		2	○	4	○
5	○	6 or more	○		

17 a. What were the other colleges to which you applied for admission? (If you applied to more than three others, name the three that were most preferred):

Name of Institution	City, State	b. Were you accepted for admission? Yes	No	c. How much financial aid were you offered for the first year? (Write in actual dollar amounts; write "0" if none was offered) Grants	Loans	Work-Study
1.		○	○	$	$	$
2.		○	○	$	$	$
3.		○	○	$	$	$

18. How much of your first year's educational expenses (room, board, tuition, and fees) do you expect to cover from each of the sources listed below? (Mark one answer for each possible source)

	None	$1–$499	$500–$999	$1,000–$1,999	$2,000–$4,000	Over $4,000
Parental, or family aid, or gifts	○	○	○	○	○	○
Grants or Scholarships:						
Basic Educational Opportunity Grant	○	○	○	○	○	○
Supplemental Educational Opportunity Grant	○	○	○	○	○	○
College Work-Study grant	○	○	○	○	○	○
State scholarship or grant	○	○	○	○	○	○
Local or private scholarship or grant	○	○	○	○	○	○
Loans:						
Fed. guaranteed student loan	○	○	○	○	○	○
Nat'l direct student loan	○	○	○	○	○	○
Other loan	○	○	○	○	○	○
Full-time work	○	○	○	○	○	○
Part-time or summer work (other than above)	○	○	○	○	○	○
Savings	○	○	○	○	○	○
Spouse	○	○	○	○	○	○
Your G.I. benefits	○	○	○	○	○	○
Your parent's G.I. benefits	○	○	○	○	○	○
Social secur. dependent's benefits	○	○	○	○	○	○
Other	○	○	○	○	○	○

19. What was your total income last year independent of your parents? Consider annual income from all sources before taxes. (Mark one)

None	○	$2,000–$2,999	○
Less than $500	○	$3,000–$4,999	○
$500–$999	○	$5,000–$9,999	○
$1,000–$1,999	○	$10,000 or more	○

20. Are you financially independent of your parents this year? Were you financially independent last year?

	Yes	No		Yes	No
This year	○	○	Last year	○	○

21. Are you: (Mark one)

- Not presently married ○
- Married, living with spouse ○
- Married, not living with spouse ○

22. Have you taken any of the following tests?

(Mark one for each)	Yes	No	Don't Remember
SAT	○	○	○
ACT	○	○	○
PSAT (11th grade)	○	○	○

23. Below are some reasons that might have influenced your decision to attend this particular college. How important was each reason in your decision to come here?

(Mark one answer for each possible reason) (N) Not Important (S) Somewhat Important (V) Very Important

My relatives wanted me to come here	(V)	(S)	(N)
I wanted to live away from home	(V)	(S)	(N)
My teacher advised me	(V)	(S)	(N)
This college has a very good academic reputation	(V)	(S)	(N)
I was offered financial assistance	(V)	(S)	(N)
Someone who had been here before advised me to go	(V)	(S)	(N)
This college offers special educational programs	(V)	(S)	(N)
This college has low tuition	(V)	(S)	(N)
My guidance counselor advised me	(V)	(S)	(N)
I wanted to live at home	(V)	(S)	(N)
I could not get a job	(V)	(S)	(N)
A friend suggested attending	(V)	(S)	(N)
A college representative recruited me	(V)	(S)	(N)
It will help me get a better job	(V)	(S)	(N)

24. What is the highest academic degree that you intend to obtain?

(Mark one in each column) ▸	Highest Planned	Highest Planned at this college
None	○	○
Associate (A.A. or equivalent)	○	○
Bachelor's degree (B.A., B.S., etc.)	○	○
Master's degree (M.A., M.S., etc.)	○	○
Ph.D. or Ed.D.	○	○
M.D., D.O., D.D.S., or D.V.M.	○	○
LL.B. or J.D. (Law)	○	○
B.D. or M.Div. (Divinity)	○	○
Other	○	○

25. Where do you plan to live during the fall term? If you had a choice, where would you have preferred to live?

(Mark one in each column) ▸	Plan To Live	Prefer To Live
With parents or relatives	○	○
Other private home, apt. or rm.	○	○
College dormitory	○	○
Fraternity or sorority house	○	○
Other campus student housing	○	○
Other	○	○

26. Are you: (Mark all that apply)

- White/Caucasian ○
- Black/Negro/Afro-American ○
- American Indian ○
- Oriental ○
- Mexican-American/Chicano ○
- Puerto Rican-American ○
- Other ○

27. Do you have any concern about your ability to finance your college education? (Mark one)

- None (I am confident that I will have sufficient funds) ○
- Some concern (but I will probably have enough funds) ○
- Major concern (not sure I will have enough funds to complete college) ○

28. How would you characterize your political views? (Mark one)

- Far left ○
- Liberal ○
- Middle-of-the-road ○
- Conservative ○
- Far right ○

29. What is your best estimate of your parents' total income last year? Consider annual income from all sources before taxes. (Mark one)

Less than $3,000	○	$15,000–19,999	○
$3,000–3,999	○	$20,000–24,999	○
$4,000–5,999	○	$25,000–29,999	○
$6,000–7,999	○	$30,000–34,999	○
$8,000–9,999	○	$35,000–39,999	○
$10,000–12,499	○	$40,000–49,999	○
$12,500–14,999	○	$50,000 or more	○

30. What is the highest level of formal education obtained by your parents?

(Mark one in each column)	Father	Mother
Grammar school or less	○	○
Some high school	○	○
High school graduate	○	○
Postsecondary school other than college	○	○
Some college	○	○
College degree	○	○
Some graduate school	○	○
Graduate degree	○	○

31. What is:

Ⓜ Your mother's current occupation?
Ⓕ Your father's current occupation?
Ⓨ Your probable future occupation?

(Mark one in each column. If your father or mother is deceased or retired, please indicate his or her last occupation.)

	Ⓨ	Ⓕ	Ⓜ
Accountant or auditor	Ⓨ	Ⓕ	Ⓜ
Architect or urban planner	Ⓨ	Ⓕ	Ⓜ
Artist (painting, sculpture, etc.)	Ⓨ	Ⓕ	Ⓜ
Business: banker or financier	Ⓨ	Ⓕ	Ⓜ
Business: buyer or purchasing agent	Ⓨ	Ⓕ	Ⓜ
Business: manager or administrator	Ⓨ	Ⓕ	Ⓜ
Business: owner or proprietor	Ⓨ	Ⓕ	Ⓜ
Business: public relations or advertising	Ⓨ	Ⓕ	Ⓜ
Business: sales worker	Ⓨ	Ⓕ	Ⓜ
Carpenter	Ⓨ	Ⓕ	Ⓜ
Clergy or religious worker	Ⓨ	Ⓕ	Ⓜ
Clerical worker: secretary, stenographer, typist, or bookkeeper	Ⓨ	Ⓕ	Ⓜ
Clerical worker: other	Ⓨ	Ⓕ	Ⓜ
Commercial artist, designer, decorator	Ⓨ	Ⓕ	Ⓜ
Computer programmer or analyst	Ⓨ	Ⓕ	Ⓜ
Construction craftsman, n.e.c.*	Ⓨ	Ⓕ	Ⓜ
Counselor: guidance, family or school	Ⓨ	Ⓕ	Ⓜ
Dentist (including orthodontist)	Ⓨ	Ⓕ	Ⓜ
Draftsman	Ⓨ	Ⓕ	Ⓜ
Driver: truck, taxi or bus	Ⓨ	Ⓕ	Ⓜ
Electrician	Ⓨ	Ⓕ	Ⓜ
Engineer	Ⓨ	Ⓕ	Ⓜ
Factory worker, n.e.c.*	Ⓨ	Ⓕ	Ⓜ
Farm or ranch laborer	Ⓨ	Ⓕ	Ⓜ
Farm or ranch owner or manager	Ⓨ	Ⓕ	Ⓜ
Foreman, n.e.c.*	Ⓨ	Ⓕ	Ⓜ
Forester, conservationist, fish or wildlife specialist	Ⓨ	Ⓕ	Ⓜ
Government official, administrator or politician	Ⓨ	Ⓕ	Ⓜ
Home economist or dietitian	Ⓨ	Ⓕ	Ⓜ
Homemaker (full-time)	Ⓨ	Ⓕ	Ⓜ
Lawyer or judge	Ⓨ	Ⓕ	Ⓜ
Librarian or archivist	Ⓨ	Ⓕ	Ⓜ
Laborer (unskilled or semi-skilled)	Ⓨ	Ⓕ	Ⓜ
Law enforcement officer	Ⓨ	Ⓕ	Ⓜ
Mathematician, statistician or actuary	Ⓨ	Ⓕ	Ⓜ
Mechanic, machinist or repairman	Ⓨ	Ⓕ	Ⓜ
Military (career)	Ⓨ	Ⓕ	Ⓜ
Nurse	Ⓨ	Ⓕ	Ⓜ
Optometrist	Ⓨ	Ⓕ	Ⓜ
Performing artist, musician or entertainer	Ⓨ	Ⓕ	Ⓜ
Pharmacist or pharmacologist	Ⓨ	Ⓕ	Ⓜ
Physician or surgeon	Ⓨ	Ⓕ	Ⓜ
Plumber	Ⓨ	Ⓕ	Ⓜ
Psychologist (clinician or therapist only)	Ⓨ	Ⓕ	Ⓜ
Scientific researcher	Ⓨ	Ⓕ	Ⓜ
Service worker: private household (maid, cook, etc.)	Ⓨ	Ⓕ	Ⓜ
Service worker: protective (other than law enforcement)	Ⓨ	Ⓕ	Ⓜ
Service worker: other	Ⓨ	Ⓕ	Ⓜ
Skilled tradesman, n.e.c.*	Ⓨ	Ⓕ	Ⓜ
Social, welfare or recreation worker	Ⓨ	Ⓕ	Ⓜ
Teacher, professor or administrator: college, university	Ⓨ	Ⓕ	Ⓜ
Teacher or administrator: secondary	Ⓨ	Ⓕ	Ⓜ
Teacher or administrator: elementary	Ⓨ	Ⓕ	Ⓜ
Teacher or education specialist: other than above	Ⓨ	Ⓕ	Ⓜ
Technician or technologist (health)	Ⓨ	Ⓕ	Ⓜ
Technician or technologist (other)	Ⓨ	Ⓕ	Ⓜ
Therapist (physical, occupational, speech)	Ⓨ	Ⓕ	Ⓜ
Veterinarian	Ⓨ	Ⓕ	Ⓜ
Writer, journalist, interpreter	Ⓨ	Ⓕ	Ⓜ
Other occupation, n.e.c.*	Ⓨ	Ⓕ	Ⓜ
Unemployed		Ⓕ	Ⓜ
Undecided	Ⓨ		

*Not elsewhere classified

Continued in the next column

32. Current religious preference:

(Mark one in each column)

	Yours	Father's	Mother's
Baptist	Ⓨ	Ⓕ	Ⓜ
Congregational (U.C.C.)	Ⓨ	Ⓕ	Ⓜ
Eastern Orthodox	Ⓨ	Ⓕ	Ⓜ
Episcopal	Ⓨ	Ⓕ	Ⓜ
Jewish	Ⓨ	Ⓕ	Ⓜ
Latter Day Saints (Mormon)	Ⓨ	Ⓕ	Ⓜ
Lutheran	Ⓨ	Ⓕ	Ⓜ
Methodist	Ⓨ	Ⓕ	Ⓜ
Muslim	Ⓨ	Ⓕ	Ⓜ
Presbyterian	Ⓨ	Ⓕ	Ⓜ
Quaker (Society of Friends)	Ⓨ	Ⓕ	Ⓜ
Roman Catholic	Ⓨ	Ⓕ	Ⓜ
Seventh Day Adventist	Ⓨ	Ⓕ	Ⓜ
Unitarian-Universalist	Ⓨ	Ⓕ	Ⓜ
Other Protestant	Ⓨ	Ⓕ	Ⓜ
Other Religion	Ⓨ	Ⓕ	Ⓜ
None	Ⓨ	Ⓕ	Ⓜ

MAKE SURE YOU HAVE ANSWERED ITEM 32

33. Mark one in each row:

① Disagree Strongly
② Disagree Somewhat
③ Agree Somewhat
④ Agree Strongly

The Federal government is not doing enough to control environmental pollution	④③②①
The Federal government is not doing enough to protect the consumer from faulty goods and services	④③②①
State and Fed. governments should provide more money for private colleges and universities	④③②①
The Federal government should help college students with more grants instead of loans	④③②①
There is too much concern in the courts for the rights of criminals	④③②①
People should not obey laws which violate their personal values	④③②①
As long as they work hard, people should be paid equally regardless of ability or quality of work	④③②①
The activities of married women are best confined to the home and family	④③②①
A couple should live together for some time before deciding to get married	④③②①
Parents should be discouraged from having large families	④③②①
If two people really like each other, it's all right for them to have sex even if they've known each other for only a very short time	④③②①
Women should receive the same salary and opportunities for advancement as men in comparable positions	④③②①
Wealthy people should pay a larger share of taxes than they do now	④③②①
Marijuana should be legalized	④③②①
Large political campaign contributions from wealthy individuals should be outlawed	④③②①
Realistically, an individual can do little to bring about changes in our society	④③②①
Compared to most older people in their forties and fifties, young people these days are more idealistic	④③②①
Young people these days understand more about sex than most older people	④③②①
College officials have the right to regulate student behavior off campus	④③②①
Faculty promotions should be based in part on student evaluations	④③②①
College grades should be abolished	④③②①
Colleges would be improved if organized sports were de-emphasized	④③②①
Student publications should be cleared by college officials	④③②①
College officials have the right to ban persons with extreme views from speaking on campus	④③②①
Students from disadvantaged social backgrounds should be given preferential treatment in college admissions	④③②①
Open admissions (admitting anyone who applies) should be adopted by all publicly supported colleges	④③②①
Even if it employs open admissions, a college should use the same performance standards in awarding degrees to all students	④③②①
The federal government should do more to discourage energy consumption	④③②①
Students have the right to demonstrate to prohibit speakers from coming to campus	④③②①

34. Below is a list of different undergraduate major fields grouped into general categories. Mark only one circle to indicate your probable field of study.

ARTS AND HUMANITIES
- Art, fine and applied ○
- English (language and literature) ○
- History ○
- Journalism ○
- Language and Literature (except English) ○
- Music ○
- Philosophy ○
- Speech and Drama ○
- Theology or Religion ○
- Other Arts and Humanities ○

BIOLOGICAL SCIENCE
- Biology (general) ○
- Biochemistry or Biophysics ○
- Botany ○
- Marine (Life) Science ○
- Microbiology or Bacteriology ○
- Zoology ○
- Other Biological Science ○

BUSINESS
- Accounting ○
- Business Admin. (general) ○
- Finance ○
- Marketing ○
- Management ○
- Secretarial Studies ○
- Other Business ○

EDUCATION
- Business Education ○
- Elementary Education ○
- Music or Art Education ○
- Physical Education or Recreation ○
- Secondary Education ○
- Special Education ○
- Other Education ○

ENGINEERING
- Aeronautical or Astronautical Eng. ○
- Civil Engineering ○
- Chemical Engineering ○
- Electrical or Electronic Engineering ○
- Industrial Engineering ○
- Mechanical Engineering ○
- Other Engineering ○

PHYSICAL SCIENCE
- Astronomy ○
- Atmospheric Science (incl. Meteorology) ○
- Chemistry ○
- Earth Science ○
- Marine Science (incl. Oceanography) ○
- Mathematics ○
- Physics ○
- Statistics ○
- Other Physical Science ○

PROFESSIONAL
- Architecture or Urban Planning ○
- Home Economics ○
- Health Technology (medical, dental, laboratory) ○
- Library or Archival Science ○
- Nursing ○
- Pharmacy ○
- Therapy (occupational, physical, speech) ○
- Other Professional ○

SOCIAL SCIENCE
- Anthropology ○
- Economics ○
- Geography ○
- Political Science (govt., international relations) ○
- Psychology ○
- Social Work ○
- Sociology ○
- Other Social Science ○

TECHNICAL
- Building Trades ○
- Data Processing or Computer Programming ○
- Drafting or Design ○
- Electronics ○
- Mechanics ○
- Other Technical ○

OTHER FIELDS
- Agriculture ○
- Communications (radio, T.V., etc.) ○
- Computer Science ○
- Forestry ○
- Law Enforcement ○
- Military Science ○
- Other Field ○
- Undecided ○

35. Indicate the importance to you personally of each of the following: (Mark one for each item)

(N) Not Important — (S) Somewhat Important — (V) Very Important — (E) Essential

	E	V	S	N
Becoming accomplished in one of the performing arts (acting, dancing, etc.)	E	V	S	N
Becoming an authority in my field	E	V	S	N
Obtaining recognition from my colleagues for contributions to my special field	E	V	S	N
Influencing the political structure	E	V	S	N
Influencing social values	E	V	S	N
Raising a family	E	V	S	N
Having administrative responsibility for the work of others	E	V	S	N
Being very well off financially	E	V	S	N
Helping others who are in difficulty	E	V	S	N
Making a theoretical contribution to science	E	V	S	N
Writing original works (poems, novels, short stories, etc.)	E	V	S	N
Creating artistic work (painting, sculpture, decorating, etc.)	E	V	S	N
Being successful in a business of my own	E	V	S	N
Becoming involved in programs to clean up the environment	E	V	S	N
Developing a meaningful philosophy of life	E	V	S	N
Participating in a community action program	E	V	S	N
Keeping up to date with political affairs	E	V	S	N

36. What is your best guess as to the chances that you will: (Mark one for each item)

(N) No Chance — (L) Very Little Chance — (S) Some Chance — (V) Very Good Chance

	V	S	L	N
Change major field?	V	S	L	N
Change career choice?	V	S	L	N
Fail one or more courses?	V	S	L	N
Graduate with honors?	V	S	L	N
Be elected to a student office?	V	S	L	N
Join a social fraternity, sorority, or club?	V	S	L	N
Live in a coeducational dorm?	V	S	L	N
Live in a commune while in college?	V	S	L	N
Be elected to an academic honor society?	V	S	L	N
Make at least a "B" average?	V	S	L	N
Need extra time to complete your degree requirements?	V	S	L	N
Need tutoring in some courses	V	S	L	N
Have to work at an outside job during college?	V	S	L	N
Seek vocational counseling?	V	S	L	N
Seek individual counseling on personal problems?	V	S	L	N
Get a bachelor's degree (B.A., B.S., etc.)?	V	S	L	N
Drop out of this college temporarily (exclude transferring)?	V	S	L	N
Drop out permanently (exclude transferring)?	V	S	L	N
Transfer to another college before graduating?	V	S	L	N
Be satisfied with your college?	V	S	L	N
Find a job after graduation in the field for which you were trained?	V	S	L	N
Get married while in college? (skip if married)	V	S	L	N
Get married within a year after college? (skip if married)	V	S	L	N

The Laboratory for Research on Higher Education at UCLA actively encourages the colleges that participate in this survey to conduct local studies of their student bodies. If these studies involve collecting follow-up data, it is necessary for the institution to know the students' ID numbers so that follow-up data can be linked with the data from this survey. If your college asks for a tape copy of the data and signs an agreement to use it only for research purposes, do we have your permission to include your ID number in such a tape?

Yes ○ No ○

37. (A)(B)(C)(D)(E)
38. (A)(B)(C)(D)(E)
39. (A)(B)(C)(D)(E)
40. (A)(B)(C)(D)(E)
41. (A)(B)(C)(D)(E)

The remaining circles are provided for items specifically designed by your college, rather than by the Laboratory for Research on Higher Education. If your college has chosen to use the circles, observe carefully the supplemental directions given you.

42. (A)(B)(C)(D)(E)
43. (A)(B)(C)(D)(E)
44. (A)(B)(C)(D)(E)
45. (A)(B)(C)(D)(E)
46. (A)(B)(C)(D)(E)

THANK YOU!

Prepared by the Laboratory for Research on Higher Education, University of California, Los Angeles, California 90024 Processed by Intran Corporation, 4555 West 77th Street, Minneapolis, Minnesota 55435

California State University, Chico
Chico, California 95926

Office of Institutional Research
(916) 895-5623

COOPERATIVE INSTITUTIONAL RESEARCH PROGRAM
Sponsored by
AMERICAN COUNCIL ON EDUCATION
and
UNIVERSITY OF CALIFORNIA AT LOS ANGELES

Dear Freshman Student:

Your participation in a national study of the effects of colleges on students is requested. Initiated in 1965 by the American Council on Education, the program now includes data from more than 3 million students at 900 colleges and universities. It is the largest ongoing study of its kind involving the American higher educational system.

Task. Please fill in your answers on the enclosed Student Information Form (SIF). This is a four-page survey which can usually be completed in 20-30 minutes. It is designed to secure standard biographical and demographic information from entering freshmen at U.S. colleges and universities. Ample safeguards of your right to privacy have been provided. Your participation is voluntary and necessary for the improvement of higher education at Chico.

Confidentiality of your answers. The information you provide on SIF will be held in the strictest confidence. Your data will not be made available with your identification to parents, administrators, faculty, or other students. Only Institutional Research personnel will have access to your personally identified data and they will use it solely to accomplish the purposes of this study.

The National Data Bank, gathering the information, has provided excellent and rigorous safeguards for confidentiality. Their files do not identify data in a manner which would allow your answers to be connected to you as an individual. Their procedures for ensuring data security and respondent anonymity provide protection from congressional or judicial subpoena of the files as well as from unethical utilization of the files by research personnel.

Invasion of privacy. If, despite the assurance of confidentiality given above, you consider any question an invasion of your privacy, simply leave that question blank. We ask you to avoid omitting questions but wish you to feel completely free to use your own judgment.

Thank you.

Sincerely,

J. G. Safarik, Director
Institutional Research

Please find the set of circles labeled "Mark in this area only if directed". They are located on page 1 at the middle of the left side. Mark these circles to indicate your social security number. ~~If you do not have a social security number, ask your survey administrator to give you an ID# for use here.~~

On the last page of the questionnaire (following question 36 in heavy-face type) is a question which asks you "...do we have your permission to include your ID number in such a tape?" PLEASE MARK THIS YES. Your data will be used solely for research purposes and your ID is needed.

PLEASE READ THE QUESTIONS BELOW AND ANSWER THEM IN THE APPROPRIATE SPACES AT THE BOTTOM OF THE LAST PAGE OF THE QUESTIONNAIRE. DO NOT MARK YOUR ANSWERS ON THIS SHEET.

STRONGLY AGREE = (A)
AGREE = (B)
UNCERTAIN = (C)
DISAGREE = (D)
STRONGLY DISAGREE = (E)

(A) (B) (C) (D) (E) 37. In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.

(A) (B) (C) (D) (E) 38. My blood boils whenever a person stubbornly refuses to admit he's wrong.

(A) (B) (C) (D) (E) 39. There are two kinds of people in this world: those who are for the truth and those who are against the truth.

(A) (B) (C) (D) (E) 40. Most people just don't know what's good for them.

(A) (B) (C) (D) (E) 41. Of all the different philosophies which exist in this world there is probably only one which is correct.

(A) (B) (C) (D) (E) 42. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

(A) (B) (C) (D) (E) 43. The main thing in life is for a person to want to do something important.

(A) (B) (C) (D) (E) 44. I'd like it if I could find someone who would tell me how to solve my personal problems.

(A) (B) (C) (D) (E) 45. Most of the ideas which get printed nowadays aren't worth the paper they are printed on.

(A) (B) (C) (D) (E) 46. Man on his own is a helpless and miserable creature.

AGAIN, PLEASE MARK 'YES' ON THE "ID NUMBER" RELEASE QUESTION AND COMPLETE THE ABOVE 10 QUESTIONS, ENTERING YOUR ANSWERS AT THE BOTTOM OF THE LAST PAGE OF THE QUESTIONNAIRE.

THANK YOU FOR YOUR COOPERATION!



APPENDIX B

1976 STUDENT INFORMATION FORM, COVER LETTER, AND SUPPLEMENTAL QUESTIONS

505838

PLEASE PRINT: YOUR NAME _____ (First / Middle or Maiden / Last)

HOME STREET ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____ ( ) Area Code Home Phone No.

When were you born?

Month (01-12) Day (01-31) Year

1976 Student Information Form

DIRECTIONS

Your responses will be read by an optical mark reader. Your careful observance of these few simple rules will be most appreciated.

- Use only black lead pencil (No. 2 or less).
- Make heavy black marks that fill the circle.
- Erase cleanly any answer you wish to change.
- Make no stray markings of any kind.

EXAMPLE:

Will marks made with ball pen or fountain pen be properly read? Yes . . ○ No . . ●

Dear Student:

The information in this form is being collected as part of a continuing study of higher education conducted jointly by the American Council on Education and the University of California at Los Angeles. Your voluntary participation in this research is being solicited in order to achieve a better understanding of how students are affected by their college experiences. Detailed information on the goals and design of this research program are furnished in research reports available from the Laboratory for Research on Higher Education at UCLA. Identifying information has been requested in order to make subsequent mail follow-up studies possible. Your response will be held in the strictest professional confidence.

Sincerely, Alexander W. Astin

Alexander W. Astin, Director
Cooperative Institutional Research Program

DO NOT MARK IN THIS AREA

MARK IN THIS AREA ONLY IF DIRECTED — GRP CODE

1. Your sex: Male . . ○ Female . . ○

2. Are you a veteran? (Mark one) No . . ○ Yes . . ○

3. How old will you be on December 31 of this year? (Mark one)

16 or younger	○	21	○
17	○	22	○
18	○	23-25	○
19	○	26-29	○
20	○	30 or older	○

4. In what year did you graduate from high school? (Mark one)

1976	○	Did not graduate but	
1975	○	passed G.E.D. test	○
1974	○	Never completed	
1973 or earlier	○	high school	○

(Note: Please check that your pencil markings are completely darkening the circles. Do not use pen or make ✓'s or X's. Thank You.)

5. Was your high school program: (Mark one)

College preparatory? . . . . . ○
Other? (For ex., vocational) . . . . . ○

6. What was your average grade in high school? (Mark one)

		B+ ○	C+ ○
A or A+	○	B ○	C ○
A-	○	B- ○	D ○

7. How well do you feel that your high school prepared you in the following areas:

(Mark one in each row)	Very Well	Fairly Well	Poorly
Mathematical skills	○	○	○
Reading and composition	○	○	○
Foreign languages	○	○	○
Science	○	○	○
History, social sciences	○	○	○
Vocational skills	○	○	○
Musical and artistic skills	○	○	○
Study habits	○	○	○

8. Are you enrolled (or enrolling) as a: (Mark one)

Full-time student? . . ○
Part-time student? . . ○

9. Prior to this term, have you ever taken courses for credit at this institution?

Yes . . . ○ No . . . ○

10. Since leaving high school, have you ever taken courses at any other institution?

(Mark all that apply in each column)	For Credit	Not for Credit
No	○	○
Yes, at a junior or cmty. college	○	○
Yes, at a four-year college or university	○	○
Yes, at some other postsecondary school (For ex., technical, vocational, business)	○	○

11. How many miles is this college from your parents' home? (Mark one)

5 or less	○	51-100	○
6-10	○	101-500	○
11-50	○	More than 500	○

12. How much aid has this college agreed to provide (or assist you in obtaining from other sources) for this academic year.

None	○	$1,000-1,499	○
$1-249	○	$1,500-1,999	○
$250-499	○	$2,000-2,999	○
$500-749	○	$3,000-3,999	○
$750-999	○	$4,000 or more	○

13. If you are receiving financial aid from this institution, what is your understanding as to the basis on which your aid was awarded? (Mark one in each row)

	Major Reason	Minor Reason	Not a Reason
Financial need	○	○	○
Academic talent	○	○	○
Athletic talent	○	○	○
Other special talent	○	○	○

14. Is this college your: (Mark one)

First choice?	○	Less than third	
Second choice?	○	choice?	○
Third choice?	○		

15. To how many colleges other than this one did you apply for admission this year?

No other	○	1 . . ○	3 . . ○	5	○
		2 . . ○	4 . . ○	6 or more	○

Note: If you applied to no other college skip to item 17 on the next page.

16. How many other acceptances did you receive this year? (Mark one)

None	○	1 . . ○	3 . . ○	5	○
		2 . . ○	4 . . ○	6 or more	○

17. How much of your first year's educational expenses (room, board, tuition, and fees) do you expect to cover from each of the sources listed below?

(Mark one answer for each possible source)

	None	$1–$499	$500–$999	$1,000–$1,999	$2,000–$4,000	Over $4,000
Parental, or family aid, or gifts	○	○	○	○	○	○
Grants or Scholarships:						
Basic Educational Opportunity Grant	○	○	○	○	○	○
Supplemental Educational Opportunity Grant	○	○	○	○	○	○
College Work-Study grant	○	○	○	○	○	○
State scholarship or grant	○	○	○	○	○	○
College grant (other than above)	○	○	○	○	○	○
Other private grant	○	○	○	○	○	○
Loans:						
Fed. guaranteed student loan	○	○	○	○	○	○
Nat'l direct student loan	○	○	○	○	○	○
Loan from the college	○	○	○	○	○	○
Other loan	○	○	○	○	○	○
Full-time work	○	○	○	○	○	○
Part-time or summer work (other than above)	○	○	○	○	○	○
Savings	○	○	○	○	○	○
Spouse	○	○	○	○	○	○
Your G.I. benefits	○	○	○	○	○	○
Your parent's G.I. benefits	○	○	○	○	○	○
Social secur. dependent's benefits	○	○	○	○	○	○
Other	○	○	○	○	○	○

18. How many children do you expect to have?

None ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 or more ○

19. How many children do you have now?

None ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 or more ○

20. Do you feel that you will need any special tutoring or remedial work in any of the following subjects? (Mark all that apply)

English ○ Social studies ○
Reading ○ Science ○
Mathematics ○ Foreign language ○

21. Are you: (Mark all that apply)

White/Caucasian ○
Black/Negro/Afro-American ○
American Indian ○
Asian-American/Oriental ○
Mexican-American/Chicano ○
Puerto Rican-American ○
Other ○

22. Are you: (Mark one)

Not presently married ○
Married, living with spouse ○
Married, not living with spouse ○

23. Have you taken any of the following tests?

(Mark one for each)	Yes	No	Don't Remember
SAT	○	○	○
ACT	○	○	○
PSAT (11th grade)	○	○	○

24. Rate yourself on each of the following traits as you really think you are when compared with the average student of your own age. We want the most accurate estimate of how you see yourself.

(Mark one for each trait)

Trait	Highest 10 Percent	Above Average	Average	Below Average	Lowest 10 Percent
Academic ability	○	○	○	○	○
Athletic ability	○	○	○	○	○
Artistic ability	○	○	○	○	○
Cheerfulness	○	○	○	○	○
Defensiveness	○	○	○	○	○
Drive to achieve	○	○	○	○	○
Leadership ability	○	○	○	○	○
Mathematical ability	○	○	○	○	○
Mechanical ability	○	○	○	○	○
Originality	○	○	○	○	○
Physical attractiveness	○	○	○	○	○
Political conservatism	○	○	○	○	○
Political liberalism	○	○	○	○	○
Popularity	○	○	○	○	○
Popularity with the opposite sex	○	○	○	○	○
Public speaking ability	○	○	○	○	○
Self-confidence (intellectual)	○	○	○	○	○
Self-confidence (social)	○	○	○	○	○
Sensitivity to criticism	○	○	○	○	○
Stubbornness	○	○	○	○	○
Understanding of others	○	○	○	○	○
Writing ability	○	○	○	○	○

25. What is the highest academic degree that you intend to obtain?

(Mark one in each column) ▸	Highest Planned	Highest Planned at this college
None	○	○
Associate (A.A. or equivalent)	○	○
Bachelor's degree (B.A., B.S., etc.)	○	○
Master's degree (M.A., M.S., etc.)	○	○
Ph.D. or Ed.D.	○	○
M.D., D.O., D.D.S., or D.V.M.	○	○
LL.B. or J.D. (Law)	○	○
B.D. or M.Div. (Divinity)	○	○
Other	○	○

26. Where do you plan to live during the fall term? If you had a choice, where would you have preferred to live?

(Mark one in each column) ▸	Plan To Live	Prefer To Live
With parents or relatives	○	○
Other private home, apt. or rm	○	○
College dormitory	○	○
Fraternity or sorority house	○	○
Other campus student housing	○	○
Other	○	○

27. In deciding to go to college, how important to you was each of the following reasons?

(Mark one answer for each possible reason)

	Very important	Somewhat important	Not important
My parents wanted me to go	V	S	N
I could not find a job	V	S	N
I wanted to get away from home	V	S	N
To be able to get a better job	V	S	N
To gain a general education and appreciation of ideas	V	S	N
To improve my reading and study skills	V	S	N
There was nothing better to do	V	S	N
To make me a more cultured person	V	S	N
To be able to make more money	V	S	N
To learn more about things that interest me	V	S	N
To meet new and interesting people	V	S	N
To prepare myself for graduate or professional school	V	S	N

28. Do you have any concern about your ability to finance your college education? (Mark one)

None (I am confident that I will have sufficient funds) ○
Some concern (but I will probably have enough funds) ○
Major concern (not sure I will have enough funds to complete college) ○

29. How would you characterize your political views? (Mark one)

Far left ○
Liberal ○
Middle-of-the-road ○
Conservative ○
Far right ○

30. What is your best estimate of your parents' total income last year? Consider annual income from all sources before taxes. (Mark one)

Less than $3,000 ○	$15,000–19,999 ○
$3,000–3,999 ○	$20,000–24,999 ○
$4,000–5,999 ○	$25,000–29,999 ○
$6,000–7,999 ○	$30,000–34,999 ○
$8,000–9,999 ○	$35,000–39,999 ○
$10,000–12,499 ○	$40,000–49,999 ○
$12,500–14,999 ○	$50,000 or more ○

31. What is the highest level of formal education obtained by your parents?

(Mark one in each column)	Father	Mother
Grammar school or less	○	○
Some high school	○	○
High school graduate	○	○
Postsecondary school other than college	○	○
Some college	○	○
College degree	○	○
Some graduate school	○	○
Graduate degree	○	○

32. Mark only three responses, one in each column.

Your probable career occupation
Your father's occupation.
Your mother's occupation.
(Y) (F) (M)

NOTE: If your father (or mother) is deceased, please indicate his (her) last occupation.

	Y	F	M
Accountant or actuary	Y	F	M
Actor or entertainer	Y	F	M
Architect or urban planner	Y	F	M
Artist	Y	F	M
Business (clerical)	Y	F	M
Business executive (management, administrator)	Y	F	M
Business owner or proprietor	Y	F	M
Business salesman or buyer	Y	F	M
Clergyman (minister, priest)	Y	F	M
Clergy (other religious)	Y	F	M
Clinical psychologist	Y	F	M
College teacher	Y	F	M
Computer programmer or analyst	Y	F	M
Conservationist or forester	Y	F	M
Dentist (including orthodontist)	Y	F	M
Dietitian or home economist	Y	F	M
Engineer	Y	F	M
Farmer or rancher	Y	F	M
Foreign service worker (including diplomat)	Y	F	M
Homemaker (full-time)	Y	F	M
Interior decorator (including designer)	Y	F	M
Interpretor (translator)	Y	F	M
Lab technician or hygienist	Y	F	M
Law enforcement officer	Y	F	M
Lawyer (attorney) or judge	Y	F	M
Military service (career)	Y	F	M
Musician (performer, composer)	Y	F	M
Nurse	Y	F	M
Optometrist	Y	F	M
Pharmacist	Y	F	M
Physician	Y	F	M
School counselor	Y	F	M
School principal or superintendent	Y	F	M
Scientific researcher	Y	F	M
Social, welfare or recreation worker	Y	F	M
Statistician	Y	F	M
Therapist (physical, occupational, speech)	Y	F	M
Teacher or administrator (elementary)	Y	F	M
Teacher or administrator (secondary)	Y	F	M
Veterinarian	Y	F	M
Writer or journalist	Y	F	M
Skilled trades	Y	F	M
Other	Y		
Undecided	Y		
Laborer (unskilled)		F	M
Semi-skilled worker		F	M
Other occupation		F	M
Unemployed		F	M

33. Below are some reasons that might have influenced your decision to attend this particular college. How important was each reason in your decision to come here? (Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
My relatives wanted me to come here	V	S	N
My teacher advised me	V	S	N
This college has a very good academic reputation	V	S	N
I was offered financial assistance	V	S	N
I was not accepted anywhere else	V	S	N
Someone who had been here before advised me to go	V	S	N
This college offers special educational programs	V	S	N
This college has low tuition	V	S	N
My guidance counselor advised me	V	S	N
I wanted to live at home	V	S	N
A friend suggested attending	V	S	N
A college representative recruited me	V	S	N

BE SURE TO ANSWER QUESTION 34.

34. Current religious preference: (Mark one in each column)

	Yours	Father's	Mother's
Baptist	Y	F	M
Congregational (U.C.C.)	Y	F	M
Eastern Orthodox	Y	F	M
Episcopal	Y	F	M
Jewish	Y	F	M
Latter Day Saints (Mormon)	Y	F	M
Lutheran	Y	F	M
Methodist	Y	F	M
Muslim	Y	F	M
Presbyterian	Y	F	M
Quaker (Society of Friends)	Y	F	M
Roman Catholic	Y	F	M
Seventh Day Adventist	Y	F	M
Unitarian-Universalist	Y	F	M
Other Protestant	Y	F	M
Other Religion	Y	F	M
None	Y	F	M

35. Mark one in each row.

1 Disagree Strongly
2 Disagree Somewhat
3 Agree Somewhat
4 Agree Strongly

	4	3	2	1
The Federal government is not doing enough to control environmental pollution	4	3	2	1
The Federal government is not doing enough to protect the consumer from faulty goods and services	4	3	2	1
State and Fed. governments should provide more money for private colleges and universities	4	3	2	1
The Federal government should do more to discourage energy consumption	4	3	2	1
There is too much concern in the courts for the rights of criminals	4	3	2	1
People should not obey laws which violate their personal values	4	3	2	1
As long as they work hard, people should be paid equally regardless of ability or quality of work	4	3	2	1
Grading in the high schools has become too easy	4	3	2	1
The activities of married women are best confined to the home and family	4	3	2	1
A couple should live together for some time before deciding to get married	4	3	2	1
Parents should be discouraged from having large families	4	3	2	1
If two people really like each other, it's all right for them to have sex even if they've known each other for only a very short time	4	3	2	1
Women should receive the same salary and opportunities for advancement as men in comparable positions	4	3	2	1
Wealthy people should pay a larger share of taxes than they do now	4	3	2	1
Marijuana should be legalized	4	3	2	1
Busing is O.K. if it helps to achieve racial balance in the schools	4	3	2	1
Realistically, an individual can do little to bring about changes in our society	4	3	2	1
It is important to have laws prohibiting homosexual relationships	4	3	2	1
College officials have the right to regulate student behavior off campus	4	3	2	1
Students might appreciate the value of college more if they had to pay a greater share of the costs	4	3	2	1
Faculty promotions should be based in part on student evaluations	4	3	2	1
College grades should be abolished	4	3	2	1
Colleges would be improved if organized sports were de-emphasized	4	3	2	1
Student publications should be cleared by college officials	4	3	2	1
College officials have the right to ban persons with extreme views from speaking on campus	4	3	2	1
Students from disadvantaged social backgrounds should be given preferential treatment in college admissions	4	3	2	1
Open admissions (admitting anyone who applies) should be adopted by all publicly supported colleges	4	3	2	1
Even if it employs open admissions, a college should use the same performance standards in awarding degrees to all students	4	3	2	1
Students have the right to demonstrate to prohibit speakers from coming to campus	4	3	2	1

36. Below is a list of different undergraduate major fields grouped into general categories. Mark only one circle to indicate your probable field of study.

ARTS AND HUMANITIES
- Art, fine and applied
- English (language and literature)
- History
- Journalism
- Language and Literature (except English)
- Music
- Philosophy
- Speech and Drama
- Theology or Religion
- Other Arts and Humanities

BIOLOGICAL SCIENCE
- Biology (general)
- Biochemistry or Biophysics
- Botany
- Marine (Life) Science
- Microbiology or Bacteriology
- Zoology
- Other Biological Science

BUSINESS
- Accounting
- Business Admin. (general)
- Finance
- Marketing
- Management
- Secretarial Studies
- Other Business

EDUCATION
- Business Education
- Elementary Education
- Music or Art Education
- Physical Education or Recreation
- Secondary Education
- Special Education
- Other Education

ENGINEERING
- Aeronautical or Astronautical Eng.
- Civil Engineering
- Chemical Engineering
- Electrical or Electronic Engineering
- Industrial Engineering
- Mechanical Engineering
- Other Engineering

PHYSICAL SCIENCE
- Astronomy
- Atmospheric Science (incl. Meteorology)
- Chemistry
- Earth Science
- Marine Science (incl. Oceanography)
- Mathematics
- Physics
- Statistics
- Other Physical Science

PROFESSIONAL
- Architecture or Urban Planning
- Home Economics
- Health Technology (medical, dental, laboratory)
- Library or Archival Science
- Nursing
- Pharmacy
- Therapy (occupational, physical, speech)
- Other Professional

SOCIAL SCIENCE
- Anthropology
- Economics
- Geography
- Political Science (govt., international relations)
- Psychology
- Social Work
- Sociology
- Other Social Science

TECHNICAL
- Building Trades
- Data Processing or Computer Programming
- Drafting or Design
- Electronics
- Mechanics
- Other Technical

OTHER FIELDS
- Agriculture
- Communications (radio, T.V., etc.)
- Computer Science
- Forestry
- Law Enforcement
- Military Science
- Other Field
- Undecided

37. Indicate the importance to you personally of each of the following: (Mark one for each item)

(N) Not Important — (S) Somewhat Important — (V) Very Important — (E) Essential

	E	V	S	N
Becoming accomplished in one of the performing arts (acting, dancing, etc.)	E	V	S	N
Becoming an authority in my field	E	V	S	N
Obtaining recognition from my colleagues for contributions to my special field	E	V	S	N
Influencing the political structure	E	V	S	N
Influencing social values	E	V	S	N
Raising a family	E	V	S	N
Having administrative responsibility for the work of others	E	V	S	N
Being very well off financially	E	V	S	N
Helping others who are in difficulty	E	V	S	N
Making a theoretical contribution to science	E	V	S	N
Writing original works (poems, novels, short stories, etc.)	E	V	S	N
Creating artistic work (painting, sculpture, decorating, etc.)	E	V	S	N
Being successful in a business of my own	E	V	S	N
Becoming involved in programs to clean up the environment	E	V	S	N
Developing a meaningful philosophy of life	E	V	S	N
Participating in a community action program	E	V	S	N
Keeping up to date with political affairs	E	V	S	N

38. What is your best guess as to the chances that you will: (Mark one for each item)

(N) No Chance — (L) Very Little Chance — (S) Some Chance — (V) Very Good Chance

	V	S	L	N
Vote in the November presidential election?	V	S	L	N
Change major field?	V	S	L	N
Change career choice?	V	S	L	N
Fail one or more courses?	V	S	L	N
Graduate with honors?	V	S	L	N
Be elected to a student office?	V	S	L	N
Get a job to help pay for college expenses?	V	S	L	N
Join a social fraternity, sorority, or club?	V	S	L	N
Live in a coeducational dorm?	V	S	L	N
Be elected to an academic honor society?	V	S	L	N
Make at least a "B" average?	V	S	L	N
Need extra time to complete your degree requirements?	V	S	L	N
Need tutoring in some courses?	V	S	L	N
Have to work at an outside job during college?	V	S	L	N
Seek vocational counseling?	V	S	L	N
Seek individual counseling on personal problems?	V	S	L	N
Get a bachelor's degree (B.A., B.S., etc.)?	V	S	L	N
Drop out of this college temporarily (exclude transferring)?	V	S	L	N
Drop out permanently (exclude transferring)?	V	S	L	N
Transfer to another college before graduating?	V	S	L	N
Be satisfied with your college?	V	S	L	N
Find a job after graduation in the field for which you were trained?	V	S	L	N
Get married while in college? (skip if married)	V	S	L	N
Get married within a year after college? (skip if married)	V	S	L	N

The Laboratory for Research on Higher Education at UCLA actively encourages the colleges that participate in this survey to conduct local studies of their student bodies. If these studies involve collecting follow-up data, it is necessary for the institution to know the students' ID numbers so that follow-up data can be linked with the data from this survey. If your college asks for a tape copy of the data and signs an agreement to use it only for research purposes, do we have your permission to include your ID number in such a tape? Yes ○ No ○

39. (A) (B) (C) (D) (E)
40. (A) (B) (C) (D) (E)
41. (A) (B) (C) (D) (E)
42. (A) (B) (C) (D) (E)
43. (A) (B) (C) (D) (F)

The remaining circles are provided for items specifically designed by your college rather than by the Laboratory for Research on Higher Education. If your college has chosen to use the circles, observe carefully the supplemental directions given you.

44. (A) (B) (C) (D) (E)
45. (A) (B) (C) (D) (E)
46. (A) (B) (C) (D) (E)
47. (A) (B) (C) (D) (E)
48. (A) (B) (C) (D) (E)

THANK YOU!

Prepared by the Laboratory for Research on Higher Education, University of California, Los Angeles, California 90024. Processed by Intran Corporation, 4555 West 77th Street, Minneapolis, Minnesota 55435.

California State University, Chico
Chico, California 95926

Office of Institutional Research
(916) 895-5623

COOPERATIVE INSTITUTIONAL RESEARCH PROGRAM
Sponsored by
AMERICAN COUNCIL ON EDUCATION
and
UNIVERSITY OF CALIFORNIA AT LOS ANGELES

Dear Freshman Student:

Your participation in a national study of the effects of colleges on students is requested. Initiated in 1965 by the American Council on Education, the national study now includes data from more than three million students at 900 colleges and universities. It is the largest ongoing study of its kind involving the American higher educational system.

Task. Please fill in your answers on the enclosed Student Information Form (SIF). This is a four-page survey which can usually be completed in 20 to 30 minutes. It is designed to secure standard biographical and demographic information from entering freshmen at U.S. colleges and universities. Ample safeguards of your right to privacy have been provided. Your participation is voluntary and necessary for the improvement of higher education at Chico.

Confidentiality of your answers. The information you provide on SIF will be held in the strictest confidence. Your data will not be made available with your identification to parents, administrators, faculty, or other students. Only Institutional Research personnel will have access to your personally identified data and they will use it solely to accomplish the purposes of this study.

The National Data Bank, gathering the information, has provided excellent and rigorous safeguards for confidentiality. Their files do not identify data in a manner which would allow your answers to be connected to you as an individual. Their procedures for ensuring data security and respondent anonymity provide protection from congressional or judicial subpoena of the files as well as from unethical utilization of the files by research personnel.

Invasion of privacy. If, despite the assurance of confidentiality given above, you consider any question an invasion of your privacy, simply leave that question blank. We ask you to avoid omitting questions but wish you to feel completely free to use your own judgment.

Thank you.

Sincerely,

J. G. Safarik, Director
Office of Institutional Research

Don S. Graham, Test Officer
Test Office

Please examine page 1 and find the set of circles labeled "Mark in this area only if directed". They are located at the middle of the left side. Mark these circles to indicate your social security number. If you do not have a social security number, ask your survey administrator to give you an ID number for use here.

On the last page of the questionnaire (following question #38 in small, heavy-face type) is a question which asks you "...do we have your permission to include your ID number in such a tape?" PLEASE MARK THIS YES. Your data will be used solely for research purposes and your ID number is needed.

PLEASE READ THE QUESTIONS BELOW AND ANSWER THEM IN THE APPROPRIATE SPACES AT THE BOTTOM OF THE LAST PAGE OF THE QUESTIONNAIRE. DO NOT MARK YOUR ANSWERS ON THIS SHEET—MARK THEM ON THE QUESTIONNAIRE ITSELF!

STRONGLY AGREE = A
AGREE = B
UNCERTAIN = C
DISAGREE = D
STRONGLY DISAGREE = E

A	B	C	D	E	39.	In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.
A	B	C	D	E	40.	My blood boils whenever a person stubbornly refuses to admit he's wrong.
A	B	C	D	E	41.	There are two kinds of people in this world: those who are for the truth and those who are against the truth.
A	B	C	D	E	42.	Most people just don't know what's good for them.
A	B	C	D	E	43.	Of all the different philosophies which exist in this world there is probably only one which is correct.
A	B	C	D	E	44.	The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.
A	B	C	D	E	45.	The main thing in life is for a person to want to do something important.
A	B	C	D	E	46.	I'd like it if I could find someone who would tell me how to solve my personal problems.
A	B	C	D	E	47.	Most of the ideas which get printed nowadays aren't worth the paper they are printed on.
A	B	C	D	E	48.	Man on his own is a helpless and miserable creature.

AGAIN, PLEASE MARK "YES" ON THE ID NUMBER RELEASE QUESTION (following question #38) AND COMPLETE THE ABOVE 10 QUESTIONS, ENTERING YOUR ANSWERS AT THE BOTTOM OF THE LAST PAGE OF THE QUESTIONNAIRE.

THANK YOU FOR YOUR COOPERATION!



APPENDIX C

INTERCORRELATIONS OF BIOGRAPHIC, INTENTION, AND MET EXPECTATION ITEMS

TABLE C-1

Intercorrelations of 22 Biographic, 1 Intention, and 1 Met Expectation Predictor Variables 1975 Cohort (N = 512)[a]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 - Sex	-	-14	06	24	-09	07	16	03	00	-01	17	11	04	06	12	-02	06	-10	02	-02	-03	04	00	07
2 - Age		-	10	-21	-02	04	-11	-04	-07	-10	-07	-05	01	-16	-13	-02	-05	-03	-02	-01	-05	-09	01	10
3 - Type high school program			-	-03	-05	-13	-11	-09	-12	09	01	-13	-06	-13	-08	-04	04	-06	-02	-02	-11	-10	01	-01
4 - Average high school GPA				-	20	10	12	13	10	04	04	20	-08	-11	-07	03	19	08	10	-10	-11	-06	-10	04
5 - Mathematical					-	-04	02	19	03	01	-01	15	-03	-10	00	-06	-00	-01	-01	-05	07	06	-10	-03
6 - Reading & composition						-	11	08	23	-00	04	22	04	02	06	-05	01	01	02	00	03	-01	-03	-12
7 - Foreign languages							-	13	13	02	06	14	-08	00	05	-07	-04	-01	03	09	09	02	-08	-09
8 - Science								-	15	11	04	26	-05	-03	-02	03	07	04	07	-00	-01	-00	-07	-12
9 - History/social sciences									-	10	14	28	06	04	01	-00	-03	-02	-01	05	01	00	-18	-06
10 - Vocational skills										-	21	03	-02	-08	-04	-05	-02	-02	03	-02	-11	-13	-06	-03
11 - Music & artistic skills											-	11	03	-01	02	-03	03	-01	-01	-01	11	08	-01	-09
12 - Study habits												-	03	-00	01	-04	03	02	-00	02	-02	-07	-18	-10
13 - Miles from home													-	38	26	-01	-04	-03	08	08	01	06	-01	-01
14 - Residency														-	34	-05	-06	-10	-03	11	07	11	04	-05
15 - Parental or family aid															-	-34	-24	-01	-04	38	22	20	-03	-03
16 - Basic educ. oppor. grant																-	34	01	-07	-40	-19	-14	-05	-05
17 - State scholarship																	-	07	-02	-35	-20	-18	-05	-04
18 - Part-time work																		-	33	-01	-01	-01	-06	-02
19 - Savings																			-	00	-01	-02	05	04
20 - Parental income																				-	29	23	-01	02
21 - Father's education																					-	59	06	05
22 - Mother's education																						-	02	04
23 - Intention to leave																							-	22
24 - Met expectation																								-

[a]Decimals omitted.

TABLE C-2

Intercorrelations of 22 Biographic, 1 Intention, and 1 Met Expectation Predictor Variables 1976 Cohort (N = 957)[a]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 - Sex	-	-10	02	22	-11	09	08	-09	-03	02	15	03	06	08	13	05	10	-16	-03	-06	-02	00	-12	05
2 - Age		-	08	-13	-04	-02	-04	-03	-02	01	-01	-06	06	-17	-20	09	-06	05	05	-10	-12	-12	-04	03
3 - Type high school program			-	-10	-16	00	-20	-14	-07	15	01	-04	-04	-13	-15	-16	-01	-05	-01	-17	-17	-11	01	-03
4 - Average high school GPA				-	22	06	10	19	01	05	05	14	-20	04	-01	-01	18	08	09	-01	02	04	-06	29
5 - Mathematical					-	-07	05	15	-01	00	-03	19	-08	-00	-03	-04	05	03	-00	-00	-01	04	-10	00
6 - Reading & composition						-	08	04	18	07	11	29	-01	02	-02	02	03	01	-01	-01	-01	-00	-04	-05
7 - Foreign languages							-	12	11	-02	09	14	01	07	06	-04	04	01	-04	08	06	03	-04	00
8 - Science								-	14	01	08	16	-08	03	03	-07	04	03	01	06	04	03	-08	00
9 - History/social sciences									-	13	06	16	-00	02	07	04	-02	-02	01	06	01	03	-00	-10
10 - Vocational skills										-	20	16	01	06	-00	04	01	-03	02	-01	-10	-01	-10	-05
11 - Musical & artistic skills											-	07	-03	03	06	03	00	-03	-00	-02	06	05	-03	-06
12 - Study habits												-	-02	04	-02	05	04	01	03	-03	-03	-02	-13	01
13 - Miles from home													-	41	21	-01	-03	-04	04	12	05	02	00	-04
14 - Residency														-	37	-21	-06	-02	08	29	21	17	01	-01
15 - Parental or family aid															-	-37	-26	03	-03	49	33	24	03	-03
16 - Basic educ. oppor. grant																-	32	-09	-11	-48	-33	-23	-10	00
17 - State scholarship																	-	-03	-01	-32	-20	-16	-10	07
18 - Part-time work																		-	28	09	03	-01	-01	05
19 - Savings																			-	05	06	01	-02	06
20 - Parental income																				-	44	35	10	-04
21 - Father's education																					-	55	09	-01
22 - Mother's education																						-	08	-01
23 - Intention to leave																							-	09
24 - Met expectation																								-

[a]Decimals omitted.

APPENDIX D

TABLE D-1

Biographic and "Affective" Variables Not Included in the Step-Wise Multiple Regression on Attrition -1975 Cohort (See Table 6)

Variable	Beta In	Partial	Tolerance	F
Sex of student	-.00193	-.00188	.76468	.001
Science	.00014	.00014	.85540	.000
History/social sciences	.02457	.02457	.80552	.200
Parental or family aid	-.02690	-.02528	.71186	.212
Basic educ. opportunity grant	-.03559	-.03464	.76314	.399
Part-time work	-.03095	-.03073	.79442	.314
Estimated parental income	.04073	.03794	.69888	.479
Father's education	.01587	.01591	.80931	.084
Mother's education	-.03284	-.03328	.82766	.368
Relatives	.01906	.01995	.88249	.132
Teachers	-.02881	-.02897	.81438	.279
Academic reputation	.04894	.04632	.72180	.714
Financial assistance	-.03427	-.03196	.70058	.339
Low tuition	.02270	.02285	.81689	.174
Advice from guidance counselor	.02137	.02194	.84946	.160
Live at home	-.00926	-.00884	.73400	.026
Change major field	-.02311	-.02191	.72412	.159
Change career choice	-.00665	-.00653	.77640	.014
Graduate with honors	.03026	.02838	.70873	.268
Elected to student office	.03112	.02971	.73425	.293
Live in a coed dorm	.01965	.01666	.57910	.092
Elected to academic honor society	.03602	.03472	.74865	.401
Need tutoring	.02256	.02044	.66118	.139

TABLE D-1 (cont'd)

Variable	Beta In	Partial	Tolerance	F
Work during college	.04327	.04098	.72262	.559
Seek individual counseling	.00977	.00967	.78946	.031
Transfer before graduating	-.04738	-.04817	.83276	.772
Be satisfied with college	-.00508	-.00522	.84871	.009
Find a job in field	.00839	.00850	.82688	.024

APPENDIX E

TABLES FOR GROUP MEANS (ON ATTRITION) OF PERSONALITY VARIABLES NOT FOUND TO HAVE A QUADRATIC RELATIONSHIP WITH ATTRITION

TABLE E-1

Importance-Item-Sum Group Means
on Attrition - 1975 Cohort
(See Table 11, in Text)

Group (Importance Sum Scores)	Count	Mean	Std. Dev.
GRP01 (18-27)	53	.7547	.4344
GRP02 (28-30)	54	.7037	.4609
GRP03 (31-32)	62	.7097	.4576
GRP04 (33)	37	.7027	.4634
GRP05 (34-35)	66	.6818	.4693
GRP06 (36)	30	.7333	.4498
GRP07 (37-38)	76	.8158	.3902
GRP08 (39-41)	68	.7353	.4445
GRP09 (42-45)	61	.7213	.4521
GRP10 (46-63)	55	.7455	.4396
Total	562	.7331	.4427

TABLE E-2

"Popularity" Factor Group Means
on Attrition - 1976 Cohort
(See Table 14, in Text)

Group (Factor Scores)	Count	Mean	Std. Dev.
GRP08 (5-7)	13	.7692	.4385
GRP09 (9)	18	.7778	.4278
GRP10 (10)	29	.8276	.3844
GRP11 (11)	81	.8148	.3909
GRP12 (12)	255	.7294	.4451
GRP13 (13)	167	.7186	.4511
GRP14 (14)	158	.7152	.4528
GRP15 (15)	135	.6741	.4705
GRP16 (16)	113	.6814	.4680
GRP17 (17)	46	.6739	.4740
GRP18 (18)	14	.7857	.4258
GRP19 (19-20)	19	.6316	.4956
Total	1048	.7204	.4490

TABLE E-3

"Confidence" Factor Group
Means on Attrition - 1976 Cohort
(See Table 15, in Text)

Group (Factor Scores)	Count	Mean	Std. Dev.
GRP07 (5-7)	30	.7667	.4302
GRP08 (8)	75	.7733	.4215
GRP09 (9)	194	.7113	.4543
GRP10 (10)	209	.7751	.4185
GRP11 (11)	201	.6766	.4689
GRP12 (12)	203	.7192	.4505
GRP13 (13)	87	.7011	.4604
GRP14 (14)	31	.7097	.4614
GRP15 (15)	24	.7083	.4643
Total	1054	.7239	.4473

TABLE E-4

"Defensiveness" Factor Group
Means on Attrition - 1976 Cohort
(See Table 16, in Text)

Group (Factor Scores)	Count	Mean	Std. Dev.
GRP05 (3-5)	13	.6923	.4804
GRP06 (6)	18	.8333	.3835
GRP07 (7)	65	.7692	.4246
GRP08 (8)	144	.7500	.4345
GRP09 (9)	315	.7143	.4525
GRP10 (10)	249	.7430	.4379
GRP11 (11)	128	.6953	.4621
GRP12 (12)	64	.6406	.4836
GRP13 (13)	33	.7576	.4352
GRP14 (14-15)	21	.6667	.4830
Total	1050	.7248	.4468

TABLE E-5

"Cheerfulness" Factor Group
Means on Attrition - 1976 Cohort
(See Table 17, in Text)

Group (Factor Scores)	Count	Mean	Std. Dev.
GRP05 (3-5)	11	.8182	.4045
GRP06 (6)	137	.7372	.4418
GRP07 (7)	272	.6985	.4597
GRP08 (8)	369	.7371	.4408
GRP09 (9)	188	.6809	.4674
GRP10 (10)	89	.7528	.4338
Total	1066	.7195	.4494

TABLE E-6

"Liberal/Conservatism" Factor Group
Means on Attrition - 1976 Cohort
(See Table 18, in Text)

Group (Factor Scores)	Count	Mean	Std. Dev.
GRP-3 (-4, -3)	17	.8824	.3321
GRP-2 (-2)	55	.8000	.4037
GRP-1 (-1)	101	.7030	.4592
GRP00 (0)	540	.7000	.4587
GRP01 (1)	135	.8000	.4015
GRP02 (2)	152	.7039	.4580
GRP03 (3)	33	.5758	.5019
GRP04 (4)	20	.8000	.4104
Total	1053	.7198	.4493

APPENDIX F

FORMULAS AND VALUES USED IN THE EXAMPLE ANALYSIS OF COVARIANCE PRESENTED IN THE DISCUSSION

TABLE F-1

ANALYSIS OF COVARIANCE

Sources of variation	Sums of squares	Degrees of freedom	*F*
(1) SS due to *Z* and *X*, saturated model	$SS_y[R^2_{Z,X,ZX}]$	$k_1 + k_2 + k_1k_2 = K$	$\frac{(1)/DF_1}{(4)/DF_4}$
(2) SS due to *Z* and *X*, additive model	$SS_y[R^2_{Z,X}]$	$k_1 + k_2$	$\frac{(2)/DF_2}{(4)/DF_4}$
(*a*) SS due to *Z*, adjusted for *X*	$SS_y[R^2_{Z,X} - R_X{}^2]$	k_1	$\frac{(2a)/DF_{2a}}{(4)/DF_4}$
(*b*) SS due to *X*, adjusted for *Z*	$SS_y[R^2_{Z,X} - R_Z{}^2]$	k_2	$\frac{(2b)/DF_{2b}}{(4)/DF_4}$
(3) SS due to interaction, lack of homogeneity of slopes	$SS_y[R^2_{Z,X,ZX} - R^2_{Z,X}]$	k_1k_2	$\frac{(3)/DF_3}{(4)/DF_4}$
(4) SS residual	$SS_y[1 - R^2_{Z,X,ZX}]$	$N - K - 1$	

The above table is copied from Nie et al. (1975, p. 383). For the computations presented in the discussion based on the 1975 cohort:

Y = Attrition status

X = Dichotomized performance group (the covariate)

Z = Composite intention to drop out item score (the factor)

k_1 = The number of variables in the factor "set" (i.e., 1)

k_2 = The number of variables in the covariate "set" (i.e., 1)

N = The number of subjects (N = 320)

$R^2_{z,x,zx}$ = .04345

$R^2_{z,x}$ = .03205

R^2_x = .03119

R^2_z = .00005

VITA

Charles Curtis Worth was born in Berkeley, California on March 17, 1947. He attended public schools in the San Francisco Bay Area, and graduated in 1965 from El Cerrito High School. He attended the University of California, Santa Cruz (Stevenson College), and earned a bachelor of arts degree in 1969 with a major in Psychology.

In 1969, the writer entered the University of Tennessee, Knoxville to pursue the doctor of philosophy degree in Industrial-Organizational Psychology. While at the University of Tennessee, the writer was employed as a research assistant, part-time instructor, and later as an investigator at the Training and Technology Program, Oak Ridge Associated Universities.

In 1973, the writer left the University of Tennessee, Knoxville to gain employment at California State University, Chico. Since that time, he has been employed primarily as a research associate in the Office of Institutional Research, with part-time instructional duties in the Department of Psychology. He is currently Assistant Director of the Office of Institutional Research at California State University, Chico. He intends to continue his association with this institution and office upon reception of his doctor of philosophy degree.

The author is a member of the American Psychological Association, the American Educational Research Association,

the Society for the Psychological Study of Social Issues, and the American Association for the Advancement of Science. He is married to Dr. Denise Meredith Worth (the former Denise Meredith Pryor of Eureka, California). They are expecting their first child in May, 1979.