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OF ADULTS ON A COLLEGE CAMPUS.**

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**PREDICTIVE VARIABLES AND SCHOLASTIC PERFORMANCE
OF ADULTS ON A COLLEGE CAMPUS**

by

Jean Eason

**A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education**

**Greensboro
1974**

Approved by


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An investigation was undertaken to determine the relationships which exist for adult college students between demographic and behavioral variables available for prediction and a measure of scholastic performance. Extensive review of theoretical and research literature suggested the need for detailed understanding of these relationships in light of changing demands for college admissions.

The subjects were 186 adult students enrolled at the University of North Carolina at Greensboro during the fall semester of 1973. They had been admitted to coursework through a special admissions process which involved a pre-entry interview with a continuing education counselor. Data were collected from application and registration records as well as interview notes.

Ten categorical descriptive variables and seven continuous-interval performance measures were viewed as independent or predictor variables. The criterion measure of academic performance was the traditional grade point average computed at the close of the term. Statistical analyses applied to the variables included chi square tests for frequency variations from chance, analyses of variance (simple and two-factor designs), Pearson product-moment correlation coefficients, multiple regression and discriminant analysis techniques.

Traditional admissions criteria related to high school and prior college performance were found to be non-valid predictors of these adult

students' performance. Self-predicted performance, age, educational background, employment and marital status, and sex showed significant patterns in relation to the achieved grade point averages.

The findings suggest that a modification in entry administration procedures, with more emphasis on placement and guidance rather than selectivity, would be justified when concerned with non-traditional students.

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CHAPTER I

INTRODUCTION: GENERAL THEORETICAL BACKGROUND AND STATEMENT OF THE PROBLEM

Changing concept of higher education

A number of basic traditions - even the central philosophy - of American higher education are in transition in these early 1970s.

New forms, new structures, new means, and new opportunities for higher education have, in the past two years, become focal points of discussion, planning, and action in the academic world. (Commission on Non-Traditional Study, 1973, p. ix)

Contemporary publication titles give some idea of the dimension of the shift: Increasing the Options (Valley, 1972), Breaking the Institutional Mold (Feinsot & Sigel, 1971), Less Time, More Options (Carnegie Commission on Higher Education, 1971), Beyond the Open Door (Cross, 1971), The Expanded Campus (Vermilye, 1972), The Innovative Spirit (Henderson, 1970), Diversity by Design (Commission on Non-Traditional Study, 1973). In addition, a long glossary of new terms and concepts has emerged during the last decade: university without walls, open university, external degree, credit by examination, experience-based learning, non-traditional study are examples.

The substance of this changing philosophy suggests that education may no longer be constrained by the limits and assumptions which have been traditional over the last three hundred years. Education, or more

precisely learning, can and does take place in a wide variety of settings and formats, and all such learning is becoming recognized as valuable and relevant in the development of "an educated person." The timing of learning is altered, with increasing emphasis on lifetime, continuous or recurrent options rather than the availability of educational experiences only to children and youth (see Boyer, 1973). There is a new focus on the learner, as reflected in publications of the American Association for Higher Education (Smith, 1971, p. xii) and a new consideration of the content and processes of education:

The needs of individuals can no longer be served by education that merely transmits knowledge. The new world ... requires a new purpose for education: the development of the capacity in each individual to learn, to change, to create a new culture throughout the span of his life. (Knowles, 1962, p. 274)

The use of the term "non-traditional" has led to much debate over definition as Samuel Gould, chairman of the Commission on Non-Traditional Study, stresses in that group's final report:

Non-traditional study is more an attitude than a system and thus can never be defined except tangentially. This attitude puts the student first and the institution second, concentrates more on the former's need than the latter's convenience, encourages diversity of individual opportunity rather than uniform prescription, and deemphasizes time, space, and even course requirements in favor of competence and, where applicable, performance. It has concern for the learner of any age and circumstance, for the degree aspirant as well as the person who finds sufficient reward in enriching life through constant, periodic, or occasional study. This attitude is not new; it is simply more prevalent than it used to be. (Commission on Non-Traditional Study, 1973, p. xv)

Tracing the evolution of this new focus of higher education is a lengthy and intricate task. Much of it has been done by the Commission

on Non-Traditional Study, established in 1971 and sponsored by the Educational Testing Service and the College Entrance Examination Board with funds from the Carnegie Corporation. The Commission was charged with assessment of the state of non-traditional postsecondary education and with making recommendations for future action. In support of the Commission's work, the Educational Testing Service is conducting a research program into six areas of inquiry; their comprehensive search and review of the existing literature brought together more than 2,000 recent references of interest (Mahler, 1973). Additional investigation of the topic has been undertaken by other groups such as the Commission of Post-Secondary Education in Ontario (1972), the Carnegie Commission on Higher Education (1971, 1972; Gould & Cross, 1972), the HEW Task Force on Higher Education (Newman, 1971), and the American Council on Education Commission on Academic Affairs (1972).

Many threads are intertwined in contemporary American higher education philosophy: the twentieth-century knowledge explosion and the need to avoid intellectual, professional, or technical obsolescence; the democratic interpretation of equal opportunities for all citizens; the impact of the many dimensions of the civil rights movement and pressure to redress deprivations of disadvantaged groups; the emphasis on educational credentials as determinants of economic and social status; the youth rebellion of the sixties and the stimulation it provided for soul-searching about the goals and relevance of higher education; the emerging educational needs of women beyond traditional

college age, as well as of veterans, the elderly, and other adults; the impending decrease in the college-age youth population; new understanding about learning processes and variables; the financial pressures constantly mounting on both private and public institutions of higher education.

Analysis and evaluation of these threads are offered by a wide variety of spokesmen, not only educators but also other commentators on social policy and values. Current publications carry a constant stream of thought on higher education, its new diverse clientele, and society's needs and demands for learning. Vermilye (1972, p. x) summarizes the current awareness:

The campus is expanding, not just physically and numerically but ideologically. Colleges and universities are trying to reach out to new students in new ways. The idea of universal higher education--or higher education for almost anybody who wants it--is far from a reality, but it is no longer just a dream. The doors are opening Colleges and universities, whose standards and traditions people have always been expected to adjust to, are trying to learn to adjust to people. And they are finding it is not an easy adjustment to make.

For one thing, there is all this diversity to contend with. It is so much easier to fit the people into the mold than to fit the mold to the people. It is easier because those who do not fit either do not get in or get in and do not last long. Viewed this way, college is synonymous with test. Those who do not pass are failures; the burden is on them. Now, increasingly, the burden is on the colleges as centers of teaching and learning, and students are the test.

For colleges and universities today, the heart of the challenge is the recognition and accommodation of personhood--the personhood of women, blacks, young, old, rich, poor, gifted, and plodding--in whatever form it touches academic life.

Consequences and implications of change. Such diversity seems likely to lead toward a twenty-first century redefinition of the term "student." The label may no longer evoke an image of identity-seeking adolescent or casual youth, and may carry no stereotype of age or other personal characteristic. "Student" may rather again signify "a learner, scholar ... one who studies, an attentive and systematic observer [Webster's Collegiate Dictionary]." The place, context, design and timing of study may be established not by institutional constraints but by the needs and interests of those who seek to learn, whether the content be academic discipline, professional or technical skills, or personal and social facility (see Marien, 1972).

The increasing diversity of the students in higher education will undoubtedly have permanent repercussions on goals and programs throughout higher education. Institutions which begin to respond to the wider range of demands and needs will find themselves caught up in the dynamics of change. And in one sense, the emergence of the new student demands a radical shift in attitude on the part of educational institutions, a shift toward service. Clark Kerr (1968, p. 313) notes this new emphasis:

Knowledge is now central to society. It is wanted, even demanded, by more people and more institutions than ever before. The university as producer, wholesaler and retailer of knowledge cannot escape service. Knowledge, today, is for everybody's sake.

Traditional higher education is not readily viewed as service-oriented, since cultural pressures and expectations in the past have

brought youth to institutional doors with only modest effort on the part of institutions. Educators are adjusted to the kinds of motivations, positive and negative, which such a student population brought with it. But the new adult student reflects a subtle and significant change in motivation.

Since adults are most clearly characterized by an involvement with the production and business of society, their commitment to schooling cannot be the total or mandatory one we have demanded from youth. An adult "student" does not spend all of his resources and energies on this role, but combines it with other responsibilities. The extent of his learning interaction with other parts of life may well lead to a new criteria of quality education.

Adult students are voluntary participants, "customers" or "clients" of higher educational purveyors, and a "marketing orientation" is to some extent demanded of institutions (Meeth, 1970). This idea is disturbing to many scholars and academicians, although more acceptable to professional schools and technical trainers. Yet it seems that if traditional scholarly and academic content has the value we believe it to have and can contribute to a significant quality of life in a basically market-oriented society, higher education must face this situation realistically and acknowledge the motivations and behaviors of the students it needs and may want to serve. This is the crux, as we see it, of the issue of educational accountability currently under debate.

As the transition of higher education goals and styles develops, it becomes evident that new functional concepts and tools are necessary to relate the emerging "non-traditional" student to the "traditional" system of higher education. Although many proposals are offered which involve the design of new institutions, the neglect of our traditional resources of academic quality would eventually be felt as a considerable loss to society, and to the extent that existing institutions fail to respond to the changing concern, they will lose potential students to new systems.

Kerr (1968, p. 4) has warned:

The continuing-education movement does not need any special encouragement. It will develop at a rapid pace regardless of what the colleges and universities do. But I believe that the colleges and universities should provide intellectual leadership with respect to such education, and that depends on their own creative activity in this field. If they ignore it, the movement will pass them by and leadership will go out of their hands. If that happens, I think they will have reason to regret it.

Many fears are raised about the ultimate quality and standards of non-traditional patterns. As with most social movements, the philosophical and political pendulums are likely to swing back and forth within the two limits. Most change will inevitably take place at the interface, with traditional higher education gradually shifting its structure and operation to acknowledge the changing need for accommodation and recognition of individual learner demands and values.

This interface encompasses, in particular, the fields of educational administration termed admissions, guidance, and student

service, since these are the fields which interrelate the students and the academic programs. This may indeed be the appropriate area in which to respond to Vermilye's challenge (1972, p. 1):

There must be a powerful creativity that shapes a system to fit the time and need, creativity that strengthens the process of change by moving in tandem with it.

Access: admissions policies and procedures

The basic concepts of educational admissions policy are prediction and selection, the prediction from known variables about the probability of academic success within the institutional programs and the selection of a maximum number of individual students into such programs who show high success probabilities. When variability has been limited, and applicants excessive, this policy has fared effectively; it was philosophically acceptable so long as education was viewed as an elitist privilege.

Under such policy, concern with those not admitted to educational programs has been negligible, although it is clear that many who might succeed are statistically excluded ("false negatives") and thus screened out of higher education and its benefits. This negligence is in part responsible for the pressures now building with respect to access to higher education, and many of the formerly-excluded individuals are the contemporary adults challenging the system for their right to pursue previously-denied or discouraged (or in some instances, previously-not-desired) learning.

There is no doubt that admissions policies are being strongly affected by the changing philosophies of higher education, for admissions policy is one of the administrative functions at the interface between institution and student. Thus, Thresher comments:

We are beginning to see education as a continuum of life-long duration, a notion that tends to soften and dissolve much conventional thinking The idea of education as a continuum reinforces the idea that tests are increasingly seen as diagnostic guidance devices, the main purpose of which is to help the student, to speed him on his way, or at the very least to bring him up to par. (Colloquium on College Admissions Policies, 1968, pp. 11-12)

Astin (1971, p. 103) argues that "to defend selective admissions on the grounds that aptitude tests and high school grades predict performance is perhaps to miss the main point of education." And Sanders (1971, p. 31) suggests that selectivity is of declining importance and "the primary problem ... is to provide adequate guidance to students before they file applications for admission and appropriate placement for them after they register."

In speculating on admissions counseling in 1984, Thresher (1969) predicts that greater emphasis will be on self-evaluation and self-selection of educational opportunities and resources. Astin (1971, p. 108) notes that under open admissions plans,

the responsibility for matching students with colleges falls into the hands of the student Then the institution must assist prospective applicants in making informed choices. One obvious mode of assistance would be to provide the prospective applicants with definitive information about the academic demands and requirements of the institution.

Even the College Entrance Examination Board, which has been involved in a major way with selectivity, is reevaluating its function:

What is wrong with "selective admissions" is partly that it has too often been conducted with too little regard for the intersection of socially and psychologically significant variables with scholastically significant variables. (Commission on Tests, 1970, p. 41)

The CEEB Commission goes on to propose that the Board change its name to the "Continuing Education Entrance Board"

in recognition of the fact that it increasingly is, and ought to be, concerned with helping people take advantage of, and helping institutions provide, avenues of entrance into America's opportunity structure and not simply with providing examinations for that purpose. (Commission on Tests, 1970, p. 99)

Some reactions to the new pressures are rather innovative, and jolt us into some new thinking even if offered somewhat tongue-in-cheek. For example, Astin (1970) suggests that if traditional admissions selectivity is not justified by research, a "lottery" might be the replacement; those selected would gain access to the curriculum regarded as a "cafeteria" wherein the students are informed of available offerings and may make the choices they consider appropriate, since Astin believes the student to be the best judge of his particular needs and objectives.

In a highly theoretical paper examining the question "can a machine admit an applicant to continuing education?", Tiedeman (1969) speculates on some new concepts and approaches to admissions. He too places responsibility on the applicant for knowing what he wants and

for seeking "resources of an institution of continuing education as a means for his intention and plan." The admissions officer (Tiedeman does not propose substitution of a machine) is called upon to operate in a dynamic feedback or self-correcting process with the institution and the student, rather than within the traditional static model.

Eurich (1963, p. 21) also offers guidelines for future policy:

Our objective in higher education is to provide the optimum conditions of growth for each kind of ability an individual possesses--or for as many of them as is feasible. The task of admissions has become to match previous growth patterns with future possibilities. The admissions officer ... must perceive the pattern of each individual's growth in his past education, and he must understand the educational program of his institution intimately enough to see how the student's record and achievement profile can interlock with the institution's offerings.

Despite these theoretical speculations about future admissions philosophy, the first response of contemporary admissions administrators in the face of diversity of applicants and pressures for more open access has been to ask for more research on variables which can be used for effective screening.

Selection and prediction of performance. Those variables which have been found most predictive for youth as they complete the standard twelve years of elementary-secondary schooling are not clearly applicable to the new students appearing at college doors. Even if they were, there are many unresolved questions about their measurement and use, as discussed fully by Lavin (1965) among others. He notes the value judgments, in particular, which underlie the selection of

criteria when working toward performance prediction. The usual choice is college grade point average, but such a criterion is increasingly being questioned and Lavin suggests that when education is considered in the context of societal values and needs, other dimensions of student behavior may require consideration.

Fishman & Pasanella (1960) see the prospect of newer and better criteria as exciting, offering "fresh possibilities for relating the tools of the college to the total development of the individual," but the shift in criteria also raises a host of new problems. For example, Henderson (1971) calls the conventional academic process "an inappropriate vehicle for educating the disadvantaged student" but fails to fully develop a substitute. Christ-Janer (1972, p. 12) anticipates a demand for flexible responses: "The real problem faced by educators will be to make opportunity relevant to the needs of individuals who differ greatly in competence, aptitude, interests, and motivation." The challenge is to define a purpose of education broad enough that it can be applicable to a wide range of students and can be utilized as a criterion of performance.

New statements of goals and purposes of higher education are plentiful (Gordon, Lane, & Mendenhall, 1970; Houle, 1964; Kaplan, 1972; Knowles, 1970, 1971, 1972; Tiedeman, 1969). They basically agree with Toffler (1971, p. 414) that

tomorrow's schools must therefore teach not merely data, but ways to manipulate it. Students must learn how to discard old ideas, how and when to replace them. They must, in short, learn how to learn.

Such shifts in educational objectives will modify the role of admissions policy, particularly in choosing criteria for prediction purposes. Lane (in Gordon et al., 1970) notes that new procedures

must emphasize the development of human potential rather than the identification of talent The use of tests and measurement must become diagnostic and generate statements about the specific student, specifying the conditions under which he can learn, rather than normative.

Although a change in objectives is a broader institutional responsibility, Millett (in Colloquium on College Admissions Policies, 1968, pp. 53-54) insists that clear institutional objectives are essential to the admissions function:

I believe that if educational objectives are not clearly formulated and explicitly stated, then the selection of students for admission to a college or university will tend to be confused and confusing I would emphasize that applicants and institutions need to have a meeting of the minds during the admissions process.

Colleges need to select students not upon the basis of scholastic aptitude but upon the basis of institutional aptitude, upon the basis of the student's relationship to the educational objectives of an institution.

Thus, with changing philosophies and changing patterns of student participation, higher education admissions personnel are faced with a variety of dilemmas: the greater heterogeneity and unknown significance of variables presented in a diversity of applicants, shortcomings of the traditional regression-equation formula which is

far from a perfect statistical tool, the deeper question of what constitutes successful performance and the possibilities of new criteria of educational success, and demands for new skills and tasks within the admissions interface activity. Undoubtedly, regardless of staunch adherents to historical precedent, the admissions concept will be forced toward modification due to the realities of market-orientation, accountability, competitive financial situations, and emerging rather than stable educational philosophy.

Experimental responses to new applicant pressures. A variety of experimental programs in this country and abroad are now testing modifications of entry procedures, with the most simple being totally "open" admissions. Open access in its pure form is sometimes interpreted as unquestioned entry of all comers to the institutional doors, regardless of needs and learning goals, and in this form is not a reality. Modifications are most often practiced by public two-year institutions; open-door policies have been tried in four-year colleges and may bring significant problems, as evident at City University of New York (Libo & Stewart, 1972).

Under traditional entry procedures, the careful selection of students who are permitted to enroll within an institution can limit the demand upon the institution for services supportive of its academic coursework. By selecting only those individuals who have already demonstrated appropriate capability and the skills necessary for learning, an institution maximizes the possibility that its students will

prosper in the new environment. But with the diversity of backgrounds and learning experiences consequent upon more open admissions, supportive services may be essential for the heterogeneous student needs. Such concerns have led many institutions into experiments with special service programs for minority and/or disadvantaged students who are admitted under unconventional provisos.

Other modifications of admissions policies have been tried by many institutions. For example, World War II veterans entered many colleges under special provisions and similar procedures are advocated for contemporary veterans (Stephens & Stenger, 1972; Stocker, 1972). In addition to special projects for recent high school graduates in minority groups, one writer urges that special policies be extended to adults in these groups as well (Fink, 1971). Special programs for adult women (e.g., Wilkins, 1971), for specific professional groups, and for senior citizens have been offered (see Kibbee, 1973; Havighurst, 1973; Helling & Bauer, 1972).

An extensive experiment has been underway in Canadian universities during the past decade. A 1965 survey seeking a "mature student clause" in institutions found some liberalization in all instances. The mature student clause was defined as "any special clause permitting a student above a certain age to apply for acceptance into a course or to take written examinations without having to fulfill specific prior educational requirements [Thomas, 1965, p. 207]." A later study (Beagle & Melnyk, 1971) reports that during the period

1951-68, the full-time enrollment in Canadian universities tripled while part-time (presumably mature) students multiplied 23 times; the prediction is offered that by 1975, perhaps 50% of all Canadian university students will be part-time. It is of interest to note that in this study, the authors found general dissatisfaction expressed by admissions departments with the available procedures for selection as they dealt with non-traditional students.

In the United States, most special adult admissions procedures have been utilized in evening colleges and non-traditional programs rather than for entry into regular academic activities. Thus, Kuder (1971) reports that "admissions to adult programs have always had some points of difference from the admission of regular college students"; they have generally been more "open-door," less stringent, "easier" operationally. In a 1961 survey by the Association of University and Evening Colleges, more than half of the institutions reported one or more of the following variations: omission of entrance exams for evening students, waiver of the usual day student requirement to be in the top half of the high school class, waiver of requirements for personal references or for health examinations, and formal matriculation not required as of all day students. Hoppe (1972) likewise reports on evening college policies and practices, and found that approximately 90% of the institutions surveyed allow adults to register as special or non-degree students before being required to matriculate.

In more recent years, the trend has been toward entry of adults directly into regular academic programs, frequently through the special student avenue suggested above. Waters (1971) reports that she found no standardized procedures for adult admissions, and urges that more special attention be given to this question and to the related problems which are typically considered the concerns of counseling, guidance, and other student service areas.

Guidance: placement and planning assistance

The shift in admissions function is clearly away from selection as a goal and toward the development of guidance and special services to facilitate learning. Since no single educational institution can meet the diverse service (and academic) needs of all potential learners without unlimited resources, institutions must assess their own capabilities to respond to student needs. Thus, admissions policies must reflect a two-part assessment, plus "an attempt to understand the individual-system dynamics or the interplay of the person with the institution [Gump, 1973, p. 18]."

This two-way process may best be conveyed by the concept of articulation, used to denote the joining of a potential individual student's needs with the existing or feasible institutional services and programs. (It should be noted that this usage differs somewhat from the traditional concept of articulation, which focuses on the integration of programs from one institution to another so that students

might progress evenly; this usage seems less applicable as we shift toward discontinuous patterns of education). Thus, Thresher suggests

we worry about articulation--fitting education at successive stages together so that the student does not on the one hand suffer from gaps in his knowledge or, on the other, find himself needlessly repeating something he has already mastered. We shall have to organize in a more flexible manner for this.
(Colloquium on College Admissions Policies, 1968, p. 22)

The present author also believes the articulation process must be viewed as between student and institution, rather than as between two institutional programs, and that the goal must be to bring together relevant individual and institutional variables to optimize higher educational processes and goal attainment. Within such a concept, a new use may be made of the variables known to be involved in academic performance; rather than tools for prediction and sorting, they become instruments in pre-matriculation counseling, guidance, and planning for individual learners.

Functions of an educational entry counselor. The articulation of a heterogeneous voluntary body of students with a broad diversity of higher education institutions or programs is essentially a brokerage process. The guidance counselor serves as an advocate or ombudsman for potential learners, seeking an optimal learning environment for each individual. But the counselor is also a representative of the learning system, both in its breadth of options for the student and in the depth of opportunities within any single institution by which he is employed. Such an entry administrator serves at an interface of tradition and

individual innovation which is perhaps a more difficult confluence in which to maneuver than the newer area of counseling in non-traditional learning environments highly adaptive to the students.

In many respects, the continuing education counselor must be a "change-agent," seeking to influence both client and institution so that goals of both may be met in their interaction. Knowles (1971, p. 34) elaborates on the activities of a change-agent:

His responsibilities entail the involvement of his clients in a penetrating analysis of their higher aspirations and the changes required to achieve them, diagnosis of the obstacles that must be overcome in achieving these changes, and planning of an effective strategy for accomplishing the desired results.

He adds,

for the highest level of individual motivation to be achieved, it is imperative that the specific learning needs of the particular participants of a given learning activity be diagnosed--in fact, self-diagnosed (1971, p. 273)

and offers a three-stage process for such diagnosis: 1) constructing a model of the competencies or characteristics required to achieve a given ideal model of performance, 2) providing diagnostic experiences in which the learner can assess his present level of competencies in the light of those portrayed in the model, and 3) helping the learner to measure the gaps between his present competencies and those required by the model.

Allen (1972, p. 8) notes that "the traditional, client-centered, non-directive counseling posture of Carl Rogers has often been modified or discarded by counselors of adults in higher education." Breen (1970)

suggests an active rather than non-directive approach to motivate and encourage clients to pursue education at the level most appropriate to their ability; to challenge and confront self-defeating attitudes, values, and belief systems that may hinder educational, vocational, or personal development; to teach clients to think more clearly, logically, objectively about problems of everyday living; and to "manipulate" the client's environment wherever possible so it will be maximally beneficial to him.

It is pertinent to note that Empire State (New York) Learning Centers have found it appropriate to title their entry administration representatives "learning consultants" rather than admissions officers or counselors. Their function is to teach people "without games and complexities" the techniques of value-clarification, goal-setting, and decision-making with respect to educational alternatives.

The new functions of the entry counselor are not the same as those of the conventional admissions officer. Thresher (1969, p. 12) says that "the 1984 concept of admissions counseling takes the counselor out of the steamship-booking category and engages him, instead, in the major strategy of educational design." Allen (1972, p. 9) summarizes: "In a discontinuous world, and for students who have, for the most part, a discontinuous relationship with the university, the counselor must attempt to provide some measure of continuity."

All of the above would likely concur that the goal postulated by Thresher is appropriate:

Perhaps the art of college guidance may eventually be refined to the point where the student thinks, not of finding a college where something favorable will be done to him, or for him, or on his behalf--essentially a passive concept. His habit of mind will be centered on the learning process; how does one go about learning, using whatever tools come to hand. A student imbued with this viewpoint will not worry about "the college of his choice." He will pick up whatever aids to learning are available in whatever environment he finds himself, and go on from there. (Colloquium on College Admissions Policies, 1968, p. 19)

It seems that this goal might first be achieved by adult students, and that traditional institutions which encourage such a process will find their regular students moving toward a similar viewpoint.

Tools and processes of educational entry counseling. There are very few guidelines for how the entry counseling process should be developed or what tools and information are required. It is apparent that the process requires the ability to assess behaviors in the personal, emotional, social, and occupational as well as intellectual areas (Vontress & Thomas, 1968). One new tool which may be useful in this respect is the "Comparative Guidance and Placement Program" of the College Entrance Examination Board (Lunneborg, Greenmun, & Lunneborg, 1970), composed of twenty measures relevant to the development of diverse student groups. However, the use of the traditionally-measured intellectual, personality, sociological, or behavioral variables for purposes other than prediction and selection has not yet become common in most educational settings.

The preferred role of the counselor is "to combine the functions of assessment and information collection with the function of helping

his clients utilize the resulting information in a broader process [Goldman, 1967]." The translation of accumulated information is a challenge in itself. Mahler (1973, p. 14) suggests that the "wealth and complexity of information which is necessary ... has illuminated the need for interactive computer systems," some of which "would use a human ... intermediary ... while others have the student interacting directly with the system." Prediger (1971) discusses new techniques for converting test data to counseling information, and his recommended procedures using similarity score profiles might be useful with other client variables as well as test scores.

The entry counselor must clearly combine a variety of skills, tasks, tools, and processes on behalf of the diverse clients seeking admission to continuing education experiences, as well as on behalf of institutions with significant and desirable academic traditions and values. Without attempting to establish their priority, it is suggested that these skills should include the following:

- a) a primary concern with the individual and the valued counselor commitment to place client needs utmost;
- b) a respect and understanding for the values and standards of traditional academic patterns, as well as an openness to change and innovation which may enhance educational quality;
- c) the ability to elicit, assess, and clarify the learning needs and capabilities of individual potential students (and to teach such individuals this skill as a personal tool for life);

- d) an awareness of resources which exist within an institution to meet learning needs;
- e) an awareness of the institutional potential or inability to develop new resources, and perhaps the political expertise to convey emerging student needs to the institution;
- f) a knowledge of other learning alternatives (beyond the institution) available to the client;
- g) the skills demanded of any counselor relative to interpersonal communication and intrapersonal understanding;
- h) the ability to use data from all fields of education and learning to develop new hypotheses and generate new knowledge about the emerging field of continuing education guidance.

This full range of expertise has not been integrated and clearly defined in any personnel description currently in general use. Some experimentation with services to adult students within the higher educational institutions is known to exist, and student personnel services in community colleges and technical institutes are moving toward this model. However, to the extent that such a new concept of entry counseling and administration can be developed, it may well prove to become the essential link in the transitional development of responsive higher education in the future.

Statement of the problem

There is a dearth of research and concrete data on which to base any necessary change in student services which would facilitate the integration of non-traditional adult students into traditional institutions of higher education. It is toward the development of a concept and tool for such purposes that this study is oriented. A trend toward emphasizing the placement and guidance, rather than the screening and selection, of non-traditional students at the time of entry is evident, but this trend will be slow until there is a valid information base which can be utilized in that process.

Before reporting the specific investigation conducted by this author, it is appropriate to examine the research base on which existing admissions policies now rest. This has been done in the next chapter. Particular attention is paid to those studies which involve specific adult student populations such as veterans, mature women, prior dropouts, married and employed students. In addition, known factors relative to adult learning processes and behaviors are considered; much of this research comes from the field of adult or continuing education, a professional area which has long been at the periphery but is now clearly relevant to the newer central issues of higher education.

The purpose of the research investigation conducted by the author was to determine the relationships which exist between available independent predictor variables and a measure of the scholastic performance of adults in college courses. Subjects were diverse adult

students admitted under special provisions into regular academic programs of the University of North Carolina at Greensboro. The investigation dealt with the following questions:

1) To what extent do the traditional admissions criteria, demographic and other easily-measured variables characterizing adult students relate to their performance (as measured by grade point average) in academic courses?

2) What conclusions are to be drawn regarding admissions selectivity or modified procedures for access of adult students to University courses?

3) How might the significant variables be utilized in the process of counseling or placement of such students as they enter higher education?

CHAPTER II

REVIEW OF RELATED RESEARCH

In reviewing research on college and university admissions issues, Ebels (1969, p. 39) calls attention to the "excessive pre-occupation with prediction studies and their uses in the decision process." Nearly all of the studies on college academic performance and continuation have involved subjects of traditional college age (18-19 years old).

In most studies, the criterion for success has been the student's grade point average (usually the first term only) despite the limitations of this measure discussed earlier. In a few instances the criterion has been "success" defined as staying in or dropping out of college (e.g., Nicholson [1973]), an inadequate measure as we move toward the "stop-out" pattern and life-long continuing education clearly documented by Eckland (1964). Lavin (1965) notes that some studies have sought prediction not of a global performance measure, but of performance in specific courses. Such differential prediction studies yield inconsistent findings, partly because the different research designs are not comparable.

In the following pages will be reviewed the main findings of admissions research, noting particularly those reports which have

direct bearing on adult students. Additional research from the field of adult education will be noted as it pertains to learning characteristics of adults which may be relevant to the questions under consideration.

Prediction of academic performance

Lavin (1965, p. 12) summarizes the basic variables of interest to researchers:

Early research on this subject focused primarily on intellectual and ability factors as predictors. Recently there have been important shifts in emphasis and in the conceptualization of the problem due to the gradual recognition that some students perform better and some perform worse than predicted by ability tests. The search for causes of these variations in academic performance led first to the consideration of "nonintellectual" or personality characteristics. Even more recently the search has led to recognition that the interaction between aspects of the student's personality and his social environment is important.

Intellectual factors.

1. Ability and achievement tests. Success in academic programs requires certain cognitive and problem-solving skills, and Lavin (1965) notes that general intelligence tests are "moderately successful" in predicting academic performance. More often used than standard intelligence tests are special tests of academic aptitudes, particularly the instruments developed by the College Entrance Examination Board and the American College Testing Program. Lavin's review and Bloom & Peters (1961) report test score correlations with grade point average ranging from .14 to .70, with an average correlation of about .40-.50. Lavin notes that there is need for more longitudinal studies on these measures (rather than for freshman criterion only).

One such study (Humphreys, 1968) found the predictive validity over eight college semesters highly unstable and concludes that

intellectual functioning ... depends on a very broad, cumulative, well-learned repertoire of skills, knowledge, modes of performance, etc. Furthermore, this repertoire increases with age and experience.

No studies could be located which explore the specific validity of standard college aptitude tests with adults, although the general opinion of many academic administrators seems to be that such use is equivocal; this assertion is made by Kaback (1967) who suggests that there is a "need to devise various types of tests specifically for adults." In the absence of data regarding such variables as age, maturity, experiences both academic and nonacademic, it seems clearly inappropriate to assume that aptitude test scores have the same predictive significance for adults as for the college-age students traditionally studied and normed.

One examination that is probably administered more often to adults than to teenagers is the Test of General Educational Development, used extensively (particularly by the armed services) for determining award of high school equivalency diplomas. Sharon (1972 a,b) explored the validity of these achievement tests for admitting non-high school graduates into higher education. The median age of the students evaluated (1,367 in 40 institutions) was 28 years, with an age range of 18-63 years. Although none of these students were technically qualified for college entrance (except by virtue of the GED examination) and 8%

had never attended high school, Sharon reports that their college grades were only slightly (not significantly) lower than those of regularly-admitted students, and their attrition rate was no greater. Canning (1955) also found that the college achievement of non-high school graduates was equal to that of students who held diplomas. Parenthetically in a related area, Hills (1963) comments that "the gist of a number of studies around the country over the years is that the pattern or number of [high school] academic units is of very little value as a predictor of academic success in college."

2. Previous scholastic performance. The most common variable used in the prediction of performance in higher education is some measure of past academic performance based on high school grade point average or rank in high school class. One author (Guisiti, 1964, p. 207) concludes a review of articles published over a thirty-year period with the observation that the research demonstrates "unquestionable superiority and stability of the high school grade average as a single source of data for predicting college success" and others agree (Bloom & Peters, 1961, p. 9). It should be noted that only one of these studies dealt with students who had interrupted their educational pattern and that this study (Frederiksen & Schrader, 1952) found high school standing less valid for veterans of military service than for students applying directly from secondary school.

Ryan (1972) found a small statistically-significant relationship ($r = .15$) between academic performance of adults generally at high

school and college levels, but not for students over age 25. He concludes that "as the age of the student increases the use of high school grade point averages as predictors becomes less reliable."

One investigation (Lunneborg & Lunneborg, 1967) found that high school grade point average was a better predictor of academic achievement of transfer students than was their grade point average at the prior college. Willingham (1963) reports finding a correlation of .33 between previous college grade average and the first year average of transfer students to Georgia Tech, "considerably lower than that normally found between high school average and freshman average [p. 127]." He suggests that although "we have developed at least a superficial technology with respect to predicting college grades of regular freshmen, predicting the success of transfer students is a different matter [p. 125]."

In the past decade, increasing attention has been given to the question of academic performance of transfer students, since the transfer pattern of education has become increasingly common, particularly from two-year to four-year institutions. Although a great many of these studies have, in Knoell's opinion (1963, p. 110) consisted of "seemingly unproductive activity," they examine a broad range of questions of prediction, achievement, and articulation. Such studies will not be reviewed here, since they involve a complexity of factors not directly relevant to the present study. It is sufficient to note Knoell's conclusions: "Routine computations of grade-point averages

before and after transfer are scarcely sufficient as a basis for making policy affecting transfer students and for planning programs to help them adjust to a new campus [p. 122]." Some other factors involving transfer students, such as age and length of interruption in education, will be noted in a later section.

A recurrent problem in utilization of measures of past academic performance, whether in high school or previous college, is the lack of standardization or comparability of such measures due to the wide variety of institutions and personnel reflected. It may be suggested that this variability is increased when we are confronted with high school performance at different periods of time (as found when we deal with college students of diverse age). Various techniques have been designed for adjustment of such measures to reduce the variability, discussed for example by Willingham (1963) and Bloom & Peters (1961).

A more extreme instance of non-standardization is found when ratings or recommendations by counselors, teachers, or other acquaintances are used for predictive purposes, but such approximations of intellectual ability are also used in admissions procedures (Nicholson, 1971). Brackin (1956) reports that counselors of veterans are highly successful in predicting college success when it is defined as "degree completion," but cannot predict grade point average.

Such subjective measures ultimately reflect not only intellectual variability but also factors of personality (both of the student and of the rater). Lavin (1965) likewise reminds us that "ability is not the

only factor determining the high school record" and therefore that index is not a pure measure either.

3. Self-prediction. Another measure that has received considerable attention in recent years has been that of self-prediction of academic achievement. Such measures are again impure, but are not totally independent of intellectual ability (Lavin, 1965, p. 22) since self-evaluations are generally reflective of past performance and the feedback resulting from it. Most subjects in these studies have been traditional age students, and most studies have reported a high correlation between self-predictions and actual achievement (Biggs & Tinsley, 1970; Borislow, 1962; Jones & Grieneeks, 1970; Payne, 1962; Young, 1954). Biggs & Tinsley. (1970, p. 85) conclude that "self-made academic predictions ... have strong relationships with past performance, scholastic aptitude, future performance, and interest in academic achievement." Keefer (1969) found that self-predicted grade point average actually correlated higher with the achieved grade point average than did either high school grade point average or the ACT score, particularly beyond the freshman year. On the other hand, Doleys & Renzaglia (1963) report self-estimates were less accurate predictors than SAT scores (especially for less able students).

Although no direct research on the question of self-prediction of performance by adult college students is known, it might be speculated that this variable has considerable significance for such a student group. It may be assumed that most adults more or less voluntarily

seek entrance to higher education, and do so with a level of self-confidence which reflects past experiences and anticipates success with continuing education. On the other hand, this variable is confounded by the many motivational and personality factors which affect individual behavior and cannot be regarded as a pure measure of intellectual ability despite its basic source. For adults in particular, it may be more a function of work and other life experience than of academic performance and thus be less valid than for those students whose only or primary feedback has been about scholastic activity.

Psychological factors. Lavin notes (1965, p. 64) that even though ability measures are the best single type of predictor of academic performance, they account for less than half of the variability observed. Thus, investigators have sought additional factors to improve predictability and this search has accelerated as higher education has been pressured to broaden its admissions policies. For example, Green (1969) discusses the admissions dilemma consequent to the "black quest for higher education" and urges administrators to take into account motivational and attitudinal characteristics of individual students as well as the usual intellectual abilities. Most research results, however, document Travers' conclusion (1949, p. 177) that "motivational factors which affect academic success have not yet been adequately measured."

Robb (1963) also notes that measures of non-academic variables "have not been found to yield substantial correlations with academic

performance" but have been the basis for considerable study and deserve continued investigation. "The problem of defining and discussing the many non-academic characteristics which might be considered in the admissions context is formidable [p. 7]" and this is "no less or more complicated than the search for operational measures of factors which can be used successfully in the admissions process [p. 9]."

Lavin's summary chapter (1965) on "Personality Factors as Predictors" is extensive and evaluates the research evidence on a broad range of variables: study habits and attitudes, measures of interest, achievement motivation, independence, impulsivity, anxiety, introversion, self-image, adjustment, cognitive style, aggression, defensiveness. Robb (1963) notes some additional dimensions: intellectual curiosity, potentiality for independent work, character, emotional stability, special abilities or interests; and Rowe (1963) adds aspirations, attitudes, and personal and social needs. Trent (1968) found self-confidence and clarity of goals differentiated college persisters from students who withdrew. Many studies are single variable studies; that is, they examine the correlation between a single personality measure and academic performance. But many others are multivariate analyses which Lavin (1965, p. 107) has summarized in a six-dimension chart entitled "Classification of Personality Variables Associated with Academic Performance in Multivariate Studies."

Dimension I: Social Maturity in the Student Role

greater social presence	greater socialization
responsibility	restraint in social behavior
greater social maturity	

Dimension II: Emotional Stability

higher morale	greater freedom from neurotic orientation to study
greater stability	

Dimension III: Achievement Motivation Syndrome

higher achievement motivation	more endurance
higher activity level	

Dimension IV: Cognitive Style

greater curiosity	more relevant thinking in class
greater flexibility	more class participation
greater originality	greater liking for thinking
greater ability to visualize a configuration when moved	less stereopathy

Dimension V: Achievement via Conformance

higher need for order	higher conformance
greater femininity	

Dimension VI: Achievement via Independence

lower need for affiliation	low conformity to peer group standards
greater independence	
moderate impulsivity (lack of constrictedness)	

Lavin (1965, p. 110) comments:

A few of the single-variable findings do not seem to fit readily into this structure. Those that do not align indicate that: the higher-achieving student tends to have a more positive self-image; he tends to be more interested in the course areas in which he achieves best; his vocational interests have greater clarity; and he is less defensive about revealing personal inadequacy.

He warns (p. 111) that

the order with which we have infused the findings should not lead the reader to think that we can, at present, be very confident about the state of knowledge regarding the relationship between personality characteristics and academic performance Essentially, we think that the literature presents a somewhat disappointing picture.

Bower, Boyers, & Scheirer (1970) call for new theory and approaches if we are to gain understanding of the potentially-significant variable termed achievement-motivation.

Nearly all of the investigations reported by Lavin involve traditional age college students as subjects, as do many recent studies in the literature (Baird, 1969; Bower et al., 1970; Elliott, 1972; Elish, 1969; Farley & Truog, 1971; Johnson, 1971; Johnson, 1969; Kim, 1971; Nichols, 1966; Packwood, 1973; Schroeder & Sledge, 1966; Tedell, 1971; Thomas, Morrill, & Miller, 1970). Two rather inconclusive studies have been reported by White and associates (White, Gaier, & Cooley, 1966; Dooley & White, 1968) investigating personality characteristics and academic performance of adult evening college students, and an extensive amount of research and literature is available examining motivations and other dimensions as they relate to the continuing education of adults in informal learning settings; these will be summarized in a later section.

A thoughtful reading of the variables and dimensions presented by Lavin (1965) as having some positive relationship to academic performance would suggest that these factors are deserving of more study in relationship to adult students. Most of the variables are the same factors used to denote maturity (e.g., emotional stability, social development, independence, clarity of vocational interests). For example, Lavin reports that studies of clarity of vocational or educational interests show that students "more certain of their occupational choice ... are likely to perform at a higher level than students who are unsure of what goals they wish to pursue [p. 72]." Also, "those who were successful in their school work were more likely to have set their own goals and these goals were more often in line with their measured interests [p. 72]" and "tend ... to have been chosen independently of the influence of others [p. 100]." Frederiksen & Schrader (1950) report that the effect of motivational factors on scholastic performance of veterans was not clearcut, but veterans generally showed greater seriousness of purpose which apparently underlay their superior performance. Similar motivational factors have also been considered significant in the superior performance demonstrated by many mature women returning to the college classroom in the past decade (Osborn, 1963; Wilkins, 1971).

Demographic measures. The ready availability of biographical data from application forms and records of students has encouraged a number of investigators to assess the significance of such variables in

prediction equations, most often in conjunction with measures of intellectual factors. Lavin (1965, pp. 122-3) suggests that many sociological variables "symbolize certain uniformities of personality" and that "personality characteristics pertinent to achievement are not simply randomly distributed in the population."

1. Sociological variables. Variables which have been investigated include socio-economic status, religion, ethnic background, size of high school, type (urban/rural) of residence community (Klein & Snyder, 1946; Myers, 1952) with inconsistent and inconclusive results. However, many authors draw a conclusion similar to that of Fudge (1972):

Biographical information greatly aids in the accurate prediction of criteria of academic performance in college. Taken alone or in combination with aptitude test scores, this information better estimates academic performance than does aptitude test data, either by itself or in combination with another commonly used predictive index, high school rank.

Beasley (1972), Bryson (1971), and Malloy (1955) also find that adding biographical variables to the prediction equation (although using different variables for different groups) improved predictability.

2. Sex. One variable which seems to consistently affect the relationship of all other predictors to performance criteria is that of sex. Lavin (1965) calls attention in his review to those studies which analyze sex differences, and finds repeatedly that "females tend to be more predictable than males in academic performance [p. 52]"; that is, correlations between various predictors (especially ability factors)

and performance tend to be higher for women than men. Klein & Snyder's study (1969) is another illustration of this relationship, and Seashore (1962) has contributed a highly-readable analysis of the hypothesis, concluding that he is unable to explain the objective evidence.

3. Age. In an early study, Dwyer (1939) concludes that age can be used as a supplement to intellectual measures in prediction formulae, since he found a moderate (non-linear) correlation. Cain, Michaelis & Eurich (1950, p. 884) in their discussion of "Prognosis" in the Encyclopedia of Educational Research report

there is some evidence of a relationship between age and freshman scholastic success. Typical results ... show a negative relationship between age and scholarship up to 21 as the age of college admission, and a positive trend beyond 21 This trend is more pronounced for men than for women.

In exploring the performance of veterans on college campuses after World War II, Frederiksen & Schrader (1950) call attention to a number of studies which suggest "that age may at least be regarded as providing some clues as to why veterans did better" than non-veterans (a rather consistent finding.) Thus, Pultz (1947) reports that the older the veteran, the higher the grades he made; those 17-19 years old had a grade point average of 2.16 whereas the group age 32 and over had a 2.87 average. Owens & Owens (1949) found age correlated .37 with grade point average for 194 male veterans. But Garmezzy & Cross (1948) found no correlation between age and the performance of veterans. Frederiksen & Schrader note that at that period in history, it was exceedingly difficult to control age when comparing veteran and

non-veteran performance, since age tended to be highly correlated with the veteran status and thus control groups were not available.

More recent studies of the age factor have been inconclusive (Baron, 1969; Schroeder & Sledge, 1966). Halfter (1962) suggests that chronological age serves as a poor index for performance, although "functional age" might be a useful discriminant concept. Dennison & Jones (1969) found "mature" (age 25 and over) transfer students achieved at a higher level both in their community college and later university courses than those students younger than 25. Klein & Snyder (1969) report a similar correlation for high achievers but not underachievers. Perkins (1968) compared a group of mature students (ages 24-50) with four groups of regular freshmen, and found that although the mature group had the lowest entrance test scores, they attained the highest first term and cumulative grade point averages; the author hypothesized that their success was due to "motivation and prior experience," or in other words, "maturity."

Hull (1970) examined the effect of maturity (as measured by age) on the regression equation normed on all former students (primarily traditional-age) at the University of Missouri. His purpose was to test whether the grade point averages of mature women deviate from predicted norms utilizing a grade index combining the SCAT total score and converted high school rank. Older subjects (age 24-44) had a predicted grade point average of 2.087 but an actual first semester average of 2.656, with the difference significant at the .005 level of confidence.

Hull concluded that although the grade index in use may be an accurate predictor for mature students, it was not so with the regular norms in use at that institution.

The difficulty in investigating age as an independent variable relative to academic performance is that it becomes confounded with other factors such as experience, motivation, and skills of a non-academic nature. As Kuder (1971, p. 14) concludes, "the effects of maturity and experience cannot be directly measured in terms of past performance or test scores." Studies of the intellectual capacities of adults are also significant in this context, but will be discussed in a later section.

Experiential factors. Many factors which are reflected in biographical data may be classified as experiential factors; that is, they are dimensions which differentiate the experiences individuals have had or are currently engaged in. Thus, such factors as family characteristics (siblings, birth order, parental interests), youth activities (athletic, leadership roles, non-curricular activities), and social interests have been assessed for traditional-age students. Adult performance might be more logically related to post-high school experiences, but little research is known on these factors.

1. Marital status. In addition to sex, Beagle (1970) found that marital status was a significant predictor of academic achievement of adult students. Aller (1963) reports that marital adjustment shows a significant positive relationship to academic achievement for men but

not for women students. And Feldman (1973), reporting on graduate study, finds that the greatest success obtains among married men and divorced women. He concludes that "the student and the marital roles are not independent. In some instances, they conflict, while in other instances they compliment one another." Jeghelian (1969) suggests that marital status, as well as age and occupational level, are intervening variables which affect needs and motivations relevant to student performance; Nicholson's data (1971) would support this.

2. Full-time vs part-time study. In traditional education, there is little variation on this factor and very few studies have examined this variable; those located have noted it to be of no significance (Beagle & Melnyk, 1971; Hay & Lindsay, 1969). Lavin (1965, p. 133) reports: "Five studies find that academic load (number of courses carried) has little or no effect upon school performance."

3. Employment. Since most adult students are simultaneously or at least formerly employed when classified as students, studies which investigate the effect of employment on academic performance may be relevant. Hay & Lindsay (1969) report that the evidence is inconclusive, but there is apparently little difference in the grades of employed and non-employed students; a South Carolina University study (1970) supports this conclusion. On the other hand, Meskill (1971) found that academically deficient transfer students who worked were more likely to appear in a lower range on grade point average than those who did not work. He reports that other studies have shown that students

who worked more than twenty hours a week were less successful than students who worked less than that; in these instances also the students were individuals who had had a record of previous academic difficulty.

Wilkins (1971, p. 18) reports that prior vocational variables (classification of job and number of years since employment) "could be used to discriminate between the average and below average performance of women in a continuing education program." As with other experiential factors, it may be more appropriate to view employment factors as intervening variables which determine interest, motivation, goal-orientation, skills or performance.

4. Veteran status. One unique employment factor for many adult men re-entering higher education is that of service in the armed forces for a period of years. Academic performance of such students was extensively researched in the period following World War II, although little recent interest has been shown in the implications of that work for contemporary veterans or other mature students.

The extensive study by Frederiksen & Schrader (1950) has already been cited in another context. In that study, the records of 10,000 male college students were examined for comparison of veterans and non-veterans with regard to academic performance and adjustment, personal characteristics, general background, motivation, worries. The major finding, reported also in many other studies, was that veterans were generally superior in achievement. Taylor (1947) found similar indications, as did Thompson & Pressey (1948). In one similar assessment

of cold war veterans, Paraskevopoulous & Robinson (1969) again confirmed this finding. Shaffer (1948) reports one interesting deviation: male non-veterans were found to excel veterans when age was controlled.

5. Educational timing. Nomer (1968) suggests that the years immediately following World War II were the "golden age" of college teaching because of the seriousness of purpose and the maturity of ex-GIs. He suggests, and others have concurred, that institutions should consider requiring an interruption in the educational timing of college entrance. Hecker & Lezotte (1969, p. 110) find supportive evidence in their study of transfer students:

The 14% ... who delayed their transfer for more than one year did attain a significantly higher grade point average gain. It seems quite probable that these students were exposed to non-academic experiences in this greater time lapse that raised their motivational level for college studies.

Bluhm & Couch (1972) also found that academic performance increased after an interruption, according to the length of time previously spent in school and with no effect shown by the length of the interruption. And Gustavus (1972, p. 144) notes that

one of the most interesting implications of research on readmitted students is the possibility that perhaps we are currently observing the changing of a norm whereby college success will no longer be viewed in terms of whether or not one completes his education in the traditional four year span.

Little quantitative prediction research has been done with regard to "time-out" as an independent variable. Beagle (1970) reports a 1969 study by Flaherty which suggests that the greater the time lapse (since prior education), the lower the prediction-criterion relationship

(although not necessarily the lower the performance) becomes. Halfter (1962) reports that lengthy absence from education had no effect on performance by older women, generally superior to the average younger student. Most research which involves "interruption of education" is more directly investigating some other factor which took place during that interruption or which was responsible for the break, (for example, the questionnaire devised by Hagey, [1971]).

Campbell & Hahn (1962, p. 133) found that "there is a definite likelihood of academic improvement following a period of absence from the campus" but "better scholastic work ... is not necessarily due to absence alone." They report that students who had engaged in "activities of import" during absence from college improved significantly more than students who failed to so utilize the interruption. "Activities of import" included the following: military service, church mission, good college work at another institution, responsible employment, change in marital status, and combinations of these activities. These investigators found that length of absence was a significant variable and conclude "one would be justified in favoring readmission of a student with two or more years of absence over that of a student who had interrupted his college career for a short time only." Campbell & Hahn draw attention to limitations of their and similar investigations; subjects are screened either through self-selection or administrative actions so that factors under consideration do not show random variation,

and no direct causal relationships can be construed from correlational evidence since many intervening variables are in operation.

6. Previous academic experience. One significant cause of disruption in educational activity is that of failure and discontinuation of college study. Since many of the adults who seek entry into higher education have had such an experience, it is appropriate to examine some of the findings regarding the academic performance of "readmitted" students. Both of the following generalizations are supported by evidence: "Senior college and university policies which permit the readmission of academic dropouts are justified on the basis of the number who succeed when given a second chance [Carter & Schultz, 1971, p. 44]" and "predicting the success or failure of academic dismissals after their readmission is especially hazardous [Hansmeier, 1965]."

One extensive study (Lautz, MacLean, Vaughan, & Oliver, 1970) examined the relationship of 56 variables including test scores, educational history items, biographical data, and subjects' opinions to academic performance of formerly suspended students; statistically significant differences between successful and failing students were primarily in the area of study methods, incentive, and activities during the interruption; success was found to be unrelated to past academic achievement in high school or college, to amount of prior college experience, or to most ACT scores. A number of variables were also studied by Dole (1963) and by Hansmeier (1965) with equivocal results.

Meskill (1971) reports a study involving sixty transfer students who were admitted to Long Island University under a special program. All of the students were academically deficient on the basis of previous college work as well as traditional measured variables, yet they attained a mean grade point average during their first year of 2.67 (compared to 2.53 for the average regular student) and 79% of them were considered successful students. Meskill notes other studies which have yielded similar results.

A major study by Eckland (1964) at the University of Illinois points up the somewhat irrelevant nature of the term "drop-out" in an era of continuing education. Although 21% of the male freshmen withdrew for academic or other reasons during their first year, and only 50% of those beginning their education finished with a degree at the end of four years, nearly three-fourths of the group did attain a bachelors degree within ten years of entry. Three out of five drop-outs returned to college (not necessarily the same institution) to graduate, and only one out of these three failed a second time. Thus, Eckland feels many colleges report a rate of attrition which fails to take allowance for these patterns and "apparently four years in regular progression is not the empirical average for men who eventually attain degrees [p. 403]."

Multivariate studies. Over thirty of the previously-noted studies have involved more than a single independent variable in the analysis of academic performance criteria. As noted earlier, test score validities rarely exceed .50, accounting for only 25% of the variance

observed in subsequent performance, and the addition of a high school performance measure increases this to no more than 50% of the variability accounted for. Many of the other factors noted above and their interactions can enhance the prediction equation to some extent (Worthington & Grant, 1971). However, Muhich (1971) performed a complex analysis of ninety-two variables in a regression model, seeking the most parsimonious as well as most predictive combination; the result was that model used most frequently, a combination of aptitude test score and high school grade point average.

Again, it should be noted that these studies involved norms for traditional age students rather than adults and the evidence reviewed previously would indicate that prediction of adult academic performance is a more complex matter. Flaherty (1969) conducted a complex multivariate study of adult extension students at the University of Toronto and found that "although the intellectual-educational factor [not a direct measure but derived through statistical analysis] was the best predictor of overall grade average, non-cognitive factors made substantial and sometimes larger contributions to the prediction of grades in specific course areas" with marked differences in predictive validity for males and females.

One multivariate approach of considerable potential value is that utilized by Wientge & DuBois (1964) in the preliminary investigations of their instrument, Test of Adult College Aptitude (TACA). A combination of biographical data (55 items) and verbal and numerical test data

(100 items) was analyzed in relation to academic success of adult students. Twenty-two of the biographical items and 54 items requiring a choice of dissimilar word or number were incorporated into the TACA, a single-page inventory requiring about 45 minutes for completion. Norms are provided in the 1966 manual based on a modest 329 students and the test is now being distributed for experimental use and continuing supplementation of the norms.

Adult learning characteristics

Additional research data of interest in the present study has been gathered within the field of adult and continuing education. Interest in the variables relevant to the behavior of adult learners, in both formal academic and informal settings, has led to numerous studies of factors and characteristics which relate to such behavior. Although often not clearly defined by factors other than age, "adult learners" in most such studies would be consistent with the definition of that phrase offered by Knowles (quoted in Leagans, Copeland, & Kaiser [1971]): "An adult learner is a man or woman who enters a learning activity with a self-image of being a self-directing learner, with a broad background of experience, and with the intention of applying the learning to life problems," and developed by Thompson (in Farmer, 1971, p. 19).

As has been pointed out by Bittner (1950), a great many of these studies are not highly sophisticated research, often limited to

questionnaire data of unknown reliability (e.g., Kohn, 1952). Frequently, they are descriptive studies of adult student populations with very little focus on performance or prediction (Knox, 1959) or statistical relationships; Knox, however, outlines some of the research areas which need exploration based on differentiating characteristics (undated reference, p. 11). Since the common context for adult and continuing education (non-credit coursework) often does not utilize any evaluative measure of performance (i.e., grades), less quantitative data are available for analysis purposes. The limited number of studies dealing with traditional academic performance as measured by grades will be reviewed in a later section.

Most adult education is undertaken on a voluntary basis and one basic area of research has been what might be broadly termed "marketing research." Such studies have focused on the motivations and interests which bring adults into the learning situation, and the factors which maintain involvement and pertain to programs which satisfy the goals sought. In this review, we will limit attention to those studies which involve adult subjects with traditional undergraduate higher education or its minor variations as found in evening colleges and other special programs for adults.

Descriptive studies of adult students. Other than the studies reported earlier dealing with World War II veterans, little attention can be noted regarding adult students in traditional college programs until a 1965 publication by Hiltunen. She questioned all daytime

students 23 years of age or older who were enrolled at Louisiana State University (a sample of 73 subjects). A summary of characteristics, reported separately for males and females, gives a broad descriptive picture of these students but very little insight into their motivations, performance, or problems (although Hiltunen concludes that more counseling is needed).

An unpublished doctoral dissertation by Osborn (1963) at George Washington University at the same time was an extensive descriptive study of the characteristics, motivation, and problems of mature married women college students at that institution. Osborn's sample included 221 women who completed a questionnaire which was analyzed for descriptors relating to student status, prior experiences, personal data, multiple roles, educational aspirations, and problems.

Ferguson (1966) reports a 1964 study at the University of Illinois, involving 134 adult students in the Chicago Undergraduate Division. Questionnaires yielded general descriptive information about the subjects, their reasons and goals for educational endeavors. In addition, Ferguson sought knowledge about academic performance and variables predictive of success (measured as being in good standing at end of the term, versus placed on probation or dropped). The latter area yielded no conclusive answers, although she did find evidence that adult students performed significantly better than regular students by this measure of success.

Erickson (1970) has reported on results of a questionnaire completed by 494 of 1,100 undergraduate students over the age of 26 at the University of Michigan. Sixty-one percent of the total group were males, but a larger proportion of females replied to the questionnaire. Of the sample, male students tended to be younger than the females, nearly all of the students were white and non-urban. Seventy-six percent were married, 24% of the males and 9% of the females were single. When questioned whether they were satisfied with their job, nearly three-fourths said they were. Fifty-four percent of the students both held jobs and attended school, with 68% of the males and 32% of the females enrolled on a part-time basis. A large proportion of the students queried expressed a great need for academic advisement and counseling, both before entry and continuing as they progressed.

Many of the following studies are also largely descriptive, but include some specific evidence relevant to prediction. It is noted that "adult learners vary in their ability to learn because of the differences in cognitive abilities, psychomotor abilities, attitudes, values, and their readiness for a learning experience [Leagans et al., 1971, p. 49]." We therefore turn attention to specific studies relevant to these variables.

Ability to learn. Brunner, Wilder, Kirchner, & Newberry (1959) present a good review of early research on adult learning capacity, beginning with a pioneer study in 1928 by Edward Thorndike. Thorndike's results generally supported his contention that "inner growth" which

includes experiential factors as well as native intelligence reaches its height at about age 22, and that persons between the ages of 25 and 45 can learn as easily as those in their early twenties and more readily than youth younger than 20 (Thorndike, 1928, p. 120). Extensive research following World War I use of the Army Alpha Test initiated a long train of laboratory and field studies of adult learning capacities which are extensively reviewed in Birren (1964) and Zahn (1967).

Birren (in Kuhlen, 1963, p. 39) concludes:

The evidence which has been accumulating on both animal and human learning suggests that age changes in primary ability to learn are small under most circumstances. When significant age differences in learning appear, they seem more readily attributed to processes of perception, set, attention, motivation, and the physiological state of the organism, including that of disease.

Bischoff (1969, p. 224) concludes

the old dog can learn new tricks but the answer is not a direct and simple one. It appears that the old dog is reluctant to learn new tricks. He is less likely to gamble on the results, particularly when he is not convinced that the new trick is any better than the old tricks, which served him so well in the past. He may not learn the new trick as rapidly as he did in the past, but learn it he does. Further, the best evidence seems to indicate that if he starts out as a clever young pup, he is very likely to end up as a wise old hound.

The emerging data suggest that cognitive and intellectual performance of aging adults is a highly complex area needing more research (Arenberg, 1973; Baltes & Labouvie, 1973). Many independent variables are reflected in the aging process, and many results are influenced by choice of dependent variable and its assessment. For example, Charles (1971) suggests that a quantitative decline in capacity to learn is

probably balanced by improvement in verbal skills but that "there are no safe generalizations about complex learning performance in relation to specific ages." Siegle (1954, 1955) concludes that more important than age in adult learning is a combination of basic creativity, energy, experience, motivation, and guidance. Before examining research on other such variables, we shall look briefly at those studies which report data on the performance of adult students in college classes.

Performance. Many of the studies cited earlier clearly demonstrated the general superiority of adult student performance at the college level. Notably, studies comparing veteran students and mature women students with younger counterparts have demonstrated higher level performance by the older students. This finding holds up particularly for females, as noted by Hiltunen (1965) who reported adult male grade-point average of .84 (on a 3-point scale) but mature females averaging 1.58. Lichtenstein & Block (1963) confirm the higher achievement of women over men. Sharon (1971) reports that academic achievement (as measured by CLEP tests) correlates with level of formal education and its pattern varies with the age factor.

In a recent unpublished and preliminary study of student characteristics at Empire State College (New York) Genesee Valley Learning Center (1973) 52 successful and 20 unsuccessful adult students were compared on a number of items. (Success was defined as completion of at least two learning "contracts" or receiving a degree). The salient results were summarized as follows: successful students had

completed two or more prior years of college and had long-range plans in teaching; students who failed were more likely found to be single and had listed their occupation as "student." Trends which were not statistically significant indicated that successful students were more likely to be married and between ages 30-53, those who failed were in the age group 17-28 and tended to have unclear long-range plans. Sex was not a significant variable, nor were differences in full-time/part-time study or in major interests.

Since there is little evidence as to change in ability (and if any change does occur with age, it is generally a decline), one must look to other factors for explanation of the repeated observation of superior performance by adult students. The question of why adults learn leads to an assessment of motivation and other psychological factors underlying return to the classroom and behavior within that situation.

Psychological factors. We have noted that adults who seek college-credit learning situations are usually voluntary students; this can be restated to mean that they are learning-oriented, but additional motivational factors may be examined to determine why such learning-orientation exists. Whipple (1957, p. 37) suggests that "adult motivations are more complex than youth's; they are directed toward practical objectives and are more action-oriented ... are more practical and are generally tied to objectives for the immediate future." Lorge & Kushner (1950) suggest that such factors stem from individualized

childhood orientations. Brunner et al. (1959) summarize a number of studies on motivations, attitudes, and interests, and conclude that a great many questions have yet to be investigated. For example, level of prior education and socio-economic factors appear to interact with motivations and interests, but the form of this interaction is unclear.

Kuhlen (1963) offers a comprehensive survey of motivational changes during the adult years and finds a useful distinction between two broad motivational patterns--one of growth and expansion, the other of anxiety and threat. Individual differences are particularly apparent with respect to sex and socio-economic class.

Love (1953) conducted a pilot investigation using a "depth-interview" technique to compare attitudes and motivations of adult college students with matched adults who were not attending college classes. He discerned what he calls a "sequence of enrollment" which involves two preconditions: an awareness of education as a positive value in the solution of problems, and the equating of education with success and happiness. Under these circumstances, adults who pursue college coursework must 1) have a current problem for which they seek a solution, 2) be aware of a specific course or a specific field of study, 3) direct an inquiry to one or more schools which 4) culminates in actual enrollment if all barriers are hurdled. Thus, not only motivations are found to be complex but the prediction of behavior as a consequence of the motivations is determined by many additional factors.

Vocational motives tend to be dominant for a large proportion of adult students in higher education. Thus, Deane (1950) found that more credit students had been urged or encouraged by employers to continue formal education, were highly work-oriented and competitive, and expressed particular interest in the practical aspects of course material. Nicholson (1949) found economic-occupational motives dominant among over 5,000 adult students, with some variability related to age, sex, and marital status. Workun (1971) concurs that "the returning adult is often more concerned with the relevance of what he studies to what he is and wants to become." Knox's analysis (1959) indicated that three-fourths of the adult students in the Syracuse sample selected a vocational reason for attending college, with cultural or intellectual and social reasons given by others. Schlossberg (1970) questioned more than 400 men students over age 35 at Wayne State University and found over half indicating that job interests were their primary motivators for continuing education. Employment and other factors are discussed by Knerr (1967) as continuing education motives.

There is some indication that the motivations of adult women students differ from those of men. Osburn (1963) reports that although many women gave vocational reasons as partial explanation of their continuing education, they were more likely to offer reasons such as "personal growth and self-improvement" or "enjoyment of learning." Erickson (1970) found women more likely than men to select "intellectual stimulation" as their goal for education. Letchworth (1970) found

motives such as relief from boredom, escape from responsibility, marital and adjustment difficulties, desire for stimulation, and compulsion to finish significant in women who return to college. Lichtenstein & Block (1963) in a descriptive report noted that female adult students tend to be more anxious than their male counterparts, hold less salient vocational motives and generally more variable motivation, and are higher on measures of "attitude toward intellectualism."

With differing motivations go differing attitudes, and several researchers have addressed themselves to these variables. Zahn (1969, p. 95), for instance, explored attitudes of powerlessness, conflicting needs, and role transition and suggests that "knowing what roles a student identifies with, how newly acquired is the identity, what needs or habits he has that may conflict with the content of the learning, and how much control he feels he has over what happens to him are ... relevant to learning." Loring & Anderson (1971), in a proposal for contemporary college education of veterans, report a range of attitude characteristics: high motivation, age-anxiety, low academic self-concept, ambivalent reactions to authority and structure, preference for external rather than self-discipline, dissatisfaction with the social system, and civilian readjustment difficulties; these are found to affect the academic behaviors of such students and lead to recommendations for special assistance from institutions of higher education. (This recommendation is echoed by O'Neill & Fontaine, 1973).

Sturtz (1971) recently compared the satisfaction with college of samples of women at Iowa State University differentiated by age (over 25 and usual age). Older women expressed significantly more satisfaction with college, with the quality of their education, and with institutional policies and procedures. No difference in satisfaction toward social life was noted in the two groups.

Deterrents. If adults have motivations and attitudes which tend to work in favor of continuing higher education, there are certainly equally strong pressures working against such behavior. A considerable number of studies have assessed the problems and deterrents, and of particular interest have been those of adult students who are "dropouts" from formal programs.

Schlossberg (1970) noted that men returning to school often find their jobs as negative factors, and also list lack of educational opportunity, family situation, personal problems, and political and social forces as deterrents. Doty (1967) found older women students reported that problems in concentrating, reading rapidly, and taking notes interfered with their college performance. Blum, Sullivan, & O'Dea (1953) identified the following problems of adults in evening schools: finances, living conditions, employment, adjustment to college work, and psychological relations.

Love (1953) reports that fewer than 10% of the students enrolled at New York City College School of Business (evening and extension division) completed degrees, and the major reasons for dropping out were

given as wrong selection of school or course, lack of orientation, work load, illness, scholastic difficulties, home responsibilities, business or military interference, financial difficulty, or failures of the institution. Spence & Evans (1956) review a number of similar investigations and find consistent indicators. Hurkamp (1969) found significant differences in the initial attitudes of adults who continue versus dropouts in an adult education program, and suggests counseling of potential dropouts to develop realistic ideas of the benefits of a course, recognition of negative attitudes toward others, and acknowledgment of home programs that are potential interferences.

Zahn & Phillips (1961) note that dropouts from a psychology course offered by the Extension Division of the University of California at Berkeley generally scored lower than continuing adult students in academic aptitude, and did not score higher on anxiety measures. Boshier (1972) has developed a complex Dropout Prediction Scale which clearly differentiates dropouts from persisters on the basis of attitudinal responses.

It should be noted that in the context of contemporary continuing education, the term dropout has a shorter time-range significance than under traditional schooling patterns. Adults, as well as younger college students, are developing a pattern of "stopping-out" which may be temporary and thus a different phenomenon than is implied by the previous idea of termination. An adult "drop-out" under the changed pattern is thus the individual who fails to complete a contracted learning

experience rather than one who has terminated his education altogether. This changing use of the terminology is not clearly reflected in the mentioned studies and not at all utilized in studies of the traditional age student who is labeled a drop-out.

Summary

The foregoing chapter represents an effort to highlight findings relevant to the current investigation, and is not intended to be an exhaustive survey of all such research. It is believed, however, that most if not all studies which are directly concerned with the questions posed about adult student performance have been reviewed. The limitations and inconsistencies of these investigations fail to generate a clear set of hypotheses for testing.

Many variables have been investigated in the search for predictors of academic performance of traditional college-age students. Intellectual factors tend to demonstrate the most validity, and most institutions rely on a combination of high school performance and academic aptitude test measures. Although this combination shows fairly consistent moderate correlation with college grade point average, little research has been done with adult subjects to determine if the same measures have validity for students who have had an interrupted pattern of education.

Much variability in performance is not accounted for by intellectual measures and other factors may be significant (again

perhaps in a different way for adult students than for the regular college population). Additional variables which have been investigated have been classified as psychological factors, demographic measures, and experiential factors.

Some of the variables which may be of particular interest in predicting adult student performance include self-expectations, motivations and values, sociological descriptors, sex, age, marital status, employment status, veteran status, course load, educational timing, and previous academic experiences. Little use of existing data on adults has been made for other than descriptive purposes.

A review of adult learning characteristics notes descriptive studies and summaries of experimental data from several fields. The general conclusion to be drawn is that adults are often highly effective learners, although it is not clear what factors determine their level of performance. The considerable effect of motivation and goal-orientation is evident, as is the pressure of multiple responsibility. Adult learning behavior may therefore be less a function of intellectual ability and more determined by other factors than is true for traditional age students.

It is toward an understanding of such factors that the present research design will be oriented.

CHAPTER III

METHODOLOGY

The purpose of this investigation was to determine the relationships which exist for adult college students between available (predictor) variables and a measure of scholastic performance. As is evident in the prior discussion and review of published research, this is an area of increasing concern but with little empirical data bearing on the question. The evidence which has been gleaned from research with adult students and more broadly from related research with traditional students is not clearcut and few hypotheses for experimental testing could be generated prior to the study.

This investigation was a post hoc empirical study to statistically examine data presented by a specified population. The subject population was not a random sample, and the predictor-variables which were available for observation and description were not controlled in any a priori manner nor manipulated except by statistical analysis. It is recognized that a limitation of such an investigation is that generalizations cannot be directly extended to other adult student populations. Controlled experimental testing of well-grounded or suggested hypotheses should follow in future research.

Subjects

Approximately 235 Special Students were registered in the undergraduate programs of the University of North Carolina at Greensboro in 1972 and 1973 under modified admissions procedures. Usual admissions processing to the University utilizes a regression-equation approach to predict the college performance of applicants; this formula is based on quantitative measures of prior academic performance and scholastic aptitude (or in the case of transfer students, on prior performance only). To the extent that they were available, measures on Special Students did not predict success in college by the above approach. However, these students were admitted to the University to participate fully in courses on a trial basis; admission was approved if the applicant had been out of school for at least one year (this minimum was waived in several instances) and demonstrated motivation toward appropriate academic goals by agreement with an entry counselor. Upon completion of 15 hours of satisfactory coursework and removal of any subject area deficiencies, the students were eligible for entry into regular degree programs.

Subjects for this study were 186 Special Students who completed the fall 1973 term. Approximately 30 Special Students had entered the University during a pilot program in 1972-73 and 9 were continuing their study during the fall 1973 semester. Approximately 22 Special Students began coursework during the 1973 summer term and 18 continued during the

fall semester. The other 159 subjects in the group investigated in this study entered the University during the fall semester of 1973.

In addition to the subjects specified (those students whose fall 1973 performance could be evaluated), two other groups of individuals were identified for information purposes. These groups included: Comparison Group I - 36 individuals who applied for and were admitted into the Special Student program but who did not follow through with fall registration; and Comparison Group II - 15 individuals who did register for the fall term but who failed to complete the semester (3 of these received grades of "Incomplete"; the remaining 12 officially withdrew from classes.) In addition, it has been learned that several of the 20 students in the analyzed sample who received term grades of 0.00 (Fs) actually failed to complete their coursework but also failed to officially withdraw from the University; since their transcripts carry a record of their F grades, they have been included as part of the sample group.

Information on ten predictor variables was available on the full sample of 186 subjects. In addition, data for smaller numbers of subjects was obtained on seven other variables and in each of these instances, sample size was determined by the information available. These limitations will be described more fully in the later discussion on variables.

Criterion of academic performance

The measure used in assessing scholastic performance was students' grade point average (GPA) for the fall 1973 term. The GPA may be regarded as a continuous quantitative variable, with assumptions of normal distribution and interval scaling. The University of North Carolina at Greensboro computes this measure by assigning values to letter grades (A=4, B=3, C=2, D=1, F=0), multiplying each value by the number of credit hours associated with it, summing, and dividing by the total number of credit hours attempted during the term. Courses graded on a pass-fail basis and physical education or military coursework are omitted from the computations.

Consideration has been given to the objections raised earlier about grading as a criterion measure in education, but in this instance it was the only relatively-consistent measure available on all UNC-G students. The GPA thus gives some perspective on the performance of the subjects within their own population and in relation to the larger student body with which they competed.

A prior analysis was conducted on the GPAs of Special Students who had completed two or more semesters of coursework before the fall of 1973. Their GPAs for successive semesters were compared and no significant variation was found over time ($t = .68$, $df = 32$, $p > .05$). Therefore it was concluded that using the fall term GPA for all subjects (regardless of entry date) was appropriate as the criterion measure of performance. Earlier intentions to utilize cumulative GPAs

(incorporating all semesters of Special Student performance) had to be altered when it was found that recorded cumulative averages for intra-institutional transfers (from other UNC campuses) reflected performance prior to UNC-G enrollment.

Predictive variables

All subjects were categorized with respect to ten descriptive or demographic variables. Information was taken from application forms and interviewer notes, or from registration records. Subjects were classified as follows:

Sex - male or female.

Race - white or non-white.

Veteran status - veteran or non-veteran.

Marital status - single, married, or formerly married.

An attempt was also made to categorize subjects as to family responsibilities by noting the number and age-range of children, but such information was available on only a very small percentage of the group.

Employment status - employed full-time or other (employed part-time, not employed, or not clearly specified). It should be noted that this information was given at the time of application and may or may not reflect the employment status of the individual during the term for which academic performance was being evaluated.

Educational goals - specific academic, general vocational, or personal enrichment objectives. Since students were not asked to answer specifically a question about educational goals, this information was taken from the essay statement required on the application form and from interviewer notes. Such information often noted such specific goals as "a degree in business administration" or "pre-law preparation"; general vocational goals were considered present when phrases were used such as "to increase my employment possibilities" or "need a degree for advancement"; thirdly, personal objectives were stated in phrases such as "to enrich my knowledge" or "for personal growth and satisfaction."

Former educational level - non-high-school graduate (less than 15 units of high school coursework and thus includes holders of equivalency certificates), high school graduates, persons with formal technical training, college experience of less than one year, one year college, two years college, three or more years college. Subjects were placed in the college experience groups depending on actual length of college involvement regardless of success or failure and regardless of number of transfer hours of credit accepted by the University.

Course load during the fall 1973 term - 1-3 hours, 4-7 hours, 8-12 hours, 13+ hours.

Special Services usage - users and non-users. The Special Services program of the University offers tutorial assistance in specific subjects and in general educational skills such as reading and writing. Special Students were apprised of the availability of such assistance, but utilization was optional and voluntary.

Age - Subjects were grouped into six age categories selected to reflect approximately equal frequencies: ages 18-21, 22-23, 24-25, 26-29, 30-34, and 35-52. In addition, age was treated as continuous interval data for some purposes in which case the categories were ignored.

In addition to the above, seven performance or behavioral measures were evaluated as predictor variables, all of which were expressed in continuous interval form. These measures included:

Years away from formal schooling - This measure reflects the interval since the applicant last attended school on a formal basis, but was found to be a difficult variable to assess since many of the older applicants had records of part-time participation in education. Such participation was considered "formal" in determining the value used, but this decision makes evaluation of the variable unclear.

High school performance - For the 171 subjects who were high school graduates, a measure of high school performance was computed (according to UNC-G Admissions Office formula) which reflects a converted estimate of rank-in-class. Arriving at this value involved utilizing the applicant's rank-in-class (usually given on the high school transcript) or high school grade average, applying a conversion formula to adjust for size of class. Derived values ranged from 20 to 80, with a mean of 50.

Scholastic Aptitude Test scores - available on 102 subjects (this was optional for application); total score was utilized as the measure.

Test of General Educational Development scores - available on ten subjects who were non-high school graduates and offered the GED Equivalency Certificate; total score was utilized as the measure.

Prior college grade point average - a computed average (by UNC-G formula) of all grades on transcripts of 110 subjects who had previously attended college.

Transfer hours - 107 subjects were awarded transfer credits on the basis of previous college experience; the number of credited hours was recorded as the variable value.

Self-predicted grade point average - A sub-sample of individuals was selected from the full group of Special

Students to gain a behavioral measure termed "self-predicted grade point average." Every third subject (alphabetically) admitted in the fall term was solicited by mail after classes began but prior to the first grading period, seeking a self-estimate of final grades expected in the courses in which he/she was registered. Followup was made by telephone one week later to those subjects not responding; only one subject could not be reached for a self-estimate. Self-predicted GPAs were thus computed for 49 of the 186 subjects.

It had been hoped to utilize scores on the Test of Adult College Aptitude which had been taken by the pilot group of Special Students in 1972. However, since only five such scores were involved, this variable was dropped from consideration.

A summary description of the 186 Special Students used as subjects in this investigation, according to the 17 variables noted above, is shown in Table 1.

Statistical treatment

The data for the Special Student group were coded, transferred to punched cards, and most statistical analyses were computer-performed.

In order to evaluate the general academic performance of Special Students, an overall mean GPA for the fall 1973 term was calculated and a frequency distribution generated. Chi square analyses were conducted

TABLE 1

Description of Special Students, Fall 1973, at the

University of North Carolina at Greensboro

(Part I: Categorical Variables)

Variable	Computer code	Categories	N
Sex	1	Male	101
	2	Female	85
Race	1	White	177
	2	Non-white	9
Veteran status	1	Veteran	50
	2	Non-veteran	136
Marital status	1	Single	80
	2	Married	96
	3	Formerly married	10
Employment status	1	Employed full-time	126
	2	Other (part-time, not)	60
Educational goals	1	Specific academic	62
	2	General vocational	45
	3	Personal enrichment	79
Educational level	1	Non-high school graduate	15
	2	High school graduate	37
	3	Technical training	20
	4	College, less than one year	28
	5	College, one year	28
	6	College, two years	35
	7	College, three or more years	23
Course load	1	1-3 hours	57
	2	4-7 hours	52
	3	8-12 hours	44
	4	13 or more hours	33

TABLE 1 (continued)

Variable	Computer code	Categories	N
Special Services	1	Users	20
	2	Non-users	166
Age (categories)	1	18-21	30
	2	22-23	39
	3	24-25	34
	4	26-29	30
	5	30-34	30
	6	35-52	23

(Part II: Continuous Variables)

Variable	Mean	SD	Range	N
Age (continuous)	26.89	6.30	19-52	186
Years away	5.54	5.92	0-34	185
High school rank	50.22	7.68	28-78	168
SAT scores	889.14	155.51	562-1291	102
GED scores	285.80	32.07	233-336	10
Prior college GPA	1.71	0.67	0-4.0	110
Transfer credit	31.63	22.61	1-96	107
Self-predicted GPA	2.71	0.64	0-4.0	49

on all possible combinations of descriptive variables for the Special Student group, and on ten variables which allowed analyses of the Comparison Groups I and II in relation to the subject group. Such procedures permitted an assessment of characteristics of the sample and of the comparison groups as they deviated from expected chance frequencies.

Major statistical analyses were initiated to ascertain the relationships of predictor variables to the criterion. Simple analyses of variance were performed on mean GPAs of the subject group with respect to the ten categorical variables; Bartlett's test for homogeneity of variance (to test the prior assumption) and an intraclass correlation coefficient (to test strength of relationship) were computed in each analysis.

Two-way analyses of variance were performed on the data for eleven pairs of variables for which an interaction effect might be anticipated and where frequencies were sufficient for such analysis. Since cell frequencies were unequal in the two-way analyses, computation was by the method of unweighted means which yields approximate sums of squares (Winer, 1962, p. 222-224).

Pearson product-moment correlation coefficients were computed between the criterion measure and the other eight continuous variables to determine degree of relationships.

A step-wise multiple regression procedure was followed utilizing all available variables for prediction, and a step-wise discriminant

analysis using eleven variables was applied to the upper and lower 20% of the subject group. The first of these multivariate techniques is designed to yield a regression-equation for the prediction of performance by a combination of the measures obtained on subjects. The latter analysis identifies those variables which most readily discriminate successful from unsuccessful students (see Tiedeman, Rulon, & Bryan, 1951).

CHAPTER IV

RESULTS

The subject group (N=186) achieved a mean grade point average of 2.33 during the fall 1973 semester, thus demonstrating altogether about average college performance. Twenty Special Students failed all coursework attempted (although in many instances this involved only one course) and 18 of the group received all As (4.00) in the coursework attempted. A frequency distribution of the grades received by the entire subject group is presented in Figure 1.

Comparison group analyses

Before further consideration of the Special Student subject group performance, it is of interest to examine the similarity of this group to the previously-mentioned comparison groups. It may be recalled that the Special Student group contained 186 individuals, Comparison Group I was composed of 36 individuals who were admitted to the program but did not register for the fall semester, and Comparison Group II consisted of 15 persons who enrolled for but did not complete the semester of coursework. Comparisons of mean age and years away from school, as well as measures of high school rank and Scholastic Aptitude Test scores are shown in Table 2 for the three groups.

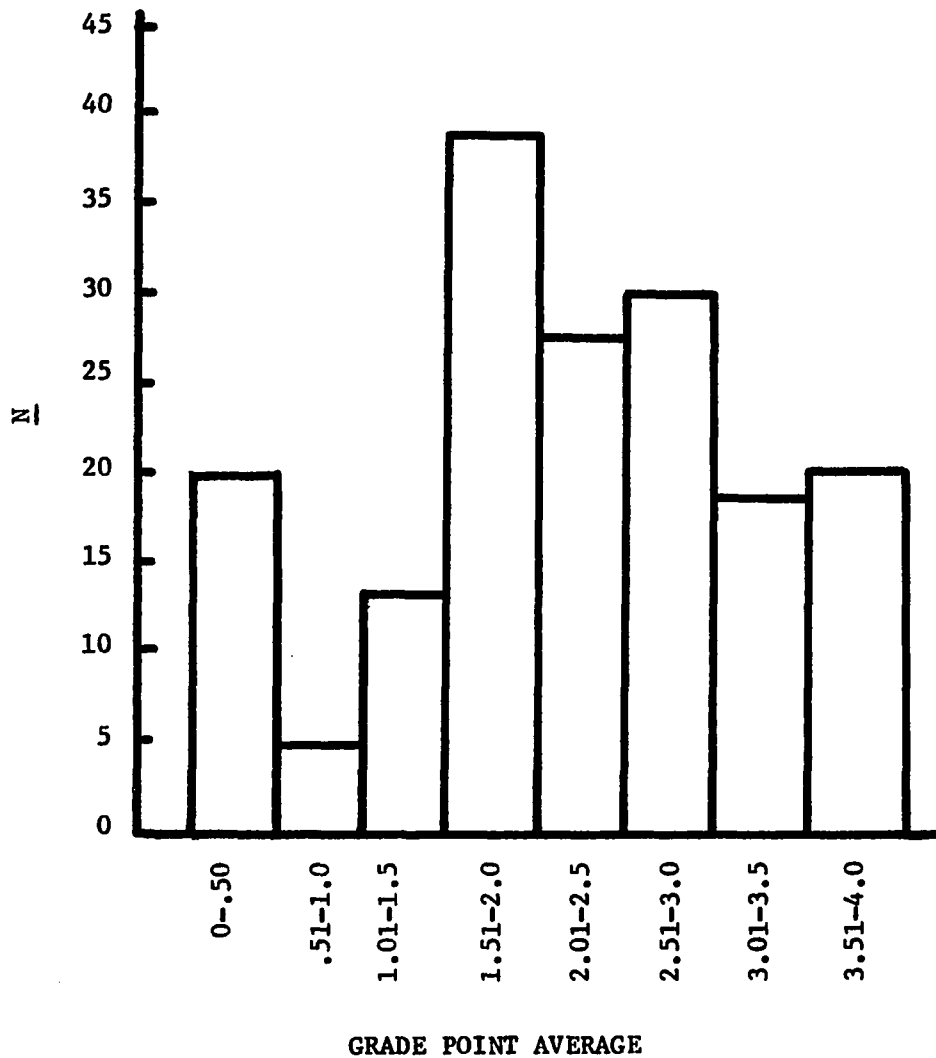


FIGURE 1

Frequency Distribution of Achieved Grade Point Averages
of Special Students, Fall 1973

TABLE 2
 Mean Values for Special Student Group (S)
 and Comparison Groups I and II

Group	Variable			
	Age	Years away	High school rank	SAT
Group S	26.89	5.54	50.22	889.0
Group Ia	29.31	6.81	51.16	890.7
Group II ^b	26.67	4.67	51.30	940.0

^aGroup I - Non-registered applicants for Special Student program.

^bGroup II - Dropouts from Special Student group.

Chi square analyses were conducted on descriptive variables for the three groups, and no significant differences were found to characterize their makeup in terms of sex, race, veteran status, employment status, goals, educational level, age, or course load. It was noted that the comparison groups had a disproportionate percentage ($p < .05$) of married or formerly married individuals, possibly indicating that family responsibilities were associated with their failure to follow-through with the school interest. In addition, a disproportionate percentage (one third, $p < .02$) of students who dropped out of classes during the term were non-high school graduates, perhaps suggesting a pattern of educational non-persistence. On the other hand, 18 non-high school graduates completed the term with a 1.86 GPA (five failures and one 1.00; the remaining twelve had term GPAs ranging from 2.00 to 3.50).

Contingency analysis of Special Student group

Chi square analyses were performed to evaluate the distribution of the Special Students with respect to most combinations of the ten categorical variables assessed. Since race had only nine cases in the non-white category, this factor was not examined in detail. Computed chi square values, associated degrees of freedom, and probabilities are shown in Table 3.

Comparisons between men and women revealed several variations. More than the expected number of single men appeared in the sample, and the formerly-married individuals were more likely to be women. With

TABLE 3
 Summary of Chi Square Analyses
 of Frequency Data

Variables	χ^2	df	Probability ^a
Sex X Race	1.68	1	NS
Sex X Marital status	14.25	2	<.001
Sex X Employment status	1.27	1	NS
Sex X Goals	2.67	2	NS
Sex X Age categories	16.01	5	<.01
Sex X Educational level	19.02	6	<.01
Sex X Course load	21.04	3	<.001
Sex X Special Services usage	0.78	1	NS
Veteran status X Marital status	4.07	2	NS
Veteran X Employment status	0.44	1	NS
Veteran status X Goals	1.64	2	NS
Veteran status X Age	20.01	5	<.01
Veteran X Educational level	11.84	6	NS
Veteran status X Course load	14.91	3	<.01
Veteran status X Special Services	0.04	1	NS
Marital status X Employment status	0.51	2	NS
Marital status X Goals	2.97	4	NS
Marital status X Age	46.46	10	<.001

TABLE 3 (continued)

Variables	χ^2	df	Probability ^a
Marital status X Educational level	13.72	12	NS
Marital status X Course load	20.56	6	<.01
Marital status X Special Services	2.32	2	NS
Employment status X Goals	2.51	2	NS
Employment status X Age	11.60	5	<.05
Employment status X Educational level	4.29	6	NS
Employment status X Course load	3.92	3	NS
Employment status X Special Services	10.99	1	<.001
Goals X Age	13.52	10	NS
Goals X Educational level	27.62	12	<.01
Goals X Course load	13.96	6	<.05
Goals X Special Services usage	0.11	2	NS
Age X Educational level	49.27	30	<.05
Age X Course load	39.65	15	<.001
Age X Special Services	1.48	5	NS
Educational level X Course load	22.34	18	NS
Educational level X Special Services	4.73	6	NS
Course load X Special Services	5.53	3	NS

^aNS = not significant.

respect to age, men tended to be younger than the women who enrolled as Special Students. The educational background of the men reflected a disproportionate number of high school dropouts as well as of students with prior college experience. Women's educational level tended to be more highly concentrated in the high school graduate and technical training (mostly nursing) categories. These findings are consistent with trends noted nationally with regard to the continuing education patterns of men and women; married women tend to postpone college coursework until family responsibilities lessen, whereas men feel social and economic pressure to pursue higher education during their early adult years.

Men (and one female) who were veterans of military service tended, as would be expected in this era, to be concentrated in the 24-28 year age group. Older students were noted more often to be married, younger students were more likely to be single--an expected pattern. Younger students were more likely to report being employed full time, although it should be remembered that this status was relevant to the immediately preceding months but might not have continued during the period of school attendance. The higher degree of part-time or non-employment in the older groups would undoubtedly be related to the larger proportion of women in those groups.

The distribution of the seven levels of educational background showed several deviations from statistical expectancy. As noted above, different patterns were found for men and women. With respect to age,

the highest educational level tended to be found for those groups age 21 through 28. The youngest group (19-21) reported lower educational background (obviously due to the lesser time available for pursuit), and those Special Students over the age of 30 tended to have less education than the average participant in the twenties. In examining the relationship of educational level to the goals stated by participants resuming college work, it was found that those students with higher educational background tended to express more specific vocational goals while the less educated adults were seeking coursework for more general or personal reasons. Individuals with specific goals were found to be more likely to pursue full-time course loads.

The variable of course load during the semester was found to be related differentially to age, sex, marital and veteran status as well as goals. Older students tended to register for fewer courses simultaneously, and these were likely to be married women. Veterans disproportionately registered for full-time study, probably due to the fact that veteran benefits are keyed to course load. It should be observed that more than half of the Special Students were part-time students (carrying seven or less credit hours), and that only 18% were enrolled full-time (thirteen or more credit hours).

The use of the campus Special Service programs (tutoring, study skills, etc.) was examined with respect to all variables. There were 20 users among the total group, and no differences were noted with respect

to any variable except employment; those students who sought Special Service assistance were less likely to be fully-employed than the non-users.

Simple analyses of variance

Simple analyses of variance were conducted to test differences in achieved GPA of the Special Student group in relation to the ten categorical variables with available data. Results are summarized in Table 4. Subjects did not differ significantly in achievement when compared by sex, race, veteran status, goals stated, course load, or use of Special Services.

Significant F-values were observed with respect to age and employment status ($p < .01$) and in relation to educational level and marital status ($p < .05$). However, Bartlett's test for homogeneity of variance suggests that the assumption of homogeneity was violated in the instances of the employment and educational variables (see Table 5) and the interpretation of these relationships is thus unclear.

Further inspection reveals that the means attained by single students and formerly married students differed significantly ($t = 1.65$, $df = 88$, $p < .05$), with the formerly married students achieving higher performance measures; this finding supports earlier research cited by Feldman (1973).

The relationships found between age and GPA and between educational level and GPA are illustrated graphically in Figure 2.

TABLE 4
Summary of Results of One-Way Analyses of Variance
of Achieved Grade Point Average of Subjects
Categorized Along Ten Variable Dimensions

Variable	N	Mean GPA	Source	Mean Square	df	F
Sex						
Male	101	2.18	Between	4.67	1	3.82
Female	85	2.50	Within	1.22	184	
Race						
White	177	2.35	Between	1.52	1	1.23
Non-white	9	1.93	Within	1.24	184	
Veteran						
Vet	50	2.27	Between	0.22	1	0.18
Non-vet	136	2.35	Within	1.25	184	
Marital						
Single	80	2.05	Between	5.58	2	4.68*
Married	96	2.52	Within	1.19	183	
Formerly	10	2.68				
Employment						
Full-time	126	2.14	Between	12.90	1	10.96**
Other	60	2.71	Within	1.18	184	
Goals						
Specific	62	2.28	Between	2.04	2	1.66
General	45	2.11	Within	1.23	183	
Personal	79	2.48				
Age						
18-21	30	1.84				3.88**
22-23	39	2.00				
24-25	34	2.36	Between	4.47	5	
26-29	30	2.59	Within	1.15	180	
30-34	30	2.50				
32-52	23	2.91				

TABLE 4 (continued)

Variable	N	Mean GPA	Source	Mean Square	df	F
Education						
Non-high school	15	1.73				
HS graduate	37	2.06				
Technical	20	2.22	Between	3.24	6	2.76*
Less than year	28	2.32	Within	1.17	179	
One year	28	2.19				
Two years	35	2.77				
Three+ years	23	2.74				
Load						
1-3 hours	57	2.23				
4-7 hours	52	2.51	Between	1.32	3	1.06
8-12 hours	44	2.16	Within	1.24	182	
13+ hours	33	2.44				
Service						
Users	20	2.73	Between	3.61	1	2.94
Non-users	166	2.28	Within	1.23	184	

*p < .05.

**p < .01.

TABLE 5
 Results of (A) Bartlett's Test for Homogeneity of Variance
 and (B) Intraclass Correlation Analysis
 Between GPA and Ten Variable Dimensions

Variable	Bartlett's Test		Intraclass R
	χ^2	df	
Sex	0.06	1	0.03
Race	0.00	1	0.01
Veteran status	3.81	1	-0.01
Marital status	0.41	2	0.07
Employment status	7.95**	1	0.11
Goals	3.79	2	0.01
Age	0.63	5	0.09
Educational level	15.26**	6	0.06
Course load	17.11**	3	0.00
Special Services	0.03	1	0.05

*p < .05.

**p < .01.

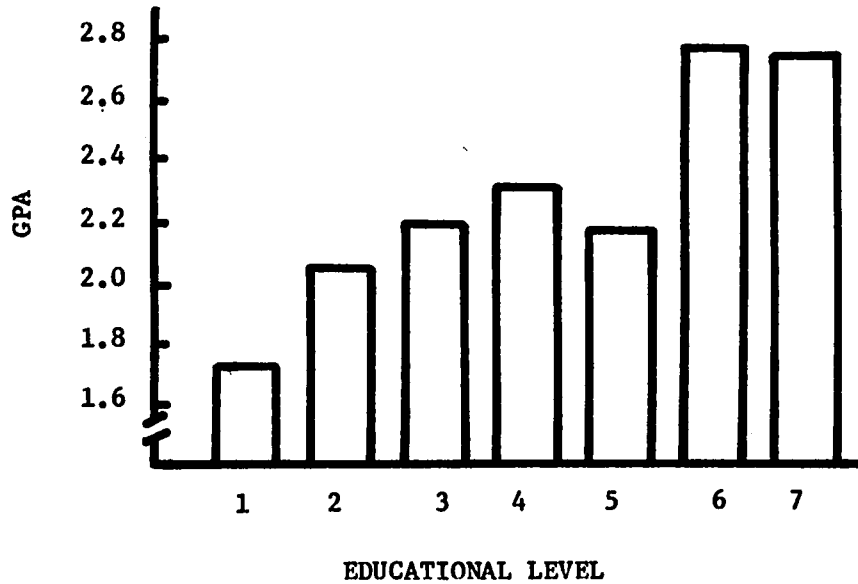
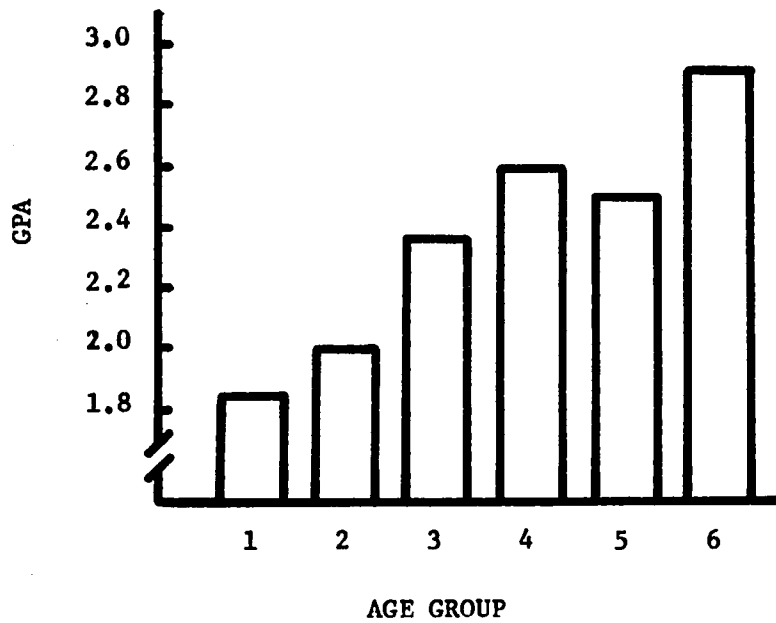


FIGURE 2

Observed Relationships Between Grade Point Average and Variables of Age by Categories and Educational Level

In both instances a positive relationship is observed with higher GPA associated with older age groups and with higher educational levels. Application of the Newman-Keuls procedure to determine the studentized range statistic indicates that the means of the two youngest age groups are significantly different from the mean of the oldest group ($p < .01$).

None of the intraclass correlation coefficients was found to be significant (see Table 5). Despite lack of statistical significance, it can be noted that tendencies toward higher performance were observed for women, whites, students pursuing personal goals, students not employed full-time, and users of Special Services.

Two-way analyses of variance

Two-way analyses of variance were performed to test for differences in mean GPAs for eleven selected variable combinations. Results are summarized in Table 6. Selection of the pairs of variables was based on suggestions evolving from prior research noted in Chapter 2 and from observed patterns obtained in the present study. Thus, sex was analyzed in relation to six of the categorical variables following the advice of Lavin (1965) who urged that all analyses should examine the sex factor in detail. Age, educational level, and employment status revealed significant patterns in earlier analyses of these data and were further examined for interactions.

The only significant interaction observed in these analyses was that of sex by age. Mean values are illustrated in Figure 3, revealing

TABLE 6
 Summary of Results of Two-Way Analyses of Variance
 of Achieved Grade Point Average of Subjects
 for Eleven Variable Combinations

Variables	Source	Mean Square	df	F
Sex X Age	Sex	3.97	1	3.64
	Age	2.78	5	2.55
	Interaction	3.88	5	3.55**
	Error	1.09	174	
Sex X Marital status	Sex	2.80	1	2.36
	Marital	0.94	2	0.80
	Interaction	1.60	2	1.35
	Error	1.19	180	
Sex X Educational level	Sex	8.35	1	7.33**
	Education	3.52	6	3.09**
	Interaction	1.32	6	1.16
	Error	1.14	172	
Sex X Course load	Sex	3.57	1	2.99
	Load	1.20	3	1.01
	Interaction	2.05	3	1.71
	Error	1.19	178	
Sex X Goals	Sex	4.84	1	4.00*
	Goals	1.04	2	0.86
	Interaction	2.14	2	1.77
	Error	1.21	180	
Age X Goals	Age	4.76	5	4.08**
	Goals	2.84	2	2.44
	Interaction	0.34	10	0.29
	Error	1.17	168	

TABLE 6 (continued)

Variables	Source	Mean Square	df	F
Education level	Education	4.74	6	4.23**
X Goals	Goals	2.43	2	2.17
	Interaction	1.76	12	1.57
	Error	1.12	165	
Education level	Education	3.98	6	3.43**
X Veteran status	Veteran	3.47	1	2.99
	Interaction	1.59	6	1.37
	Error	1.16	172	
Employment status	Employment	11.89	1	10.20**
X Sex	Sex	4.39	1	3.76
	Interaction	0.96	1	0.83
	Error	1.17	182	
Employment status	Employment	11.71	1	9.90**
X Goals	Goals	0.70	2	0.59
	Interaction	0.65	2	0.55
	Error	1.18	180	
Employment status	Employment	12.67	1	10.79**
X Course load	Load	1.65	3	1.40
	Interaction	1.17	3	0.99
	Error	1.17	178	

*p < .05.

**p < .01.

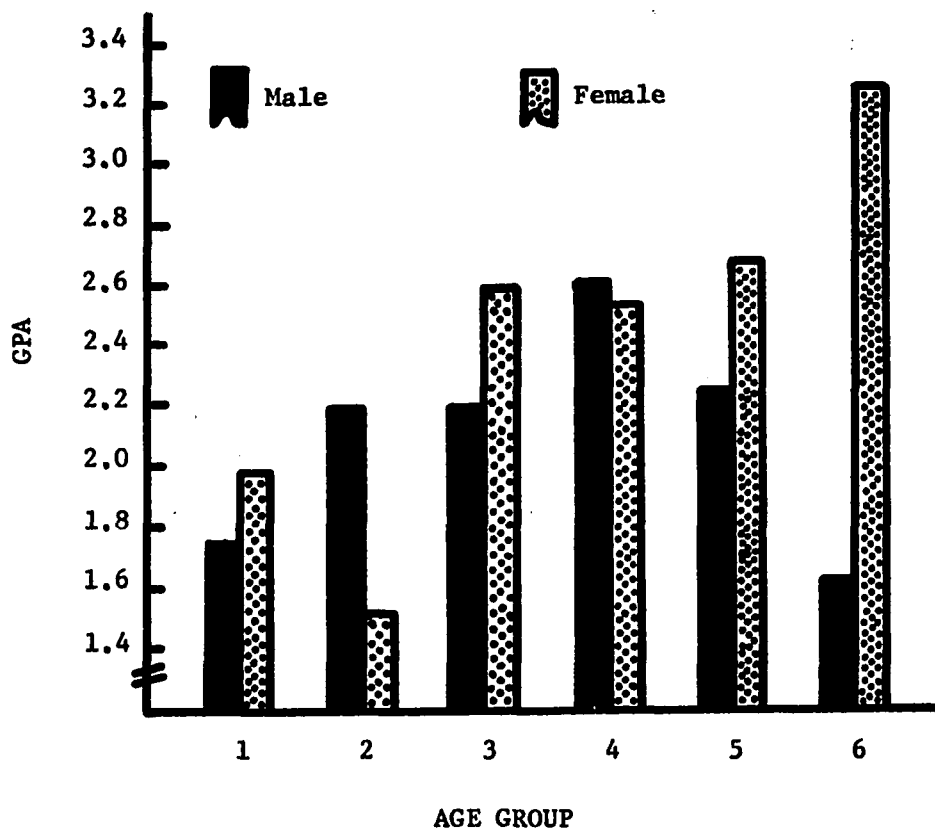


FIGURE 3

Achieved Grade Point Average of Males and Females
at Different Age Levels, Illustrating
Significant Sex X Age Interaction

different patterns in achievement of men and women over the age groups. Interaction of these two variables for the lower three age groups and for the upper three age groups was further tested and found to be significant for the older group only. That is, beyond the age of thirty sex becomes an increasingly significant factor related to performance, with women achieving higher grades than men.

Simple t-tests were conducted to determine whether the most deviant means for men and women differed significantly. Within the oldest group, this difference (male = 1.63, female = 3.27) was significant at the .01 level of confidence. At a younger age level (22-23), the difference between the means approached significance at the .05 level, females performing less well than males (females = 1.52, males = 2.21).

Again referring to Table 6, additional significant main effects may be noted when sex is examined in relation to educational level and to goals. As seen in Figure 4, females performed consistently better than males independent of level of education. This sex difference was supported in the sex by goals analysis.

Educational level was found to have a consistently significant effect on performance in two-way analyses of variance involving sex, goals, and veteran status. This effect is illustrated in Figure 4, where performance measures show an upward progression with higher educational background.

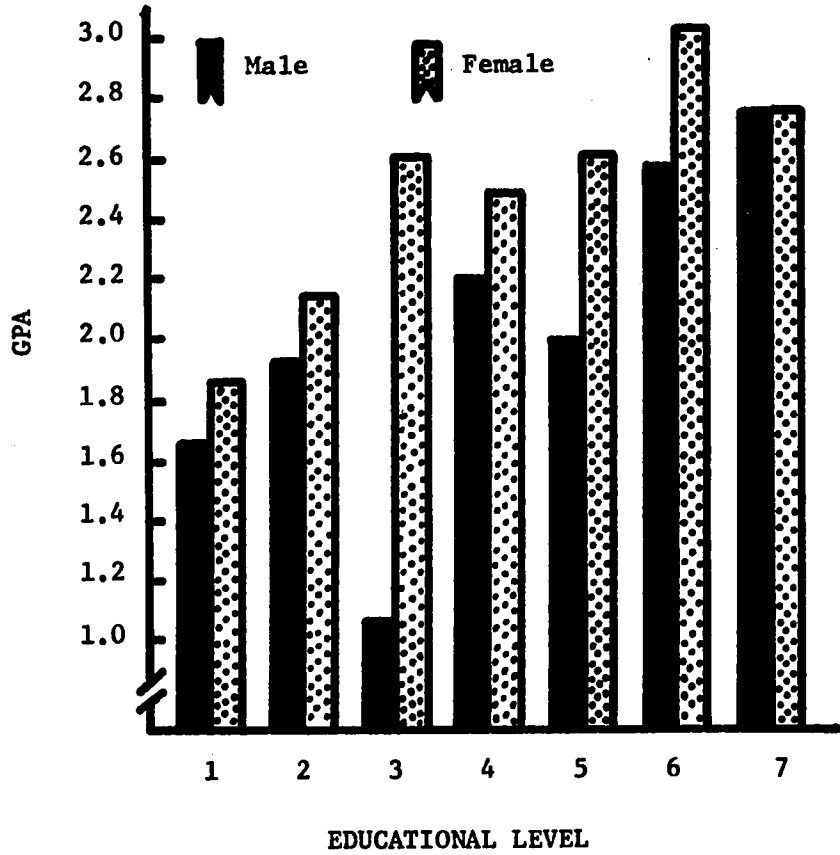


FIGURE 4

Achieved Grade Point Average of Males and Females
at Different Educational Levels

Finally, employment status was seen to have a significant effect on performance, with those students who reported part-time or non-employment attaining higher GPAs (mean = 2.70) than those who reported full-time employment (mean = 2.14).

As in the simple analysis of variance, the age by goals analysis revealed a significant effect of the age factor. However, the sex by age interaction noted above should be kept in mind when interpreting differences in performance with respect to either of these variables. That is, it must be understood that differences in performance with respect to sex depend upon the age group under consideration, and vice versa.

Correlational analysis

A correlation matrix was generated utilizing all of the numerical variables available for the subjects. These included (with different Ns) measures of age (when stated in continuous form), years away from formal schooling, number of transfer hours credited, high school rank, scores on the Scholastic Aptitude Test and on the Test of General Educational Development, prior college grade point average, self-predicted grade point average, and the dependent variable--attained grade point average. Table 7 reports the product-moment correlation coefficients and N for each measure paired with the dependent criterion variable.

TABLE 7
 Product-Moment Correlation Coefficients on
 Eight Variable Measures for Achieved GPA

Variable	N	r
Age	186	.329**
Years away	185	.263**
Transfer credit	107	.205*
High school rank	168	.101
SAT score	102	.213*
GED score	10	.411
Prior college GPA	110	.154
Self-predicted GPA	49	.600**

*p < .05.

**p < .01.

A highly significant correlation was noted between self-predicted and attained GPAs for those subjects involved in the selected sub-sample. Significant correlations were also noted for age and for years away from school when paired with the criterion measure; these two independent variables, as would be expected, were also found to be highly correlated with each other ($r = .74$).

It should be noted that these data reveal no significant correlations of attained GPA with high school rank or prior college GPA. These are two of the measures which are most useful and most utilized for prediction of college performance for traditional students, but their validity for estimation of performance for a sample of adult students is not supported by these results. Predictive validity of SAT scores is also somewhat less than it is for younger students, and less than that found for age in this study.

Further correlational analyses of high school rank, SAT scores, prior college grades, and years away from school with the attained GPA for each of the six age sub-groupings revealed no significant patterns with predictive value.

Multivariate analyses

Two step-wise multiple regression analyses were performed to assess the predictability of the criterion variable (GPA) from the measures available on the Special Student subject group. Thirteen variables entered the initial computation, yielding a multiple

correlation coefficient of .9999. Sex, marital status, and employment status had an insufficient F-level for entry and thus were not factors in the equation. Other variables were found to have weights as reported in Table 8. All steps of the multiple R were significant at the .01 level; standard error of the correlation coefficient was found to be 0.008.

Since self-predicted grades showed the highest correlation with the criterion (.61) and thus accounted for 38% of the variance in this analysis, a second multiple regression was computed without the self-predicted GPA factor. Eleven variables were utilized by the computer in this instance, yielding a considerably lower predictor-criterion correlation coefficient of .667. Optimal prediction was attained with the variable equation shown in Table 9, at which point the multiple R was .61, with a standard error of .69 and an F-value of 4.04 ($p < .01$). Thus, with the nine variable components noted, 37% of the variance in performance could be predicted with reasonable accuracy.

A second multivariate technique, step-wise discriminant analysis, was applied to the data available on all of the subjects found in two groups, the highest-achieving 38 and the lowest-performing 38 Special Students. Variables with missing data were eliminated from consideration, and the two groups were compared with respect to the remaining eleven factors. The first four variables selected for inclusion were age, educational level, goals, and employment status; upon entering the fourth variable, the F-value obtained to discriminate between the groups

TABLE 8
 Results from Multiple Regression Analysis
 Utilizing all Available Variables for
 Prediction of Achieved GPA

Variable entered	R	B
Self-predicted GPA	.6148	3.43
Transfer credits	.6565	0.09
Educational level, one year college	.6842	5.27
Educational level, technical training	.7192	4.73
Educational level, less than one year college	.7625	4.61
Educational level, non-high school graduate	.7823	3.72
Educational level, high school graduate	.8176	2.43
Prior college GPA	.8431	0.67
Course load, 1-3 hours	.8762	-0.92
Years away from school	.9041	-0.06
SAT score	.9471	-0.003
Age	.9576	-0.06
High school rank	.9702	0.02
Veteran	.9872	0.37
Special Services user	.9934	0.30
General vocational goals	.9970	0.16

TABLE 8 (continued)

Variable entered	R	B
Course load, 8-12 hours	.9976	-0.17
Course load, 4-7 hours	.9995	-0.17
Specific academic goals	.9998	-0.05
Race, white	.9999	0.07
Constant ^a		-9.66

^aIncludes variable designations of female, formerly married, not employed full time, educational level of 3+ years of college, course load of 13+ hours, non-user of Special Services, personal enrichment goals, non-white, non-veteran.

Variables which did not have sufficient F level to enter the equation include male, single or married, employed full-time, and educational level of 2 years college.

TABLE 9
 Results from Multiple Regression Analysis Utilizing
 all Variables other than Self-predicted GPA
 for Prediction of Achieved GPA

Variable entered	R	B	F
Age	.33	0.040	5.711
SAT score	.47	0.002	15.365
Educational level, 2 years college	.51	0.353	2.638
Course load, 4-7 hours	.54	0.517	5.014
Veteran	.57	-0.196	0.987
Special Service user	.58	0.430	2.357
Course load, 1-3 hours	.59	0.359	2.459
Transfer hours	.60	0.004	1.058
Prior college GPA	.61	0.161	1.052
Constant ^a		-1.201	

^aContains variance due to sex female, formerly married, not employed full-time, educational level of 3+ years of college, course load of 13+ hours, non-user of Special Services, personal enrichment goals, non-white race, and non-veteran status.

Variables not in the equation include years away from school, high school rank, sex male, race white, married or single, employed full-time, specific academic or general vocational goals, educational levels other than those noted, and course load of 8-12 hours.

was 11.76 ($p < .01$) and it was possible to properly classify 61 of the 76 subjects using these four variables. The addition of further variables did not improve upon the classification accuracy. Students in the high-performance group were more likely to be older, with more background education, more general goals, and not employed full-time. In addition, there were slightly more women and more married students in the high group.

Summary of results

The Special Student group under study achieved a mean GPA of 2.33 during the semester of interest. They were found not to differ greatly from two comparison groups in terms of descriptive variables. The subject group itself had several deviations from chance distribution of the variables assessed, particularly with respect to sex, age, educational level, employment status, goals, and course load.

Analyses of variance suggest that age, educational level, employment and marital status are significant variables related to the criterion. A significant interaction of sex by age was noted.

When the continuous measures were subjected to correlational analyses in relation to GPA, self-predicted grades showed the highest level of correlation, followed by age, years away from school, SAT scores, and transfer credits. High school rank and former college grades showed little relation to adult achievement by any of the tests applied.

In the multivariate analyses to determine multiple regression equations and a discriminant function, the variables of self-predicted grades, age, employment status, educational level, and SAT scores were significant factors. Again high school rank and college grades were not particularly useful in the equations. Factors of sex, race, veteran status, marital status, Special Services usage, course load, and goals showed inconsistent relationships and seldom with significant predictive validity.

CHAPTER V

CONCLUSIONS AND DISCUSSION

Prediction of adult student performance

Seventeen variables have been analyzed with respect to the prediction of achieved grade point average by a group of 186 adult students who failed to meet standard college admission criteria. In the ex post facto design used, data were drawn from records of all such students attending the University of North Carolina at Greensboro during the fall term of 1973. There could be no attempt on an a priori basis to control variables or randomly sample a broader population. It is felt that some of the findings in the present investigation suggest a priori hypotheses which could be tested in future experimental studies.

Traditional predictor variables. As a general conclusion, it is apparent that the traditional variables used for prediction of college performance of young students entering directly from high school or transferring directly from other colleges were not valid predictors for most adult college students included in this study. High school rank, for example, which has consistently been the best predictor for younger students, in this study showed a notably low correlation with grades ($r = .10$). Prior college performance, commonly used to predict the future achievement of transferring students, yielded a correlation

coefficient of .15. These findings are consistent with research on nontraditional students reported by others (Frederiksen & Schrader, 1952; Lunneborg & Lunneborg, 1967; Ryan, 1972; Willingham, 1963).

Attention was called earlier to the difficulty in standardizing such measures as high school rank and college grades. Since both of these measures are likely to reflect inter-institutional differences in evaluation, the same values are not always comparable for all applicants. This variability may be increased when it involves measures on adult students, who not only differ in institutional background but also in the dimensions of time period and peer group related to the evaluations.

As was mentioned earlier, 18 non-high school graduates were included in the subject group, 10 of whom held equivalency certificates issued on the basis of the Tests of General Educational Development. The 18 individuals in this group varied with respect to the actual number of high school units completed (some lacked all four years, others only the final year). In addition, an unknown but large percentage of the total Special Student group lacked one or more specific high school subject units (usually mathematics) which are required for regular admission to the University. Despite these deficiencies in high school level education, two-thirds of the high school dropouts completed their term with grades of C or better. For those who submitted GED scores, a correlation coefficient of .41 between the total score and GPA was noted; this was not statistically significant, however, perhaps due

to the limited degrees of freedom involved. Further study should be pursued with respect to GED scores, particularly the sub-test scores as they might relate to performance in specific college courses; the sample in this present study was too small to justify further analysis.

With an increasing number of traditional-age students pursuing academic coursework in more than one institution (often transferring from two-year to four-year programs), the usual predictor variable being utilized for admission is that of prior academic achievement reflected by college GPA. A majority of the Special Student sample were transfer students; that is, they had had prior college experience ranging from a single course to more than three full years of credits. However, their previous grades were not good predictors of current performance although the amount of transfer credit did yield a correlation coefficient of .21 which is significant at the .05 level of confidence. No further analysis was made of the patterns of achievement for transferring students, but a hypothesis is suggested by the fact that a strong correlation was found between prior college performance and age ($r = .39$); that is, it was younger students who had the lower previous grades and who thus may have reduced the predictive validity of this variable.

Although scores on the Scholastic Aptitude Test were not required for admission to the Special Student program, over 100 of the registrants had such scores available. The mean of those scores presented was 889, with a range of 562 to 1291. Thus, based on existing standards (mean

SAT scores in 1973 of entering freshmen at the University of North Carolina at Greensboro was 987), a large proportion of these students were scoring competitively with other entering students on this examination. The correlation of the SAT total score with achieved grades for this sub-sample of 102 subjects was .213 ($p < .05$), suggesting that such scores may be slightly useful in predicting performance. However, a visual scanning of the data revealed that most of these scores were submitted by the younger students and the validity of SAT testing for older adults therefore is still open to question. It is tentatively concluded that the observed predictive value is not sufficient to justify requiring the submission of SAT scores which have a relatively high cost, financially and psychologically, for older applicants.

Demographic variables. Age was found to be by far the most useful demographic variable for predicting academic achievement of the observed adult student group. When averaged across sex, the data suggested that the older the student the better he will perform. However, this effect was not found to be independent of sex. Actually, the older the student the better she will perform; older male students are less likely to conform to this pattern. Similar results were noted when the variable "years away from formal schooling" was analyzed. Since this factor is obviously highly correlated with age ($r = .74$), it is not surprising that similar results were obtained.

Other demographic variables which were investigated included race, marital status, veteran status, and employment status. The race

factor was not given much attention due to the extremely small number of non-white participants (nine). None of the three status variables significantly affected academic performance in a consistent manner, although interpretation must be considered tentative in view of the confounding of these variables with the age and sex factors. Despite the interaction effects, it appears likely that veteran status had no significant effect in itself. As previously noted, the employment variable lacked clarity due to the timing of its report and the subsequent inability to determine whether the status was actually operative during the school term. Further investigation of the effects of all of these factors should utilize experimental and control groups matched on the basis of the sex and age variables. However, it should be remembered that results of earlier research conducted in this manner have not been highly significant.

Although former educational background was found to be a fairly positive predictor of continuing performance, again the sex and age variables were confounded with this factor. With cognizance of such confounding, it is tentatively concluded that the higher the previous level of education the better the adult student will perform. However, variability is such that use of educational background for screening purposes would be inadequate; such usage would furthermore raise many objections in light of emerging equalitarian standards for higher education and the philosophical considerations discussed in Chapter 1 of this paper.

Interesting observations may be made about the relationship of educational goals to performance. Although not statistically significant, the data mildly suggest that higher performance was related to less specific goals; that is, adults who were seeking further education for general vocational or personal enrichment reasons did better than those who had highly specific academic goals. It may be that the goals statement is an intervening variable reflecting a dimension of motivation. This dimension will be discussed in some detail later in this section.

The very high correlation of self-predicted grades with achieved GPA is consistent with earlier studies involving younger students, but needs cautious interpretation in the present investigation. Through difficulties in procedural timing, the self-predicted grade values were not derived until the sample of students involved had been present in their classes for several weeks. Although no formal grading had been made at that time, clearly many of the students had been able to get some feedback about the class and their performance in it. Further study should control this variable carefully, taking the measure at the time of registration to avoid such contamination. It might be anticipated that the measure would still have strong predictive validity, a finding which would relate to points to be discussed shortly.

The variables of course load and use of Special Services were found not to be significantly related to academic performance. In the instance of course load, this is consistent with earlier research, but

might be appropriately investigated with greater experimental control of other factors such as sex, employment status, and marital status. There is certainly no evidence to suggest that part-time students fail to meet performance standards established by the institution, and thus no reason to discourage part-time enrollment. Use of Special Services assistance was very limited for this sample, and no significant differences were found; however, the trend was in a direction that would suggest Special Services usage is positively associated with performance.

General conclusions. With the research procedures utilized in this investigation and in view of the large number of independent variables involved, considerable confounding and intermingling of the factors has occurred. This lack of purity in the measures makes interpretation difficult and practical application highly tentative without further experimental analysis.

Two basic dimensions for consideration in predicting performance of adult students are hypothesized as a result of this and other reported research. One such dimension is that of maturity, reflected not only by the age factor but also by such experiential variables as marital status, veteran status, previous education. Thus, it might be concluded simply that more mature students perform better. This does not clarify, however, the measures which can be used to assess maturity.

Secondly, a dimension of significance might be designated motivation. In the present study, this dimension is suggested by the apparent effects of stated goals and self-prediction on performance. It

also probably is related to many of the status variables including employment, marital status, veteran status, educational level, and perhaps sex and race. It might be hypothesized that motivation is the single inclusive factor which suppresses the predictive validity of many of the performance measures traditionally used for young students. In other words, despite marginal high school performance, unsuccessful prior college efforts, or poor aptitude test scores, adults may bring motivations which permit them to overcome such obstacles to achievement.

In this respect it is of interest to further consider the variation in goals and in sex-related performance. Women tend to give less specific goals for their continuing education, but tend to perform better the older they are. Men, who have considerably more social pressure to further their education, give more specific vocational goals as their rationale and tend to do more poorly the older they are. These observations might suggest that students who are exercising a free option and acting upon internal motivations are likely to perform better in the academic setting. Students who are being externally motivated for college pursuit (as by an employer or employment responsibilities, or perhaps because there are not other options open to them) tend to do less well. Further research on this dimension of achievement-motivation, carefully defining the construct operationally and controlling the many variables which relate to it, should be of considerable value in developing refined predictor equations. This writer thus joins

others in the area of performance prediction in suggesting exploration of psychological factors other than ability.

Implications for admissions selectivity

It is clearly evident that adult students admitted without regard for entrance criteria can perform satisfactorily in college courses. It should be recalled that traditional criteria would have screened out all of the subjects under investigation, due to one or a combination of the factors of high school performance or preparation, SAT score, or prior college achievement. Continuation of policies which permit such elimination of "false-negative" performers is probably not in the best interest of students nor institutions in this era of changing concerns in higher education.

Age is the most easily assessed factor highly related to performance, and admissions criteria which reflect this variable will produce a better than chance performance level. That is, special admissions policies may appropriately be established for applicants beyond a specified age. In the present instance, the minimum age was effectively 19 years, since all participants were to have been away from formal schooling for at least one year. Although these data and other research done on the "time-out" pattern of college enrollment (Bluhm & Couch, 1972; Campbell & Hahn, 1962; Hecker & Lezotte, 1969) might suggest a slightly higher minimum age, it does not seem appropriate

to exclude non-traditional entry of even the youthful applicants without further understanding of the many factors which determine performance levels.

Special admissions policies for adults rest on the assumption that the best way to assess college performance of such students is to allow them an opportunity to demonstrate it. None of the available measures of prior scholastic performance or aptitude, nor of demographic or behavioral factors assessed in this study show sufficient validity for selective screening use. Although the evidence suggests that performance may be related most strongly to basic factors of maturity and motivation, until these factors are more specifically identified and analyzed the selective admissions of adult students appears to be unjustified by any objective procedures.

In the final analysis, a reasonable criterion for admission into college coursework for adult applicants at this time might be that of self-selection. That is, adults who apply for admission have already screened themselves by the factors of motivation and maturity if no external pressures are constraining them. The fact that adults may predict their own performance quite accurately also reflects this self-screening; that is, students who predict failure would seem to be unlikely to apply for entrance into situations where this would occur. Although social and personal responsibilities may determine self-selection to a fair degree (thus accounting for some of the differences observed between men and women and between various age groups), formal

higher education probably reflects more of an option than a mandate for both men and women beyond the age of 21 in contemporary society.

Implications for entry counseling

In the absence of variables which can validly screen adult applicants for admission, and thus assuming policies which non-selectively admit all who apply for college coursework due to self-determined criteria, the entry counselor and student are together faced with the question of how to facilitate successful performance.

There was no effort to control or assess the level of counseling intervention extended to the Special Students in this study. Indeed, only a few of the variables analyzed are subject to intervention; course load and use of Special Services could be subject to institutional control, but their effects were for the most part nonsignificant. Employment and other pursuits during the period of student status may well be within the control of the student. Clarity of goals might be viewed as a variable which could be modified by counseling intervention, but there is no clearcut indicator as to what type of modification would be facilitative.

There is clearly a need for much more experimental research before appropriate regulations or guidelines for the placement and guidance of adult students can be developed. Such research would be most fruitful, it seems, if directed toward a more thorough understanding of the factors termed maturity and motivation, and perhaps

self-confidence. The relationship of simpler dimensions such as age, sex, objectively-measured experiences and performance to these more complex factors needs to be analyzed. And in the context of newer thinking about performance criteria, studies might seek to utilize measures other than the traditional GPA in evaluating adult college achievement.

Entry administration as a contracting process. Design of research might be more fruitful in reference to some model for the functioning of a continuing education entry counselor, which model would generate questions for exploration. One such model envisions the counselor as a "broker" in a two-way process between higher education institutions and adult students as they seek learning experiences. Even the traditional admissions function has been in one sense a form of contracting between parties, in that through the process an institution agreed to award to the student a degree or other valued certification when the student performed certain specified behaviors. Thus Millett (Colloquium on College Admissions Policies, 1968, p. 65) comments:

The act of admission is a kind of contract between student and institution. The institution agrees to accept the individual and to provide him or her with a certain kind of educational opportunity By accepting the offer of admission, the student also enters in a contractual agreement with the institution. He or she agrees to meet the academic standards established by the institution in order to obtain a degree and to accept the behavioral standards established by the institution governing social activity on the institution's property If the admissions process is to become in fact a contract as I believe it is indeed in essence, then I think the contract must be far more specific than it now is, and the colleges and

universities must do more than they have done thus far to define their educational objectives and the standards of behavior they find related to those objectives.

The prediction formula conventionally used in the admissions process gives both parties some probabilities regarding the student's likelihood of attaining an end-goal defined by the institution. Academic advising after entry is designed to assure that the student is following the established procedures for attaining the goal.

The changing patterns and objectives of higher education may now lend themselves to a sequence of shorter-term and more individualized contracts between institution and nontraditional student. For example, Christ-Janer (1972, p. 13) suggests that rather than establishing the bachelor's degree as the goal, higher education might be defined as "a whole series of achievement hoops, of steps toward maturity." Newcomb (in Rever, 1971, p. 57) proposes that "students would not begin by entering a formal curriculum of successively prescribed courses. Instead, each one would have a series of experiences that he considered desirable for himself at that time."

Short-term contracting is becoming an increasingly useful concept in defining educational and behavioral objectives and responsibilities in school and counseling settings (Brown & Brown, 1972; Chickerling, 1972; Douglass, 1971; Lewinski, 1972; McCoy, 1972; Ohles, 1970; Thomas & Ezell, 1972; Wilson & Gambrell, 1973). It readily fits into the emerging concept of counseling as applied behavioral science concerned with outcomes rather than processes (Berdie; 1972; Hackney, 1973) and is

highly consistent with the functions outlined earlier as essential in the concept of entry administration counseling. Students have expressed a favorable attitude toward the contracting concept (Warner & Akamine, 1972), and it might be speculated that adult students would be at least equally inclined to find such an approach appealing if they are indeed more pragmatic in their approach to higher education. Ingham (unpublished) and Tough (1971) use variations of the idea in their designs for adult learning projects.

The continuing education contract developed by Empire State College (Chickering, 1972; Empire State College, 1973; Lewinski, 1972) is an example of this approach. There are indirect benefits which accrue in the contracting process: "It is not the formalizing of a contract that is of major importance, but the speculation, dialogue, and decisions that the formalizing [precipitates]" (Ohles, 1970). Newcomb (in Rever, 1971, p. 59) further notes

learning to take responsibility for one's own learning ... is not just a matter of making choices for oneself, however freely, among ready-made alternatives. Behind those individual choices lie the processes by which alternatives themselves are determined, and participation in those processes can add a powerful incentive to learning.

Facilitation of non-traditional student achievement. The Special Admissions project undertaken by the University of North Carolina at Greensboro which permitted this investigation might be viewed in terms of the short-term contracting model. In this process, the institution agreed to allow the student to participate in courses, to demonstrate

ability to handle the learning demands, and thus to acquire academic credits. The student was permitted to make choices about timing, course selection, and use of resources as well as to define his own short-term goal. This goal may have been to gain entry into the degree programs of the institution; it is of interest to note that 23 of the Special Students enrolled for the fall 1973 term did complete the 15 hours of satisfactory coursework which allows them to matriculate if they choose.

The individualized advising and consideration of goals prior to entry as well as the length of contract established may, upon analysis, be significant variables related to the performance of non-traditional students in academic settings. Short-term goals may be conducive to better performance by adult students with other responsibilities than the traditional long-term (four-year) educational goal. And the pre-entry focusing on learning interests and needs as related to individual goals and conditions may facilitate more specific contracts which enhance motivation and thus performance.

Need for continuing research. The basic steps in contracting involve utilizing relevant information about both parties to the contract (in the present context, student and institution) to come to agreement on the behaviors and responsibilities which both must fulfill in order to reach an agreed-upon goal. Much more must be learned about the variables which are relevant to this process. The results of the present investigation are merely suggestive of new possibilities for entry administration. The conclusion of the Commission on Non-

traditional Study (1971, p. 12) is applicable to this as well as other facets of the contemporary issue:

Much more data gathering and other forms of research are necessary and ... these should be undertaken and completed as soon as possible if sound planning and programming are to result.

CHAPTER VI

SUMMARY

The purpose of the reported investigation was to determine the relationships which exist for adult college students between variables available for prediction and a measure of scholastic performance. An understanding of these relationships was deemed necessary in light of changing objectives and patterns of post-secondary education which create a demand for the integration of non-traditional students into traditional institutions of learning. A review of reported research relevant to the admissions process, the prediction of academic performance, and the specific characteristics of adult learners yielded extensive data of a related nature but very little valid information specifically addressing the issue being raised.

This investigator undertook an ex post facto analysis of data available on 186 adult students enrolled at the University of North Carolina at Greensboro during the fall term of 1973. None of the students qualified for admission under regular prediction criteria, but were permitted entry to University courses through an experimental project. The Special Students were required to engage in a pre-entry counseling session with a continuing education counselor and were admitted to pursue agreed-upon goals for a limited term. Considerable

information on the students was available from application and registration records and in notes taken in the counseling interview. The students' grade point average (GPA) for the fall term was utilized as a criterion measure of academic performance in this study.

Seventeen variables were analyzed as independent or predictor variables. These included ten descriptive demographic variables, with subjects classified in terms of sex, race, veteran status, marital status, employment status, educational goals, former educational level, course load, use of Special Services, and age. In addition, seven performance or behavioral measures were evaluated as predictor variables, including years away from formal schooling, high school performance as indicated by a converted estimate of rank-in-class, Scholastic Aptitude Test scores, Test of General Educational Development scores, prior college grade point average, number of transfer hours, and self-predicted grade point average. The latter seven measures were based only on the data available.

Chi square analyses of the frequency distributions of subjects within the categories noted above and in comparison to two other groups (non-registered applicants and drop-outs from the special project) were conducted. Few significant variations from chance distributions based on marginal totals were observed. The non-participating adults had a slightly larger proportion of married and formerly married individuals and of high school dropouts than the enrolled group. The subject group differed significantly from chance distribution in terms of sex as

related to the variables of marital status, age, and educational background. Age and educational background varied from statistical expectancy when examined in relation to sex and expressed educational goals. The non-random patterns of distribution of these variables would seem to indicate some factor of self-selection determining the characteristics of those adults who applied for and pursued coursework through the special project.

The subject group achieved a mean grade point average of 2.33 (on a 4-point scale) during the fall 1973 semester. Analyses of variance (simple and two-factor) were conducted to test differences related to the ten categorical variables. Variables found to be significantly related to performance were age, employment, educational level and marital status. However, a significant interaction was observed for sex x age, and sex was also found to have a significant main effect when other variables were held constant (educational level, goals).

Correlational analyses were applied to the available performance measures as well as other variables which could be expressed in continuous numerical form (e.g., age). Significant correlations with performance were noted for age, self-predicted grades, years away from school, amount of transfer credit, and SAT scores. These same values were found to be those which entered equations to determine multiple regression predictors and discriminant profiles. Of particular interest was the fact that the traditional predictor variables for admissions

use (high school or prior college performance) were not valid predictors for the adult students in this investigation.

These results were discussed with respect to their implications for selective admissions procedures and for entry counseling of adult applicants for college courses. In the absence of clearly valid objective measures to predict academic performance of such students, it was suggested that selective admissions by traditional criteria cannot be justified. The variables which do show validity (age, educational background and other responsibilities, self-predicted performance) were hypothesized to be related to more complex dimensions of maturity, motivation, and self-confidence which suppress the effects of prior performance. It was concluded that the most rational admissions process for adult students at this time is one based on self-selection beyond some minimum age.

Assuming such a process for admissions, it was suggested that the guidance and placement of adult students becomes of major importance. The function of an entry counselor was discussed, with particular attention given to the processes by which successful performance of admitted adult students might be facilitated. It was hypothesized that short-term pre-entry contracting may be a procedure which will enhance motivation and thus performance. An understanding of the effect of variables such as those explored in this study and others, should be pursued in order to develop an individualized educational contracting which will be optimally productive for student and institution.

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