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AN EXPLORATORY STUDY OF THE BASES OF FACULTY ADVISOR PREDICTION OF SCHOLASTIC ACHIEVEMENT

by

Stanley Roy Levy

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in the
University of Michigan
1964

Doctoral Committee:

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Dedication

For Steve, Jim, Larry, and John whose very real experiences sparked my curiosity to the extent that I decided to try to find out more about others like them.

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CHAPTER I

INTRODUCTION

American colleges and universities have developed widely varying systems for student academic program advisement. Such systems range from single contacts at the beginning of each term to regularized opportunities for students to consult with advisors throughout each term or semester. On many campuses the advisory staff consists of appointed or selected faculty members who perform advisement duties in addition to teaching classes and engaging in scholarly research. The faculty advisor in some institutions is aided by a training program, but these exist in a decided minority. The amount of time spent in advising students varies considerably from one institution to another, but advisement generally represents a sizeable investment of time and money by a teaching faculty that may or may not be completely justified as costs and enrollments continue to rise. In spite of the investment and of institutional commitments to these programs, few attempts seem to have been made to evaluate the work of faculty advisors. Even fewer attempts appear to have been made to provide advisors with information for their use in counseling and advising regarding educational planning and academic progress.

It certainly is true as well that at all levels of education a difficulty persists in ascertaining with any degree of certainty whether those students who appear to

have the requisites for scholastic achievement will succeed in their scholastic endeavors. In a college population which includes students selected on the basis of previous achievement and academic potential, the greater majority perform at an acceptable level. There are, however, a sufficient number of potentially able students whose background, preparation, and aptitude point toward academic fulfillment, but who fail to live up to the expectations of counselors and advisors, parents and teachers. These students are both the object of much research interest and the cause of considerable concern and uneasiness. The label "underachiever" has been applied to such students--a term used in this study and defined more precisely later. In general, "underachiever" is used to designate two general classes of students. Its widest application is with those students whose performance is below a level indicated by scholastic aptitude tests and by their previous achievement in a different educational setting. It has also been applied, but with less agreement, to those students who perform below the minimal level of acceptable performance.

Need for the Study

This study stems from two general areas of concern. The faculty advisor and the functions he performs are the initial focus. As will be shown later, little is known about how a faculty advisor sees his role and even less is known about what faculty advisors consider important to the achievement of students. This study therefore is an initial

exploration which seeks to answer the following question: What do faculty advisors consider to be important to student achievement?

The focus of this study is upon the faculty advisor. From an analysis of factors that a faculty advisor considers relevant to student scholastic achievement, this study then focuses upon the students. The problem of the underachieving college student is approached from the perspective of the factors that advisors indicate as relevant to achievement. Using these factors as guides, this study seeks to further understanding of why some students of indicated ability are unable or unwilling to achieve the same degree of scholastic success as equally able peers.

Plan of the Study

The students and advisors in this study are affiliated with the College of Literature, Science, and the Arts of The University of Michigan referred to throughout the rest of the study as the LSA College. All students who were admitted to and enrolled in the freshman class of the LSA College beginning in September 1962, who also attended the Summer Orientation Program for Freshmen in June, July, and August 1962, are included. Faculty advisors in the study are chosen from among the various departments of the LSA College and are assigned at random to the students in the study.

In the initial interview with each student, the advisor

made estimates with regard to each student he advised. These predictions of achievement and attributes of scholastic and personal readiness were defined for advisors and consensus of agreement was obtained on the various factors to be employed. These estimates were then compared with the actual achievement of the students at the end of their first year in the college. Statistical procedures were employed to compare the validity of advisors' predictions with other means for predicting achievement. Thus advisors' predictions, clinical predictions, were compared with test scores, statistical measures, in gauging the effectiveness of each in predicting student scholastic achievement.

Statement of the Problem

This study focuses upon three separate questions. How effectively can advisors and other variables predict scholastic achievement? Upon what factors are advisors' predictions based? Finally, how do student perceptions compare with the bases of the advisors' predictions?

This study emerges from a continuing concern of college faculty and student personnel workers with the causal factors related to achievement. The men and women who comprise a freshman class in the LSA College of the University of Michigan have been carefully screened prior to admission and are admitted with the expectation that satisfactory scholastic achievement is probable. About ninety percent of these freshmen are eligible to re-enroll in the LSA College at the

end of their first year and achieve at an acceptable academic level; only a small number (less than ten percent) fail to meet the academic standards of the LSA College and are not eligible to re-enroll. A relatively small number, also less than ten percent, enter the sophomore year on academic probation. However, a number of students who achieve above a minimal level of acceptability, are performing below the level of their potential as demonstrated by scholastic aptitude tests and earlier achievement. This achievement below expectation is what Gardner (70) considers a needless waste of talent needed by the nation.

The loss of potentially able youngsters coupled with the achievement below expectation of others is a continuing cause of concern to the faculty of the LSA College. Questions are regularly asked concerning the causes of these personal and academic dilemmas: is there a way of identifying these individuals early enough to be able to assist them in achieving success? Are there identifiable factors that may account for a potentially able student's performance at a minimal level of achievement? Are there ways a faculty can assist students in reaching the limits of their potential?

Hypotheses

The major hypothesis to be tested is as follows:

Faculty advisors in the College of Literature, Science, and the Arts predict with a high degree of accuracy the

level of achievement of entering freshmen, and identify factors which are relevant to the student's actual level of achievement.

This basic hypothesis is operationally translated into a series of working hypotheses. These hypotheses are as follows:

I. Grade-point-average prediction of student scholastic achievement is more accurate after an advisor interviews a student than grade-point-average predictions based on records alone;

II. Accuracy of prediction varies among advisors with some advisors being consistently more accurate in their predictions than others;

III. Advisors use a different ordering of factors related to predicting scholastic achievement with factors relating to scholastic readiness being the ones most generally used;

IV. Students put a greater emphasis on factors related to personal readiness than on factors of scholastic readiness;

V. Within the framework of allowing a spread of one-half a grade differential between advisor prediction and student achievement, advisors predict the achievement of the majority of the students:

A. In the case of accurate predictions, the advisor indicates factors that are relevant to the actual achievement;

B. In the case of inaccurate predictions, advisors emphasize factors of scholastic readiness while students emphasize factors of personal maturity.

Scope

The results and conclusions drawn from the data in this research are limited by the unique nature of the populations. The students in this study are not representative of college students generally. As will be demonstrated later, these students are highly able, well-qualified, and well-prepared graduates of high schools primarily in the State of Michigan. They have been carefully screened prior to admission and enroll as freshmen in a liberal arts college that is one part of a large, complex, residential, state university. In addition, the advisors who participated in this study are experienced and knowledgeable members of the faculty of the college and have also had experience in the academic advisement of freshman students.

Therefore, the population of students in this study and the faculty advisors whose estimates are basic to the study must both be considered unique.

Overview

In the next chapter, literature related to this study is reviewed. The review of literature is divided into three major sections. The first section centers upon the literature pertaining to academic advising in colleges and universities. The survey of this literature includes general statements regarding the philosophy of faculty members'

serving as advisors to students as well as specific philosophical and historical information pertaining to the faculty advisors in the LSA College of The University of Michigan.

The second section reviews briefly the literature on scholastic achievement. The third section discusses the issues pertaining to clinical and statistical methods of prediction.

Chapter III describes in detail specific operational procedures that were employed in the collection and analysis of the data. The student population is described and the advisors are briefly sketched. Major emphasis is given to various means by which data were collected and subsequently analyzed.

Chapter IV considers each of the working hypotheses of this study in conjunction with appropriate data and conclusions drawn based on the data. Various tables are employed to present data with the text being used to present the major conclusions from the tables.

In the final chapter, the over-all conclusions of the study are summarized and implications and recommendations are drawn.

CHAPTER II

SURVEY OF THE RELATED LITERATURE

The literature related to this study can be classified into three general groups. By far the most important group consists of the limited literature concerning the faculty advisor, the role he plays, the functions he performs, and the relationship he has with students. A second group contains the voluminous literature pertaining to the underachieving college student. The literature on clinical and statistical prediction of achievement forms the third grouping.

Faculty Advising

Faculty advising in colleges and universities has been a source of much administrative concern. As will be shown, advising programs differ considerably. Where they exist, they necessitate both inclusion of a large number of faculty and considerable expense. The validity of faculty advising programs is being questioned with greater frequency as faculty time becomes increasingly short in supply and long on expense.

The author of this study has seen first-hand the necessary and apparently valuable contribution that a faculty member can make to the educational and personal growth of his student advisees. The specific program in which these advisors serve has evolved slowly and its development

mirrors progress that has occurred elsewhere.

For many years, student advisement consisted of little more than herding students together each semester where faculty members approved or disapproved of courses. In performing his duties under these circumstances, a faculty member was little more than an enrollment officer or registration clerk. Later as the size and complexity of institutions and curricula became more pronounced, interest was focused upon improving and increasing a faculty advisor's role.

Over two decades ago, Wren (214) argued that a faculty member had a reasonable and legitimate function to perform as an advisor. His position was that although the task might prove irksome and strange, a teaching faculty performed a necessary and valuable function, helping a student shape his educational future and plan a sensible educational program.

Programs of faculty advising vary considerably from one campus to another. On one campus each member of the faculty has some advisory duties with a segment of the student population; on another, faculty advisors are carefully selected and participate in an in-service training program. In-service programs may consist of a half-day introduction or a year-round program that includes sophisticated discussions of test materials, case studies, or roundtable consideration of mutual problems. Additional stipends and released time

from classroom teaching sometimes are provided for the advisor; or each advisor may be designated an assistant to the dean, the prestige and status of a title perhaps leading to a more effective and serious execution of responsibilities. Few colleges allow a faculty advisor to become a full-time specialist. The general expectation is that the advisor will continue with his own professional activities, including teaching and research. The one person who may become a full-time specialist is the administrative officer of the college under whose jurisdiction the advisory program rests. Generally such administrative officers have come from the ranks of the college faculty and are not specifically-trained for their task.

Specialized student personnel services evolved partially from a faculty's lacking the interest or the desire to assist students in non-academic areas. (115, 157, 208) Student personnel services also evolved from college teachers who were concerned enough with the welfare of students that they sought specialized training. (188) As a consequence of the abdication of responsibility for student welfare at some institutions, teaching and counseling have become quite disperate. Sometimes these are brought together in a training program sponsored jointly by a faculty and a professional staff. The objective of such a program is to equip faculty members with the requisite information for advising students. In-service training programs are not designed to make professionals out of faculty advisors, but rather to improve

their knowledge of the varieties of students they will encounter, to sharpen their awareness of the problems that students encounter, to provide information concerning the curriculum of their college and to help them develop confidence as advisors of undergraduates. (51, 89, 115, 188, 208, 211, 212) Trained faculty advisors are able to work hand in hand with professional personnel whose roles may remain outside the normal advisory channels. There are some natural bridges between the faculty advisor and the professional counselor with the latter serving as an addendum to the faculty counselor as a specialized instructor.

Definitions. In a short monograph addressed to "... the college faculty members interested in the personal, as well as the intellectual development of the individual student ...." (171, p.1) Shank defined counseling and its relationship to teachers, some of the possible settings for structuring the counselor-teacher relationship, and the effect of institutional policies on the role that a teacher-counselor may play.

A college psychiatrist, writing about the general problems of mental health that affect a college student, defined the roles of the faculty counselor and the professional as follows:

> ...teaching and counseling are in many respects similar, emphasis in formal teaching being directed toward understanding of subject-matter, and in counseling toward understanding the individual's interaction with the new ideas to which

he has been exposed. Therefore, the main body of counseling should be done by teachers, within the frame of reference of teaching and learning, which are the main purposes for which the college exists. For teachers' protection, however, those situations which require abilities or skills not possessed by the usual faculty member call for more professional consultation. This means that for serious financial, religious, curricular, personal, or psychological problems highly trained personnel should be available when needed.

...The teacher who does counseling has no responsibility for the student other than to do everything in his power to encourage as much effective learning as the student is capable of acquiring. He is not expected to be an amateur psychologist or psychiatrist. In fact, to assume such a function is to invite all kinds of undesirable complications. (60, p. 117)

The good counselor is in effect a specialist in indirect education. He meets the student who is in the process of making important decisions. He is, therefore, in a position to reflect with the student upon the meaning of knowledge and the subtle but significant considerations that are weighed when choices must be made with 'insufficient and constantly changing facts.' The counselor is closely associated with the student at a time when he is still quite impressionable, when standards are being set, when tastes are in the process of formation, when habits are being developed that will determine in large measure his capacity for growth. In the counselor, the student may see the intellectual process in action, or as Whitehead so accurately puts it, the student sees 'an ignorant man thinking, actively utilizing (his) small store of knowledge.'

The counselor looks at the academic scene through the student's eyes and tries to understand his viewpoint without getting too closely identified with him, that is, without making the student dependent upon him. He aids in the attempt as self-understanding, both of the student and himself. He is a center of communication and tries to make himself aware of those who possess or have access to special skills or knowledge that may be needed...

The counselor only helps the student formulate his problem. He does not solve if for

> him. He seldom gives direct advice since to do so is to give the student someone to blame if action based on the decision is disastrous, or deprive him of credit for making a wise decision if the resultant action is successful...(60, pp. 124-5)

A second definition, derived from the same institutional setting is also noteworthy:

> The essential duty of the teacher who is attempting to help a student is to be a sympathetic listener. He listens, he understands, he supports without being critical, and when his position as a college officer requires it, he administers discipline while making it clear that he still values the student as a human being. He does not possess the training necessary to lead a student through a maze of insight therapy. Although he may use a quiet, nondirective approach on occasion, he need not concern himself, as the psychiatrist often must, with suppressing his own personality in the relationship or withholding personal opinions and direct advice. (49, pp. 18-9)

Further clarification of what a faculty advisor can do has been stated as follows:

> The lowest common denominator of opinion and practice is that academic advising should provide authoritative information about the educational programs of the college so that each student may make accurate decisions. This responsibility, narrowly interpreted, is essentially clerical in nature...the college's responsibility should go beyond this 'traffic cop' role; students are entitled to answers not only concerning the 'what' but the 'why' of their programs. Intelligent understanding of the rationale behind the various requirements should certainly facilitate acceptance of requirements and, hopefully, result in a more profitable intellectual experience. Furthermore, students should be encouraged to think of the strategy of their educational program and not only of the tactics. Advising procedures must be developed whereby each student is encouraged to get the maximum benefit out of his educational opportunities so that underachievers, floundering, and intellectual

malingering can be reduced. (163, pp. 8-9)

The above definitions of the functions and the duties of the faculty advisor, reflect the point of view taken in this study, and can be stated succinctly

> Academic advising, rightly understood, is simply an extension of teaching, a conscious concern for the academic and educational questions that most students have about the importance of their studies, the proper direction of their educational development, the practical value of their educational objective. (163, p. 10)

These general considerations regarding faculty advising programs, broadly conceived, serve as an introduction to the advising at the University of Michigan.

Faculty Advising in the College of Literature, Science, and the Arts. The College program for the advising of students developed very slowly. (36) In 1934, there were two faculty members who advised freshmen, specifically those students in severe academic difficulty. In 1935, three additional faculty were selected to assist in advising students on a continuing basis. Three more faculty were added in 1936 and by 1937 the staff of faculty members had increased to ten, with the responsibilities increased to include both freshmen and sophomores. In that same year, new requirements made the duties of the advisors more difficult and complex. But the process of drafting faculty for advising duties at the start of the semester continued.

During the war years, the duties of the faculty advisors increased considerably. The size of the staff however

remained constant, except for the Chairman of Faculty Counselors whose responsibilities slowly but steadily increased. The end of the war, the return of large numbers of war veterans, and the adoption of a new curriculum pattern led to an increase in the size of the advising staff. With the increase in enrollment of the early 1950's, mere increases in advising staff would not have been enough to accomodate the needs of advising students. Consequently the faculty succeeded in the adoption of a program for the summer orientation and counseling of new students, largely freshmen. By the time of this study, the faculty advising staff of the College had grown to include 23 faculty for freshmen and sophomore students, and well over one hundred to serve the college as a whole.

From the concern, interest, and activity of a few, a program is now available for all students in the College. A faculty committee recently outlined the following functions and services of the program:

> 1. Assistance in planning a program of elections for each semester which will be in keeping with the interests and abilities of each student and appropriate to each student's educational objective. The advisor's required approval of the election card should not be conceived of as a routine clerical operation; rather it provides a systematic opportunity to supply positive answers to these questions:
>
> a. Are the distribution and other graduation requirements of the College being met?
>
> b. Are the proposed elections meeting the student's intended professional or concentration objective?
>
> c. Are the specific course elections in keeping with the student's previous preparation

and demonstrated abilities?

d. Is the proposed program demanding enough for the able student, and sufficiently realistic for the less able student?

2. Encouragement and help so that each interested student may gain an understanding of the nature and purpose of a liberal education and within the context of this understanding develop timely, realistic plans for an educational and vocational objective in keeping with his interests and abilities.

3. Interpretations and explanations to all interested students concerning the reasons for the College distribution requirements, concentration requirements, and administrative regulations in general.

4. Appropriate action on student requests (or advice on petitioning the Administrative Board) for the exceptions to stated requirements whenever the spirit, if not the letter, can be considered satisfied. (This service includes not merely such discretionary actions as evaluation of advanced standing credit, substitutions for distribution courses, waivers of requirements, but also active encouragement for the bright student to learn about and take advantage of special educational opportunities such as honors work, independent study, advanced courses, waiver of concentration, etc.)

5. Help so that a student in academic difficulty may more quickly recognize the causes of his trouble and can take constructive steps to overcome them either on his own, with the help of his advisor or instructor, or when necessary, with the assistance of the appropriate University agency or professional service.

6. To talk with students about their graduate and professional plans and to acquaint them with available scholarship and fellowship opportunities. To refer them, when necessary, to proper persons within specific fields who may give advice on which graduate or professional school a student should consider. Also, to refer students interested in job opportunities, salary level, etc., to the University Placement office for precise, specialized information. (165, pp. 5-6)

The University earlier had conducted an extensive

review of counseling facilities of the entire campus. (105) This report will be considered elsewhere; however, one of its sub-committees, concerned solely with academic advising, suggested the following six criteria:

> 1. To provide full, accurate information to all students on courses, programs, graduation requirements, and administrative regulations so that each student may plan his semester's program intelligently and correctly.
>
> 2. To provide opportunities and encouragement for any student to get reasonable explanations about the rationale of college requirements so all who are interested may learn the "why" as well as the "what".
>
> 3. To provide opportunity and encouragement for each interested student to develop strategic educational and professional objectives in keeping with his interests and ability. More specifically, a student should expect help from his academic counselor in identifying relationships between courses and programs on the one hand, and adult occupations, citizenship responsibilities, and philosophic perspectives on the other.
>
> 4. To be aware of the special services provided by professional agencies on campus so that, when desirable, referral may be made intelligently and expeditiously.
>
> 5. To provide sufficient faculty personnel, quarters, data, and administrative support so that the chief responsibilities of the academic counseling services may be properly met.
>
> 6. To give to undergraduates in particular and the university community in general adequate, continuing publicity about the availability and purpose of the respective academic counseling services. (164, p. 7)

These criteria or aims of academic counseling rested on two principles

> ...The first, simply stated is that academic counseling can be justified only if it helps and encourages each student to get the maximum benefit out of the unique educational opportunities the

> college offers. The second basic principle is that within reason the initiative for seeking help and the responsibility for resolving problems must rest with each student. We do not believe in required, compulsory advising; neither do we believe it proper, possible or wise for the college to assume responsibility for anticipating student problems or of guaranteeing satisfactory solutions. This principle rests upon the basic assumption that each student must be given maneuver room to make his own choices--to be relatively free to struggle with his educational problems himself and to resolve them with or without outside help...(164, p. 6)

The complete study of counseling services at the University of Michigan LSA College is summarized in a report by Kelly and others. (105) While considering all of the various counseling services, the Committee suggested that academic advising has a four-fold object

> ...to help each student (1) make sound decisions concerning the selection of specific programs and courses, (2) develop an appropriate, realistic educational objective, (3) understand and master the causes for poor performance, and (4) develop his intellectual capabilities to the fullest extent.

Kelly's study summarized the results of a random sample of undergraduate students at the University in 1956. Students were aware of academic counselors and looked to them and to individual faculty as the first point of reference in seeking assistance on academic and educational matters. Students approached faculty advisors for assistance in decreasing numbers from the freshman to the senior year; the trend however was from the advisor to an individual faculty member. Students also sought aid and assistance from a variety of other individuals--e.g. other students, parents, residence hall staff personnel, and professional agencies--on matters relating to their academic work but

less frequently than the advisor or the individual faculty member.

Students did not appear to understand the purpose and range of academic counseling services offered by their own college. In addition, a considerable number indicated that they were not happy with the assistance they had received from faculty advisors. Of seniors in the LSA College, thirty-two percent indicated that they had been inadequately advised at sometime in their career; six percent indicated that they had been "advised incorrectly and suffered." As stated in the report, "...to the extent such criticism is justified, to that extent the academic counseling services are failing to meet one of their key responsibilities." The Counseling Study Committee accepted as part of its report, the specific aims for academic advising that its sub-committee had proposed. (164)

Counseling facilities in the College were also studied earlier in a separate study. (67) A four percent random sample of students served by the freshman-sophomore counseling office and the entire staff of advisors serving these students was interviewed. Student attitudes toward the counseling service were studied as well as the attitudes of the advisors toward the services they were providing. Points of agreement and disagreement were noted between the advisors and the students, and modifications and changes were suggested.

Faculty Advising in other Colleges. Studies of advisory services at other universities and colleges are quite common, although the detail is not as extensive as the two University of Michigan studies cited above. Brumbaugh and Berdie surveyed student personnel programs in various universities some time ago and concluded:

> Almost every college visited (by the consultants) had some type of faculty advisory program in which faculty members worked with students assigned to them, and these programs functioned at various levels of efficiency. This was the most frequently found personnel activity, and one of the consultants' most frequent recommendations was that the faculty advisory program be improved. (24, p. 17)

Most reported research on faculty advising programs consists of surveys of existing practice. (6, 17, 19, 75, 88, 89, 143, 163, 193, 209) These reports describe various programs, survey an entire range of colleges regarding present, projected, or anticipated programs, and suggest methods for improving that which is already present.

General surveys are not the only approaches reported in the literature. Specific institutional programs are also discussed, such as those at Ohio State University (120), Mississippi State College (3), the University of California at Los Angeles (162), East Texas State College (114) and Kansas State College (77). Each author emphasized the necessity for institutional commitment to a faculty advisory program, for involvement of faculty in both planning and execution stages, for placing responsibility in the hands of the faculty of the college, and for providing adequate

administrative and clerical support.

Beyond descriptions of programs, there have been few attempts to evaluate the effectiveness of faculty advising programs. Little is known about student reactions to advisory programs, but the few attempts that have been made shed some very necessary light. The study reported by Kelly (105 supra) at the University of Michigan gave some indication of student reaction to an advisory program.

Freidenberg (67) studied roles that students ascribe to faculty advisors. Students were asked to comment on the scope of the program, the realities of the advisory system, its over-all effectiveness, and roles they felt advisors best suited to play. These undergraduates saw their advisors as being helpful and understanding, but concerned with purely academic matters. Few students saw their advisors as being helpful with or interested in non-academic questions and few indicated that they would consult them on such matters.

At Miami University, students expected their advisors to do more for them, to be more readily available, and to be more helpful than they were. The system that existed at Miami University, its casual nature and its lack of structure, seemed to be the chief cause of student criticism. The conclusion reached was that a more structured arrangement was desired. (29)

To determine the desirability of a formal guidance program for students experiencing academic difficulty, the effects of various kinds of advising procedures were studied at the University of Iowa. A one-hour highly-structured interview was compared with four separate individual counseling sessions that were quite directive and concerned with educational matters. In all cases the counselor was a faculty advisor. No difference in subsequent performance was found between students who had had a single interview and those who had had four. A significant difference was noted, however, between those who had been interviewed and those who had not. The advised group achieved substantially better academic results. (111, 112)

At Brooklyn College, all members of a freshman class were asked to complete a check list and a series of sentences related to their faculty advisor. (108) The questionnaire was completed after students had been enrolled for one semester, and after each student had seen his advisor at least twice on routine academic matters. A majority of students were favorably inclined toward their advisors. They indicated that their advisor was both able and interested in discussing matters related to program planning. Personal matters were not considered within the advisor's domain. Student comments and criticisms led to the conclusion that some changes in the administrative organization and in the physical structure of the advising offices was necessary.

When upperclassmen and faculty members were compared as advisors to freshmen in another study (8), differences between matched groups of students were slight. Freshmen considered upperclassmen more sympathetic than faculty. The study pointed to other differences between faculty and upperclass advisors, but these differences were too slight statistically for other conclusions to be drawn. An attempt to discover factors which motivated faculty toward consistent and conscientious acceptance of their roles as advisors yielded a large number of possibilities, none of which seemed to be sufficiently unique or unusual as a means for selecting them. (39) Rackham (159) developed an inventory for evaluating the effectiveness of student personnel services, including a program of faculty advising. While developing a useful tool, Rackham found problems of defining faculty advising and of testable evaluative criteria to be quite elusive. Rackham suggested the character and extent of the problems but gave no solutions.

In a study (48) investigating extent of student satisfaction with faculty advisors, students with advisors whom they perceived to be interested in their counseling duties were the most satisfied. Interviews with sixteen of the most and sixteen of the least satisfied students suggested that perception of advisor interest in students was related to several factors. They were:

1) knowledge the advisor has of academic matters in fields other than his own teaching field;

2) personal interest an advisor shows in both academic and non-academic affairs of his students;

3) accessibility and approachability of an advisor.

Townsend (194) shed a different light on the problems faced by freshmen. Her report was anecdotal in nature and was based on an extensive survey of students enrolled in twenty-seven colleges across the country. In the chapter, "Focus on Guidance" she reported that the faculty advisor was the resource that was best known and most often used by students who desired assistance in answering questions and in solving problems. Expectations and opportunities among institutions varied, but the advisory system was considered to be most important. Faculty advisors were not the only individuals that freshmen consulted; however, they were the first persons to whom students would turn.

A unique contribution to the literature was the extensive work by Hardee (89). An extensive survey of the literature concerning faculty advising, it included both philosophical discussions of the basis for faculty members' serving as advisors and documented in detail a variety of institutional programs. While lacking in original contributions and considerations, Hardee's book provided a comprehensive summary of much that has been written about faculty advising. It served best as a structured, annotated bibliography of the literature.

Summary. Academic advising remains an important area of concern in higher education. To advisory programs, colleges have committed extensive funds and numbers of faculty members. Little is known about what happens although inferences to be drawn from the above seem fairly clear. Students desire assistance from faculty members; faculty members ought to be designated as advisors and be available and accessible to students; advisors ought to know something about other services offered in the institution; advisors are not seen as curative agents for all sorts of problems that a student will encounter, rather they are seen as the most available, and best known sources of assistance.

The present literature represents a variety of materials which in many cases can be traced historically to the early works of Wrenn and Williamson. From their writing many years ago, others have paraphrased, adapted, applied, and amplified; in many instances others have added little to the initial formulations. In this section the philosophical basis for teaching members of a faculty serving as academic advisors have been examined; various institutional programs have been mentioned; and an indication has been given of the desired objectives of the advising program at the University of Michigan College of Literature, Science, and the Arts.

Little effort has been directed toward determining how a faculty advisor performs his task; nothing is known about those things that advisors considers relevant and important

in their dealings with students. Students are both satisfied and dissatisfied with advisory programs that exist. Many commentaries on advisory systems, their development and organization, seem to be simple restatements of something said earlier. A clear, complete, and useful discussion of the role, procedure, methods, and substance of a faculty advising program has not as yet been published.

Student Scholastic Achievement

The voluminous literature pertaining to scholastic achievement covers a wide range of materials in a variety of settings; it leaves a reviewer with a sense of quantity rather than one of quality. Why some students achieve sound academic results and why others of equal potential fail has been examined from numerous points of view. These studies range from those that question relationship between size of high school or number of extra-curricular activities and scholastic achievement to the occasional study that goes beyond the biographical or statistical data to the individual student himself.

An achiever is generally defined as a student who performs at a level that aptitude tests and previous achievement would tend to indicate; an underachiever is one whose performance is significantly below potential. Many of the studies summarized below differ in actual yardsticks for potential that they employ. "Potential" is invariably de-

fined as a standing or score on an aptitude test; "achievement" is based on school or college grades. There is little agreement, however, on how close these must be for a student to be labeled an achiever, and equally little agreement on how far apart they must be for a student to be identified as a non-achiever, or underachiever. Absence of agreement on definitions makes comparison difficult. Despite the great quantities of data and information available, conclusions that may be drawn are few.

General Reviews and Summaries. Among the notable contributions have been periodic reviews undertaken by various authors. These extensive summaries attempted to categorize all appropriate research evidence in a particular span of years. The success of the authors varied considerably. In one, the author summarized without analysis; in another, the summary served as a valuable and insightful critique.

Harris (90), Garrett (71), and Raph and Tannenbaum (160) reviewed the literature, each from a different focal point. Harris showed early directions taken in investigating differences between potential and achievement. Harris focused on specific problems. Although a certain communality existed with later reviews, Harris included materials that were not included later. His conclusions reflected a change in perspective on scholastic achievement. Whereas Harris included validation studies of aptitude and achievement measures, these were noticeably absent from later reviews, few studies

concerned themselves with anything except intellective factors. The greatest deficiency he found was failure of researchers to define and describe populations studied and to delineate with clarity statistical procedures employed.

Garrett 's review of the literature gave historical perspective to the evolution of research on achievement from study of intellective to study of non-intellective factors. The range of articles encompassed by his bibliography was broad; most aspects of school and collegiate life and activities both within and on the periphery of the academic program were examined. There was, however, less concern for the individual student--his personality, his objectives, and his social relationships--than is currently true. Garrett reported pioneer efforts in the study of non-intellective topics, but these comprised but a small segment of his materials.

In surveying the most recent literature on underachievement, Raph and Tannenbaum (160) followed a procedure similar to their predecessors. They collected, collated, categorized, and summarized a number of studies, drawing inferences from them and proposing both tentative conclusions and alternative methods. Many studies reported by Raph and Tannenbaum centered upon personal and social factors. In reflecting upon the broad range of past research, they note

> A review of the research on scholastic underachievement among the gifted students provide little insight into the causes of

> unfulfilled promise. The results of some studies are often contradicted by the outcomes of others, and it is accordingly difficult to work one's way out of a tangle of conclusions that bewilder rather than enlighten the reader. Despite the voluminous work done in this area, we do not as yet have a clear profile of the traits that distinguish the underachievers from their comparably able peers who live up to scholastic expectations. From the mass of results already reported, it is altogether possible that only one characteristic differentiates all gifted underachievers from all gifted achievers; that fact that one group succeeds at school and the other does not. (160, p. 19)

In addition to contradictory results often found in studies of the same or similar problems, the above conclusions rested upon other factors:

1. research that was uneven in quality;
2. a lack of uniformity in defining the underachiever;
3. characteristics of tests of general ability; and
4. the assumption that an IQ score is a precise and inflexible measure.

Failure of investigators to consider the phenomenon of regression toward the mean was also criticized: "the difference between actual and 'expected' scores in achievement may be an artifact of the measurement procedures rather than due to non-intellective factors." (160, p. 21)

In many of the studies they reviewed, Raph and Tannenbaum were quite critical of researchers who failed to give any benchmarks of the institutional setting, thereby enabling a reviewer to determine degree or extent of

"underachievement." They believed that this omission clouded the value of a particular study, since those designated as underachievers may not have been so in fact. To be clearly an underachiever, a potentially able student should not only be performing below the numerical average for his class or group, but significantly below average. Only under such circumstances would measurement errors be accounted for.

Gowan (81, 82, 83) has at various times summarized characteristics which distinguished an underachieving student. In one of his reviews of the literature, he suggested the following as non-intellective factors related to scholastic achievement:

> 1. clearness and definiteness of academic and occupational choices versus the opposite;
> 2. strong ego controls and strength versus weak ones;
> 3. socialization and social interaction versus withdrawal and self-sufficiency;
> 4. good use of time and money versus lack of such habits;
> 5. reading and arithmetic ability versus the lack of such abilities;
> 6. positive character integration versus psychotic or neurotic tendency;
> 7. permissiveness, intraception, and creativity versus authoritarianism;
> 8. parents who motivate versus dominant, autocratic, or laissez-faire parents;
> 9. some tension in childhood task demands versus no goals or impossible ones;
> 10. maturity, responsibility, seriousness, versus the opposites;
> 11. awareness of and concern for others versus the lack of concern and the lack of awareness;
> 12. dominance, persuasiveness, self-confidence versus the opposites;
> 13. enthusiasm versus apathetic withdrawal. (82, p. 100)

More recently Gowan (83) divided a similar listing into three broad categories as follows:

measures of input, such as environment and parents, consonance of parental and individual values, parental involvement in task demands;

measures of process, "extent to which the person was concerned with future rather than present gratification, with planning, orientation to reality and objectivity, with a growing sense of duty, conscience and responsibility;" (83, p. 94)

measures of results in cultural artifacts, those things that lead the individual away from a concern for himself toward concern with societal and cultural values in which development will take place.

Some years ago, the intensity of the problem of underachievement was pointed to by Terman in his follow-up of gifted children. (189) The top twenty percent and lowest twenty percent of men in the sample were studied in detail. (Women were excluded because "the achievement of women is difficult to estimate and is so often the outcome of extraneous circumstances.") (189, p. 349) Educational, occupational, marital, military, personal, and social records of these gifted children twenty years later were reviewed and a difference was noted between the two groups in the striving for achievement; Terman was unable to explain why the difference existed.

Four Recent Studies. In most of recent literature, the underachieving student was viewed from the perspective of performance on a particular test or combination of tests. Four recent studies, however, take quite a different tact in looking at reasons for scholastic unfulfillment.

Haggard's position (86) was the consideration of achievement as one expression of the extent to which a child was responsive to socialization pressures. Taking personality to mean the manner in which a person related to others, or to symbols, or to things, Haggard suggested that there was a great deal of correspondence between intellectual and personality facets of behavior. Following this position one step further, learning difficulties occurred when conditions normally facilitating acceptance of essential aspects and norms of culture somehow went awry.

Importance of Haggard's study rests in part on the fact that his was one of very few longitudinal studies. His subjects were gifted children, which can cloud the applicability of his findings to the average youngster. However, his design, his methods, and his conclusions were unique in the literature. His study represented a refreshingly new approach.

As counseling psychologists, Golburgh and Penney (76) used their clinical experience with college students to argue that "total personality reorganization" was not needed

to assist an underachieving student. They proposed "sector counseling" as a treatment method in which particular phases of a student's difficulties were worked on intensively. Their objective was to bring a student to a level of personal understanding that enabled him to shift emotional energies toward purposeful and successful academic effort. They argued for counseling contacts of short duration and with restricted objectives.

Here too analysis is unique. It is not the kind of report that can be readily experimentally substantiated; it resulted not from research but from clinical experience. Golburgh's and Penney's contribution is to suggest a way of assisting an underachieving student that could be profitable.

Coleman (37, 38) in studying the sociological structure of adolescent society in a school found a phenomenon that was also unique in the literature. Pressures and values of the "leading crowd" in the student body were directed away from scholastic achievement; for boys these pressures were from academic to athletic. Good grades were less valued than athletic proficiency; those who achieved good scholastic results were less respected by their peers. Coleman concluded that the adolescent sub-culture in school contributed to a development and perpetuation of scholastic underachievement among otherwise able high school students.

In a study reflecting both a difference in design and

in conclusions, Howard (96) raised other questions. A small group of students--61 underachieving and 58 achieving-- were compared using profiles from a variety of instruments. Each student was also interviewed under standard procedures. The interview centered upon the meaning attached to various facets of a college environment, a student's self-concept, a differentiation of each individual's goals, and techniques used by a student in reaching his goals.

Significant differences were noted between underachievers and high achievers on each aspect of the interview. Some meaningful although slight differences were present in test results. The author concluded that roots of underachievement were deeply imbedded and that underachievement reflected a long-standing pattern of responding. Furthermore, for the underachiever to achieve results at the level of high achievers, extensive changes in academic behavior would have to be preceded by changes in a student's ways of viewing himself and of relating to the world about him.

Howard's study is of crucial importance. While in some ways more akin to studies that follow, his intensive study of a group of college students through test data and standardized interviews yielded interesting results, although many of these do not meet standards of statistical significance. His limited sample also is restrictive in attributing great value to his research; his major contribution rests upon a careful, unusual and thorough design.

As noted above, importance of these studies rested upon freshness of approach. Focus of research was upon the student as an individual rather than a statistical artifact. In comparison with the usual kind of study on achievement, these were unprecedented in terms of purpose, philosophical foundation, design, and cautiousness of whatever conclusions were reached. These studies were not at all like ordinary studies, which consider a student in the framework of a paper and pencil test.

Tests and Inventories. Most often an underachieving student has been described through the use of various kinds of paper and pencil inventories. These devices employ numerous short descriptive phrases which, when taken together, build a composite picture of an individual. Tests are employed to describe various personality patterns and structures, by sampling an individual's ways of responding and his attitudes toward various activities, situations, and problems.

A common device mentioned in the literature on underachievement is The Minnesota Multiphasic Personality Inventory. (M.M.P.I.) A lengthy test of some four-hundred items, it produces a series of scales that are helpful to clinicians and others in assessing individual personalities. Its wide popularity as well as extensive literature on validation and clinical application have made it a popular means for sampling personality structure and characteristics. It

was often primary as a tool in research with students.

An exploratory study with the M.M.P.I. (9) attempted to gain information on direction and character of the relationship between students and their parents. As one in a series of tests, Coulson (44) used the M.M.P.I. and found that personality tests did not distinguish among achieving college seniors as well as a vocational interest inventory. Using the top decile of a scholastic aptitude test, Dowd (53) compared high and low achievers. Dowd found a number of factors that distinguished achiever from non-achiever; the M.M.P.I. by itself was only marginally helpful. He suggested that rank in high school class, dissatisfaction with teachers and courses, a pattern of underachievement prior to high school, and being male rather than female is relevant.

An item-analysis of responses to the M.M.P.I. (78) characterized successful students by traits such as introversion, dominance, self-sufficiency, good motivation, liberal social attitudes, and lack of maladjustment. Another investigation (98) found that academic success was a function of adjustment. A scholastic aptitude test in this study predicted achievement more accurately for students with normal personality test profiles. Comparable results have been obtained elsewhere leading to the conclusion that an able student who does not do well may be handicapped in areas other than school achievement. This in turn has led to the postulate that non-achievers may be affected adversely

in non-academic areas of college life. (101, 102)

Here particularly replication failed to confirm earlier findings. (65, 85, 127) No single explanation clarifies the differences that were found. It seems true however that some of the discrepancies between earlier and later studies may have been due to differences in populations studied. Replication served only to cast doubt and in no way clarified or enlarged upon what was known about underachievement.

At the University of Minnesota, Morgan (147, 148) found that achievers tended toward social science occupations, and those who worked below potential leaned toward business and sales. Clinical scales of the M.M.P.I. did not show a clear relation to scholastic achievement, but certain non-intellectual factors were positively related to scholastic achievement of high-ability students:

1. maturity and seriousness of interests
2. awareness of and concern for other persons
3. a sense of responsibility
4. dominance, persuasiveness, and self-confidence
5. motivation to achieve, or the need for achievement. (148, p. 298)

In another study, elevations of the scales of the M.M.P.I., whether taken singly or in pairs, had no relation to actual achievement of a group of engineering students. (69) Over-all personal adjustment, as reflected by the height of the profile, related positively to the accuracy of prediction of achievement but not to the level of accomplishment. Still

further evidence for the importance of personal adjustment was found in a study by Drake (54) who found

> ...strong support for pattern interpretations rather than individual scale interpretations (of the M.M.P.I.). It is not suggested, however, that this analysis has been carried through far enough...Sufficient evidence is present to indicate that, with increased number of profiles, more complex patterns may be isolated...(54, p. 166)

A second device that has often been employed in the study of scholastic achievement is the Edwards Personal Preference Schedule (E.P.P.S.). When scored, the E.P.P.S. yields scales that are more explicit than the M.M.P.I. in defining personality traits. Hence it was often easier to describe populations and to draw inferences from studies in which the E.P.P.S. was used.

Evidence collected by Gebhart and Hoyt (73) and confirmed by Krug (117), indicated that there may be different patterns of overachievement and underachievement. With students at two different colleges, the E.P.P.S. distinguished overachievers and underachievers. Some differences, although small, were also detected between engineering and liberal arts students. These authors summarized their findings by pointing to two patterns of behavior that appeared to be related to underachievement: (1) a need for variety and (2) social motives. The E.P.P.S. was a useful tool in these studies only under conditions in which ability measures were included; if past academic performance was included, the E.P.P.S. made little contribution.

Results with the E.P.P.S. conflict greatly. One study concluded that "the ambitious, conforming, deferring, persistent student of low ability is a better academic risk than his more gregarious, outgoing counterpart." (139, p.209) In another, the E.P.P.S. was not helpful in identifying non-intellectual factors related to scholastic achievement (197), while a third specified its usefulness with female students only. Because of these various conclusions, it does not appear to be profitable to employ the E.P.P.S. in further studies of scholastic achievement. Whereas it may appear to be useful, sharply varying research conclusions lead to the conclusion that other tools will have to be found and employed.

Using the Strong Vocational Interest Blank (S.V.I.B.), Cooper (41) found that it did not predict completion of college, attainment of personal stability, or achievement of high grades. In another study (40), a low but significant correlation was found between breadth of interest as measured by the S.V.I.B. and academic achievement. Jensen (96) concluded that neither the Taylor Manifest Anxiety Scale (M.A.S.) nor McClelland's need-achievement test made a significant contribution to prediction of scholastic achievement when combined with measures of aptitude and evidence of previous achievement. At Grinnell College (84), an independent and responsible student, as measured by the M.A.S. continued to remain enrolled, whereas a dependent and irresponsible student terminated his enrollment. Spielberger

and Katzemeyer (182) found a small inverse relationship between the M.A.S. and actual grade-point-average.

Projective test devices have also been employed, with quite uneven results. The Rosenzweig Picture Frustration Test and McClelland's need-achievement scales did not predict scholastic achievement. (103, 154, 180) With the Rorschach, evidence pointed in both directions. In three studies (42, 118, 155), the Rorschach yielded negative or ambiguous results, leading to the general conclusion that it was not helpful. In one study (124), the conclusion reached was that the Rorschach helped in prediction of college performance. There was no clear explanation for these varying results; much of the difficulty was due to inexact and imprecise ways in which these tests were scored. When inherent characteristics of the tests were combined with less than clear presentations of empirical procedures, careful analyses of such conflicting results were difficult.

A variety of test and other data was used by three authors (99, 185, 198) in attempting to make predictions. No one test predicted success by itself; when tests were grouped together, some meaningful predictions could be made. The most clear-cut conclusion in these studies was that men and women students ought to be considered separately in studies of achievement.

Interest and personality factors of high ability students (National Merit Scholarship Finalists) were studied by

Holland (91, 92) and Stewart (186). Their data too yielded no consistent findings. These studies suggested that in a homogeneous group of high ability students, an increasing number of non-intellective factors, personality characteristics, and patterns of behavior will have to be studied in order to be able to predict scholastic achievement accurately.

A number of authors have attempted to develop a word-picture of an underachieving student. The technique basically was to administer a considerable number of varying instruments to students. Using statistical peaks and valleys that distinguished achiever from non-achiever a description was then developed. Wellington (205) used tests, interviews, anecdotal records, personality ratings, and a student's application for admission to college. He suggested the following considerations when considering achievement:

1. no simple reason accounted for lack of achievement;
2. intellectual factors were better indices than non-intellectual;
3. observations were better indices than subjective evaluations by the student;
4. inadequacies of high school preparation and lack of remedial training were limiting factors;
5. membership in fraternal organizations was a deterrent to achievement.

At Alabama Polytechnic Institute, Burgess (28) compared results of six tests for each of twenty underachievers and

twenty achievers. An underachieving student was less adaptive intellectually, overgeneralized and over-extended himself, showed less intellectual control, was less able to repress his emotional reactions, could readily handle social situations, expressed more dependency in his attitudes toward others, showed less academic motivation, tended not to enjoy school, and was unable to see the value of an education.

Novel Methods. Well established instruments were commonly found. However, the literature contained many examples of attempts to develop new devices in order to identify an underachiever.

A scale to survey students' study habits, techniques, and attitudes was reported by Brown and Holtzman (22). The scale was based in part on an earlier study (21) in which study procedures by good and poor students were compared. Conformance with academic requirements and willingness to take decisive corrective actions were important to achievement. The basic attitude of a student was as important as, if not more important than, the specific study aids he employed.

Sie (179) employed Brown and Holtzman's Survey to predict academic success; she decided that it was useful for the purpose. In a different college setting, Ahmann and Smith (2) found it to have little predictive value.

Using the M.M.P.I., McQuarry and Truax (130) compared

responses of students at various levels of scholastic accomplishment. Their examination led them to identify a twenty-four item scale for prediction of underachievement. Dundas (57) employed a scheme for measuring adjustment to college. His measures of personality integration and achievement in college did not correlate high enough to support an hypothesis of a true relationship. Erb (59) measured conformity and related it to grades earned in college. His method, a Q-sort for self and ideal-self descriptions, was an asset in predicting achievement of female students, but was not effective with males. With an instrument designed to measure the empathic skills of students, Chamber (32) found that among a group of male college students empathy with both materials and people was important in learning, and in ultimate scholastic accomplishment.

Other attempts to develop new scales have included a forced-choice questionnaire of attitudes toward school experience (100), a structured biographical inventory (131), a personality inventory (141), an attitude-interest questionnaire (151), a perceptual reaction test (166), and an inventory of non-cognitive factors (199). Characteristic of these studies was that relationship between grade-point-average and the criterion was positive. However, the magnitude of these relationships was slight; differences were detected with a frequency that was only a little better than purely by chance. Few significant new materials or inferences came from these studies. With one novel approach, an

attempt at cross-validation of earlier positive results invalidated previous findings (170), a possibility that seems quite likely if other novel methods were replicated.

Various methods and procedures are described in connection with the development of a brief personality scale to predict undergraduate grades in introductory psychology. (79, 80) Two investigators (142) collaborated in an exploratory study of connections of psychological drives for power, social acceptance, and aggression with scholastic achievement. A twelve-item questionnaire designed for use in an industrial setting proved to be of little or no value in prediction of scholastic achievement (122). Finally, a validation study (181) of the College Inventory of Academic Adjustment was reported. Although showing a positive relationship with academic performance, the test appeared to have more usefulness in counseling than in prediction.

Whether learning in a complex task situation was related to achievement has also been investigated. (168) Ability to learn under these experimental conditions correlated positively with first semester grade-point-average, but not at a level that would allow for consistently accurately predictions. As a by-product of this research, the author suggested that the best predictor of achievement in college was rank in the high school graduation class.

This wide variety of techniques of a novel nature has not been fruitful. While exploring a number of possibilities,

most studies reported above lacked a clear definition of what was being sought. Impetus for some of the investigations seemed to lie in the desire to "see what happens if" rather than by building a framework. Whatever relationships were statistically significant were very small and in most cases the design is such that replication would be difficult if not impossible. Finally, small restricted samples were employed; this too limits the value of whatever was noted.

Personal and Social Factors. Much the same could be said for investigations of personal and social factors related to achievement. In studies that follow, that which was found in one study was sometimes found again in others; it was equally likely, however, that what was found in one would be negated by another. Some of the research designs were unusual; others quite conventional. Their importance lay in their identification of a variety of elements which may have a bearing on achievement.

Ford (63), Gerritz (74), Myers (150), and Wesley (206), using similar methods, found that

1. females are more often classed as overachievers;
2. males predominate among underachievers;
3. overachievers (and achievers) like school, tend toward specific goals, have goals consistent with parental expectations;
4. certain religious groups tend to be consistently associated with scholastic achievement;

5. achieving students have one or both parents who are foreign-born;

6. Achievers tend to hold more high school offices and to participate in a wide variety of extracurricular and co-curricular activities;

7. achievers feel better understood by their parents, view instructors favorably, are satisfied with their progress, are confident, and do not miss classes.

Confirming that which was noted earlier, Abelson (1) found that high school grades and certain aptitude test scores favor women students, leading him to recommend that studies of achievement be separated according to sex. The replication (203) with women of a study that had been completed earlier (202) with both male and female students showed that women who indicated a preference for a major field did not differ in performance from those who indicated no preference. The earlier study had showed that men with a preference for a major field achieved more satisfactory results than did those with no preference.

Home and family attitudes have also been specifically investigated to determine whether these were causally related to achievement. Among a group of junior high school students (56), parents of high achievers were less permissive and accepting in treatment of their children than parents of low academic achievers. In another exploratory study (128), home and family factors seemed to have affected

performance in college. Correlations were low and not statistically significant; however, a "trend" was noted. In family relationships (187), as socio-economic status of the family rose, power of the father increased. An important side effect was noted: as power of the father increased in family decisions, achievement of male progeny decreased. These results indicated potent and continuing influences of family in scholastic achievement of some students.

With forty-nine male students who had contacted a college counseling center, Boyce (15) found eleven variables that differentiated achievers from underachievers. Achievers

1. had one or both parents foreign-born;
2. were non-residents of Wisconsin;
3. lived in a private residence;
4. felt that their study habits were efficient or average;
5. felt that their own reading skill was a handicap;
6. had lived in cities most of their lives;
7. devoted more hours to study each week;
8. had more deviate depression scores on the M.M.P.I.

The underachievers

1. had fathers in professional or business occupations;
2. had more deviate hypomania scores on the M.M.P.I.;
3. had fathers with more formal education.

Weitz and Wilkinson (204) used an elaborate technique for matching students and found that certain experiences

significantly affected academic performance of freshmen (aptitude and achievement were held constant):

1. being an only child;
2. one or both parents being deceased;
3. parents divorced;
4. civilian private secondary school;
5. private military secondary school;
6. two or more of the factors.

Results indicated that "only child", "private military secondary school", and "two or more" led to a lower academic performance that was statistically significant.

Studies by various authors (129, 153, 158) also showed that quality of relationships at home and general socio-economic level of the home strongly influence college grades. In a theological seminary, an attempt (31) to relate personality traits to successful and unsuccessful seminarians was not fruitful. Personality variables among a group of college graduates accounted for a choice of a major field as well as achievement in that field (62). A retrospective examination of records of students at a college extension center failed to isolate significant items of importance (201). Students reported for misconduct also were not well-adjusted academically (43). Fessenden (61) prepared case studies of a number of probationary students. He found that achievement was influenced both positively and negatively by the very same factor. What hindered one student had no effect or perhaps

a positive effect on another student. Diener (52) noted much the same thing: differences between achievers and non-achievers were random fluctations of many of the same factors.

Academic failure has been postulated as being meaningful when viewed in terms of unconscious satisfaction of hostility directed against the member of the family who demanded that the student achieve success (109). Drasgow (55) believed that the role of parents was of paramount importance in looking at an underachiever. With thirty-one students of gifted ability, underachievement appeared to have no relationship to choice of curriculum. Academic failure for these students was a "behavioural manifestation of personality inconsistencies and the consequent effects of anxiety." (149)

Underachievement among a group of high school students was found to be a pattern of behavior that was not readily modified and was related to basic personality structure. (175) Here too hostility was more pronounced among non-achievers and not causally related to an actual school setting.

What a student expected of himself has also been a subject of investigation. Some recent research has focused upon level of aspiration of a student. In some cases, level of aspiration was found to be related to achievement; in other studies, self-evaluations yielded no conclusive result.

In one study (200), even though a favorable aspiration level was related to academic achievement, high cohesiveness to groups had a negative effect upon performance. It was also found that those high ability students, and women in particular, who accepted limitations achieved at higher levels (11). Self-evaluations at the beginning of the school year did not distinguish achiever from non-achiever. (13, 14) The underachieving student did however conceive of himself more poorly once he knew results of his academic endeavors. When achievement was a prime goal, when students had a good self-concept, and when success came, self-evaulations became more favorable (13, 14, 213). With male high school students, achievers were more positive about themselves while underachievers had a strong negative self-concept (174). With females results were not conclusive. Underachievement was postulated here as being only a male phenomenon.

What a student thinks of himself and terms he used in describing himself have been investigated for possible causal relationships to achievement. Self-concept has been defined a number of ways (215); an individual may accept or reject himself in some areas but not in others (4). Among college freshmen self-concept was not a unified configuration, but consisted of characteristics and dimensions that were differentially valued. Among students dropped previously from other colleges, a student's values and value system were not unrelated to his scholastic achievement (161).

With those students, there was an absence of any compelling values that would lead to academic accomplishment.

Some recent research related to self-concept centered upon various aspects of a person's relation to others and to his relation with himself. Many of these studies were fragmentary with each directed toward some specific aspect of the self. Some added a substantial body of knowledge and information toward the understanding of normal personality functioning. Studies by Berger (10), Brownfain (23), Bugental and Gunning (27), Chickering (33), Chodorkoff (34), Cowen (47), Foy (64), and Hanlon, Hofstaetter, and O'Conner (87) represented research being conducted. Many of these studies attempted to substantiate theoretical formulation; they yielded little that was relevant to an over-all understanding of levels of achievement of potentially able students.

The self-concept as a central theme appears to be the most productive area for further research. Little is known about the way that college students, in particular, respond to the environment in which they find themselves. Their attitudes and opinions, their thoughts and their feelings, and their conception of themselves in relation to society appear to be fruitful areas of exploration from which may come an understanding of an underachieving student.

A traditional aspect of investigation of underachievers was found in current literature. Such studies repeated

some of the earliest work as reported by Garrett (71) and Harris (90) and looked at achievement from a variety of viewpoints: usefulness of high school class rank as a predictor (156); admission's and registrar's data as related to transfer and native students (192); size of high school (30, 202); proportion of A and B grades in high school (30); school size and secondary curriculum pattern (111); college aptitude and high school grades (144). The value of such research efforts was to confirm earlier evidence in estimating likelihood for success in college. Little that was new or different was contributed by these studies.

Andrew (5) and Merrill and Osborn (140) found no correlation between number of credit hours elected and academic achievement. Students performed the same with overloads as they did without. Outside employment did not adversely effect a student's grade-point-average (25, 195). A trend existed that a working student did better than his unemployed classmates. Students enrolled in a collegiate reading improvement program did significantly better than a matched group of students who did not participate (125). Personal adjustment, study skills, and reading proficiency were related to academic standing and as reading proficiency improved so did academic standing (58).

Effects of special attention upon achievement and upon extra-curricular participation were studied using three groups of women (184). Each group was contacted by various

techniques including letters, interviews, dinners, and guest lectures. A fourth served as a control. No significant difference between groups in terms of achievement or extra-curricular participation was noted. Personal contact by college officials had no effect upon an individual student's performance.

Group counseling has been studied as a means for assisting underachieving students. Broedel (18), Ohlsen and Proff (152), and Winborn and Schmidt (210) found that group counseling had either no effect on scholastic achievement or a negative effect. On the other hand Spielberger, Weitz, and Denny concluded that

> ...anxious college freshmen who volunteered for and regularly attended group counseling sessions showed significantly more improvement in academic performance than anxious freshmen who either did not regularly attend group counseling or who were not offered this opportunity...(183, p. 202)

Classes of second semester freshmen enrolled in an educational psychology class were divided by Moore (146) into three groups: tutorial counseling, personal counseling, and no counseling. No statistically significant difference in grade-point-average occurred among the three groups. However, those in counseled groups had higher course grades than those in the non-counseled group.

Summary. Personality development during the college years is much less understood than it ought to be, for consistent and effective judgments to be made about college

students. An adequate understanding of collegiate achievement levels necessitates being able to expand upon the following:

> We have the strong impression that those freshmen who will get the most of college, in the usual meanings of this expression, are those who already are the most developed in respect to ego identity, interest, and personal relationships, values and general ego functioning. If we were to undertake to predict success in college, on the basis of information collected at the time of application for admission, we would of course lean heavily on measures of these growth trends... (169, p. 78)

Literature on achievement, on why some individuals do better than others given equal potentialities, represents at best a massive array. It includes a large variety of methods and materials that lack both unity and coherence. So many different points are included that even a careful reader finds conclusions and inferences difficult to draw.

Studies in this chapter include virtually every aspect of a student's personal, social, familial, communal, and educational life. Many small facets have been postulated as being causally related to actual achievement level. Results are not conclusive. No single factor appears that is clearly and demonstrably related to scholastic achievement. It may well be that no single explanation exists for distinguishing the achieving from the non-achieving. It is very likely possible that

> ...only one characteristic differentiates <u>all</u> gifted underachievers from <u>all</u> gifted achievers; that fact that one group succeeds at school and

the other does not. (160, p. 19)

To confirm or refute this statement requires employment of different techniques with larger numbers of students. Most studies reported in this section reflect single investigations of students at one point in their educational life span; longitudinal studies would be helpful. But even more importantly, going beyond traditional means for prediction and follow-up are indicated. Questionnaires and paper and pencil tests have made a contribution; future attempts along these lines do not appear to be fruitful avenues of research. With the gross factual information presently available, further research ought to be directed more forthrightly toward individual students themselves.

Clinical Prediction

Validity of prediction of performance on various kinds of tasks has been an issue long debated in the literature of psychology and education. The issue is generally posed as one of reliability of a judge compared to results of paper and pencil tests or projective devices. Meehl (132) in a lengthy summary and analysis of the question of clinical versus actuarial prediction mentioned three instances of particular relevance to this study. Sarbin in a pioneer effort used five clinically-trained counselors to predict honor-point ratios of a sample of freshmen in the Arts College of the University of Minnesota. His results showed

no significant difference between clinical and statistical predictions of academic success.

Melton studied efficiency of fourteen graduate students in psychology or educational psychology in predicting academic achievement. His results conflicted with Sarbin's to the extent that he found some counselors, namely three of fourteen, whose predictions were "more accurate, but not significantly." (132, p. 105) Over-all, Melton found that actuarial predictions based on formulae and equations were more accurate than those of counselors.

Henry Chauncey of the Educational Testing Service (132, p. 112) reported that three members of the freshman dean's office at Harvard University made predictions of academic success for a random sample of one hundred freshmen in 1936. Their predictions were based on test and other data available to the University on entering students. These predictions were then compared with a prediction based on College Entrance Examination Board scores and on rank in high school graduating class. Chauncey found that the difference between advisor and mathematical predictions was not significant.

Meehl discussed this same topic on other occasions. In a commentary (133) he expressed general accord with the views of McArthur (123), who argued for concerted research efforts for investigating more carefully and attempting to determine bases for clinical judgment. McArthur argued that too little

is known of bases employed by clinicians and others in making judgments concerning performance.

Meehl joined Cronbach (46) in presenting theoretical arguments and rudimentary research data for expanding the use of construct validity in psychological research and test development. In an address entitled "When Shall We Use Our Heads Instead of the Formala?" (135), Meehl again asked for more extensive research efforts to compare human judgments with statistical judgments. Most noteworthy in this address was Meehl's brief summary of existing literature on the topic:

> ...there are 27 empirical studies in the literature which make some meaningful comparison between the predictive success of the clinician and the statistician. (135, p. 272)

These twenty-seven studies were concerned with many kinds of problems: scholastic achievement, potential suicide, recidivism, success in military training. Seventeen studies showed superiority for statistical procedures: in the other ten, methods were about equal. In no study did clinician fare better then statistician. Meehl believed that the design of many studies was too complex or too vague to provide a research basis for a clear answer to the problem of clinical versus statistical prediction.

In an earlier address, Meehl (134) had taken the same position: on the basis of what is known thus far, effectiveness of clinical judgments cannot be discounted completely.

For a definite position to be taken, present research procedures must be refined. Meehl argued that use of low validity tests was probably not superior to carefully considered and adequately formulated clinical judgments.

Kelly and Fisk (106, 107), Holtzman and Sells (94), and Truesdell and Bath (196) described research programs that centered on clinical versus actuarial methods of prediction. Their conclusions pointed to lack of any statistically significant difference between the two methods of prediction and to an inability to reach any firm conclusions on merits of either method. Two general problems of design affecting results of their research included failure of judges to understand criteria to be used in making predictions or a fundamental inability to define criteria to be used. Inadequacies related to criteria have had a marked effect on an individual's ability to predict outcome of training experiences. Meehl, Tiedeman, and McArthur (137) participating in a symposium on methods of prediction dealt with central problems and issues. Tiedeman advocated a trait (statistical) model in predictive studies while McArthur advocated a dynamic (clinical). They agree that "depressing" results of existing studies of clinical versus statistical methods were "...largely due to the character of the prediction problems which have thus far been systematically studied with comparative intent." (137, p. 163) Before any firm statements could be made of merits of either method, they agreed on the

necessity for further research.

Meehl and Rosen (136), Holsopple and Phelan (93), and Rosen (167) had comments and suggestions to offer concerning clinical judgments. In each case their commentaries were based either upon limited research efforts or on a general discussion not directly related to any single specific problem.

Davids (50) compared three methods of assessing normal personality by studying the relationship between direct and projective methods. The purpose for which an assessment is made seemed to structure results. Melton (138) used several groups of counselors and personnel workers to make predictions of academic success of students in the undergraduate liberal arts college at Minnesota. He found that

1. actuarial predictions were significantly more accurate;

2. an actuarial table improves accuracy of prediction but not to any significant extent;

3. significant differences were found among the counselors in their ability to make predictions;

4. experienced counselors are more accurate in making predictions, but not significantly;

5. counselors trained in psychology were slightly more accurate than counselors from other disciplines;

6. the amount of data available affects the accuracy of the prediction;

7. clinical predictions were more often over-estimates.

Budd (26) attempted a similar project in another institution using students who enrolled in the fall quarter of 1954. Each student predicted his own grade-point-average. Eighty-three students were selected at random, and each of their advisors were contacted at the end of the semester and asked to predict the student's achievement. Advisors were more accurate than students, but they erred mostly in over-predicting achievement of low achieving students.

A reverse process was used by Brackin (16) with veterans who enrolled in a school of business administration. Four judges reviewed the original counselor's recommendations and found that the over-all recommendation for or against college training was highly predictive of success or failure; counselors' predictions were not valid for predicting level of scholastic achievement.

Coyle (45) studied 119 entering students in a division of Brooklyn College. Each student had a thirty-minute interview with one of five counseling psychologists. The psychologists made two predictions for each student they interviewed: "C" average or higher in the initial semester, and re-registration for the following semester. Counselor predictions were compared against a statistical prediction employing high school, test, and biographical data. Results indicated that mechanical procedures for predicting success

were more accurate. Counselor ratings, however, added valid variance to optimal mechanical combination of quantitative data.

The process and fact of clinical diagnosis is related to the studies noted above. The literature contains many examples of attempts to study how and with what accuracy and consistency a clinician judges projective and overt behavioral information. Studies by Arnhoff (7), Koester (113), Korner (116), and Luft (121) are indicative of research that is taking place. Conclusions vary, although some studies show consistency between raters and with the same rater of similar tasks. Theoretical statements, such as McHugh and Apostalakos (126), have been formulated to explain the process of diagnosis, but the subject remains open for more extensive and more varied discussions and research. As Kelly and Fisk indicate

> ...it is perhaps unreasonable to expect clinical predictions to compete in accuracy with statistical prediction in situations where the variables involved are amenable to reasonably accurate measurement. (107, p. 202)

and that

> ...the most accurate clinical predictions of the behavior of a specific individual result not from the application of correlational data based on groups but from a study of the unique pattern of the variables for that individual...(ibid)

The uniqueness of the present investigation rests upon the fact that faculty members, who are the advisors and the "clinicians" of this study and who are familiar with and

have employed on numerous occasions the somewhat arbitrary measures (letter grades) that are the basic criteria of success in college, are making predictions. Furthermore, their judgments are being made not from correlational data, but rather from as great an understanding of an individual as present circumstances will allow.

CHAPTER III

OPERATIONAL PROCEDURES

The purpose of this chapter is to define statistically the population studied, describe the advisors who participated, explain the procedures used by the advisors, describe the method of selection for the student interviews, and outline the methods and techniques employed in analyzing the data. To provide a sound foundation upon which the analysis of data and conclusions of the study can be made, each aspect will be considered in detail.

Student Population

The subjects of this study were those freshmen who enrolled in the College of Literature, Science, and the Arts of the University of Michigan for the semester beginning September 1962, and who attended the orientation program for freshmen in June, July, and August, 1962. Freshmen students who did not attend the summer program were not included; students enrolling in the College Honors Program were included.

As indicated in Table I, a total of 1411 students attended the orientation program. Through natural attrition or lack of data, the final group of students included 1220 students.

Average scores such as those found in Table II, describe the sample of students in the summer orientation

Table I

Numbers of Summer Orientation Students Dropped from and Included in Study

Category	Number
Incomplete Data from Advisors	59
Incomplete Test Score Data	37
Faculty Action to Withdraw	8
Withdrew during Academic Year	56
Did not Register for Spring Semester	31
Number Included in Study	1220
Total	1411

Table II

Achievement and Aptitude Data with Standard Deviations For Students in this Study

Aptitude or Achievement Index	Mean	Standard Deviation
Reading Speed (Co-op Reading)	55.36	29.23
Reading Accuracy (Co-op Reading)	58.47	29.78
Achiever Personality (OAIS)	55.32	26.85
Creative Personality (OAIS)	50.29	30.12
High School Percentile Rank (Michigan equivalent)	60.44	27.59
SAT - Verbal (CEEB)	558.50	91.64
SAT - Math (CEEB)	584.80	95.56
English Achievement (CEEB)	556.90	99.61

program. Two average scores are from the Co-op Reading Test; two from the Opinion, Attitude, and Interest Survey (OAIS); three from the College Entrance Examination Board (CEEB) tests. Students' high school percentile ranks as converted to University of Michigan equivalents are shown also. Individual scores were available to advisors prior to their interviews with students.

The high school percentile rank (HSPR) that advisors

found among the data for students is representative of the students' high school performance. Advisors had at their disposal actual courses and grades earned in high school; HSPR was a converted score which compared a student's rank in high school with all other University freshmen. Advisors are briefed that HSPR does not account for qualitative differences in high schools, but that it is a guide for comparing entering students with their classmates.

Shown in Table III are class standings of the entire

Table III

High School Rank of Freshmen,
College of L.S.A., September 1962*

High School Class Standing	Percent of Freshman Class
Upper 10 %	62 %
Second 10 %	23 %
Third 10 %	9 %
Fourth 10 %	4 %
Fifth 10 %	1 %
Lower 50 %	1 %

freshman class. The fact that 62 percent of freshmen in the LSA College ranked in the upper 10 percent of the high school class is a potent indicator of academic potential represented by the population of this study.

It is evident from Tables II and III that the group as a whole may not be characterized as an "average" college freshmen class. These students are "above average" for

*(Source: Office of Director of Admissions, The University of Michigan)

college freshmen generally. Thus, the results and conclusions of this study need to be interpreted in the light of the special characteristics of students who enroll in the LSA College.

Advisors

Students had appointments with faculty advisors during the orientation period. The advisors represented a variety of academic ranks and disciplines. They included a full professor, an associate professor, six assistant professors, a pre-doctoral instructor, and a researcher. The departments represented were German, Mathematics, Political Science, Speech, Accounting, Guidance and Counseling, and English. In terms of service, advisors ranged in tenure from one to thirty-one years. Advisors were familiar with the basic degree requirements of the LSA College and attempted to aid students in building academic programs that were consistent with the student's objectives. With two exceptions, one being the researcher, advisors were regularly-appointed members of the faculty and actively engaged in teaching and research.

Advisors did not interview equal numbers of students as shown by Table IV. Variation in the number of students seen by advisors was due to a variety of reasons. Two advisors saw students who were interested in specialized programs, such as pre-business and unified science; one advisor was available for a limited number of hours. The differences

Table IV

Distribution of Students Among Advisors

Advisor Code Number	Number of Students Interviewed
1	109
2	51
3	120
4	181
5	177
6	182
7	33
8	166
9	24
10	177
Total	1220

among the remaining advisors were functions of time in the advising office and individual speed in talking with students.

Experimental Procedures

The interview with an advisor typically lasted approximately thirty minutes. An advisor provided each student with information concerning programs and policies of the LSA College and assisted him in planning a program of courses. An advisor explored a student's vocational and educational plans, his areas of interest, and the reasons for enrolling in the LSA College.

For each student, an advisor had the LSA College's basic personnel file; that is, an application for admission, a transcript of the high school record, comments of a high school guidance counselor or principal, scores on standardized tests taken while in high school, and general biographical information about a student and his family. As a

part of the application for admission, each student responded to the following questions: "Which experience, activity, or talent has contributed most to your development?", "What person or persons exercised major influence on your plans to attend college?", and "What do you want to study at the University and how does this fit into your life plans?" In addition, scores received on the College Entrance Examination Board (CEEB), Scholastic Aptitude Test (SAT), three CEEB Achievement Tests, Advanced Placement Program examinations, and locally administered tests were attached to a record card that is an integral part of the college personnel record.

Before each interview, an advisor was expected to examine a student's application and credentials. This general review served to introduce him to a student, giving a basis for discussion, and was the foundation upon which an initial prediction of achievement was made. During the period of this study, each advisor used a form devised by the researcher (Appendix I) upon which basic identification data for each student were completed. Before his interview with a student, an advisor reviewed a student's personnel file and predicted the freshman year grade-point-average (Prediction A). Having made his prediction, an advisor talked with a student. Standard procedure in the LSA College dictates that after each interview an advisor record in the student's file his impressions and comments. Once having entered these impressions and comments, an advisor made a

second prediction concerning first-year grade-point-average (Prediction B).

Prediction A in this study was based upon the advisor's evaluation of test scores, the nature and quality of the high school record, subjective data supplied by high school counselors and teachers, and limited biographical data. It was a judgment based upon no direct contact with an individual. Prediction B differed in that an advisor added to the impression derived from the objective facts of the dossier his subjective impressions of a student. The second prediction could have been the same as, higher than, or lower than the initial estimate of a student's prospective achievement.

Because a variety of factors account for variations in scholastic achievement, advisors indicated the bases upon which the second prediction was made. Each advisor had on hand both "Advisors' Checklist of Variables" and "Definitions of Advisors' Checklist of Variables" (Appendices II and III), which were discussed with advisors as a group in order to attain a consensus on the meaning of various terms. Factors were grouped under three general categories: "Scholastic Readiness", "Estimate of Personal Maturity", and "Special Factors". Each advisor selected three factors he believed most appropriate for each student. His selections reflect an answer to the question "Which of the following variables do you believe will be or are most closely related to the

student's actual achievement in The College?" Because one factor would probably be more important than others, advisors indicated by a double check mark that factor which they considered most important. There was no other comparative weighing for the factors.

Selection for Follow-Up Interviews

Factors related to achievement are critical to this study. They point to characteristics of student achievement that advisors consider to be most relevant. Confirming the existence of factors in the academic experience and performance of the students also appears to be important. For this reason a sample of the students was selected to determine the accuracy of individual factors related to achievement. Specifically, the follow-up interview attempted to determine the student's reaction to his first semester in the College; determine how the student perceives his own position in the College and if appropriate to the student, whether he recognizes any inconsistencies between his potential and actual levels of performance; and demonstrate whether faculty advisors were able to forecast accurately the factors which students report as affecting their performance.

At the end of the fall semester, the grade-point-average of each student was obtained from the Office of Registration and Records. By comparing the advisor's second prediction (B) with the student's first semester achievement (X), the

sample of students was divided into five groups. Division into groups was based upon the following rationale:

Group A: B = X, where B is at the level of 3.00 ("B") or better

Group B: B is less than X, by .50 or more

Group C: B is greater than X, by .50 or more

Group D: B = X, where B is at a level below 2.00 ("C")

Group E: B = X, where B is at an average level of performance, namely between 2.00 and 3.00 (between a "C" and "B" average)

The selection and assignments of students in each of the five groups are summarized in Table V. Every seventh

Table V

Interview Selection Groups

Group	Number of Students in Each Group	Percent of Total Population	Number of Interviews Planned	Actual Number of Interviews
A	164	12.8	26	27
B	200	15.6	31	33
C	240	18.7	37	39
D	123	9.6	19	20
E	557	43.4	87	93
Total	1284	100.1	200	212

name in each group was selected for a follow-up interview.

Each student selected for a follow-up interview received a personal letter (Appendix IV) from the researcher. The letter was mailed to the student's residence on stationery of the LSA College. The true purpose of the interview

was not revealed in the letter. The explanation of the interview was stated as "The College was interested in gaining information on the reactions of the students to their first year in the College." The students were interviewed in the researcher's office, located adjacent to the office of the Associate Dean of the LSA College.

Each student was asked the same series of questions in the same order (Appendix V). Questions five, six and seven were intended to provide data which could be cross-checked with factors selected by advisors. These questions were as follows:

"What factors have been the most important in your performance?"

"Have you done as well as, better than, or less well than you thought you would last summer?"

"If there were any things you could change which would have altered your performance thus far, what would they be?"

Responses to all the questions were recorded on the interview sheets.

A majority of the students responded to the initial letter as Table VI indicates. Five separate mailings were made during the period March 22, 1963, to April 26, 1963. Students who did not respond to the initial letters received a second (Appendix VI); this letter was sent between March 29, 1963, and May 10, 1963.

Table VI

Responses to Follow-up Interview Requests

Type of Response	Number of Students	Percentage of Students
Responded to Initial Letter	110	51.9
Responded to Second Letter	79	37.3
Responded to Telephone call	6	2.8
Did not respond	11	5.2
Withdrew or Did Not Register	6	2.8
Total	212	100.0

The two letters brought excellent results. Eighty-nine percent of the students responded to one or the other letter. Students who responded to neither letter were contacted by telephone.

Even telephone contacts were not completely successful in arranging for interviews. Three students adamantly refused to participate; one student was injured in an automobile accident thereby precluding participation. Four other students made appointments, failed to appear, and did not make further appointments. Finally, three students made appointments, cancelled, made new appointments, and then did not appear.

The analysis of the interviews was originally planned to follow the scheme presented in Table VII. An individual student was to be assigned to a group based upon the advisors' second prediction (Prediction B) and the student's first-year grade-point-average. High achievement was defined as a B average (3.00) or better; average being between

Table VII

Group Assignment for Analysis of Interviews

Student First-Year Grade-Point-Average	Advisors' Prediction of Grade-Point-Average		
	High	Average	Low
high	1	2	3
average	4	5	6
low	7	8	9

2.00 and 3.00; low as being below 2.00. On this basis Groups 1, 5, and 9 in Table VII being the diagonal, represented accurate estimates of scholastic achievement. By definition, Groups 2, 3, 4, 6, 7 and 8 represent erroneous estimates of achievement. Groups 2, 3, and 6 included students ("over-achievers") who achieved substantially better than expected, and groups 4, 7, and 8 were lower than expected, hence, "under-achievers."

The rationale represented in Table VII appeared to be satisfactory at the time students were selected for interviews. When the final grade-point-average at the end of the freshman year was compared with advisors' predictions, this rationale became inadequate. The difficulties lay in part with the original scale used by advisors in predicting achievement; its divisions were too wide and advisors' predictions clustered at particular points on the scale. Further difficulty arose from the tendency of the rationale in Table VII to obscure certain errors made by advisors in

predicting achievement. This is exemplified by Group 4, in which average prediction and average achievement are defined as being between 2.00 and 3.00 on a 4-point scale. Such broad limits made some erroneous predictions appear accurate, for instance a 2.25 prediction and 2.95 achievement. The rationale of Table VII led to a variance in the group assignments for comparable student achievement. Hence when the data were analyzed, a more precise, statistically sound rationale was employed.

Methods and Procedures for Analysis

All Data on each student were coded and placed on I B M cards. Card (Appendix VII) included test score data; card 2 (Appendix VIII) included all data obtained from advisors, primarily the two predictions and the three factors; card 3 (Appendix IX) the student's first-year grade-point-average. Basic analysis of the data was accomplished by using a "linear step-wise regression" program described by Dallemand (48a) and modified by Westervelt (207) for use by the 7090 computer at The University of Michigan Computer Center. The program is described in general terms by Dallemand (48a, p. 3-4) as follows:

> The analysis deals with a set of independent variables $x_1, x_2, \ldots, x_p$, and a single dependent variable y. It is assumed that N observations are available on each of these p + 1 variables making a total of (p + 1)N data in all. The ultimate objective of the program is to relate the x-variables to the y-variable by means of a linear expression such as
>
> $$y = b_0 + b_1x_1 + b_2x_2 + \ldots + b_px_p \qquad (1)$$

The b_1, b_2, ..., b_p in (1) are determined by least square, i.e., so as to minimize the sum of the squares of the differences between observed values of y and predicted values of y.

The power of the stepwise method for this analysis as opposed to the more classical methods lies in the fact that the expression (1) is built up variable by variable in order of relative importance of the variables.

Before the task of building the predicting equation (1) begins, a number of useful statistics are computed which help to give insight into inter-relationships in the data and are used in later computations. Among these are the mean (average value) for each variable, the standard deviation for each variable (a measure of variability) and the correlation coefficient for each pair of variables. The correlation coefficient serves as a measure of the linear relationship between the pair of variables. Its value ranges from +1 (indicating a perfect direct relationship) to zero (indicating no relationship) to -1 (indicating perfect inverse relationship).[1]

This particular program was selected for its versatility and its direct application to the objectives of this study. It provides a convenient method for analyzing the ten dependent variables and relating these to the independent variable, first-year grade-point-average. Analysis is then possible based upon the regression equations and correlation matrices generated by the program. In addition, a coefficient of determination, which is one means for evaluating the effectiveness of a correlation coefficient, is provided.

Once regression equations were produced, attention was focused upon factors related to achievement. Analysis of factors selected by advisors was accomplished by mechanical

[1] A more detailed description of the program may be found in Appendix X.

sorting and counting of the factors selected throughout the group as a whole and for each separate advisor. Finally, using data from follow-up interviews conducted as a part of the research design and the personnel records in the College offices, factors suggested by students were identified.

Summary

In this chapter the student population was described as being unique. It included a selected group of students who enrolled in a liberal arts college of a large, complex, state university. The advisors who predicted the achievement of these students were from different academic departments and were of different academic ranks. Advisors made predictions before and following thirty-minute interviews with students. Thereafter the advisors selected the three factors which they believed would be relevant to a student's achievement in the College.

After the first semester grades were reported, a sample of the population was selected for follow-up interviews. Ninety-one percent of those selected for an interview responded to the request. All data were placed on IBM cards for analysis according to a linear step-wise regression program. These data are discussed in the following chapter.

CHAPTER IV

DATA AND CONCLUSIONS

In this chapter the data are presented according to hypotheses presented in Chapter I. Following the presentation of individual working hypotheses, the major hypothesis is considered.

Hypothesis I

> Grade-point-average prediction of student achievement is more accurate after an advisor interviews a student than grade-point-average predictions based on records alone.

A starting point in the testing of this hypothesis is the degree of relationship that exists between predictions of advisors and first-year grade-point-averages. Statistically significant (one percent level) correlations of .449 and .446 respectively were found between advisors' first and second predictions and student achievement. Statistical significance at this level indicates a strong likelihood that there is a true relationship among these variables, but does not attest to the strength of such a relationship. Strength of relationship as revealed by the magnitude of the correlation coefficient is relatively low. The slight difference in correlation coefficients between the prediction made before or after the interview is a difference that is not significant although there is a slight tendency for prediction made before interview to be the more accurate. If the coefficient of determination is considered, roughly 20

percent of the variance in grade-point-average is accounted for by the advisors' prediction. Whereas, the relationship between either of the predictions and achievement is statistically significant, predictions account for little of the variance in grade-point-average. With so little variance accounted for and in view of the low size of the coefficients obtained, the reasonable conclusion is that advisors predict academic success of students in terms of exact grade-point-average earned with a low degree of frequency. The interviews apparently are of little assistance in increasing the over-all accuracy of the predictions, and in some instances may even be detrimental.

If other means are employed for analyzing the data, slightly different conclusions arise. Constructing a frequency distribution with the advisors' second predictions of grade-point-averages, the ones after interviews (B), and the student's actual grade-point-averages produces the array found in Table VIII. It is a rationale similar to the one used here in Table VIII that is employed later in an analysis of follow-up interviews.

Analysis of Table VIII provides additional insight into the qualitative nature of advisors' predictions. If attention is focused upon the diagonals, the achievement of 975 or 78.8 percent is within ± .50 of predicted achievement, 192 or 15.5 percent within ± 1.00, and 70 or 5.7 percent within ± 1.50 or more. Such an array

Table VIII

Comparison of Advisors Prediction B with Actual Grade-Point-Average (G.P.A.)

Predicted G.P.A.	Actual G.P.A.							Total
	0.50-0.99	1.00-1.49	1.50-1.99	2.00-2.49	2.50-2.99	3.00-3.49	3.50-4.00	
0.50-0.99	0	0	0	0	0	0	0	0
1.00-1.49	0	0	0	2	2	0	0	4
1.50-1.99	1	8	34	23	11	3	0	80
2.00-2.49	1	17	77	132	72	23	4	326
2.50-2.99	4	15	45	153	124	81	17	439
3.00-3.49	1	2	24	59	87	77	49	299
3.50-4.00	1	1	2	10	17	22	36	89
Total	8	43	182	379	313	206	106	1237*

* The means of advisors' predictions and actual achievement for the larger population (N=1237) varies only slightly from the means of the slightly smaller group (N=1220) for whom the more complete analysis is made. These means are 2.72, 2.55 and 2.547, 2.538 respectively.

gives advisors' predictions the quality of being reasonably accurate estimates of students' later achievement.

However, there remains yet another more precise evaluation of the relationships among the data. Comparison of advisors' predictions with other variables employed in this study is possible by using a correlation matrix of all variables. Table IX is such a matrix.

A substantial relationship exists between advisors' predictions and much of the test data. The relationship between advisors' predictions and the OAIS scales is negligible; there is a slight relationship with high school rank. Advisors' predictions are more closely related to the independent variable (first-year grade-point-average) but as indicated earlier this relationship while significant is slight. These data indicate that advisors' predictions account for many of the same things that the other variables include and may well be based largely on test score information. When these relationships are mechanically combined in order to develop regression equations to predict achievement, advisors' predictions are a potent factor.

Using the program described in the previous chapter, the following equation emerges:

$$Y' = .3256 + .0048\ (1) + .0069\ (2) + .0049\ (3) + .0097\ (4) + .0044\ (7) + .1831\ (10)$$

This equation is the last in a series of eight steps and is significant at the one percent level. Its development is

Table IX

Correlation Matrix of all Variables

Code Number of Variable[1]	Code Number of Variable[1]									
	1	2	3	4	5	6	7	8	9	10
1		.276*	.288*	.265*	.174*	.203*	.188*	-.041	.373*	.354*
2			.473*	.639*	.649*	.647*	.085*	.253*	.648*	.580*
3				.353*	.299*	.344*	.012	.066+	.579*	.515*
4					.517*	.509*	.144*	.162*	.510*	.494*
5						.737*	-.095*	.237*	.502*	.470*
6							.122*	.203*	.522*	.484*
7								-.138*	.204*	.249*
8									.148*	.136*
9										.802*
10										
Y	.3897*	.3977*	.3183*	.4034*	.3187*	.3213*	.2988*	.3887*	.4489*	.4464*

*: significant at .01
+: significant at .05

1 The variables in the matrix are defined as follows: (1) High School Percentile Rank; (2) SAT - Verbal; (3) SAT- Math; (4) English Composition; (5) Reading Speed; (6) Reading Accuracy; (7) Achiever Personality; (8) Creative Personality; (9) Advisors' Prediction A; (10) Advisors' Prediction B; and (Y) First-Year Grade-Point-Average.

summarized in Table X and presented in detail in Appendix XI.

Table X

Development of Regression Equation:
All Variables Included

Step	Variables*	Multiple r	Coefficient of Determination
1	9	.4489	.2015
2	9,1	.5089	.2590
3	9,1,7	.5410	.2926
4	9,1,7,4	.5684	.3231
5	9,1,7,4,10	.5729	.3282
6	9,1,7,4,10,2	.5762	.3321
7	9,1,7,4,10,2,3	.5734	.3288
8	1,7,4,10,2,3	.5767	.3326

* For definition of variables see footnote to Table IX.

In both the final equation and each of the steps by which it ultimately evolves, a heavy emphasis is put upon the advisors' predictions, Variables 9 and 10. Advisor Prediction A, Variable 9, is the initial variable that is incorporated in the equation. It remains a heavily-weighted component through the first four steps, at which point Prediction B, Variable 10, is added. Thereafter, weighting of Prediction A diminishes sharply, is reduced further with the addition of SAT - Verbal, and is ultimately removed from the equation. Prediction B remains a part of the equation. In the final step, the equation weights the advisors' prediction much more heavily than any of the test

variables.

Because the advisors' prediction plays a role of such primacy, a second equation was generated from which the advisors' predictions are eliminated. Using only test score variables, the following equation is generated:

$$Y' = .3191 + .0051\ (1) + .0101\ (2) + .0077\ (3) + .0109\ (4) + .0050\ (7)$$

Table XI summarizes the development of the regression

Table XI

Development of Regression Equation:
Advisors' Predictions Excluded

Step	Variables*	Multiple r	Coefficient of Determination
1	4	.4033	.1627
2	4,1	.4987	.2487
3	4,1,7	.5372	.2886
4	4,1,7,2	.5572	.3104
5	4,1,7,2,3	.5664	.3208

* For definitions of Variables see footnote to Table IX.

equation for which only test variables were used. (A detailed summary is presented in Appendix XII.) Removing advisors' predictions results in an equation that is only slightly less accurate. The two equations are compared in Table XII.

Data concerning advisors' predictions may be summarized as follows:

Table XII

Comparison of Regression Equations

Equation	Variables*	Multiple r	Coefficient of Determination
With Advisors' Predictions	1,2,3,4,7	.5767	.3326
Without Advisors' Predictions	1,2,3,4,7	.5664	.3208

* For definitions of Variables see footnote to Table IX.

1) An interview with a student has a very slight, largely negative, effect upon the ability of advisors to predict scholastic achievement;

2) Advisors' predictions show the largest correlation with grade-point-average than any other single variable;

3) When advisors' predictions are either incorporated into or excluded from a regression equation, the predictive efficiencies of the final equation differ only slightly.

On the basis of these findings one can conclude that Hypothesis I is refuted.

Hypothesis II

Accuracy of prediction varies among advisors with some advisors being consistently more accurate in their predictions than others.

Diversity and divergence among advisors is apparent by examining correlation coefficients among advisors' predictions and grade-point-averages for each of the ten advisors (Table XIII).

Table XIII

Correlations of Advisors' Predictions with Grade-Point-Averages

Prediction	Code Number of Advisors									
	1	2	3	4	5	6	7	8	9	10
A	.447*	.495*	.461*	.437*	.357*	.365*	.356+	.180+	.126	.286*
B	.444*	.392*	.343*	.451*	.388*	.359*	.381+	.296*	.269*	.317*
Number of Students Interviewed	109	51	120	181	177	182	33	165	24	177

*: significant at .01
+: significant at .05

These data show that individual advisors vary greatly in their ability to predict grade-point-averages. Correlation for Prediction A for Advisor 9 is not significant statistically; correlations for Prediction A for Advisor 7 and 8 and Prediction B for Advisor 7 are significant at the five percent (.05) level; all other correlations are significant at the one percent (.01) level. Those correlations, which are either not significant or significant at the .05 level, are probably due to special circumstances. Advisor 7 and 9 interviewed substantially fewer students than other advisors; Advisor 7 spent far less time advising freshmen students and Advisor 9 interviewed only those who enrolled in the Unified Science Program. The explanation for Advisor 8 may well be found in the fact that he interviewed only those outstanding students who were invited into the College Honors program.

These data also show that advisors' predictions were differentially affected by interviews. Advisors 2 and 3 were affected greatly by interviews; their predictions before an interview were more accurate than after an interview. Other advisors, notably Advisors 8 and 10, made predictions that were substantially more accurate after the interview.

From analysis of the regression equations developed for each advisor, variance among advisors is also apparent. Using the same computer program as employed earlier with the population as a whole, individual regression equations are

developed. As Table XIV shows, components of regression equations differ slightly.

Table XIV

Components of Regression Equations for Each Advisor

Code Number of Advisor	Variables* Included in Each Equation	Multiple Correlation Coefficient	Coefficient of Determination	Significance Level
1	9,6,1	.552	.304	.01
2	9	.495	.245	.01
3	9,7,3	.574	.329	.01
4	10,1	.527	.279	.01
5	1,7,9	.552	.304	.01
6	4,1	.526	.277	.01
7	5	.382	.146	.05
8	1,10	.394	.155	.01
9	No equation			
10	7,4,1	.508	.256	.01

* For definitions fo Variables see footnote to Table IX.

For some advisors, predictions advisors made (Variables 9 and 10) become factors in the equation; for others they are of no consequence. Variables in the separate regression equations point in part to the fact that individual advisors' predictions do not always add a significant dimension to the prediction of scholastic achievement. By far the most important variable in these equations is high school rank

(Variable 1), a variable that for the entire group is less heavily weighted.

Comparison among predictors also shows differences among advisors. Using the correlation coefficient as the basis for ranking, Table XV rank orders each advisor and each of the three predictor variables, the predictions before and after interviews, and the predictive value for each of the regression equations.

Table XV

Rank-Order Comparison of the Various Predictions by Advisors

Code Number of Advisor	Rank for Prediction A	Rank for Prediction B	Rank for Regression Equation
1	3	2	2.5
2	1	3	7
3	2	7	1
4	4	1	4
5	6	4	2.5
6	5	6	5
7	7	5	9
8	9	9	8
9	10	10	10
10	8	8	6

Rank ordering of the various predictions coupled with other data reported above supports Hypothesis II, that advisors differ widely in their ability to predict scholastic

achievement.

Hypothesis III

> Advisors use a different ordering of factors related to predicting scholastic achievement with factors relating to scholastic readiness being the ones most frequently chosen.

Factors selected by the advisors are tabulated in Table XVI. These factors are grouped according to a general classificatory scheme in which Group I includes factors of Scholastic Readiness, Group II factors defined as Estimates of Personal Maturity, Group III as Special Factors.

Examination of the data in Table XVI indicates that advisors select the five factors in Group I, Scholastic Readiness, a total of 1300 times, and the nine factors in Group II, Estimate of Personal Maturity, a total of 2233 times. The Mann-Whitney U-test, a non-parametric statistic, allows for a comparison of these data. Following the description presented in Keeler (216), the value of U' is 19, which accepts the premise of the null hypothesis. Hence, advisors select factors relating to scholastic readiness with no greater frequency than they select factors relating to personal maturity.

Scholastic Potential (Factor 2) is the factor most often selected by advisors in indicating the basis for their predictions. It is followed in terms of frequency of selection by Academic Motivation (Factor 9), Maturity and Responsibility (Factor 8), Clarity of Educational Goals

Table XVI

Factors Advisors Consider Relevant to Student Scholastic Achievement

Code Number of Factor*		Initial Selection	Second Selection	Third Selection	Sub-Total	Group Total
Group I:	1	26	65	11	102	
	2	323	369	57	749	
	3	44	128	30	202	
	4	42	48	11	101	
	5	49	71	26	146	1300
Group II:	6	80	138	98	316	
	7	61	76	78	215	
	8	145	136	193	474	
	9	248	97	252	597	
	10	34	33	84	151	
	11	12	10	23	45	
	12	33	21	69	123	
	13	50	14	81	145	
	14	41	4	122	167	2233
Group III:	15	10	1	29	40	
	16	6	1	24	31	
	17	1	0	1	2	
	18	3	0	2	5	
	19	0	0	8	8	
	20	4	0	11	15	101
TOTAL		1212	1212	1210	3634	3634

* Factors used by advisors are defined as follows: Group I, Scholastic Readiness: (1) High School Attended, (2) Scholastic Potential, (3) Reading Ability, (4) Study Skills, (5) Quality of Previous Preparation; Group II, Estimate of Personal Maturity: (6) Clarity of Educational Goals, (7) Appropriateness of Stated Goal, (8) Maturity and Responsibility, (9) Academic Motivation, (10) Self-Confidence, (11) Extra-Curricular Experience and Expectations, (12) Social Adjustment and Adaptability, (13) Use of Time--Self-Discipline, (14) Image of Academic Life; Group III, Special Factors: (15) Family Background, (16) Family Influence and Pressures, (17) Finances, (18) Health, (19) Reason for selecting University of Michigan, (20) Other Factors.

(Factor 6), and Appropriateness of Stated Goal (Factor 7).

Tabulations for the entire group obscure individual differences among advisors. Table XVII denotes the factors employed by the separate advisors.

Table XVII

Number of Times Each Factor Is Selected by Individual Advisors

Code Number of Factor*		Advisor Code Number										
		1	2	3	4	5	6	7	8	9	10	
Group I:	1	28	4	0	5	7	11	0	23	6	18	
	2	47	34	15	173	149	145	2	65	14	105	
	3	11	16	47	12	2	71	3	22	0	18	
	4	0	0	2	0	1	5	4	78	10	1	
	5	3	23	7	7	15	29	0	37	4	21	
Group II:	6	6	21	14	61	77	23	17	56	8	33	
	7	8	2	16	69	15	60	7	11	2	25	
	8	62	6	55	99	84	68	16	23	7	54	
	9	55	18	63	84	115	57	11	94	11	89	
	10	16	6	19	7	6	14	12	22	5	44	
	11	3	5	10	6	0	6	2	5	1	7	
	12	20	4	14	0	23	21	10	5	0	26	
	13	48	2	38	1	5	3	3	12	1	32	
	14	14	8	53	5	31	21	9	1	1	24	
Group III:	15	3	0	3	0	4	3	1	13	2	11	
	16	1	1	0	8	1	2	1	8	0	9	
	17	0	0	0	0	0	0	1	0	0	1	
	18	1	0	3	0	0	0	0	0	0	1	
	19	0	3	0	0	0	0	0	3	0	2	
	20	0	0	1	0	2	1	0	1	0	10	
Number of Students		109	51	120	179	179	180	33	160	24	177	1212

* For definitions of factors, see Footnote to Table XVI

From these data it is apparent that advisors differ widely in the factors that they consider relevant to student achievement. Certain advisors tend to select the same factor or factors with great regularity for each of the students

that he interviews. The heavy selection of Scholastic Potential by Advisors 4, 5, and 6 appears to account in part for its heavy total frequency. Once again the rank-ordering of advisor selection of factors enhances the ability to make comparisons between advisors and to distinguish those factors considered relevant.

Examination of the data for individual advisors' factors, as reported in Table XVIII, confirms data already reported.

Table XVIII

Rank of Each Factor As Selected by Individual Advisors

Code Number of Factor*	Advisor Code Number									
	1	2	3	4	5	6	7	8	9	10
Group I: 1	5	10.5	18.5	11.5	9	11	18	6.5	6	11.5
2	4	1	8	1	1	1	13.5	3	1	1
3	9	5	4	6	13.5	2	12.5	8.5	17	11.5
4	18.5	18	15	17	15.5	13	11	2	3	19
5	13	2	12	8.5	7.5	6	18	5	8	10
Group II: 6	11	3	9.5	5	4	7	1	4	4	5
7	10	13.5	7	4	7.5	4	10	12	9.5	8
8	1	7.5	2	2	3	3	2	6.5	5	3
9	2	4	1	3	2	5	4	1	2	2
10	7	7.5	6	8.5	10	10	3	8.5	7	4
11	13	9	11	10	18.5	12	13.5	14.5	12	16
12	6	10.5	9.5	17	6	8.5	5	14.5	17	7
13	3	13.5	5	13	11	14.5	12.5	11	12	6
14	8	6	3	11.5	5	8.5	6	17.5	12	9
Group III: 15	13	18	13.5	17	12	14.5	15	10	9.5	13
16	15.5	15	18.5	7	15.5	16	15	13	17	15
17	18.5	18	18.5	17	18.5	19	15	19.5	17	19
18	15.5	18	13.5	17	18.5	19	18	19.5	17	19
19	18.5	12	18.5	17	18.5	19	18	16	17	17
20	18.5	18	16	17	13.5	17	18	17.5	17	14

* For definitions of factors, see Footnote to Table XVI.

Advisors vary considerably in factors that they select. There is however considerable consistent agreement. Factor

2, Scholastic Potential, ranks highest for six of the ten advisors; Factor 9, Academic Motivation, is ranked first by two, second by four, and third by one. Advisor 7 departs widely from the practice of the group of advisors by selecting Factor 6, Clarity of Educational Goal, more often than any other factor.

Data presented in testing Hypothesis III support the hypothesis that individual advisors differ in the factors they select as being related to scholastic achievement. Some advisors consistently select the same few factors, although advisors may not choose these same factors in the same order. As has been shown, advisors select Scholastic Potential (Factor 2) with greatest frequency; it is followed by Academic Motivation (Factor 9).

Hypothesis III also states that factors related to scholastic readiness are those factors most frequently selected. The comparison of the selections from Group I and Group II factors shows this <u>not</u> to be the case. Analysis of the data indicates that there is no significant difference between the frequencies with which advisors select factors of Scholastic Potential and of Personal Maturity.

Hypothesis IV

Students put a greater emphasis on factors related to personal readiness than on factors of scholastic readiness.

The evaluation of this hypothesis stems from the

responses of the students to the follow-up interview. Three questions in particular were asked in order to obtain from students factors they perceived as being relevant to achievement. The three questions they were asked were: What factors have been most important in your performance? Have you done as well as, better than, or less well than you thought you would last summer? If there were any things you could change, which would have altered your performance thus far, what would they be?

Responses of students do not necessarily fit precisely categories that are defined for advisors. Hence an analysis of follow-up interviews through exact coding techniques is not possible. In reviewing these interviews, an over-all tone or specific nature of a reply to the above three questions is the basis for categorizing student responses. As is already obvious, answers vary greatly in the character of the replies.

In the context of the interviews, in which the cue is the College's "desire to be of greater service to its students," the strong impression exists that students were both frank and open in discussing their reactions and attitudes. They placed a heavy emphasis on personal aspects of their educational experiences and were generally able to describe those factors which impinged upon them and which accounted for their success.

By far the most general impression that comes from the follow-up interviews is the willingness of students to accept personal responsibility for scholastic achievement. They tend to be very critical, but critical of themselves and not of others. Asked to look backward, many take themselves to task for errors or mistakes they have made. Many claim that they are not adequately prepared, personally and scholastically, for what they find. A sizeable number indicate that they had to work doubly hard initially to correct deficiencies. In their responses, students mention dormitory living, classroom practices, fraternity and sorority life, University conduct regulations, and extra-curricular opportunities on the campus. However, students overwhelmingly reply in terms that are most readily defined as "Estimate of Personal Maturity." They appear to view their educational progress primarily in terms of readiness, rather than in terms of ability. The notions of interest, commitment, purposefulness, and sincerity occur in many if not most interviews.

Students mention their own faulty impressions of University academic and social life. The value and importance of libraries for research and for study, of class attendance, of many conflicting pressures for achievement, of selecting among the many out-of-class diversions, and of the varied nature and interests of college professors lead to an altered conception of what college is all about.

An even greater number of students talk of developing maturity and sense of responsibility. Many attach self-discipline to an ability to make choices, while others allude to an increasing awareness of the world around them and their place within it. Most students find the first semester filled with surprises. The quantity of free time is for many a difficult thing to manage. Absence of parents and their influence forces a number of decisions, both large and small. Initial decision-making without the aid or encouragement of parents is especially difficult; it is of little consequence apparently whether the decisions are ones of direction and of value or day-to-day decisions of managing their own affairs.

Only passing references are made to high school preparation. For many this reference is only in terms of study habits and techniques that the student could have learned in high school. The emphasis on personal responsibility and on what college is actually like transcends many commentaries about the academic experiences of the first year.

A few students express dissatisfaction. To some the change has been too great or too abrupt; to others they find that they are not being challenged sufficiently. The "challenge" to which they refer is not the quality of the work expected of them but the inspiration from teachers and counselors. A few refer to the impersonality of the University when compared to high school. With most of these

respondents, the unsatisfactory aspects are ones to which they are becoming acclimated; with a few dissatisfaction leads to intent to change schools.

Few students refer to a specific goal or objective as impelling them toward or away from achievement. Where a goal or objective is alluded to, the student more often is referring to the absence of a goal or to the change or abandonment of one to which he has previously been committed.

Tabulations of responses of students in 96 follow-up interviews provided the data in Table XIX.

Table XIX

Factors Reported by Students in Follow-up Interviews

Factor Group	Number of Items	Number of Selections	Mean
I	5	31	6.20
II	9	174	19.33

Standard Error of Difference between Means 1.64
Critical Ratio (C.R.) = 7.98

Students select factors in Group I, Scholastic Readiness, 31 times, and in Group II, Personal Maturity, 174 times. Statistical analysis of these selections leads to the conclusion that the difference between factors selected by students is statistically significant at the one percent (.01) level. (C.R. 7.98).

These data support Hypothesis IV, namely that students

place a greater emphasis on factors related to personal readiness than on factors related to scholastic readiness. In their responses in follow-up interviews, students mention consistently factors of personal readiness. Only rarely do they refer to factors of scholastic readiness or potential.

Hypothesis V

> Within the framework of allowing a spread of one-half a grade differential between advisor prediction and student achievement, advisors predict the achievement of the majority of the students:
>
> A. With accurate predictions, the advisor will indicate factors that were relevant to the actual achievement;
>
> B. With inaccurate predictions, advisors will emphasize factors of scholastic readiness while student respondents will emphasize factors of personal maturity.

The examination of factors used by advisors with these two groups of students leads to a variety of conclusions, some of which are alluded to earlier. Based upon data presented in Table XII, three groups of students are isolated. The first group include those students whose prediction and achievement are in the same range, that is the diagonal axis which represents "accurate" advisor predictions. The second group includes those students for whom high achievement is expected but for whom the actual achievement is substantially below expectation, that is, "the under-achievers." The final group includes the over-achievers.

Once these groups are isolated, the interviews are screened, the sub-group identified, and the factors indicated are specifically identified. The composition of the

groups and the number of interviews for each group are as follows:

Table XX

Grouping of Students Interviewed

Group	Number of Students	Number of follow-up Interviews Analyzed
Accurate Predictions	1167	70
Under-achievers	61	19
Over-achievers	9	7
Total	1237	96

Table XXI summarizes advisors' selections and student indications of factors relevant to achievement in the College.

For the over-achievers, the numbers are few and the factors selected by advisors can lead to only very cautious conclusions. With equal frequency the advisors select Scholastic Potential, Quality of Previous Preparation, and Image of Academic Life; the students indicate Clarity of Educational Goals and Academic Motivation. The generalization that appears to come from these data is that this small group of students know clearly what they desire and will expend the amount of energy necessary to achieve it.

With regard to the "under-achievers", the raw number is large, but the interview selection process included few of these students. In order to add to the data available, personnel files of a dozen of these students were examined. These files contain information from advisors, from instructors, from the residence halls, and often a student's

Table XXI

Comparison of Advisor and Student Selection of Factors*

Student Groupings		Factors																			
		Group I					Group II									Group III					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Accurate Predictions	Advisor Selections	13	43	12	6	9	15	14	27	30	6	3	6	5	11	3	2				2
	Student Selections	1		2	14	8	13		10	24	17	3	9	40	20	3	2	2			2
Over-Achievers	Advisor Selections		3	2		3	1	1	1	2	1	1			3						
	Student Selections				2		4		1	4	1			1							
Under-Achievers	Advisor Selections	1	8	1	1	3	2	1	6	9	5		2	3	1	2					
	Student Selections	1	1		2		6	1	1	7			3	6			1	1	4		

Number of students: 96

* For definitions of Factors, see footnote to Table XVI.

letter of explanation or appeal. These materials proved to be a helpful means for identifying factors that affected scholastic achievement.

Advisors initially point to scholastic ability, motivation, maturity, and confidence as being important to the achievement of these students. Students indicate lack of motivation, lack of clarity in educational goals, difficulty in budgeting time, and severe health problems. In interviews, students articulate well factors or attitudes which account for academic difficulty; they often refer to attempts at "crash programs" to right themselves, but in general they indicate that these are to no avail.

In those cases where advisors' predictions are considered "accurate," factors employed in follow-up interviews mirror factors selected for the population as a whole. Scholastic Potential is most frequently selected (43 times); Academic Motivation is next selected (30); Maturity and Responsibility (27); Clarity of Educational Goals (15); and so forth. These students indicate Use of Time-Self-Discipline (40) as being the most important single factor. Next in order of frequency are Academic Motivation (24); Image of Academic Life (20); Self-Confidence (17); Study Skills (14); and Clarity of Educational Goals (13).

The data in Table XII may however be examined statistically. The chi-square test of significance determines whether the differences between advisors' and students'

selections are artifacts of the data or whether such differences are significant. Table XXII reports the results of these computations.

Table XXII

Significance of Advisor and Student Selections of Factors

Comparison of Advisors' Predictions with Actual G. P. A.	Student Selection		Advisor Selection		Chi Square
	Scholastic Factors	Personal Factors	Scholastic Factors	Personal Factors	
Accurate	25	139	83	120	28.76*
Over-achievers	2	11	8	10	2.91
Under-achievers	4	24	14	31	2.63

Number of Students: 96
* Significant at .01

Selections of factors by advisors and by students whose follow-up interviews were analyzed are significantly different only for the group for which the advisors' predictions are "accurate." What differences exist between advisors and students in the over-achiever and under-achiever groups are not significant.

If the focus of attention shifts from groups of factors to individual agreement on specific factors, Table XXIII emerges.

Table XXIII

Advisors' and Students' Agreement of Factors Related to Achievement

Comparisons of Advisors' Predictions with Actual G. P. A.	Number of Follow-up Interviews	Agreement on 2 Factors	Agreement on 1 Factor	No Agreement
Accurate	70	0	20	50
Over-achiever	7	1	1	5
Under-achiever	19	1	3	15

The infrequency with which advisors and students in the accurate and underachiever groups select the same single factor leads to the question whether such agreement is significant. Using a 2 X 2 fold contingency table, in which actual frequency is compared with chance occurence, the researcher found values of chi-square of 12.86 (accurate group) and 8.00 (underachiever group). Both of these values are significant at the one percent (.01) level.

Returning to a consideration of Hypothesis V, it becomes apparent that where predictions are "accurate" advisors'

and students' selections of factors differ significantly. Advisors do not agree with students regarding factors relevant to achievement. For predictions that are not accurate, the groups identified as overachievers and underachievers, advisors' and students' selections do not differ significantly.

The data and conclusions do not support the basic hypothesis of this study. Rather the data tend to support the following:

Faculty advisors in the College of Literature, Science, and the Arts predict with a reasonable degree of accuracy the level of achievement of entering freshmen, and identify some of the factors which are relevant to a student's actual level of achievement.

Summary

Thus, while the working hypotheses of the study were not confirmed as originally indicated, the data indicate that:

1) faculty advisors' predictions of academic success are no more effective and no less effective by themselves than other estimates of subsequent student achievement;

2) when advisors' predictions are used as a part of a regression equation for prediction of academic achievement, such an equation is only slightly more effective than an equation in which only test score variables are included;

3) advisors' predictions are based upon scholastic

potential, and upon estimate of personal maturity;

4) follow-up interviews with students indicate that students place a significantly greater emphasis upon factors related to personal readiness and that the specific factors that they select differ from those selected by advisors;

5) where advisors' predictions are accurate, factors selected by advisors and students differ, and where advisors' predictions are not accurate, factors selected are not significantly different.

It seems reasonable to conclude therefore than the bases for faculty advisors' predictions of academic success lie equally in areas of personal and scholastic readiness for college. When advisors' and students' identification of factors are compared, there is no significant difference between selections of factors of personal and scholastic readiness, although there is a wide variance in the specific individual factors selected.

CHAPTER V

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

As initially stated, the major hypothesis of this study is not confirmed. It is not, however, completely refuted by the data. Rather, in light of the data and conclusions, further discussion is necessary.

Summary

It seems appropriate to summarize briefly conclusions drawn in the previous chapter. These conclusions were as follows:

a) The interviews with students by faculty advisors in this study had a very slight, but largely negative, effect upon their ability to predict scholastic achievement.

b) Advisors' prediction of first-year grade-point-average by themselves correlated more highly with actual grade-point-average than any other single variable.

c) Regression equations that either include or exclude advisors' predictions differ only slightly. Those equations from which advisors' predictions are excluded compensate for the exclusion by weighting test score variables more heavily.

d) Individual advisors vary widely in their ability to predict scholastic achievement. Individual advisors are also differentially affected by the interviews with some advisors markedly improving the accuracy of their predictions.

e) In predicting scholastic achievement, advisors do

not indicate the same factors as being related to scholastic achievement. The rank ordering of the factors individual advisors select differs widely, although there is consistency in the importance that they attach to Scholastic Potential and Academic Motivation.

f) Comparisons of the three major groups of factors, Scholastic Readiness, Estimate of Personal Maturity, and Special Factors show no significant difference between factors of Scholastic Readiness and factors relating to Personal Maturity. Little emphasis is placed by all of the advisors on all of the Special Factors.

g) In follow-up interviews with students, students place most of their emphasis on factors related to personal maturity and place little emphasis on scholastic potential.

h) Students who are "underachievers", based upon discrepancies between advisors' predictions and actual achievement, indicate lack of motivation, lack of clarity in their educational goals, difficulty in budgeting their time, and severe health problems as being factors related to their actual achievement in the College.

i) Students who achieve at the level to which advisors assigned them indicated in order of frequency of selection the following: Use of Time -- Self-Discipline, Academic Motivation, Image of Academic Life, Self-Confidence, Study Skills, and Clarity of Educational Goals.

j) Advisors and students in the "accurate prediction" group differed significantly in the factors that each

considered relevant to achievement. No other differences were statistically significant.

The major hypothesis of this study must therefore be altered to read as follows:

Faculty advisors in the College of Literature, Science, and the Arts predict with a reasonable degree of accuracy the level of achievement of entering freshmen, and identify some of the factors which are relevant to a student's actual level of achievement.

Implications

Data clearly show that advisors' predictions by themselves are reasonably accurate. When their predictions are combined statistically with objective test score data, advisors' predictions for the entire population in this study become a major factor in a regression equation that predicts achievement. Such a conclusion only applies to the group as a whole. There are wide and marked differences among advisors which are obscured by data for the group.

If an analysis were to have proceeded no further, data in this study would have added another dimension to literature on clinical prediction. When the analysis is continued, however, this does not occur. Removal of advisors' predictions and development of a second regression equation result in an equation that is only slightly and not significantly less accurate than a regression equation built solely with advisors' predictions. Test variables included in these two

equations are the same; the difference lies in the weighting of each of the separate test score variables. The net conclusion, therefore, is that no real difference exists between the clinical and statistical methods of prediction described in this study.

As clinical predictors, faculty advisors possess the capability for making reasonable estimates of later student achievement. Their estimates, when combined in a regression equation that includes test variables, are no more accurate than the test variables themselves.

Faculty advisors play a major role in the development of a student's educational plans. Had the predictions proved to be successful in a selected student population, the impact on institutions of higher education could have been extensive. If teaching members of a college faculty could make accurate estimates of student achievement, reviews of and additions to college admission practices would have been indicated as possible courses of action.

Advisors however prove to be no more accurate or effective than a variety of aptitude and achievement test scores available on students in this population. But even these measures leave a sizeable margin for error in prediction.

One hopeful sign comes from these data. The Achiever Personality scale (Ach P) of the Opinion, Attitude, and Interest Survey (OAIS) apparently measures something uniquely

different and has a sizeable effect upon prediction. From correlation data presented earlier and from its influence upon the regression equations, Ach P makes a substantial contribution to the prediction of success. Furthermore, it seems possible that the presence of the Ach P scores may have greatly affected selections of advisors, as evidenced by their selection of Academic Motivation as frequently as they do. Because advisors have had much experience using the Ach P score for placement of students in courses and special sections of courses, Ach P may have greatly influenced their denotation of factors related to achievement.

Factors which advisors actually select are substantially different from those originally anticipated. Advisors are apparently equally concerned with factors of personal readiness and of scholastic readiness. Advisors rely heavily upon their own estimates of particular aspects of students' personal maturity in gauging how well they will do in the College. As has been noted earlier, advisors concentrate their choices on four factors relating to a student's maturity:

Clarity of Educational Goals
Appropriateness of Stated Goal
Maturity and Responsibility
Academic Motivation.

There is a certain unity in these factors and the overlap that probably exists among these factors is broad. That these are selected so frequently tends to point toward what must have been a focus of the interview and discussion

between an advisor and a student -- what is a student's immediate objective and what is a student's ultimate objective in the LSA College. In addition, discussion was probably related to a student's attitude toward his studies and toward his stated goal.

Advisors and students do not agree on what is important to achievement. Unlike advisors who mention it frequently, students do not mention scholastic readiness as being important to their achievement. Students focus upon personal readiness, but their focus differs from that of advisors. Students mention maturity, self-discipline, and what may best be described as Image of Academic Life. These factors, being so frequently mentioned, indicate facets of students' interest and concern which ought to be discussed by advisors. In follow-up interviews it became apparent that many illusions held by students regarding academic and social life are shattered. Many do not understand the changed nature of teacher-student relationship, the importance of critical thinking, and the variety of demands placed upon them. When the great quantity of out-of-class time is considered and experienced, students indicate that they find it difficult to gauge or allocate their time. To be able to cope with time and to blend it with academic demands and expectations become central problems of the freshman year.

Aware of this information, faculty advisors should devote more time and effort to discussing with students the

nature of their new academic lives. Whereas students are well-informed about the social life and extra-curricular opportunities, they are quite uninformed or misinformed about the character of academic demands. They indicate a desire to have had such information; many wish that they had simply been better informed and thereby potentially more able to meet academic demands and standards. Information received realistically and authoritatively about the expectancies of the LSA College would have helped many. But even with such knowledge, most students seemed to recognize that a trial-and-error process is necessary if they are to be successful.

Students point to the necessity for achieving self-discipline if academic success is to be achieved. Those who achieve success are apparently those who faced the problem and overcame it. Those with low achievement are those either who avoided confronting the problem or who faced the problem but failed to find an adequate resolution.

The most startling note, however, is the finding that advisors' predictions are generally less accurate after an interview. While the difference in quantitative terms is slight, the data are opposed to the original hypothesis. A few advisors make more accurate predictions after an interview, but the overwhelming effect of all interviews is negative with regard to prediction. Reasons for this are many undoubtedly. The personal impact of a student upon an

advisor, thoughtfulness in discussion with an advisor or self-consciousness in this first interview with a member of the faculty are but a few possible explanations. The interviews seem to affect adversely the ability of an advisor to judge effectively the potential for success of a student. The data however indicate something additional and perhaps even more crucial about the initial interview between an advisor and a student.

Recognizing the need for an appropriate goal and assisting students in finding and reaching such goals are necessary and valuable functions of an advisor. The follow-up interviews as well as the initial data suggest another function for an advisor. Heavy emphasis by advisors on factors related to goals and objectives of students may not be worthwhile. Students are far less concerned with where they are headed and are more concerned with what they will encounter. Factors selected by advisors suggest that an ultimate objective may well represent the focus of the initial interview and such a discussion accounts for predictions advisors ultimately make.

But even more surprising in terms of the original hypothesis is the heavy emphasis advisors place on the personal maturity of students. It was predicted that advisors would place greatest emphasis upon objective evidence of a student's capabilities and preparation. It was predicted that advisors would be far less concerned with person-

ality factors. Data point toward concern for factors that extend far beyond the achievement and aptitude data. Advisors apparently recognize that more than mere ability is necessary to achieve in the LSA College and their selections of factors may well be an attempt to specify some of these additional factors. The follow-up data indicate that other dimensions are present but these are not ones upon which advisors had focused.

Recommendations

This study represents an initial effort to describe one facet of the role of a faculty advisor. Advisors in this study have indicated what factors they believe are relevant to student achievement. Contrasting advisors' selections of factors with students' has value in providing advisors with information concerning the attitudes of their student advisees. This study is based largely on the notion that the more informed an advisor is, the more probable it is that he can assist his student charges.

Advisors should discuss with students the nature of the experience of being a student in the College. Whereas educational and vocational goals are by no means unimportant, students in this study indicate a consistent desire to have known more about what they would be encountering. Discussions of the different character of the collegiate experience, the demands and aspects that are so different from high school, would apparently help them in developing a more

realistic attitude. To these students, at least, the importance of self-discipline, of a need for planning, of a recognition of self-management as important in the conduct of their affairs are points that merit extensive discussion in an initial orientation to the College.

A faculty member is uniquely qualified by inclination and role to perform some of these functions. His availability to students, his knowledge of the demands that the LSA College places on students, his own concern with teaching and research, and his critical position with regard to a student's development and progress make him strategically placed to raise some of these issues with a student. In addition, in view of an advisor's administrative responsibility for assisting a student in planning an academic program, a faculty counselor or advisor can become the one person who is best situated and suited to discussing academic goals and objectives as well as academic necessities of a student's initial collegiate experience. Students in this study have indicated an inadequate understanding of the character of an academic community. As a group, students appear to have been woefully uninformed about what they would encounter, and some apparently were not able to cope with these new and different demands.

Data point quite clearly to the fact that what is important to an advisor is not always as important to a student. Only as advisors learn more about their student

advisees can they assist students in their academic and educational development. Greater knowledge and understanding of students whom they strive to assist should enable them to assist students more adequately.

Prediction of achievement remains a sizeable problem. Students in this study represent a high ability group, one that has already been screened and selected. In such a situation, ordinary predictive tools and techniques are not very helpful. The Ach P of the OAIS clearly adds a new dimension, but even with this potent new addition, there is a sizeable error.

This study is but an initial exploration. No attempt is made herein to differentiate between men and women students, or to consider separately those indicating specific educational or vocational goals from those who indicate no definite or differing objectives, or to isolate or consider in depth any single classification of students. The presence of selected, yet widely-varying students in a liberal arts college that is but one segment of a larger more complex institution makes the identification of achievement-related factors more difficult. Even allowing for those few students for whom unusual or severe mishaps affect ability to succeed academically, variables which affect students in this study remain exceedingly complex. Differences which do appear are ones of degree not of kind.

Further research to discern more clearly the role of

the faculty advisor seems particularly appropriate. Faculty advisors remain in a unique position to render valuable and necessary assistance to students. Further efforts to define their roles, to provide information which can be employed with students, and to measure advisors' impact upon a developing college student, have broad implications for use of faculty members as advisors to students.

Within the context of this study, information has been gathered about achievement-related factors that students and faculty advisors consider important. It is however only a single step leading to a broader and deeper understanding of why one student succeeds in college while another student does not.

FORMS USED BY FACULTY ADVISORS

Name: Last First Middle Initial _____ 1 2 3 4 5 6 7 8 9 0 Advisor _____ Code No.

A. First-year grade-point-average (before interview)

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

B. First-year grade-point-average (after interview)

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

Which of the following do you believe are the most relevant, and thereby serve as a basis for your prediction after interview?

(CHECK THREE: indicate with two checkmarks the one you believe is most important.)

Scholastic Readiness
- __1 High School Attended
- __2 Scholastic Potential
- __3 Reading Ability
- __4 Study Skills
- __5 Quality of Previous Preparation

Estimate of Personal Maturity
- __6 Clarity of Educational Goals
- __7 Appropriateness of Stated Goal
- __ 8 Maturity and Responsibility
- __ 9 Academic Motivation
- __10 Self-Confidence
- __11 Extra-Curricular Experience and Expectations
- __12 Social Adjustment and Adaptability
- __13 Use of Time--Self-Discipline
- __14 Image of Academic Life

Special Factors
- __15 Family Background
- __16 Family Influences and Pressures
- __17 Finances
- __18 Health
- __19 Reason for selecting University of Michigan
- __20 Other Factors (Specify below)

_____ Actual G. P. A.

V M Ach P

_____ S.S. Group

Sp Acc Cr P

_____ Assign. Group

Ach I Ach II Ach III

_____ M F Mich. Non-Mich.

APPENDIX II

ADVISORS' CHECKLIST OF VARIABLES

Scholastic Readiness

- High School Attended
- Scholastic Potential
- Reading Ability
- Study Skills
- Quality of Previous Preparation

Estimate of Personal Maturity

- Clarity of Educational Goals
- Appropriateness of Stated Goal
- Maturity and Responsibility
- Academic Motivation
- Self-Confidence
- Extra-Curricular Experience and Expectations
- Social Adjustment and Adaptability
- Use of time -- Self-Discipline
- Image of Academic Life

Special Factors

- Family Background
- Family Influence and Pressures
- Finances
- Health
- Reason for Selecting University of Michigan

APPENDIX III

DEFINITIONS OF ADVISORS" CHECKLIST OF VARIABLES

Scholastic Readiness	
High School attended	size, quality, location educational offerings
Scholastic Potential	aptitude test scores
Reading Ability	reading speed, reading accuracy
Study Skills	knowledge and use of the tools and techniques of being a student
Quality of Previous Preparation	courses in high school, grades, entrance units, Advanced Placement Program, accelerated classes, CEEB achievement test scores
Estimate of Personal Maturity	
Clarity of Educational Goals	realistic understanding of intended program, ultimate objective, perception of demands and obligations
Appropriateness of Stated Goal	adequacy of background, adequacy of ability, realistic appraisal of personal strengths and weaknesses
Maturity and Responsibility	acceptance of responsibility, personal stability, readiness for College
Academic Motivation	seriousness of purpose, drive, enthusiasm, ambition

Self-Confidence	self-assurance, self-reliance, belief in one's own abilities and potentiality without being either too sure ("cocky") or unsure (scared)
Extra-Curricular Experience and Expectations	number, extent, and variety of activities in high school or college
Social Adjustment and Adaptability	peer relationships, poise, flexibility; adaptability to new situations
Use of time-- Self-discipline	allocation of time, self-management
Image of Academic Life	understanding of the role of a student, appreciations for scholarship, expectations regarding college life

Special Factors

Family Background	occupational and educational attainment of parents, siblings in College
Family Influences and Pressures	demands and expectations of parents, curricular choice, parental desires
Finances	family resources, need for part-time employment, scholarships, or loans
Health	health problems which may affect ability to perform well academically; may be either physical or mental
Reason for Selecting University of Michigan	geography, alumni parents, status, prestige, costs, parental pressures, athletic tender, whim

APPENDIX IV

REQUEST FOR INTERVIEW, INITIAL LETTER

THE UNIVERSITY OF MICHIGAN ANN ARBOR

COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS

JAMES H. ROBERTSON, Assistant Dean

Your College has a continuing concern with the progress being made by its freshmen and the reactions that they have to their first semester. This year a systematic attempt is being made to talk with freshmen about their initial reactions to the College, the changes they have experienced, and those things which have had the most influence on their actual performance. A random sample of the freshman class has been selected for this study.

You are one of the students selected to represent your class in the present research. All that is being asked is that you answer a few questions concerning your experiences thus far. What is being sought from you requires no large amount of time and may be of material value to future freshmen.

I would appreciate the opportunity to talk with you for about thirty minutes. Would you call my secretary, Mrs. Satterthwaite, as soon as possible and arrange for a mutually convenient appointment. You may contact her by calling 663-1511, extension 2991, or by stopping in 1220 Angell Hall.

Thank you.

Sincerely,

Stanley R. Levy
Administrative Assistant

SRL:js

APPENDIX V

INTERVIEW QUESTIONS

_____
Number

1. Have you enjoyed your freshman year?
2. In what ways?
3. What has been the most significant thing that has happened to you thus far?
4. Are you satisfied with your performance thus far in the College?
5. What factors have been the most important in your performance?
6. Have you done as well as, better than, or less well than you thought you would last summer?
7. If there were any things you could change, which would have altered your performance thus far, what would they be?
8. What advice would you give to freshmen entering next fall?

APPENDIX VI

REQUEST FOR INTERVIEW, SECOND LETTER

THE UNIVERSITY OF MICHIGAN ANN ARBOR

COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS

JAMES H. ROBERTSON, Assistant Dean

Two weeks ago your assistance was sought in a research study concerned with the experience of freshmen enrolled in the College. A selected sample of students have been asked to give comments and reactions to a short list of questions concerning their first semester in the College. As yet we have not heard from you and would once again like to enlist your aid.

Therefore, would you pick up the phone now and arrange for a mutually convenient time when I might talk with you? You may contact my secretary at 663-1511, extension 2991.

Your assistance will be greatly appreciated.

Sincerely,

Stanley R. Levy
Administrative Assistant

SRL:js

APPENDIX VII

IBM CARD NUMBER 1, TEST SCORE DATA

COLUMNS	INFORMATION
1	(Blank)
2	Card Number
3 - 17	Identification Number
18 - 19	High School Percentile Rank
20 - 21	CEEB: SAT - Verbal
22 - 23	CEEB: SAT - Math
24 - 25	CEEB: English Composition
26 - 27	Co-op Reading: Speed
28 - 29	Co-op Reading: Accuracy
30 - 31	OAIS: Achiever Personality
32 - 33	OAIS: Creative Personality
34	(Blank)
35	Sex
36	Residence
37	Advisor
38	(Blank)
39 - 40	Orientation Group

APPENDIX VIII

IBM CARD NUMBER 2, ADVISOR DATA

COLUMNS	INFORMATION
1	(Blank)
2	Card Number
3 - 8	Identification Number
9 - 12	Prediction A
13 - 16	Prediction B
17	Sex
18	Residence
19	Advisor
20 - 21	Orientation Group Number
22 - 23	Factor 1
24 - 25	Factor 2
26 - 27	Factor 3
28	High School Attended
29	Scholastic Potential
30	Reading Ability
31	Study Skills
32	Quality of Previous Preparation
33	Clarity of Educational Goals
34	Appropriateness of Stated Goal
35	Maturity and Responsibility
36	Academic Motivation
37	Self-Confidence
38	Extra-Curricular Experience and Expectations
39	Social Adjustment and Adaptability
40	Use of Time--Self-Discipline
41	Image of Academic Life
42	Family Background
43	Family Influences and Pressures
44	Finances
45	Health
46	Reason for selecting University of Michigan
47	Other Factors

APPENDIX IX

IBM CARD NUMBER 3, GRADE-POINT-AVERAGE

COLUMN	INFORMATION
1	(Blank)
2	Card Number
3 - 8	Identification Number
9 - 12	Freshman Year Grade-Point-Average

APPENDIX X

DESCRIPTION OF LINEAR STEP-WISE REGRESSION EQUATION*

In order to simplify the description of the stepwise generation of the predicting equation, an example will be used. Suppose there are 5 independent or predictor variables x_1, x_2, x_3, x_4, and x_5 which are to serve as candidates for predicting the dependent variable y.

The first step consists of finding the best single predictor of y from among the x-variables. This is done by scanning the list of correlation coefficients between the x-variables in turn and y. That x-variable having greatest (in absolute value) correlation with y is selected to form the first predicting equation. If this variable were x_3, then the first predicting equation would be

$$y = a + b_3x_3. \qquad (2)$$

The a and the b_3 in (2) are computed by the method of least squares.

Once a predicting equation is formed, subsequent steps are of a slightly different form. The x-variables are divided into two sets: one consisting of all those which are presently in the predicting equation, and the other consisting of the remaining x-variables which are not in the

* Dallemand, James E. Stepwise Regression Program on the IBM 704. GMR 199. General Motors Research Staff, Research Laboratories, General Motors Corporation, November 6, 1958. Pp. 4-7.

equation. An "importance factor" is calculated for each variable in the first set. These "importance factors" measure the relative importance of each variable in the equation to the prediction. The smallest of these "importance factors" is then isolated, and if it is less than some minimum importance level specified, that corresponding variable is removed from the equation before continuing. (This minimum level will be discussed later.)

If all the "importance factors" for variables in the equation are greater than the minimum value, then the procedure goes about selecting a variable from the second class to add to the equation. For each variable in this second class, a "potential importance factor" is computed. These factors measure the relative contribution each variable not in the equation would make to the prediction of y if it were put into the equation. The greatest of these quantities is isolated, thus selecting the "best" variable for entering into the equation at that point. However, before the insertion into the equation is performed, a test is made comparing the maximum "potential importance factor" against a specified threshold level. The variable is inserted only if its potential contribution exceeds this threshold. If it does, the variable is inserted, new a's and b's are computed, the x-variables are separated into new sets, and the procedure is repeated.

Computation is terminated whenever either all x-variables are in the equation or whenever the potential contri-

bution of none of the variables not in the equation fails to exceed the threshold for entering variables.

Returning to the example, suppose that in Step 2, x_3 was found to have an "importance factor" greater than the minimum, and variable x_4 was found to make the greatest potential contribution, also greater than the threshold value. Then at the end of the second step, a new equation would result:

$$y = a' + b_3'x_3 + b_4x_4. \tag{3}$$

Note that primes have been written on the a and b_3 quantities since after the addition of x_4, these a's and b's no longer have the same values as they had in equation (2).

Continuing with the example, suppose that in Step 3, again nothing was removed, and variable x_1 was added to produce

$$y = a'' + b_1x_1 + b_3''x_3 + b_4'x_4. \tag{4}$$

Here again the coefficients in (3) take on new values when x_1 is introduced and hence the primes and double primes in (4).

A situation might now exist where the combination of x_1 and x_4 behaved almost exactly like x_3 and consequently the total effect was similar to having x_3 in the equation twice. In this instance, the importance factor for x_3 might be extremely small and even below the minimum limit. Consequently, on the 4th step, variable x_3 would be removed, and the result would appear as

$$y = a''' + b_1'x_1 + b_4''x_4 \tag{5}$$

In Step 5, variable x_5 might be added, and on the following step it might be concluded that no variables could be removed or entered. Then, the final equation would appear as

$$y = a^{(iv)} + b_1'' x_1 + b_2 x_2 + b_4''' x_4 \qquad (6)$$

In addition to the number of the variable entering or being removed and the a-value and b-values at each step, the computer program makes available some other statistics which can be interpreted to give a measure of the goodness of fit or prediction at each step.

APPENDIX XI

DETAILED DESCRIPTION OF REGRESSION EQUATION: ALL VARIABLES INCLUDED

STEP	EQUATION
1	$Y' = 1.0062 + .6094\ (9)$
2	$Y' = .9812 + .0058\ (1) + .4787\ (9)$
3	$Y' = .8720 + .0053\ (1) + .0044\ (7) + .4389\ (9)$
4	$Y' = .5203 + .0049\ (1) + .0128\ (4) + .0042\ (7) + .3080\ (9)$
5	$Y' = .5054 + .0048\ (1) + .0120\ (4) + .0040\ (7) + .1889\ (9) + .1492\ (10)$
6	$Y' = .4230 + .0048\ (1) + .0063\ (2) + .0096\ (4) + .0042\ (7) + .1409\ (9) + .1392\ (10)$
7	$Y' = .4588 + .0049\ (1) + .0081\ (2) + .0097\ (4) + .0042\ (7) + .2162\ (10)$
8	$Y' = .3256 + .0048\ (1) + .0069\ (2) + .0049\ (3) + .0097\ (4) + .0042\ (7) + .1831\ (10)$

For definitions of Variables, see Footnote to Table IX, page 83.

APPENDIX XII

DETAILED DESCRIPTION OF REGRESSION EQUATION: ADVISORS' PREDICTIONS EXCLUDED

STEP	EQUATION
1	$Y' = 1.129 + .025\ (4)$
2	$Y' = .995 + .007\ (1) + .020\ (4)$
3	$Y' = .849 + .006\ (1) + .019\ (4) + .005\ (7)$
4	$Y' = .550 + .006\ (1) + .013\ (2) + .012\ (4) + .005\ (7)$
5	$Y' = .3191 + .0051\ (1) + .0101\ (2) + .0077\ (3) + .0109\ (4) + .0050\ (7)$

For definitions of Variables, see Footnote to Table IX, page 83.

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