Testing a Model of Degree Progress Among African-American Graduate Students

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LOYOLA UNIVERSITY CHICAGO

TESTING A MODEL OF DEGREE PROGRESS
AMONG AFRICAN-AMERICAN GRADUATE STUDENTS

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

DEPARTMENT OF COUNSELING PSYCHOLOGY

BY
MARY F. TOLIVER

CHICAGO, ILLINOIS
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CHAPTER I
INTRODUCTION

Attrition can be defined as a gradual reduction in number of membership due to constant stress. Attrition of college students pertains to a gradual reduction in the number of men and women attending institutions of higher education resulting from several factors. The study of attrition among African-American students at the undergraduate level has been addressed by many researchers in the past (Astin, 1975; Blackwell, 1983; Brown, 1981; Carter, 1989; Cross & Astin, 1981; Mannan & Preusz, 1980; Richardson & Gerlach, 1980; Smith, 1983; Young, 1981). These studies tend to suggest that the attrition process among African-American college students results from several complex factors, such as academic problems related to inadequate preparation, the quality of teaching, and academic support in colleges, insufficient finances, interpersonal complications, difficulties with faculty or family life, health problems, and a hostile institutional environment. However, few studies have focused on the attrition of African-American graduate students.

African-American graduate students face similar challenges as undergraduate students in their attempt to earn a master's or doctoral degree. Yet, the attrition rate
for African-American graduate students can have a greater impact on society. The availability of African-Americans for professional positions and leadership roles is dependent on the successful completion of graduate degree programs (Lehner, 1980). However, little information is available on the factors associated with African-American graduate student retention or degree completion. Furthermore, little is known about the reasons why some African-American graduate students complete their degree and others leave before earning a degree.

Attrition, retention, and success in graduate school have been addressed in the literature. Attrition or the dropout rate differs at the graduate level than at the undergraduate level. The dropout rate also differs for women and minorities compared to men and non-minorities at each step along the educational process, including graduate school (Berryman, 1983). Studies tend to focus on retention rather than degree completion. At the undergraduate level, retention is associated with continued registration usually during the sophomore year. However, at the graduate level continued registration does not necessarily lead to degree completion. On the other hand, success is considered to be earning a degree (Berg & Ferber, 1983; Matthews & Jackson, 1991; Ott, Markewich, & Ochsner, 1984). Although success can be defined as earning a bachelor's degree at the undergraduate level, it is not so easily defined at the
Girves and Wemmerus (1988) developed a model of graduate student degree progress. In their study, the idea of retention or success was replaced with the concept of degree progress. Instead of focusing on master’s or doctoral degree earned, they examined milestones attained. Five steps or milestones were identified in the graduate degree process. At the master’s level, there were two steps: (1) courses are taken but no degree was earned, and (2) the master’s degree was earned. At the doctoral level, there were three steps: (1) courses beyond the master’s were completed, (2) the comprehensive examination was completed, and (3) the doctoral degree was earned.

Girves and Wemmerus (1988) presented a model that links department and student characteristics, financial support, and student perceptions of the faculty with student grades, involvement in the program, satisfaction with the department, and alienation in order to predict progress toward the master’s and doctoral degrees. Their conceptual model of graduate student degree progress built upon the theoretical and empirical works of Spady (1971), Tinto (1975), and Bean (1980). They also included other factors considered essential to the graduate education experience: (1) the student/advisor relationship, and (2) financial support.

The conceptual model of graduate student degree progress attempts to show graduate grades, involvement in
one's program, satisfaction with department, and alienation to be directly related to degree progress. Grades were expected to be a better predictor of master's degree progress than of doctoral degree progress because of range restriction which results in little variation among graduate grades, especially at the doctoral level. Involvement in one's program is very important at the graduate level. Not only does a student learn the norms and expectations of the discipline, but also a student is able to participate in projects and other activities outside the classroom with faculty and other graduate students. Satisfaction has been shown to be a factor in the retention of undergraduates (Bean, 1980; Pascarella, 1980; Tinto, 1975). The level of satisfaction for graduate students would likely be higher for those who have completed their degree program. African-American students often feel alienated (Loo & Rolison, 1986). The degree to which faculty express feelings of acceptance, support, and encouragement will influence feelings of belonging, which could influence retention (Tinto, 1975).

Girves and Wemmerus' (1988) conceptual model also include department characteristics, student characteristics, financial support, and students' perceptions of their relationship with faculty as being related to grades, involvement in one's program, satisfaction with the department, and alienation. Department characteristics were
expected to influence grades, involvement in one's program, satisfaction with the department, and alienation. Student characteristics were expected to influence grades, involvement, and alienation. One of these characteristics, enrollment status, was expected to have a direct relationship to degree progress. Financial support was expected to influence involvement and alienation. Students' perceptions of their relationship with faculty were expected to influence involvement, satisfaction, and alienation.

**Statement of the Problem**

Girves and Wemmerus' (1988) conceptual model of graduate student degree progress identified department and student characteristics, financial support and students' perceptions of the faculty as having influences on grades, involvement in one's program, satisfaction with the department, and alienation, which are directly related to degree progress. Since graduate degree programs consist of master's and doctoral degrees, degree progress was examined at both levels.

Girves and Wemmerus' (1988) first step in testing their model was to reduce the list of variables. Simple correlations of all the variables with degree progress at both the master's and doctoral level were examined. They deleted variables from the model that were not related to degree progress at either level. Next, they tested the conceptual model using hierarchical regression with sets of
variables. This method allowed Girves and Wemmerus to examine the relationships of department and student characteristics, financial support, students' perceptions of their relationship with faculty with grades, involvement in one's program, satisfaction with the department, and alienation with degree progress at the master's and doctoral level, however it focused on prediction and not causation among these variables. Furthermore, Girves and Wemmerus did not examine measures of goodness of fit to determine the overall fit of the model.

This study seeks to test the causal structure of Girves and Wemmerus' (1988) model of graduate student degree progress for masters and doctoral students using structural equation modeling techniques of EQS. This study will also test whether the model of graduate student degree progress can be applied to an African-American graduate student population.

**Research Questions**

This study will address the following research questions:

1. What is the overall strength of the causal structure of Girves and Wemmerus' (1988) model of graduate student degree progress?

2. What is the relative importance of department and student characteristics, financial support, perceptions of the faculty with grades, involvement in one's program,
satisfaction with department, and alienation in the prediction of degree progress?

3. How does degree progress vary in relation to grades, involvement, satisfaction, and alienation?

4. How do department characteristics and student characteristics relate to grades?

5. How do department and student characteristics, financial support, and perception of the faculty relate to involvement?

6. How do department characteristics and perception of the faculty relate to satisfaction with department?

7. How do department and student characteristics, financial support, and perception of the faculty relate to alienation?

**Significance of the Study**

If this study finds significant relationship between the predictor variables and degree progress for African-American graduate students at the master’s and doctoral levels, there may be potential benefits for understanding degree completion of this ethnic group in several ways:

1) there may be greater understanding of degree progress of African-American graduate students and variables which are associated with it;

2) predictors of degree progress for African-American graduate students may be found;

3) strategies for enhancing retention and degree
completion could be identified for African-American graduate students.

**Method**

This research proposed a descriptive and correlational study of factors considered to influence degree progress for African-American graduate students. The sample will be large enough to permit statistical analysis using structural modeling techniques. Measurement of the variables in this study will be sought using the questionnaire developed by Girves and Wemmerus (1988). Replication of the existing models in Girves and Wemmerus' study will be attempted.

The research will study African-American graduate students in two samples. One group will consist of those students who have attained the two steps of degree progress at the master's level. Participants in the other group will be those students who have attained the three steps of degree progress at the doctoral level.

The questionnaire developed by Girves and Wemmerus (1988) to measure degree progress will be used. Questions about demographics will also be asked. The validity of Girves and Wemmerus' models of predicting graduate student degree progress will be analyzed.

**Summary**

This chapter introduced the problem of degree progress among graduate students. Degree progress is important in retention and degree completion. Girves and Wemmerus'
research found factors related to the concept of academic integration to predict degree progress: graduate grades for master's level students and involvement in one's program for doctoral level students. This finding may differ for African-American graduate students. In order to develop strategies for improving retention and graduate degree completion among African-American students, it is important to know if and how the degree progress patterns differ for these students.

Chapter II will present a review of the related literature of attrition in higher education, models of student attrition, and attrition of African-American students. Also, Girves and Wemmerus' (1988) conceptual model of degree progress will be explained. Chapter III will describe the methodology of the study, including research questions, sample, instrumentation, variables, and procedures for data collection and analysis. Chapter IV will present the results of the hypothesis testing, the structural equation modeling, and comparisons of the master's and doctoral level groups. Chapter V will discuss and analyze the results and make recommendations regarding application of findings to the graduate school and individuals interested in the retention of African-American graduate students.
CHAPTER II

REVIEW OF THE LITERATURE

The previous chapter stated the problem, identified several research questions, and proposed the research study.

This chapter will review theory and empirical findings of the major variables in this study. First, attrition will be defined and models of student attrition will be reviewed. Attrition of African-American students will be discussed next, beginning with undergraduates and the factors influencing their retention. Factors influencing graduate students' retention will be examined in the next section. In the last section, an explanation of Girves and Wemmerus' (1988) study of graduate student degree progress and the factors identified in their model will be summarized as follows: degree progress, grades, involvement, satisfaction with department, alienation, department characteristics, student characteristics, financial support, and perceptions of the faculty.

Attrition

Attrition can be defined as a gradual, natural reduction in membership or personnel, as through retirement, resignation, or death. Attrition in higher education pertains to a reduction in the number of college students.
attending institutions of higher education. Individuals that leave institutions of higher education are labeled "dropouts." Past research has addressed student attrition and dropout from higher education extensively.

Defining dropouts from an individual perspective refers to the goals and intentions the individual established upon entering a college or university. In general, the higher the level of one’s intentions, expressed in terms of educational or occupational goals, the greater the likelihood of college completion (Astin, 1975; Rossmann & Kirk, 1970; Weingartner, 1981). Although the goals and intentions of a student prior to entering an institution are important, an individual’s commitment to his/her goals must be taken into consideration.

Individual commitment, which can be expressed as motivation, drive, or effort has proved to be inversely related to withdrawal from institutions. Several studies found that a person’s willingness to work toward his/her goals is an important component of the process of persistence; while the lack of willingness proved to be a critical part of student departure (Cope & Hannah, 1975; Pace, 1980).

Along with individual commitment, the institutional commitment of an individual further distinguishes betweenpersisters and withdrawals, especially those who transfer to other institutions (Pascarella & Terenzini, 1980; Terenzini,
Lorang, & Pascarella, 1981). Terenzini, Lorang, and Pascarella (1981) found individuals who are committed to graduating from a specific institution are more likely to complete than those whose commitments are not as specific. However, goals, intentions, and commitments tend to change over time. Goals and intentions may, in some cases, lead directly to departure, since they not only set the boundaries of a student’s participation in higher education, but also shape the student’s experiences within the institution after entry. Thus, what happens after entry, is in most cases, more important to the process of student departure than what occurs prior to entry (Tinto, 1982).

Defining dropouts from an institutional perspective refers to the different types of leaving behaviors (i.e., academic dismissals, voluntary withdrawals, transfers, temporary withdrawals). The problem of defining dropouts from an institutional perspective involves distinguishing between which types of leaving behaviors are considered dropouts and which are a natural result of the functioning of the institution. Tinto (1982) makes this point, "understanding these differences is both the beginning point of understanding dropout from the institutional perspective and the groundwork for developing effective institutional policies for student retention" (p. 9).
Models of Student Attrition

Understanding student attrition involves: a) defining dropout; b) deciding what variables to measure; and c) selecting a model that examines the relationship among the variables to be used (Bean, 1982). This process should be based on theory. Theories of student attrition serve two purposes: 1) to explain why students withdraw from school, and 2) to predict which students are more likely to withdraw from school. From theories, researchers develop models that put the theories into reality. Bean (1982) points out that a model of student attrition is a representation of the factors presumed to influence decisions to dropout of an institution and it identifies the interrelationship among the various factors and the relationship between these factors and the decision to dropout.

Several models have been proposed by past research to help understand the process of student attrition at the postsecondary level. One theoretical model of the dropout process was developed by Spady (1970). Spady borrowed Durkheim’s (1961) idea that shared group values and friendship support were expected to reduce suicide. Using these constructs, Spady formulated a model of the dropout process from a sociological perspective. This theory provided the foundation for Spady (1971), Tinto (1975), and Pascarella and Terenzini (1980) models of student attrition. In all these models, social and academic integration were
both expected to influence the decision to dropout. These constructs, social and academic integration correspond to Durkheim’s constructs of shared group and friendship support.

Spady’s (1971) model specified that the decision to dropout resulted from a longitudinal process. He identified important background characteristics in the dropout process such as: family background, academic potential, ability, and socio-economic status. He also identified normative congruence and friendship support, and Durkheim’s (1961) ideas, as important variables in his model. To these variables, Spady added grade performance and intellectual development. The model indicated that all these factors lead to greater social integration. Social integration was expected to increase satisfaction, which was expected to increase institutional commitment. At the last stage in the process, institutional commitment was expected to decrease the likelihood of dropout.

Tinto’s (1975) model is very similar to Spady’s (1971) model of student attrition. His model identified family background characteristics, which interacted with each other and were expected to influence both goal commitment and institutional commitment. Tinto’s linear model also identified two types of systems within an institution: academic and social. In the academic system, goal commitment, grade performance and intellectual development
were variables that were expected to facilitate an individual's integration into the academic system. Goal commitment leads to higher grade and intellectual development. Increased grade performance and intellectual development lead to academic integration. Once an individual was integrated into the academic system, this leads to greater goal commitment in the academic system. In addition to goal commitment, Tinto identified institutional commitment. Commitment to the institution leads to peer group and faculty interaction. Peer group and faculty interaction was expected to lead to greater social integration. This increased social integration increased an individual's institutional commitment in the social system. It was this institutional commitment that was expected to reduce the likelihood of dropout.

Pascarella and Terenzini's (1980) model of the student attrition process emphasized the importance of a student's informal contact with faculty members in the decision to dropout. Their model identified background characteristics, which were expected to have direct influence on institutional factors. These institutional factors included administrative policies and decisions, size, admissions, and academic standards. The institutional factors were expected to influence informal contact with faculty members. A student's informal contact with faculty members was expected to influence other college experiences, such as peer groups,
classes, and extracurricular activities. These college experiences influenced a student's informal contact with faculty members. Informal contact with faculty members also influence educational outcomes. Pascarella and Terenzini identified educational outcomes as academic performance, intellectual development, college satisfaction, and institutional integration. These educational outcomes in turn, influenced informal contact with faculty members. It was these educational outcomes that were expected to directly influence withdrawal decisions.

Bean's (1980) model of student attrition was adapted from a model developed by Price (1977) of turnover in work organizations. Bean made the assumption that student attrition was similar to turnover in work organizations. In other words, students leave colleges and universities for the same reasons employees leave work organizations. This model contained four categories of variables: 1) the dependent variable, dropout; 2) the intervening variables, satisfaction and institutional commitment; 3) the organizational determinants; and 4) the background variables. The model indicated that the background variables influenced a student's interaction with the institution. The student's interaction with the institution was based on his/her perceptions of objective measures, such as grade point average or belonging to an organization, as well as subjective measures, such as the practical value of
the education received and the quality of the institution. These variables were expected to increase the level of institutional commitment. Institutional commitment was expected to reduce the likelihood of dropout.

Degree Progress

In this section, the degree progress construct will be defined, Girves and Wemmerus’ (1988) conceptual model will be discussed, and the findings of their research summarized.

Definition of the Degree Progress Construct

Progress is defined as movement toward a goal. For a graduate student, the goal is to obtain a master’s degree or a doctorate in a specific area of discipline. Thus, degree progress can be considered as the movement toward a specific degree. The movement would consist of examining the process from the time a graduate student first enrolls in a graduate degree program to the time a graduate student completes the program, and has obtained the degree of interest.

The process of earning a graduate degree varies from one university to another. A graduate student’s progress is influenced by policies and requirements established by the institution. For instance, at the university where data were gathered, according to policy, the master of arts (M.A.) and master of science (M.S.) must be completed in no more than five years. For the degree of doctor of philosophy (Ph.D.), a student has approximately six years to complete all requirements. In addition, the diversity of
graduate work in different programs imposes individual department requirements that influence degree progress.

Girves and Wemmerus (1988) examined degree progress as milestones attained. They chose not to focus on whether a student earned a master's or doctoral degree, but instead five steps in the process that a graduate student is likely to achieve as he or she moves toward completion of the degree program. At the master's level, there were two steps: 1) courses were taken but no degree was earned, and 2) the master's degree was earned. At the doctoral level, three steps were identified: 1) courses beyond the master's were completed, 2) the general examination was completed admitting the student to doctoral candidacy, and 3) the doctoral degree was earned.

A Conceptual Model of Graduate Student Degree Progress

Girves and Wemmerus' (1988) developed a conceptual model of graduate student degree progress. Their model consisted of two stages, where each stage contained four sets of variables. In various combinations, the first stage variables were expected to affect the second-stage variables and in turn, these second-stage variables would directly affect graduate student degree progress.

The first-stage variables consisted of four sets of variables: a) department characteristics; b) student characteristics; c) financial support; and d) perceptions of the faculty.
Department Characteristics. These were operationalized according to Biglan's (1973) three dimensions: 1) hard/soft science, with hard science being characterized by the existence of paradigms; 2) applied/basic research, which distinguishes between practical application and basic research; and 3) life/non-life, which categorizes departments based on the study of living or inanimate objects.

Biglan (1973) examined relationships between the characteristics of academic subject matter and the structure and output of university departments. He found that depending on the characteristics of the academic subject, scholars differed in four areas: 1) the degree to which they were socially connected to others; 2) their commitment to teaching, research, and service; 3) the number of journal articles, monographs, and technical reports that they published; and 4) the number of dissertations that they sponsored. These results lead Girves and Wemmerus to propose that the experiences of graduate students could also vary depending on the characteristics of their academic disciplines.

Feldman and Newcomb (1969) point out that the academic department is an important part of an undergraduate's experience. Departments are like "home" to faculty and students. Faculty provide teaching, research, and service to these departments. As for students, a large part of
their encounters, particularly during the later years of college, involve completing course requirements within these departments.

Once a student enters a graduate program, the student’s experience within the department becomes more focused and intense. At the graduate level, the student’s interactions with other graduate students, faculty, administrators, and staff become an important part of that experience. The characteristics of a department and the norms and expectations of the faculty may have an effect on social integration. Tinto (1975) believed that if these interactions, seen as social integration, were successful, they should increase the likelihood that a student will remain in college.

Girves and Wemmerus (1988) also included several characteristics of the student body as part of department characteristics. They were the number of students, percent female, percent white, and percent foreign. These were used as indicators of student subcultures. According to Spady (1970), "social integration, as it pertains to persistence in college, may be influenced by "congruence" with some part of the social system. Students with similar values, attitudes, and interests established closer relationships or "friendship support" that provides opportunities for greater social integration. Overall, Girves and Wemmerus expected these department characteristics to influence grades,
involvement, satisfaction, and alienation.

Student Characteristics. Girves and Wemmerus (1988) included ten variables in the set of student characteristics. They were: 1) age; 2) gender; 3) ethnic group; 4) marital status at entry; 5) change in marital status; 6) parental status at entry; 7) change in parental status; 8) residency; 9) undergraduate grade point average; and 10) registration status.

Bean (1985) examined factors affecting college student dropouts and found that age was not a predictor of retention at the undergraduate level.

Ott, Markewich, and Ochsner (1984) developed a model to predict retention of graduate students. Age was not found to be a predictor of retention for both master’s students and doctoral students.

Gender has been found to be a significant factor in persistence at the undergraduate level (Spady, 1970). However, gender at the graduate level is not a significant factor of retention by itself. Berg and Ferber (1983) found difference in gender within academic departments. Male graduate students were more likely to be successful in disciplines with a higher proportion of male faculty, i.e., physical and biological science than female graduate students. Women were more likely to be successful in education, a department with a higher proportion of female faculty. Ott, Markewich, and Ochsner (1984) found similar
differences between male and female graduate students within academic departments. At the doctoral level, predicted retention rates were greater for males than females in the mathematical, physical sciences, and engineering departments. On the other hand, predicted retention rates were greater for females than males in the behavioral and social sciences departments.

Ethnic group was found to be a predictor of retention at the undergraduate level (Pascarella, 1980; Pascarella & Chapman, 1983). However, there were differences found in the retention of certain ethnic groups at the graduate level. Matthews and Jackson (1991) examined difference by gender of determinants of retention for African-American graduate and professional students. In predicting retention for African-American students in professional schools, financial resources were more critical determinants of retention, especially for females. However, for African-American students in graduate school, Matthews and Jackson speculated that differences in retention may include factors such as feelings of alienation, perceptions of progress, and the existence of mentors. These factors considered nontraditional, were not included in their model.

Girves and Wemmerus (1988) expected getting married/being coupled and/or becoming a parent while enrolled in graduate school to influence degree progress. They expected the impact to affect men and women differently and to
directly affect involvement in one's program. However, neither of these characteristics has been examined in undergraduate retention models or at the graduate level. Furthermore, differences were expected in degree progress between foreign and domestic students, although little evidence exists to support their predictions.

Past educational background, particularly high school grade point average, has been shown to be an important predictor of future college performance, but not directly related to college dropout (Astin, 1971; Tinto, 1975). Likewise, undergraduate grade point average has been shown to be predictor of first year graduate grade point average (Livingston & Turner, 1982). Yet, neither high school grade point average and undergraduate grade point average may not be directly related to degree progress. Girves and Wemmerus used the graduate grade point average as the measure of student academic performance in their study.

Ott et al. (1984) found that one's registration status at the time of entry into graduate school (full-time or part-time) is an important factor associated with retention and degree completion of graduate students. They suggested that full-time rather than part-time status may be related to greater goal commitment and a higher degree of social integration. Both of these characteristics would be expected to lead to greater likelihood of persistence, according to Tinto's model.
Overall, Girves and Wemmerus (1988) expected this set of student characteristics variables to influence grades, involvement, and alienation. They also expected full-time enrollment status to be directly related to degree progress.

Financial Support. Financial support for graduate education can come in different forms. Scholarships and fellowships are used to recruit prospective graduate students to an institution. Academic departments may provide employment in the form of research, teaching or graduate assistantships, which play an important part in a graduate student’s educational experience. As an assistant, a student is given an opportunity to work with other graduate students, faculty and staff in the department. While working in the department, the student learns the norms and expectations of the department as he/she becomes part of the instructional or research team. This interaction with faculty in the department is an important part of the social integration component of Tinto’s model. The greater the social integration a student experiences, the greater the commitment to the institution and the less likely the student is to dropout. Rodriguez et al. (1984) suggested that fellowship students, particularly minorities, may miss out on the socialization process and may become isolated and even alienated from the department.

However, many students are dependent upon their own resources to finance their graduate education. These
resources may include savings, spouse's/partner's income, full-time or part-time employment outside the university, or loans. Students that rely on these sources are more likely to continue to assess the costs and benefits of staying in school. Employment outside the university can demand more time, distract students from their studies, and can slow the student's progress through the program. Loans could motivate a student to either complete the degree program quickly or withdraw from the program to avoid more debt. Then, there are those students who apply for financial support and are not able to receive assistance. These students are expected to withdraw early or postpone graduate studies until a later time. For African-American graduate students, financial support plays an important role in retention. Matthews and Jackson (1991) found financial resources to be a more critical determinant of retention, especially for females. Solomon (1976) pointed out that women graduate students are more likely to be teaching assistants rather than research assistants and receive on the average somewhat lower financial support, as compared to men graduate students. Girves and Wemmerus (1988) predicted that financial support variables would influence both involvement in one's program and alienation.

Perceptions of Faculty. The relationship between a student and the faculty is the key element that distinguishes graduate education from undergraduate
education. Faculty members serve as role models and mentors, determine where the student is employed, determine the area of specialization, and impact the norms and expectations of the department (Girves & Wemmerus, 1988).

Girves and Wemmerus (1988) focused on graduate students' perceptions of their relationship with the faculty, especially with their adviser. The adviser's quality as a scholar and teacher, concern for students, and usefulness in providing information to progress through the program, and whether the adviser treated students as junior colleagues were variables examined in this relationship. Both adviser's quality as a scholar and teacher and concern for students has been found to be predictors of retention (Bean, 1985; Pascarella, 1980). Berg and Ferber (1983) found differences in the number of faculty who treated graduate students as colleagues. Men reported knowing more faculty members and being treated more as junior colleagues than women. They suggested that this is a function of the number of men and women faculty in the department.

Grades. Girves and Wemmerus (1988) used the graduate grade point average as the measure of student academic performance. They expected grades to be a better predictor of master's degree progress than of doctoral degree progress because of range restriction which results in little variation among grades at the doctoral level. They also expected grades to be a function of both department and
student characteristics.

Involvement in One's Program. Increasing a student's involvement in his/her own education is one way of improving the quality of the educational experience as well as improving retention (Bean, 1980; Noel, 1985; Tinto, 1975). Involvement in one's program is more important at the graduate level than the undergraduate level. Involvement means that a student participates in projects and other activities outside the classroom with faculty and their peers. Feldman (1974) reported that women are viewed as less dedicated and less promising by faculty. One may speculate whether there is a relationship between this perception of the faculty and involvement in one's program. This is particularly important at the graduate level since faculty in many disciplines are predominantly male.

Tidball (1976) found both men and women faculty tend to be more supportive of students of their own sex. Berg and Ferber (1983) found in interacting with faculty, students were more likely to form close professional relationships with faculty of the same sex. Tidball (1973) suggested that receiving less encouragement from men faculty may help to explain why women students are more successful in earning graduate degrees in departments with a relatively higher proportion of women faculty.

If women graduate students are at a disadvantage in finding role models and mentors, relationships with their
peers might be expected to become relatively more important. However, Herman and Sedlacek (1973) found male graduate students perceived their female peers to be different from their male peers and interact less with female peers than with male peers. Girves and Wemmerus (1988) expected department and student characteristics, financial support, and perceptions of faculty would influence involvement.

Satisfaction with Department. Satisfaction has been found to be a significant factor in the retention of undergraduates (Bean, 1980; Pascarella, 1980; Tinto, 1975). Berg and Ferber (1983) found no difference in satisfaction between men and women at the graduate level. There was no difference in the level of satisfaction by ethnic group for undergraduates (Loo & Rolison, 1986). Girves and Wemmerus (1988) predicted that satisfaction would be a function of department characteristics and perceptions of the faculty.

Alienation. Alienation can be defined as "... the outcome of one's holding values highly divergent from those of the social collectivity, and ... insufficient personal interaction with other members of the collectivity" (Loo & Rolison, 1986). Women often feel alienated (Berg & Ferber, 1983; Harnett, 1981) as well as minority students (Loo & Rolison, 1986; Suen, 1983). Matthews and Jackson (1991) speculated that the determinants of retention for African-American females in graduate schools and African-American males in professional schools may include factors such as
feelings of alienation, perception of progress, and the existence of mentors. Tinto (1975) suggested that the degree to which faculty express feelings of acceptance, support, and encouragement will influence a student’s feelings of belonging, which could influence retention. Girves and Wemmerus (1988) expected alienation would be a function of department and student characteristics, financial support, and perceptions of the faculty.

Summary

The literature review focused on attrition and models of attrition, attrition and African-American students, and Girves and Wemmerus’ (1988) conceptual model of graduate student degree progress. Theoretical bases and relevant research findings in each area were presented. The variables in Girves and Wemmerus’ model of degree progress were presented and the relationship between them were discussed.

Based on this review of the literature, attrition among students in higher education are influenced by background characteristics as well as variables associated with the educational process. Models of student attrition have been developed to examine the factors presumed to influence the decision to dropout and their interrelationship. However, these models have been developed based on undergraduate students. Girves and Wemmerus (1988) developed a model of degree progress that attempts to explain factors associated
with graduate student retention. These factors which may affect degree progress include department characteristics, student characteristics, financial support, perceptions of the faculty, grades, involvement in one's program, satisfaction with department, and alienation.

In Chapter III, the methodology of this study will be presented, including hypotheses, design, instrumentation, description of subjects, and procedures for data collection and statistical analysis.
CHAPTER III

METHODS

The previous chapters introduced the research questions of this study, and reviewed the relevant literature in attrition/retention models, attrition of African-American students, and factors influencing graduate student degree progress. This chapter presents the hypotheses of the study, the study design, the instrument used, the methods employed in selecting and recruiting the sample, and the procedures followed to collect and analyze the data.

Hypotheses

This research assessed degree progress of African-American graduate students at the masters and doctoral levels. The purpose was to confirm Girves and Wemmerus' (1988) model of graduate student degree progress for masters and doctoral students, and to test whether the model of graduate student degree progress applied to African-American graduate students. In the hypotheses, the dependent variable was degree progress, and the independent variables were graduate grades, involvement in one's program, satisfaction with the department, alienation, department characteristics, student characteristics, financial support, and students' perceptions of their relationship with the
The following hypotheses were tested:

H1: There is no relationship between grades, involvement, satisfaction, alienation, and degree progress.

H2: There is no relationship between department characteristics, student characteristics, and grades.

H3: There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty and involvement.

H4: There is no relationship between department characteristics, perceptions of the faculty, and satisfaction with the department.

H5: There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, and alienation.

H6: There is no relationship between department characteristics, student characteristics, grades, and degree progress.

H7: There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, involvement, and degree progress.

H8: There is no relationship between department characteristics, perceptions of the faculty, satisfaction with department, and degree progress.

H9: There is no relationship between department characteristics,
characteristics, student characteristics, financial support, perceptions of the faculty, alienation, and degree progress.

H10: There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, graduate grades, involvement, satisfaction, alienation and degree progress.

In addition to the variables measured for hypothesis testing, other data were gathered to identify other factors which could predict degree progress. These data included employment history while attending graduate school, qualities of their relationship with their advisor and mentor, and problems or barriers to degree completion.

Design

The design for this study was descriptive, correlational, and linear structural equation modeling. Girves and Wemmerus' (1988) conceptual model of graduate student degree progress was used for analysis (see Figure 1). Their conceptual model built upon the theoretical and empirical works of Spady (1971), Tinto (1975), and Bean (1980), and included other factors they considered essential to the graduate education experience: the student/adviser relationship and financial support. The model contained two stages. Stage one consisted of four sets of variables related to (1) department characteristics, (2) student characteristics, (3) financial support, and (4) student
Figure 1. Girves and Wemmerus' (1988) Conceptual Model of Graduate Student Degree Progress

perceptions of their relationship with the faculty. In various combinations, these first-stage variables were expected to affect the four intervening variables in stage two. In the second stage, the intervening variables consisted of (1) graduate grades, (2) involvement in one's program, (3) satisfaction with the department, and (4) alienation. They expected the four intervening variables would contribute directly to graduate student degree progress (see Table 1).

For the purpose of analysis, degree progress was selected as the dependent variable. The concept of degree progress examined the milestones attained instead of focusing on masters or doctoral degree earned. Five steps were identified in the graduate degree process. Two steps were identified at the masters level: (1) courses are taken but no degree is earned, and (2) the masters degree is earned. Three steps were identified at the doctoral level: (1) courses beyond the masters are completed, (2) the general examination is completed admitting the student to doctoral candidacy, and (3) the doctoral degree is earned (see Table 2).
Table 1

Variables Included in the Conceptual Model of Graduate Student Degree Progress

**First-Stage Variables**

<table>
<thead>
<tr>
<th>Department Characteristics</th>
<th>Perceptions of the Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>. Hard/soft science</td>
<td>. Number of faculty colleagues</td>
</tr>
<tr>
<td>. Applied/Basic Research</td>
<td>. Treated as a colleague</td>
</tr>
<tr>
<td>. Life/Non-Life</td>
<td>. Advisor quality, concern, utility</td>
</tr>
<tr>
<td></td>
<td>. Mentor</td>
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</table>

<table>
<thead>
<tr>
<th>Student Characteristics</th>
<th>Second-Stage Variables</th>
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</thead>
<tbody>
<tr>
<td>. Age</td>
<td>Graduate Grades</td>
</tr>
<tr>
<td>. Gender</td>
<td>Involvement</td>
</tr>
<tr>
<td>. Marital Status at entry</td>
<td>Satisfaction with</td>
</tr>
<tr>
<td>. Change in marital status</td>
<td>Department</td>
</tr>
<tr>
<td>. Parental status at entry</td>
<td>Alienation</td>
</tr>
<tr>
<td>. Change in parental status</td>
<td></td>
</tr>
<tr>
<td>. Residence</td>
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</tr>
<tr>
<td>. Undergraduate GPA</td>
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<td>. Enrollment Status</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
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<th>Financial Support</th>
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</tr>
</thead>
<tbody>
<tr>
<td>. Fellowship/Assistantship</td>
<td></td>
</tr>
<tr>
<td>. Own resources</td>
<td></td>
</tr>
<tr>
<td>. Other employment</td>
<td></td>
</tr>
<tr>
<td>. Loans</td>
<td></td>
</tr>
<tr>
<td>. Worried</td>
<td></td>
</tr>
<tr>
<td>. No Help</td>
<td></td>
</tr>
</tbody>
</table>

Table 2

Five Steps of Degree Progress

<table>
<thead>
<tr>
<th>Taken courses toward master’s degree</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earned master’s degree</td>
<td>2</td>
</tr>
<tr>
<td>Taken courses toward doctorate degree</td>
<td>3</td>
</tr>
<tr>
<td>Completed comprehensive exams</td>
<td>4</td>
</tr>
<tr>
<td>Earned doctorate degree</td>
<td>5</td>
</tr>
</tbody>
</table>
Instrument

This study used a self-report questionnaire developed by Girves and Wemmerus (1988) to examine a student’s overall progress. A letter requesting permission to use the questionnaire (see Appendix A), and an adaptation of the questionnaire (see Appendix B) were necessary for the purposes and population intended.

Girves and Wemmerus (1988) developed the survey with the assistance of a faculty advisory committee. It was pilot-tested in Autumn 1984 on currently enrolled graduate students at Ohio State University and then mailed to students in the sample. The survey contained eight sections dealing with the participant’s experiences during and after graduate school.

Section one asked participants to report on their employment history after graduate school. Participants were asked to respond to the questions based on the first job they held after leaving graduate school. However, if the participants were still enrolled in graduate school at the time they received the survey, they were asked to skip this section and go to section two.

Section two contained questions concerned with getting married as well as being coupled and/or becoming a parent while enrolled in graduate school. Girves and Wemmerus (1988) termed these "environmental" characteristics. Neither of these environmental characteristics has been
examined in the undergraduate retention models or at the graduate level. Participants were asked their marital status when they entered graduate school and whether their status changed while they were in graduate school. Parental status at time of enrollment and change in parental status during graduate school were also collected in this section. Furthermore, if participants indicated that their marital and/or parental status changed during graduate school, an open-ended format was included to respond on how the change affected their progress toward their degree. Also included in section two were questions concerned with the spouse's/partner's employment status while they were enrolled in graduate school. If the participant was not married or coupled at the time of enrollment, they were asked to go to section three.

Section three asked participants to report on the types of financial support they received and the extent of financial concern they experienced while in graduate school. One question in the financial section listed types of financial support and asked participants to indicate whether each type of support was 1 (a major source), 2 (a minor source), or 3 (not a source) of funding their graduate education.

Another question in the financial section contained a list of statements that might describe their financial concerns while enrolled in graduate school. Participants
were to indicate whether each statement posed 1 (a major problem), 2 (a minor problem), or 3 (not a problem) to them in continuing their graduate education.

In addition, data were gathered about employment history while attending graduate school and how being employed affected the quality of their academic performance and their progress toward their degree. Participants were asked to respond to a question about whether they feel that their employment affected the quality of their academic performance with "yes", "no", or "does not apply." If their response was "yes", they were asked to rate on a Likert-type scale from 1 (interfered) to 5 (enhanced) how employment affected their academic performance. Another question asked participants to respond to whether their employment affected the time it took to progress toward their degree with "yes", "no", or "does not apply." Again, if the participant responded "yes", they were asked to rate on a Likert-type scale from 1 (slowed down) to 5 (speeded up) how employment affected their progress toward their degree. A final question in the financial section asked subjects to respond to the length of time they held a non-university job(s) while attending graduate school.

Section four contained questions about their relationship with faculty. One question dealt with their relationship with their advisor. Participants were asked to rate a list of characteristics that best described their
advisor on a Likert-type scale from 1 (excellent) to 4 (poor). There were questions concerned with (1) their advisor’s gender, race, and whether their advisor treated them as a junior colleague, (2) if they had a mentor, if their mentor was their advisor, and the mentor’s gender and race, and (3) how many faculty members they maintained regular interactions. Questions concerned with the advisor and the mentor asked the participants to respond "yes", "no", "not applicable." The number of faculty members they maintained regular interactions was coded as ordinal categories from 1 (none) to 5 (four or more). Also included in the faculty relationship were two open-ended questions asking participants to (1) describe the qualities of their relationship with their mentor, and their influence on completing or not completing their degree; and (2) describe the qualities of their relationship with their advisor, and their influence on completing or not completing their degree.

Section five consisted of statements describing their involvement in their graduate program. Participants were asked to respond "yes" or "no" to whether they participated in such activities as research projects, seminars, professional or scholarly meetings, discussions with faculty outside the classroom, student study groups, or social activities.

Section six contained items measuring the participant’s
satisfaction with the learning environment in the department. Satisfaction is composed of participant’s ratings of their level of satisfaction in five areas: (1) the quality of scholarship, instruction, and general intellectual atmosphere of the department; (2) the fairness in providing financial support, in enforcing requirements, and in evaluating performance; (3) concern for the student as a professional; (4) communication between faculty and students; and (5) accessibility of the faculty.

Participants responded on a Likert-type scale from 1 (Very satisfied) to 4 (Very dissatisfied).

Section seven contained items considered potential problems or barriers to degree completion. One question asked subjects to respond "yes" or "no" if the item contributed to their decision to leave graduate school. Only participants who left before earning a master’s or doctorate degree or if they earned a master degree but did not begin a doctoral degree were required to respond. Another question contained a list of problems or barriers they may have encountered while enrolled in graduate school. Participants were asked to indicate the extent to which each item posed 1 (a major problem), 2 (a minor problem), or 3 (no problem) to them continuing their graduate program. A third question in this section asked subjects to respond "yes", "no" or "don’t know" to whether they were subjected to (1) sexism, (2) sexual harassment, (3) racism, (4)
harassment, and (5) age discrimination while enrolled in graduate school. If they responded "yes" to any of the items, they were asked to respond to the nature of the problem and how it affected their ability to progress toward their degree in an open-ended format. A fourth question asked participants if they could start graduate school over, would they (1) come back to the same school, and (2) select the same department. Responses to both items were coded on a Likert-type scale from 1 (definitely yes) to 5 (definitely no). There was also an opportunity to explain why in an open-ended format. The last question in this section asked participants if there were any departmental or university policies or practices that should be changed to enhance retention and graduate degree completion. An open-ended format asked them to comment on financial support, involvement in one's program, the faculty, or the learning environment that might improve retention of graduate students through degree completion.

Section eight contained questions on student demographic information. From these questions, data were collected about the participant's gender, age, residence, undergraduate grade point average, graduate grade point average, academic department, enrollment status when first enrolled in graduate school, and current graduate degree status. Gender was coded as male or female. Residence was coded as U.S. citizen or foreign student. Undergraduate and
graduate grade point averages were coded as ordinal categories from 1 (below 2.0) to 5 (3.6-4.0). Enrollment status at the time they first enrolled in graduate school was coded as full-time or part-time. Academic department was coded on Biglan's three dimensions which analyze relationships between characteristics of academic disciplines and the norms and expectations of the faculty in those disciplines. His three dimensions are: (1) hard/soft science, with hard sciences being characterized by the existence of paradigms; (2) applied/basic research, which distinguishes between departments emphasizing practical application and basic research; and (3) life/non-life, which categorizes departments on the basis of their concern with living or inanimate objects of study. Biglan's three dimensions were used as an indicator of the nature of the department (see Figure 2). Current graduate degree status was coded from 1 (taken courses toward master's degree) to 5 (earned doctorate degree).

Reliability of Instrument

This study used an adaptation of the questionnaire Girves and Wemmerus (1988) developed to examine graduate students' degree progress. The survey contained several sections dealing with the participants' experiences during and after graduate school. The items in the questionnaire were grouped together to form scales that would measure factors expected to influence degree progress. Four scales
<table>
<thead>
<tr>
<th>Pure</th>
<th>Hard</th>
<th>Soft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astronomy</td>
<td>Life</td>
<td>Non-Life</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Botany</td>
<td>English</td>
</tr>
<tr>
<td>Geology</td>
<td>Entomology</td>
<td>History</td>
</tr>
<tr>
<td>Math</td>
<td>Microbiology</td>
<td>Philosophy</td>
</tr>
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<td>Physics</td>
<td>Physiology</td>
<td>Foreign Language</td>
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<td>Ceramic</td>
<td>Zoology</td>
<td>Communication</td>
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<td>Engineering</td>
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</tr>
<tr>
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<td>Agronomy</td>
<td>Accounting</td>
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<td>Horticulture</td>
<td>Finance</td>
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<td>Science</td>
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<td>Vocational Education</td>
</tr>
<tr>
<td></td>
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<td>Counseling</td>
</tr>
</tbody>
</table>

Figure 2. Biglan's Three Dimensions of Department Classification
were developed: (1) advisor; (2) satisfaction with department; (3) alienation; and (4) involvement in one's program. These scales measured factors identified in Girves and Wemmerus' conceptual model of graduate student degree progress.

The advisor scale contained seven items regarding (1) his or her concern for the student as a person, (2) his or her quality as a scholar and teacher, and (3) his or her usefulness or utility in providing information needed by the student to progress. Girves and Wemmerus (1988) reported the intercorrelations among these items ranged from 0.44 to 0.77. The reliability of the advisor scaled reported a Cronbach's alpha of 0.92. In this study, intercorrelations among these items ranged from 0.46 to 0.82 and the scale had a Cronbach's alpha of 0.91.

The satisfaction with department scale contained items measuring the participant's satisfaction with the learning environment in the department. Satisfaction is composed of participant's ratings of their level of satisfaction with (1) the quality of scholarship, instruction, and general intellectual atmosphere of the department; (2) the fairness in providing financial support, in enforcing requirements, and in evaluating performance; (3) concern for the student as a professional; (4) communication between faculty and students; and 5) accessibility of the faculty. Girves and Wemmerus (1988) reported the intercorrelations among these
items ranged from 0.13 to 0.79. The Cronbach's coefficient alpha was reported as 0.90. In this study, intercorrelations among these items ranged from 0.02 to 0.86 and the Cronbach's coefficient alpha was 0.90.

The alienation scale consisted of three items from the problems or barrier section. This measure was a combination of responses regarding the extent to which the participant perceived a problem in continuing the graduate program. If there was a problem, was it because he or she (1) did not feel part or involved in the department; (2) was not encouraged by the faculty or taken seriously; and (3) had few people in the graduate program with whom he or she could identify. Girves and Wemmerus (1988) reported the intercorrelations among these items ranged from 0.29 to 0.69 and a reliability coefficient of 0.77. In this study, intercorrelations among these items ranged from 0.47 to 0.57 and the scale had a reliability coefficient of 0.77.

The involvement in one's program scale consisted of 10 "yes" or "no" items. These items asked whether or not the participant was involved in such activities as research projects, seminars, professional or scholarly meetings, discussions with faculty outside the classroom, student groups, or social activities. Girves and Wemmerus (1988) reported that the intercorrelations among these items ranged from -0.02 to 0.41 and the Cronbach's alpha was 0.69. In this study, intercorrelations among these items ranged from
-0.02 to 0.44 and this scale had a Cronbach's alpha of 0.74.

In the financial section, one question listed types of financial support and asked participants to indicate the extent to which each type of support had financed their graduate education. To reduce the number of variables, this list was collapsed by combining participants' answers to several items, which were clustered according to six categories of support. Since items within the categories were essentially mutually exclusive, measures of reliability are inappropriate. Four items: (1) personal savings; (2) parents, relatives, or friends; (3) partner's income; and (4) summer employment were combined into a category called Own Resources. The Fellow/Graduate Assistantship category consisted of responses to the items (1) regarding employment as a graduate teaching, research, or administrative assistant, fellow, or trainee; and (2) educational grants or scholarships. The third category called Other Employment, consisted of (1) other university employment, (2) non-university employment, and (3) reimbursement by employer items. The fourth category, Loans, contained responses to the loan items and the response to whether "my education has placed me deeply in debt" from the financial concerns section. The fifth category, Worried, consisted of one item from the financial concerns section: "I was often worried about my financial situation." Other financial concern items: (1) applying for but not getting financial aid,
(2) receiving insufficient aid, and (3) being unable to find a part-time job were combined into the sixth category labeled No Help.

Validity of Instrument

Girves and Wemmerus (1988) designed this questionnaire as a convenient way by which graduate students can be asked to report personal opinions about their experiences during and after graduate school. The questionnaire was designed to measure the concept of degree progress. Degree progress was identified as the criterion variable and presented in a model that links department and student characteristics, financial support, and student perceptions of the faculty with student grades, involvement in the program, satisfaction with the department, and alienation in order to predict progress toward the master's and doctoral degrees. Validity refers to the "appropriateness, meaningfulness, and usefulness of the specific inferences made" (Committee to Develop Standards for Educational and Psychological Testing, 1985, p. 9) from questionnaire responses. The identification of evidence of content-related, criterion-related, and construct-related validity will be discussed because of the importance that evidence supports the inferences that are made from the responses.

Content-related evidence of validity demonstrates the degree to which the sample of items on a questionnaire are representative of some defined universe or domain of
content. The methods to obtain this evidence often rely on expert judgments to assess the relationship between parts of the questionnaire and the defined universe, and to judge the representativeness of the sample items.

Expert professional judgment should play an integral part in developing the definition of what is to be measured such as describing the universe of content, generating or selecting the content sample, and specifying the item format and scoring system. (Committee to Develop Standards for Educational and Psychological Testing, 1985, p. 11)

Girves and Wemmerus (1988) presented evidence of content-related validity when they developed the questionnaire with the assistance of a faculty advisory committee.

Criterion-related evidence of validity demonstrates that responses to questionnaire items are systematically related to the primary variable(s) of interest. The relationship between responses to questions on the questionnaire and criterion measures results in how accurately can criterion performance be predicted from responses on the questionnaire (Committee to Develop Standards for Educational and Psychological Testing, 1985). One design for obtaining criterion-related evidence is from predictive evidence of validity. A predictive study obtains information about the accuracy with which early questionnaire data can be used to estimate criteria measures that will be obtained in the future (Committee to Development Standards for Educational and Psychological Testing, 1985). Girves and Wemmerus (1988) presented
evidence of criterion-related validity from predictive evidence when the questionnaire was pilot-tested on currently enrolled graduate students and then later mailed the questionnaire to all graduate students in the sample.

Construct-related evidence of validity focuses on the responses of the questionnaire as a measure of the construct of interest. The construct of interest should be embedded in a conceptual framework. "The conceptual framework specifies the meaning of the construct, distinguishes it from other constructs, and indicates how measures of the construct should relate to other variables" (Committee to Develop Standards for Educational and Psychological Testing, 1985, p. 10). Evidence for construct-related validity may be obtained from (1) intercorrelations among items; (2) substantial relationships of a questionnaire to other measures of the same construct and the weaknesses of relationships to measures that are of different constructs; (3) analyses of individual responses; and (4) evidence from content- and criterion-related validation studies. Girves and Wemmerus (1988) presented evidence of construct-related validity by (1) reporting the intercorrelations among items from their questionnaire that form various scales used to measure a single construct; (2) using an open-ended format for responses to particular items on the questionnaire in an attempt to analyze individual responses; and (3) presenting evidence from content-related and criterion-related
validity.

**Sample**

This study was designed to measure degree progress of graduate students toward master's and doctoral degrees. The sample was divided into two groups according to the five steps identified by Girves and Wemmerus (1988) for degree progress (see Table 2). The master's level group consisted of subjects in steps 1 or 2 and the doctoral level group consisted of subjects in steps 3, 4, or 5. According to Girves and Wemmerus, "this division was necessary to reflect more accurately the student's degree intent as measured by his or her behavior" (p. 179). Participants in each group were drawn from Loyola University Chicago.

**Inclusion Criteria**

Inclusion criteria for participating in this study were the following: participants must be African-Americans currently enrolled in master's and doctoral degree programs, or African-Americans who have completed master's and doctoral degree programs. Both males and females were accepted. African-American students were sought from the Graduate School and the School of Education. Students enrolled in or completed programs from the professional schools (medicine, law, business, social work, etc.) were not included in the sample.
Recruitment

African-American graduate students were recruited through the Graduate School and School of Education. An associate dean in the Graduate School provided mailing labels of names and addresses of potential students. Mailing labels of names and addresses of potential students from the School of Education were provided by a staff member in the admissions office. African-American students were recruited from the Graduate School first. This helped to maximize participants from a broad range of departments. Also, an attempt was made to gather names from 1986 to 1993 records to obtain as many as possible potential students who have completed a graduate degree as well as students who were currently enrolled in graduate programs. However, the potential pool of African-American students currently enrolled in or completed graduate programs in the Graduate School was small. Therefore, the School of Education was contacted to locate similar potential students. The School of Education was only able to provide a mailing list of African-American students enrolled based on the Spring 1993-94 academic year.

Demographic Characteristics of Participants

The sample consisted of a total of 132 students from the Graduate School and School of Education at Loyola University Chicago. Of the 132 students, 39 or 30.0% were males, 91 or 70.0% were females, and two were unidentified.
The age of the students ranged from 23 years to 60 years, with a mean age of 38.6 years and SD = 9.0. One hundred twenty-four (124) or 96.1% were U.S. citizens, five or 3.9% were foreign students, and three with no classification. Sixty-nine (69) or 52.3% were married or had a partner, 43 or 32.6% were single, 16 or 12.1% were divorced, three or 2.3% were separated, and one was a priest. Seventy-two (72) or 55.0% had no children, 47 or 35.9% had one or two children, 10 or 7.6% had three or four children, two or 1.5% had five or more children, and one with no classification. On the measures of academic performance, there were more students with a grade point average (GPA) above 3.0 at the graduate level than at the undergraduate level (121 to 67 respectively, see Table 3). Ninety-five (95) or 74.2% of the participants came from soft/life/applied departments based on Biglan's classification. Eighty-five (85) or 65.9% were part-time when they first enrolled in their graduate program while 44 or 33.3% were full-time when they first enrolled, and three had no classification. Of the 48 master's level students, 13 or 27.1% had completed their degree. Of the 83 doctoral level students, 17 or 20.5% had completed their degree (see Table 4).
Table 3

Distribution of Participants by Grade Point Average at Undergraduate and Graduate Levels

<table>
<thead>
<tr>
<th>GPA</th>
<th>Undergraduate</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
</tr>
<tr>
<td>Below 2.0</td>
<td>2 (1.6)</td>
<td>0</td>
</tr>
<tr>
<td>2.0 - 2.5</td>
<td>16 (12.1)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>2.6 - 3.0</td>
<td>44 (33.3)</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>3.1 - 3.5</td>
<td>33 (25.0)</td>
<td>37 (28.0)</td>
</tr>
<tr>
<td>3.6 - 4.0</td>
<td>34 (25.8)</td>
<td>84 (63.6)</td>
</tr>
<tr>
<td>Not reported</td>
<td>3 (2.3)</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>Total</td>
<td>132 (100.0)</td>
<td>132 (100.0)</td>
</tr>
</tbody>
</table>

Table 4

Distribution of Participants by Degree Progress

<table>
<thead>
<tr>
<th>Degree Level</th>
<th>n (%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taken courses</td>
<td>35 (72.9)</td>
<td></td>
</tr>
<tr>
<td>toward master’s degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earned master’s degree</td>
<td>13 (27.1)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>48 (100.0)</td>
<td></td>
</tr>
<tr>
<td>Doctoral Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taken courses</td>
<td>35 (42.2)</td>
<td></td>
</tr>
<tr>
<td>toward doctoral degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed comprehensive exams</td>
<td>31 (37.3)</td>
<td></td>
</tr>
<tr>
<td>Earned doctorate degree</td>
<td>17 (20.5)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>83 (100.0)</td>
<td></td>
</tr>
<tr>
<td>Not reported</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Procedures

This section will describe the procedures used for data collection and statistical analysis.

Data Collection

Each participant was mailed a questionnaire packet. The packet included: a cover letter, a questionnaire, and a return envelope. The cover letter explained the nature of the study, invited the student to participate in the study, and gave instructions for returning completed and uncompleted questionnaires (see Appendix C). All participants were assured that the information on the questionnaires was confidential, and that their names would not be used.

Department characteristics were collected from the subject in the student demographic section. Each department was coded on each of Biglan's three dimensions using a four-point scale.

Student characteristics were also collected in the student demographic section. Age was left as a continuous variable, as opposed to Girves and Wemmerus (1988) dichotomizing age into two levels: over or under 25. Gender was coded as male or female. Residence was coded as U.S. citizen or foreign student. The student's undergraduate and graduate grade point averages were kept on the common four-point scale. Enrollment status was coded as full-time or part-time based on first registration into
their graduate program.

Confidentiality was maintained by assigning a code number to each participant. The code number was written on each questionnaire. Each participant was provided a stamped, self-addressed envelope in which to return the questionnaire to the investigator. If the student chose not to participate, he or she was instructed to return the blank questionnaire in the envelope provided.

Data collection began in January of 1994. The Graduate School mailing list contained 145 students. Students on this list were mailed a questionnaire. Follow-up postcards and letters were sent if students had not responded by the return date specified in the cover letter. After six months, the response rate from the Graduate School was low. Therefore, a mailing of questionnaires was done for the School of Education. The School of Education mailing list contained 79 students. Follow-up postcards were also sent to this group. In an attempt to increase the response rate, a second mailing of the questionnaire was sent to all students that had not responded to the first questionnaire. Follow-up postcards were sent to these students as well.

Data collection ended March of 1995. Eighteen questionnaires were returned unopened because of invalid addresses. Of the 206 remaining students, 132 responded for a response rate of 64%.
Statistical Analysis

The research design for this study was descriptive, correlational and linear structural equation modeling. This research analyzed the variables presented in Girves and Wemmerus' (1988) conceptual model of graduate student degree progress. Specifically, the relationship between degree progress and department characteristics, student characteristics, financial support, perceptions of the faculty, grades, involvement in one's program, satisfaction with department, and alienation. The data presented in this study were processed using the Statistical Package for the Social Sciences (SPSS) computer program (SPSS-X User's Guide, 1988) and EQS Structural Equations Program Manual (Bentler, 1992).

Means and standard deviations were calculated for each variable included in the conceptual model of graduate student degree progress. For the purpose of analysis, the sample was divided into two groups according to degree progress. The master's level sample consisted of subjects in step 1 or 2 and the doctoral level group consisted of subjects in step 3, 4, or 5. Group characteristics were described and t-test done to compare similarities and differences between the master's level and doctoral level groups.

Following the descriptive statistics, further analysis of the data involved testing the model of graduate student
degree progress. The first step in testing the model was to refine the list of variables. Simple correlations of all the variables with degree progress at both the master's and doctoral level were examined. Using Girves and Wemmerus' (1988) criteria for refining the variable list, variables were deleted from the model if they were unrelated to degree progress.

The method used to test the conceptual model was structural modeling using EQS computer program. The first-stage variables (department characteristics, student characteristics, financial support, and perceptions of the faculty) were treated as exogenous variables. Grades, involvement in one's program, satisfaction with department, alienation, and degree progress were considered endogenous variables. Exogenous variables are measured variables that are not caused by any other variable in the model, whereas endogenous variables are variables that are affected by the exogenous variables and may also have causal effects on other endogenous variables within the model (Cohen & Cohen, 1983). The statistical techniques used to estimate the causal parameters involved the solution of a series of structural equations in which each endogenous variable was regressed on the exogenous variables and all other endogenous variables in the model. The result of these structural equations would produce regression (beta) weights that were considered as direct effects or path coefficients
Chi-square Goodness of Fit measure will be used to test the whole model. The path coefficients will be examined and tested to determine which path coefficients were significantly different from zero. Error residuals will be examined and tested to determine the significance of the errors to the variables. Based on the results, nonsignificant paths will be eliminated, and the series of regressions performed again using only those variables with significant path coefficients. These analyses will produce a parsimonious path model, which included only those hypothesized paths of the model that are statistically reliable in the initial series of regressions (Kerlinger & Pedhazer, 1973). The reduced path model will determine the extent to which the hypothesized paths made a significant contribution to the explained variance in degree progress.

Lastly, multiple regression analysis will be used to test the ten hypotheses proposed by Girves and Wemmerus' (1988) conceptual model of degree progress. Forced entry and stepwise procedures will be used to examine the various combinations of the predictor variables with each other and with degree progress, the criterion variable. Any significant relationships found will be presented and discussed in the following chapters.
**Summary**

This chapter has stated the hypotheses, described the design of the study, the instrument used, the sample selection, the data collection, and statistical analysis procedures.

In order to test the research hypotheses, the questionnaire developed by Girves and Wemmerus (1988) was adapted and used in this study. The participants included in this study were African-American students currently enrolled in master's and doctoral degree programs, or African-American students who have completed master's and doctoral degree programs. Both male and female students were sought from Loyola University Chicago's Graduate School and School of Education. Data collection involved completion of the questionnaire sent by mail. Data collection began in January, 1994 and was completed in March, 1995.

The demographic characteristics of the participants revealed there were more females, than males, more U.S. citizens than foreign students, more students that came from soft/life/applied departments and more students were part-time when they first enrolled in their graduate program. The average age of the students was 38.5 years. A majority of the students were married or had a partner and had no children. On the measure of academic performance, there were more students with a grade point average (GPA) above
3.0 at the graduate level than at the undergraduate level. In terms of completion rate, 27.1% of the participants had completed the master's degree and 20.5% of the participants had completed the doctorate degree.

The design of the study was descriptive, correlational and linear structural equation modeling. Statistical procedures consisted of means and standard deviations to describe the variables in the conceptual model of graduate student degree progress. Structural equation modeling was used to test the model, and to determine which hypothesized paths made significant contribution to the explained variance in degree progress, the criterion. Multiple regression techniques were used to examine the relationships hypothesized in the conceptual model of degree progress.

In Chapter IV, the results of the study will be presented. First, the descriptive statistics will be presented, followed by the testing of the model, and ending with the hypothesis testing of the factors which predicted degree progress for graduate students.
CHAPTER IV
RESULTS

In the previous chapter, the hypotheses of the study, the research design, the instrument, the criteria for selecting and recruiting participants, and the procedures for data collection and statistical analysis were discussed. This chapter will present (1) a comparison of master’s and doctoral degree groups, (2) results of the structural equation modeling, (3) results of hypothesis testing, and (4) summary of findings.

Group Comparison on Variables in the Conceptual Model

Means and standard deviations for the two groups were calculated for the variables in the conceptual model of graduate student degree progress and are presented in Table 5. In this section, the master’s and doctoral groups were compared on (1) department characteristics, (2) student characteristics, (3) financial support, (4) perceptions of the faculty, (5) grades, (6) involvement in one’s program, (7) satisfaction with department, and (8) alienation.

Department Characteristics

Department characteristics classified academic majors based on Biglan’s three dimensions: hard/soft science, applied/basic research, and life/nonlife science. Master’s
students were more likely to come from life science departments. Doctoral students were more likely to come from soft science departments (see Figure 2).

Table 5

Descriptive Statistics for Variables Included in the Conceptual Model of Graduate Student Degree Progress

<table>
<thead>
<tr>
<th>Variable</th>
<th>Masters Mean/SD</th>
<th>Doctoral Mean/SD</th>
<th>t for Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>36.56 9.92</td>
<td>39.74 8.25</td>
<td>-1.87</td>
</tr>
<tr>
<td>Undergrad GPA</td>
<td>3.38 1.11</td>
<td>3.77 0.99</td>
<td>-1.96</td>
</tr>
<tr>
<td><strong>Financial Support</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fellowship/Assistantship</td>
<td>2.48 0.70</td>
<td>2.41 0.66</td>
<td>0.52</td>
</tr>
<tr>
<td>Own resources</td>
<td>2.50 0.46</td>
<td>2.36 0.56</td>
<td>1.49</td>
</tr>
<tr>
<td>Other employment</td>
<td>2.23 0.51</td>
<td>2.36 0.52</td>
<td>-1.42</td>
</tr>
<tr>
<td>Loans</td>
<td>2.41 0.81</td>
<td>2.29 0.73</td>
<td>0.88</td>
</tr>
<tr>
<td>Worried</td>
<td>2.26 0.77</td>
<td>2.13 0.78</td>
<td>0.86</td>
</tr>
<tr>
<td>No Help</td>
<td>2.86 0.31</td>
<td>2.65 0.48</td>
<td>2.96**</td>
</tr>
<tr>
<td><strong>Perceptions of Faculty</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Faculty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colleagues</td>
<td>2.55 1.47</td>
<td>2.94 1.04</td>
<td>-1.59</td>
</tr>
<tr>
<td>Treated as a Colleague</td>
<td>1.59 0.49</td>
<td>1.47 0.50</td>
<td>1.15</td>
</tr>
<tr>
<td>Advisor quality, concern, utility</td>
<td>2.05 0.31</td>
<td>1.85 0.81</td>
<td>1.33</td>
</tr>
<tr>
<td>Mentor</td>
<td>1.67 0.48</td>
<td>1.43 0.49</td>
<td>2.55*</td>
</tr>
<tr>
<td><strong>Intervening Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grades</td>
<td>4.42 0.69</td>
<td>4.71 0.53</td>
<td>-2.40*</td>
</tr>
<tr>
<td>Involvement</td>
<td>1.65 0.28</td>
<td>1.49 0.25</td>
<td>3.24**</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>1.99 0.51</td>
<td>2.07 0.48</td>
<td>-0.80</td>
</tr>
<tr>
<td>Alienation</td>
<td>2.26 0.62</td>
<td>2.38 0.62</td>
<td>-1.03</td>
</tr>
</tbody>
</table>

n (Master’s) = 48; n (Doctoral) = 83

*p < .05
**p < .01
Student Characteristics

Student characteristics consisted of a set of demographic variables. These demographic characteristics included: age, gender, residence, married or had a partner, marital/partner status changed, parental status, became a parent, undergraduate GPA, and enrollment status.

The mean age for the doctoral group was 39.74 ± 8.25 years; this was slightly higher than the mean age for the master's group (36.56 ± 9.92; t = 2.87, p = 0.64). On average, there were more women than men in the master's group than in the doctoral group. Master's and doctoral students were more likely to be citizens of the U.S.

Participants were asked to indicate their marital status at the time they first enrolled in graduate school. On average, doctoral students were more likely to be married or have a partner than the master's students. Then, participants were asked if their marital status changed while they were enrolled in graduate school. Master's students were less likely to have changed their marital status while enrolled in graduate school than doctoral students. Furthermore, participants were asked to indicate how many children they had at the time they first enrolled in graduate school and if they had additional children while pursuing their graduate degree. Doctoral students had more children than master's students at the time they first enrolled in graduate school. Furthermore, doctoral students
were also more likely to have additional children while enrolled in their graduate program than the master's students.

There was no significant difference between the undergraduate grade point average for the master's students and the doctoral students. However, on average the doctoral students had a higher undergraduate grade point average than the master's students (3.77 ± 0.99 and 3.38 ± 1.11 respectively; t = -2.96, p = .053). Finally, subjects were asked to indicate their enrollment status when they first began their graduate programs. On average, the master's students were more likely to have started their graduate program on a part-time basis than the doctoral students. Overall, there were no significant differences found between the master's group and the doctoral group on any of the student characteristic variables.

Financial Support

Financial support results are presented in Table 5. There were six categories of support: (1) Fellowship/Assistantship, (2) Own Resources, (3) Other Employment, (4) Loans, (5) Worried, and (6) No Help. The means for the doctoral group were slightly lower than the master's group in four of the categories: Fellowship/Assistantship (Doctoral 2.41 ± 0.66; Master's 2.48 ± 0.70; t = 0.52, p = .605), Own Resources (Doctoral 2.36 ± 0.56 and Master's 2.50 ± 0.46; t = 1.49, p = .141), Loans (Doctoral 2.29 ±
There was one category, "No Help," where the mean for the doctoral group was significantly lower than the master’s group (2.65 ± 0.48 and 2.86 ± 0.31 respectively; t = 2.96, p < .01). The "No Help" category consisted of financial concern items: applying for but not getting financial aid, receiving insufficient aid, and being unable to find a part-time job. On average, doctoral students indicated this category to be somewhat a problem to them in continuing in their graduate programs.

In the sixth category of financial support, Other Employment, the mean for the doctoral group was slightly higher than the master’s group.

**Perceptions of the Faculty**

Perceptions of the faculty results are presented in Table 5. Perceptions of the faculty consisted of four categories: (1) Adviser scale, (2) if their adviser treated them as a Junior Colleague, (3) if they had a Mentor, and (4) the Number of Faculty Colleagues they had. The adviser scale contained seven items regarding (1) his or her concern for the student as a person, (2) his or her quality as a scholar and teacher, and (3) his or her usefulness or utility in providing information needed by the student to progress toward degree completion. On average, doctoral
students rated their adviser higher on this scale than the master's students.

Doctoral students were more likely to agree than master's students that their adviser treated them as a junior colleague. Furthermore, doctoral students, on average, indicated a higher number of faculty members they maintained regular professional interactions with than the master's students.

The only category where a significant difference was found between the means of the two groups was if they had a mentor. On average, doctoral students were more likely to have a mentor than master's students (1.43 ± 0.49 and 1.67 ± 0.48 respectively; t = 2.55, p = .013).

Grades

There was a significant difference found between the means of the doctoral and master's groups on the graduate grade point average variable. On average, more doctoral students reported grade point averages between 3.6 and 4.0 than masters students (4.71 ± 0.53 and 4.42 ± 0.69 respectively; t = -2.40, p = .019) (see Table 5).

Involvement

The involvement in one's program scale included items asking if students participated in activities such as research projects, seminars, professional or scholarly meetings, discussions with faculty outside the classroom, student study groups, or social activities. There was a
significant difference found between the means of the doctoral and master's group. On average, doctoral students were more involved in their program than master's students (1.49 ± 0.25 and 1.67 ± 0.28 respectively; t = 3.24, p = .002) (see Table 5).

**Satisfaction with Department**

The satisfaction with department scale contained items measuring the student's level of satisfaction in five areas: (1) the quality of scholarship, instruction, and general intellectual atmosphere of the department; (2) the fairness in providing financial support, in enforcing requirements, and in evaluating performance; (3) concern for the student as a professional; (4) communication between faculty and students; and (5) accessibility of the faculty. On average, master's students were more likely to be satisfied with their department than doctoral students.

A comparison of the two groups on the five areas of satisfaction with department revealed similar results in four of the five categories. On average, the doctoral group were less likely to be satisfied than the master's group with (1) fairness in providing financial support, in enforcing requirements, and in evaluating performance; (2) concern for the student as a professional; (3) communication between faculty and students; and (4) accessibility of the faculty. The fifth category, Quality, showed a different result. In this category, on
average the master’s students were less likely to be satisfied with this aspect of their department than the doctoral students (see Table 5).

Alienation

The alienation scale consisted of items regarding the extent to which the student perceived a problem in continuing their graduate program for the following reasons: (1) he or she did not feel part of or involved in the department; (2) he or she was not encouraged by the faculty or taken seriously; and (3) he or she had few people in the graduate program with whom he or she could identify. On average, the master’s students were more likely to perceive alienation as a problem than the doctoral students (see Table 5). The results of the full structural equation model to test the validity of Girves and Wemmerus’ (1988) model of graduate student degree progress will be presented in the next section.

Full Structural Equation Model

The purpose of this study was to test the validity of Girves and Wemmerus’ (1988) model of graduate student degree progress. The hypothesis to be tested relates to the pattern of causal structure linking several variables that were expected to affect degree progress. The variables of interest included department and student characteristics, financial support, perceptions of the faculty, grades, involvement in the program, satisfaction with the
Girves and Wemmerus (1988) developed their hypothesized model of graduate student degree progress based on the theoretical and empirical works of Spady (1971), Tinto (1975) and Bean (1980) and included other factors considered fundamental to the graduate education experience: the student/advisor relationship and financial support. The hypothesized model is presented in Figure 3. In their model, degree progress was a factor that was expected to be influenced by four intervening variables: (1) graduate grade, (2) involvement in one’s program, (3) satisfaction with department, and (4) alienation. Both grades and involvement were related to Tinto’s (1975) concept of academic integration. Satisfaction and alienation were related to his concept of social integration. The four intervening variables were expected to be influenced by various combinations of four sets of variables related to: (1) department characteristics, (2) student characteristics, (3) financial support, and (4) student perceptions of their relationship with the faculty. In testing Tinto’s theoretical model, the importance of informal student contacts with faculty members was emphasized in influencing both academic and social integration (Pascarella, 1980; Pascarella & Chapman, 1983; Pascarella & Terenzini, 1979). The student’s background characteristics interact with the
Figure 3. Hypothesized Model of Causal Structure Related to Graduate Degree Progress
university's characteristics influencing both the frequency and the quality of the informal contacts with faculty members. Bean (1980; 1982a) further supported and expanded on the student retention model by linking together student's goals and university commitment, academic and social integration. Later, he refined his model to reflect greater emphasis on the theories of socialization (Bean, 1985). The paths leading from department and student characteristics, financial support, and perceptions of the faculty to the four intervening variables are based on the literature review of student retention.

Formulation of Indicator Variables

The model shown in Figure 3 represents the structural portion of the full structural equation model. How each of the constructs in the above model is measured represents the measurement portion of the structural equation model. In developing the measurement model, the task is to determine (a) the number of indicators to use in measuring each construct, and (b) which items to use in formulating each indicator (see Appendix D).

In Girves and Wemmerus' (1988) hypothesized model, formulation of the indicator variables was based on the combination of particular items according to content. In the refining of the list of variables, simple correlations of all the variables with degree progress were examined (see Appendix E). Girves and Wemmerus (1988) deleted variables
from the model if they were unrelated to degree progress. Department characteristics comprised three items that were a part of Biglan’s three dimensions of department classification used to analyze relationships between characteristics of academic disciplines and the norms and expectations of the faculty in those disciplines (Biglan, 1973). Student characteristics comprised two items: (1) gender, and (2) enrollment status at the beginning of their program. Financial support comprised six indicator variables where each indicator was formed from a combination of items listing types of financial support and items regarding financial concerns. Perception of the faculty comprised four indicator variables in which three of the indicators included a single item from the faculty relationship section and the fourth comprised items from a subscale measuring the relationship with the advisor. In total, 15 indicator variables were used to measure the hypothesized structural model. A statistical representation of the full structural equation model is presented in Figure 4.

Model Specification

The hypothesized model of graduate student degree progress was tested using EQS for Windows 4.0 version (Bentler, 1993). This hypothesized model is considered a full structural equation model because it includes both a measurement and a structural model. The structural
Figure 4. Statistical Representation of Hypothesized Model of Graduate Student Degree Progress
component of this model represents the hypothesis that degree progress in graduate school is influenced by a student's graduate grades, involvement in one's program, satisfaction with the department, and alienation, which in turn is influenced by the department and student characteristics, financial support, and student perceptions of the faculty. The measurement component of the model shows the department characteristics factor to have three indicator variables, the student characteristics factor to have two indicator variables, the financial support factor to have six indicator variables, and the perceptions of the faculty factor to have four indicator variables. This model was associated with 68 degrees of freedom (15 observed variances and 53 estimated parameters) (see Appendix D). Therefore, the model meets the criterion of overidentification. Covariance among factors was not considered in this model. Covariance among the error estimates for indicators were fixed. The estimation method used was elliptical generalized least squares (EGLS).

The results of the EQS for Windows 4.0 regarding the technical acceptability of the model parameters showed the program encountered difficulties in the estimation process. In the first situation, three parameters: (1) department characteristics, (2) financial support, and (3) perceptions of the faculty resulted in the condition code message "CONSTRAINED AT LOWER BOUND." According to Bentler (1989,
1992), this code means that the parameter estimates are not inside the specified boundaries and are being held at the lower boundary specified for the problem.

The second situation indicated 23 pairs of parameters that printed the condition code message "LINEAR DEPENDENT ON OTHER PARAMETERS." This code indicates that the parameters identified are linear combinations of other parameters in the model which causes the covariance matrix of parameter estimates to be singular. This situation can occur because the parameters are underidentified in the equations, or because the parameters are empirically underidentified due to the data (Bentler, 1989; 1992).

The third situation identified 23 pairs of parameters where the message code was "VARIANCE OF PARAMETER ESTIMATE IS SET TO ZERO." This message means that the statistical variability of the parameter estimate cannot be accurately computed. Bentler (1989, 1992) points out that these messages usually accompany solutions having computational difficulties, in which a diagonal element of the covariance matrix of estimates is zero or negative.

As a result of these condition codes, the program printed a warning stating "TEST RESULTS MAY NOT BE APPROPRIATE DUE TO CONDITION CODE." At this point, any interpretation of results would not be appropriate because we cannot feel confident that the parameter estimates are correct (Byrne, 1994). Bentler (1989, 1992) suggests that
the constraint of a parameter of an upper or lower boundary may or may not be a serious problem. For instance, if the bound is desired, the solution may be totally acceptable. On the other hand if the bound is not desired, then releasing the boundary constraint may lead to an improvement in the solution. However, linear dependence among parameters is possibly a more serious problem. In this situation, Bentler says there is an indication of underidentification. But in a properly identified model it may reflect computational problems stemming from the data, the start values, the default technical parameters, etc. Bentler recommends tracking down the source of the problem and experimenting if necessary with different ways to eliminate this problem. Ideally, the output message the EQS user would like to see is "PARAMETER ESTIMATES APPEAR IN ORDER, NO SPECIAL PROBLEMS WERE ENCOUNTERED DURING OPTIMIZATION."

In an attempt to get the ideal message and eliminate the condition codes, the hypothesized model was revised and two alternative models were developed with fewer parameters. Joreskog and Sorbom (1989) demonstrated that too many parameters in the model are a likely cause for lack of identification and by removing some of the parameters from the model can produce a desired solution. The first alternative model is presented in Figure 5. It is a four-factor model where degree progress is directly influenced by
Figure 5. Alternative Full Model #1 Related to Degree Progress
involvement in one's program which is influenced by financial support and perceptions of the faculty. Financial support had six indicator variables and perception of the faculty had four indicator variables. The second alternative model is presented in Figure 6. In this model, degree progress is a five factor model influenced by involvement in one's program and satisfaction with the department, which are influenced by financial support and perceptions of the faculty. Financial support has three indicator variables and perceptions of the faculty had four indicator variables. Both alternative models reduced the number of factors and the number of indicator variables.

The first alternative model removed the following five factors from the hypothesized model: (1) grades, (2) satisfaction with department, (3) alienation, (4) department characteristics, and (5) student characteristics. In addition, the indicator variables were reduced from 15 to 10. The indicator variables associated with department and student characteristics were removed from the model. This resulted in a model with 30 degrees of freedom (eight observed variances and 23 estimated parameters) (see Appendix D). The EQS output for this model resulted in the condition code message "LINEARLY DEPENDENT ON OTHER PARAMETERS" for five pairs of parameters (D3, D3; D4, D4; F3, F1; F3, F2; F4, F3). Also, these same five pairs of parameters resulted in a second condition code
Figure 6. Alternative Full Model #2 Related to Degree Progress
message "VARIANCE OF PARAMETER ESTIMATE IS SET TO ZERO."

The second alternative model removed the following four factors from the hypothesized model: (1) grades, (2) alienation, (3) department characteristics, and (4) student characteristics. In addition, the indicator variables were reduced from 15 to 7. The indicator variables associated with department and student characteristics were removed, as well as, three indicator variables associated with financial support: (1) fellowship/assistantship, (2) own resources, and (3) other employment. As a result, this model was associated with seven degrees of freedom (seven observed variances and 21 estimated parameters) (see Appendix D). The EQS output for this model also resulted in condition code messages. There were seven pairs of parameters where the message appeared "LINEARLY DEPENDENT ON OTHER PARAMETERS (F2, F2; E7, E7; D3, D3, D4, D4; D5, D5; F3, F1; F4, F2). There were five pairs of parameters with the message "VARIANCE OF PARAMETER ESTIMATE IS SET TO ZERO" (D3, D3; D4, D4; D5, D5; F3, F1; F4, F2). Since both alternative models printed parameter condition codes, interpretation of the results would not be appropriate. In addition to testing alternative models, other approaches were attempted to eliminate the problem of parameter condition codes with no success. These other approaches included using different start values in the equations, and using different methods of estimation. Every
effort was made to remedy the problem, but the problem still remains. Therefore interpretations of the structural modeling method will not be presented on this data. The last section will present the results of the hypothesis testing. The research hypotheses of this study proposed to test the correlation of department characteristics, student characteristics, financial support, perceptions of the faculty, grades, involvement in one's program, satisfaction with department, and alienation with degree progress.

Hypothesis Testing

This study was designed to test ten hypotheses which were anticipated by Girves and Wemmerus' (1988) conceptual model of graduate student degree progress.

Hypothesis 1

There is no relationship between grades, involvement, satisfaction, alienation, and degree progress.

This hypothesis was tested by multiple regression analysis using forced entry of the predictor variables. There was a weak relationship found between grades, involvement, satisfaction with department, alienation, and degree progress ($R^2 = .168$, $F(4,80) = 4.04$, $F$ significance = .005) accounting for 16.8% of the variance in degree progress (see Table 6). INVOLVE was the only significant variable in this regression equation ($b = -.275$, $t = .015$).
Table 6

Hypothesis 1: Multiple Regression to Predict Degree Progress Using the Intervening Variables

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alienate</td>
<td>0.039</td>
<td>0.751</td>
</tr>
<tr>
<td>2. Q41</td>
<td>0.215</td>
<td>0.055</td>
</tr>
<tr>
<td>3. INVOLVE</td>
<td>-0.275</td>
<td>0.015</td>
</tr>
<tr>
<td>4. Satisfy</td>
<td>0.175</td>
<td>0.164</td>
</tr>
</tbody>
</table>

$R^2 = 0.168$ $F (4, 80) = 4.04$ $F$ Significance $= 0.005$

Hypothesis 2

There is no relationship between department characteristics, student characteristics, and grades.

This hypothesis was tested by multiple regression analysis using forced entry of the predictor variables. No significant relationship was found between department characteristics, student characteristics, and grades ($R^2 = 0.082$, $F (5, 79) = 1.40$, $F$ significance $= 0.232$). Therefore, hypothesis 2 was not rejected (see Table 7).
Table 7

**Hypothesis 2: Multiple Regression to Predict Grades**

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Q43</td>
<td>-.181</td>
<td>.116</td>
</tr>
<tr>
<td>2. LifeSci</td>
<td>.031</td>
<td>.823</td>
</tr>
<tr>
<td>3. Q37</td>
<td>.033</td>
<td>.771</td>
</tr>
<tr>
<td>4. Science</td>
<td>.133</td>
<td>.271</td>
</tr>
<tr>
<td>5. Research</td>
<td>-.222</td>
<td>.093</td>
</tr>
</tbody>
</table>

$R^2 = .082$ $F (5,79) = 1.40$ $F$ Significance = .232

**Hypothesis 3**

There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty and involvement.

This hypothesis was tested by multiple regression analysis using forced entry to predict involvement. A strong relationship was found between department characteristics, student characteristics, financial support, perceptions of the faculty and involvement ($R^2 = .445$, $F (15,69) = 3.69$, $F$ significance = .0001), accounting for 44.5% of the variance in the intervening variable (INVOLVE) (see Table 8). Fellowship and Science were the significant variables in this regression equation. Fellowship was positively related to involvement in one's program ($b = .360, t = .002$) while science was negatively related to involvement ($b = -.223, t = .043$).
Table 8

Hypothesis 3: Multiple Regression to Predict Involvement

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Advisor</td>
<td>.057</td>
<td>.582</td>
</tr>
<tr>
<td>2. Worry</td>
<td>-.083</td>
<td>.494</td>
</tr>
<tr>
<td>3. Q43</td>
<td>.047</td>
<td>.659</td>
</tr>
<tr>
<td>4. LifeSci</td>
<td>-.045</td>
<td>.742</td>
</tr>
<tr>
<td>5. Q37</td>
<td>-.137</td>
<td>.176</td>
</tr>
<tr>
<td>6. Flwship</td>
<td>.360</td>
<td>.002</td>
</tr>
<tr>
<td>7. Q22</td>
<td>.216</td>
<td>.053</td>
</tr>
<tr>
<td>8. Q28</td>
<td>-.190</td>
<td>.064</td>
</tr>
<tr>
<td>9. No Help</td>
<td>-.134</td>
<td>.213</td>
</tr>
<tr>
<td>10. OwnRes</td>
<td>.054</td>
<td>.621</td>
</tr>
<tr>
<td>11. Q21</td>
<td>.131</td>
<td>.220</td>
</tr>
<tr>
<td>12. Othemp</td>
<td>-.048</td>
<td>.060</td>
</tr>
<tr>
<td>13. Science</td>
<td>-.223</td>
<td>.043</td>
</tr>
<tr>
<td>14. Loans</td>
<td>.204</td>
<td>.105</td>
</tr>
<tr>
<td>15. Research</td>
<td>.091</td>
<td>.484</td>
</tr>
</tbody>
</table>

R² = .445  F (15,69) = 3.69  F Significance = .0001

Hypothesis 4

There is no relationship between department characteristics, perception of the faculty, and satisfaction with department.

This hypothesis was tested by multiple regression analysis using forced entry to predict satisfaction. A strong relationship was found between department characteristics, perception of the faculty and satisfaction with department (R² = .442. F (7,77) = 8.72, F significance = .000) accounting for 44.2% of the variance in the intervening variable (SATISFY) (see Table 9). Advisor was the only variable significant in this regression equation.
(b = .561, t = .000).

Table 9

**Hypothesis 4: Multiple Regression to Predict Satisfaction**

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Advisor</td>
<td>.561</td>
<td>.000</td>
</tr>
<tr>
<td>2. Science</td>
<td>.149</td>
<td>.115</td>
</tr>
<tr>
<td>3. Q28</td>
<td>.058</td>
<td>.514</td>
</tr>
<tr>
<td>4. Research</td>
<td>.031</td>
<td>.763</td>
</tr>
<tr>
<td>5. Q22</td>
<td>-.023</td>
<td>.811</td>
</tr>
<tr>
<td>6. Q21</td>
<td>.185</td>
<td>.059</td>
</tr>
<tr>
<td>7. LifeSci</td>
<td>-.056</td>
<td>.623</td>
</tr>
</tbody>
</table>

R² = .442   F (7,77) = 8.72   F Significance = .000

**Hypothesis 5**

There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, and alienation.

This hypothesis was tested by multiple regression analysis using forced entry to predict alienate. A strong relationship was found between department characteristics, student characteristics, financial support, perceptions of the faculty, and alienation (R² = .416, F (15,69) = 3.28, F significance = .0004), accounting for 41.6% of the variance in the intervening variable (ALIENATE) (see Table 10). Advisor and worry were the significant variables in this regression equation. Advisor was negatively related to alienation (b = -.412, t = .000) while worry was positively related to alienation (b = .393, t = .002).
Table 10

**Hypothesis 5: Multiple Regression to Predict Alienation**

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Advisor</td>
<td>-.412</td>
<td>.000</td>
</tr>
<tr>
<td>2. Worry</td>
<td>.393</td>
<td>.002</td>
</tr>
<tr>
<td>3. Q43</td>
<td>-.044</td>
<td>.688</td>
</tr>
<tr>
<td>4. LifeSci</td>
<td>-.135</td>
<td>.344</td>
</tr>
<tr>
<td>5. Q37</td>
<td>.092</td>
<td>.372</td>
</tr>
<tr>
<td>6. Flwship</td>
<td>.154</td>
<td>.188</td>
</tr>
<tr>
<td>7. Q22</td>
<td>-.063</td>
<td>.577</td>
</tr>
<tr>
<td>8. Q28</td>
<td>.153</td>
<td>.144</td>
</tr>
<tr>
<td>9. No Help</td>
<td>-.027</td>
<td>.805</td>
</tr>
<tr>
<td>10. OwnRes</td>
<td>-.022</td>
<td>.842</td>
</tr>
<tr>
<td>11. Q21</td>
<td>-.001</td>
<td>.991</td>
</tr>
<tr>
<td>12. Othemp</td>
<td>-.072</td>
<td>.517</td>
</tr>
<tr>
<td>13. Science</td>
<td>-.047</td>
<td>.672</td>
</tr>
<tr>
<td>14. Loans</td>
<td>.093</td>
<td>.465</td>
</tr>
<tr>
<td>15. Research</td>
<td>-.005</td>
<td>.969</td>
</tr>
</tbody>
</table>

$R^2 = .416 \quad F (15,69) = 3.28 \quad F \text{ Significance} = .0004$

**Hypothesis 6**

There is no relationship between department characteristics, student characteristics, grades, and degree progress.

This hypothesis was tested by multiple regression analysis using forced entry to predict degree progress. No significant relationship was found between department characteristics, student characteristics, grade, and degree progress ($R^2 = .114, F (6,78) = 1.68, F \text{ significance} = .137$). Therefore, hypothesis 6 was not rejected (see Table 11).
Table 11

**Hypothesis 6: Multiple Regression to Predict Degree Progress Using Department and Student Characteristics and Grades**

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Q41</td>
<td>.334</td>
<td>.004</td>
</tr>
<tr>
<td>2. Q37</td>
<td>-.023</td>
<td>.833</td>
</tr>
<tr>
<td>3. Science</td>
<td>.056</td>
<td>.639</td>
</tr>
<tr>
<td>4. Q43</td>
<td>.079</td>
<td>.492</td>
</tr>
<tr>
<td>5. Research</td>
<td>.125</td>
<td>.345</td>
</tr>
<tr>
<td>6. LifeSci</td>
<td>-.034</td>
<td>.803</td>
</tr>
</tbody>
</table>

$R^2 = .114$  \[ F(6,78) = 1.68 \]  \[ F \text{ Significance} = .137 \]

**Hypothesis 7**

There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, involvement, and degree progress.

This hypothesis was tested by multiple regression analysis using forced entry of the predictor variables. No significant relationship was found between department characteristics, student characteristics, financial support, perceptions of the faculty, involvement, and degree progress ($R^2 = .207$, $F(16,68) = 1.11$, $F \text{ significance} = .362$). Therefore, hypothesis 7 was not rejected (see Table 12).
Table 12

**Hypothesis 7: Multiple Regression to Predict Degree Progress Using First-Stage Variables and Involvement**

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Involve</td>
<td>-.398</td>
<td>.008</td>
</tr>
<tr>
<td>2. Research</td>
<td>.116</td>
<td>.458</td>
</tr>
<tr>
<td>3. Ownres</td>
<td>-.003</td>
<td>.979</td>
</tr>
<tr>
<td>4. Q37</td>
<td>.086</td>
<td>.484</td>
</tr>
<tr>
<td>5. Othemp</td>
<td>.055</td>
<td>.672</td>
</tr>
<tr>
<td>6. Advisor</td>
<td>.035</td>
<td>.782</td>
</tr>
<tr>
<td>7. No Help</td>
<td>-.276</td>
<td>.037</td>
</tr>
<tr>
<td>8. Q43</td>
<td>.072</td>
<td>.572</td>
</tr>
<tr>
<td>9. Q28</td>
<td>-.091</td>
<td>.469</td>
</tr>
<tr>
<td>10. Science</td>
<td>-.047</td>
<td>.726</td>
</tr>
<tr>
<td>11. Q21</td>
<td>.000</td>
<td>.998</td>
</tr>
<tr>
<td>12. Q22</td>
<td>-.168</td>
<td>.220</td>
</tr>
<tr>
<td>13. Flwship</td>
<td>.126</td>
<td>.390</td>
</tr>
<tr>
<td>14. Worry</td>
<td>-.062</td>
<td>.671</td>
</tr>
<tr>
<td>15. Loans</td>
<td>.141</td>
<td>.355</td>
</tr>
<tr>
<td>16. LifeSci</td>
<td>-.159</td>
<td>.342</td>
</tr>
</tbody>
</table>

R² = .207      F (16,68) = 1.11    F Significance = .362

**Hypothesis 8**

There is no relationship between department characteristics, perceptions of the faculty, satisfaction with department, and degree progress.

This hypothesis was tested by multiple regression analysis using forced entry of the predictor variables. No significant relationship was found between department characteristics, perceptions of the faculty, satisfaction with department, and degree progress (R² = .089, F (8,76) = .926, F significance = .500). Therefore, hypothesis 8 was
not rejected (see Table 13).

Table 13

Hypothesis 8: Multiple Regression to Predict Degree Progress Using Department Characteristics, Perceptions of Faculty and Satisfaction

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Satisfy</td>
<td>.224</td>
<td>.131</td>
</tr>
<tr>
<td>2. LifeSci</td>
<td>-.084</td>
<td>.565</td>
</tr>
<tr>
<td>3. Q28</td>
<td>-.021</td>
<td>.858</td>
</tr>
<tr>
<td>4. Q22</td>
<td>-.216</td>
<td>.079</td>
</tr>
<tr>
<td>5. Science</td>
<td>.042</td>
<td>.733</td>
</tr>
<tr>
<td>6. Q21</td>
<td>-.100</td>
<td>.432</td>
</tr>
<tr>
<td>7. Research</td>
<td>.074</td>
<td>.583</td>
</tr>
<tr>
<td>8. Advisor</td>
<td>-.102</td>
<td>.498</td>
</tr>
</tbody>
</table>

R² = .089  F (8, 76) = 9.26  F Significance = .500

Hypothesis 9

There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, alienation, and degree progress.

This hypothesis was tested by multiple regression analysis using forced entry of the predictor variables. No significant relationship was found between department characteristics, student characteristics, financial support, perceptions of the faculty, alienation, and degree progress (R² = .124, F (16, 68) = .601, F significance = .872). Therefore, hypothesis 9 was not rejected (see Table 14).
Table 14

Hypothesis 9: Multiple Regression to Predict Degree Progress
Using First-Stage Variables and Alienation

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alienate</td>
<td>.087</td>
<td>.562</td>
</tr>
<tr>
<td>2. Othemp</td>
<td>.081</td>
<td>.558</td>
</tr>
<tr>
<td>3. Flwship</td>
<td>-.031</td>
<td>.831</td>
</tr>
<tr>
<td>4. Q37</td>
<td>-.039</td>
<td>.758</td>
</tr>
<tr>
<td>5. No Help</td>
<td>-.220</td>
<td>.107</td>
</tr>
<tr>
<td>6. Q22</td>
<td>-.249</td>
<td>.079</td>
</tr>
<tr>
<td>7. Q21</td>
<td>-.051</td>
<td>.701</td>
</tr>
<tr>
<td>8. Q28</td>
<td>-.028</td>
<td>.828</td>
</tr>
<tr>
<td>9. Science</td>
<td>.046</td>
<td>.740</td>
</tr>
<tr>
<td>10. Q43</td>
<td>.058</td>
<td>.669</td>
</tr>
<tr>
<td>11. Research</td>
<td>.080</td>
<td>.623</td>
</tr>
<tr>
<td>12. Ownres</td>
<td>-.023</td>
<td>.868</td>
</tr>
<tr>
<td>13. Advisor</td>
<td>.048</td>
<td>.742</td>
</tr>
<tr>
<td>14. Loans</td>
<td>.052</td>
<td>.741</td>
</tr>
<tr>
<td>15. Worry</td>
<td>-.063</td>
<td>.701</td>
</tr>
<tr>
<td>16. LifeSci</td>
<td>-.129</td>
<td>.465</td>
</tr>
</tbody>
</table>

R² = .124  \( F (16,68) = .601 \)  F Significance = .872

Hypothesis 10

There are no relationships between department characteristics, student characteristics, financial support, perceptions of the faculty, graduate grades, involvement, satisfaction, alienation and degree progress.

This hypothesis was tested by multiple regression analysis using forced entry of the predictor variables. Current graduate degree status (Q44) measuring degree progress was the criterion variable. Predictor variables were Research, Lifesci, and Science measuring department
characteristics, gender (Q37) and first enrollment status (Q43) measuring student characteristics; fellowship/assistantship (FLWSHIP), own resources (OWNRES), other employment (OTHEMP), loans, worried about financial situation (WORRY), and received little or no financial assistance (NOHELP) measuring financial support; treated as a colleague (Q21), number of faculty colleagues (Q28), mentor (Q22) and advisor measuring perceptions of the faculty. These were considered the first-stage variables. The second-stage variables were graduate grades (Q41); involvement in one's program (INVOLVE); satisfaction with department (SATISFY); and alienation (ALIENATE). No significant relationship was found between the predictor variables and degree progress ($R^2 = .307$, $F (19,65) = 1.52$, $F$ significance = .11) (see Table 15). Therefore, hypothesis 10 was not rejected.
Table 15

Hypothesis 10: Multiple Regression to Predict Degree Progress

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alienate</td>
<td>.076</td>
<td>.601</td>
</tr>
<tr>
<td>2. OthEmp</td>
<td>.089</td>
<td>.498</td>
</tr>
<tr>
<td>3. Flwship</td>
<td>.022</td>
<td>.879</td>
</tr>
<tr>
<td>4. Q37</td>
<td>-.111</td>
<td>.348</td>
</tr>
<tr>
<td>5. Q41</td>
<td>.261</td>
<td>.040</td>
</tr>
<tr>
<td>6. Q21</td>
<td>-.093</td>
<td>.468</td>
</tr>
<tr>
<td>7. No Help</td>
<td>-.268</td>
<td>.039</td>
</tr>
<tr>
<td>8. Q22</td>
<td>-.089</td>
<td>.505</td>
</tr>
<tr>
<td>9. Science</td>
<td>-.071</td>
<td>.582</td>
</tr>
<tr>
<td>10. Q28</td>
<td>-.161</td>
<td>.193</td>
</tr>
<tr>
<td>11. Q43</td>
<td>.113</td>
<td>.360</td>
</tr>
<tr>
<td>12. Research</td>
<td>.131</td>
<td>.384</td>
</tr>
<tr>
<td>13. Ownres</td>
<td>.096</td>
<td>.462</td>
</tr>
<tr>
<td>14. Advisor</td>
<td>-.078</td>
<td>.606</td>
</tr>
<tr>
<td>15. Loans</td>
<td>-.103</td>
<td>.487</td>
</tr>
<tr>
<td>16. Involve</td>
<td>-.356</td>
<td>.018</td>
</tr>
<tr>
<td>17. Worry</td>
<td>-.062</td>
<td>.682</td>
</tr>
<tr>
<td>18. Satisfy</td>
<td>.276</td>
<td>.087</td>
</tr>
<tr>
<td>19. LifeSci</td>
<td>-.115</td>
<td>.481</td>
</tr>
</tbody>
</table>

$R^2 = .307 \quad F(19, 65) = 1.52 \quad F \text{ Significance} = .109$

Further examination of the relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, grades, involvement, satisfaction, alienation and degree progress was warranted when no significant relationship was found using the forced entry procedure. Multiple regression using a stepwise procedure was carried out to identify significant predictors of degree progress (see Table 16). When no variables in the equation needed to be removed and no
variables not in the equation are eligible for entry, three variables remained in the equation. As a result, three significant predictors of degree progress: (1) Q41, (2) NO HELP, and (3) INVOLVE were identified by this procedure. A weak relationship was found between grades, no help from the financial support section, involvement in one’s program, and degree progress ($R^2 = .194$, $F$ (3,81) = 6.50, $F$ significance = .0005), accounting for 19.4% of the variance in degree progress (see Table 17).

Table 16

Stepwise Multiple Regression Predictors of Degree Progress

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>$R^2$</th>
<th>F(DF)</th>
<th>F Sig</th>
<th>Beta</th>
<th>Signif</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flwship</td>
<td>.30721</td>
<td>(18,66)</td>
<td>1.626</td>
<td>.0789</td>
<td>.022</td>
</tr>
<tr>
<td>2. Worry</td>
<td>.30531</td>
<td>(17,67)</td>
<td>1.732</td>
<td>.0581</td>
<td>-.064</td>
</tr>
<tr>
<td>3. Alienate</td>
<td>.30287</td>
<td>(16,68)</td>
<td>1.847</td>
<td>.0422</td>
<td>-.065</td>
</tr>
<tr>
<td>4. Science</td>
<td>.30009</td>
<td>(15,69)</td>
<td>1.972</td>
<td>.0302</td>
<td>-.064</td>
</tr>
<tr>
<td>5. Q22</td>
<td>.29608</td>
<td>(14,70)</td>
<td>2.103</td>
<td>.0218</td>
<td>-.079</td>
</tr>
<tr>
<td>6. LifeSci</td>
<td>.29348</td>
<td>(13,71)</td>
<td>2.269</td>
<td>.0146</td>
<td>-.070</td>
</tr>
<tr>
<td>7. Othemp</td>
<td>.29120</td>
<td>(12,72)</td>
<td>2.465</td>
<td>.0093</td>
<td>.053</td>
</tr>
<tr>
<td>8. Research</td>
<td>.28526</td>
<td>(11,73)</td>
<td>2.649</td>
<td>.0066</td>
<td>.088</td>
</tr>
<tr>
<td>9. Loans</td>
<td>.28075</td>
<td>(10,74)</td>
<td>2.889</td>
<td>.0042</td>
<td>.081</td>
</tr>
<tr>
<td>10. Advisor</td>
<td>.27413</td>
<td>(9,75)</td>
<td>3.147</td>
<td>.0029</td>
<td>-.111</td>
</tr>
<tr>
<td>11. Q43</td>
<td>.26657</td>
<td>(8,76)</td>
<td>3.453</td>
<td>.0019</td>
<td>.093</td>
</tr>
<tr>
<td>12. Q37</td>
<td>.25988</td>
<td>(7,77)</td>
<td>3.863</td>
<td>.0012</td>
<td>-.085</td>
</tr>
<tr>
<td>13. Q21</td>
<td>.24770</td>
<td>(6,78)</td>
<td>4.280</td>
<td>.0009</td>
<td>-.124</td>
</tr>
<tr>
<td>15. Satisfy</td>
<td>.21296</td>
<td>(4,80)</td>
<td>5.412</td>
<td>.0007</td>
<td>.140</td>
</tr>
<tr>
<td>16. Q28</td>
<td>.19399</td>
<td>(3,81)</td>
<td>6.498</td>
<td>.0005</td>
<td>-.149</td>
</tr>
</tbody>
</table>
Table 17

Significant Predictors of Degree Progress

<table>
<thead>
<tr>
<th>STEP VARIABLE</th>
<th>Beta</th>
<th>Signif t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Q41</td>
<td>.227</td>
<td>.032</td>
</tr>
<tr>
<td>2. No Help</td>
<td>-.223</td>
<td>.030</td>
</tr>
<tr>
<td>3. Involve</td>
<td>-.257</td>
<td>.016</td>
</tr>
</tbody>
</table>

R² = .194  F (3,81) = 6.50  F Significance = .0005

Summary

A comparison of the master's level group and the doctoral level group on the measures of degree progress showed significant differences on four variables: (1) NO HELP, (2) MENTOR, (3) GRADES, and (4) INVOLVEMENT. In the NO HELP category of the financial support section, the doctoral students had a significantly lower mean than the master's students. This finding indicated that doctoral students saw getting no financial support as a problem to them in continuing their graduate programs than the master's students. On the perceptions of the faculty measure, the MENTOR category indicated a significant difference between the master's students and the doctoral students. Doctoral students were more likely to have a mentor than master's students. On the variable, GRADES, the doctoral students had a significantly higher graduate GPA than the master's students. Finally, on the measure of INVOLVEMENT in one's
program, there was a significant difference between the doctoral students and the master’s students. Doctoral students were more involved in their programs than the master’s students.

The results of the structural equation model indicated that interpretations of results was not appropriate for the hypothesized model, as well as, the two alternative models due to parameters condition codes.

The hypotheses were structured to determine which research variables related to degree progress. Hypothesis 10 examined all the variables in Girves and Wemmerus’ (1988) conceptual model of degree progress. Hypotheses 1 through 9 examined in various combinations first stage and intervening variables in predicting degree progress depicted in Girves and Wemmerus’ model.

Four significant findings resulted from the hypothesis testing:

1. There was no significant relationship found between department characteristics, student characteristics, financial support, perceptions of the faculty, grades, involvement in one’s program, satisfaction with department, alienation and degree progress. Only three predictors were significant: grades, no help, and involve.

2. Department characteristics, student characteristics, financial support, and perceptions of the faculty were factors in predicting involvement in one’s
program.

3. Department characteristics and perceptions of the faculty are predictors of satisfaction with department.

4. Department characteristics, student characteristics, financial support, and perceptions of the faculty are predictors of alienation.

The next chapter will analyze the findings of this study and discuss the implications of these results. Recommendations will be made for application of findings of this study for the Graduate School and individuals interested in the retention of African-American graduate students. Also, limitations of the study will be reviewed and suggestions for further research will be presented.
CHAPTER V
DISCUSSION AND CONCLUSIONS

This research investigated a model that links department and student characteristics, financial support, and perceptions of the faculty with grades, involvement in one's program, satisfaction with department, and alienation in order to predict degree progress of African-American graduate students. In early chapters, the research questions were stated, relevant literature reviewed, and methodology of the study described. The previous chapter compared similarities and differences between the master's and doctoral degree groups on the measures of degree progress and presented the results of the structural equation modeling and hypothesis testing.

In this chapter, three broad categories of results will be reviewed and analyzed: (1) similarities and differences between the masters level and doctoral level groups, (2) the hypothesis testing results, and (3) implications of the findings for the graduate school and administrators, and recommendations based on results of the study. In addition, the limitations of the study and suggestions for further research will be presented.
Differences Between Master’s and Doctoral Groups

In this section, the two groups, masters and doctoral students, will be compared. Four areas of differences will be analyzed in the context of theoretical prediction and prior empirical findings. The four areas are:
(1) differences in financial support, (2) differences in the perceptions of the faculty, (3) differences in grades, and (4) differences in involvement in one’s programs.

Differences in Financial Support

The present study found no significant differences in five of the six categories of financial support:
(1) Fellowship/Assistantship, (2) Own resources, (3) Loans, (4) Other Employment, and (5) Worried about their financial situation. However, a significant difference was found in the sixth category, No Help. The doctoral group had a significantly lower mean than the master’s group. The No Help category consisted of financial concern items relating to not getting financial assistance, receiving insufficient aid, and unable to find part time employment. In other words, doctoral students who received no help in financial support were more likely to indicate this as a minor problem to them in continuing in their graduate program. Matthews and Jackson (1991) found financial resources to be a more critical determinant of retention among African-American graduate students especially females. However, since doctoral students are more likely to have other employment
outside the university and be married or have a partner, the influence of No Help on degree progress is minor for this group.

Differences in the Perceptions of the Faculty

The doctoral students in this study perceived their relationship with the faculty to be better than the master’s students. The role of the adviser is critical at the doctoral level. The adviser becomes the primary individual that socializes the advisee into the department. Doctoral students perceived the adviser’s quality as a scholar and teacher, concern for students, and usefulness in providing information as important and influencing their progress toward completing their degree. This is consistent with Bean (1985) and Pascarella (1980) findings that the adviser’s quality as a scholar and teacher and concern for students to be predictors of retention. Doctoral students also perceived that their adviser treated them as a junior colleague. Typically, the adviser establishes the standards of performance and the behavior norms for his or her advisee. Communication between the adviser and advisee is important throughout the graduate program, especially when the doctoral student is at the dissertation phase. This relationship when perceived as favorable is more likely to influence the doctoral student’s progress toward degree completion. Furthermore, doctoral students maintained more regular professional interactions with faculty and perceived
these faculty to treat them as junior colleagues. Girves and Wemmerus (1988) make the point that faculty members serve as role models and mentors, determine where the student is employed, determine the area of specialization, and impact the norms and expectations of the department. Doctoral students get to know more faculty members as professional colleagues based on their involvement in the doctoral program. They spend more time in their program and are able to identify faculty members who are willing to work with them, respect their abilities, and support them. Being treated as a colleague fosters confidence and self-respect and encourages a student to continue in their graduate studies.

There was a significant difference found between the master's and doctoral students when asked if they had a mentor. Doctoral students were more likely to have a mentor than master's students. This finding is in part the result of the time doctoral students spend in the program, but it is also an important part of the socialization factor related to Tinto's concept of social integration.

Differences in Grades

This study found a significant difference between the master's students grade point average and the doctoral students grade point average. Doctoral students reported higher GPAs than the master's students. Girves and Wemmerus (1988) found grades to be the only intervening variable to
predict master’s students degree progress and not doctoral students degree progress. Typically, master’s degree programs are two-years and academic performance is assessed by graded courses. Doctoral students are selected from a more restricted pool than master’s students and therefore it is expected that they will have higher GPAs. However, the effects of grades on degree progress at the doctoral level may diminish since other activities, such as one’s performance on comprehensive examinations and one’s ability to do independent research, may be more important criteria for assessing academic success. Moreover, once coursework is completed at the doctoral level, a student’s grade point average will not change.

Differences in Involvement in One’s Program

This study found a significant difference between master’s and doctoral students. Doctoral students were more involved in their program than master’s students. This finding is not surprising since more socialization occurs at the doctoral level as a result of the time a student spends in a doctoral program. This result is consistent with findings at the undergraduate level, where socialization is important in the retention of juniors. Involvement at the doctoral level is a function of financial support and perceptions of the faculty. At the doctoral level, students have greater opportunities to participate in independent studies, work with faculty on research projects, develop
relationships with faculty and other graduate students outside of the classroom, and attend seminars, professional conferences, and scholarly meetings. Thus, involvement in one’s program is one way of improving the educational experience and improving retention (Bean, 1980; Tinto, 1975). Girves and Wemmerus (1988) found involvement in one’s program directly related to degree progress of doctoral students. This is consistent with findings of the impact that social integration has had on student persistence/retention (Pascarella, 1980; Pascarella & Terenzini, 1979; 1980).

Implications of Hypothesis Testing Results

The implications of the hypothesis testing results will be discussed in four categories: (1) degree progress and its predictors, (2) involvement in one’s program and its predictors, (3) satisfaction with department and its predictors, and (4) alienation and its predictors.

Degree Progress and Its Predictors

Girves and Wemmerus (1988) expected department characteristics, student characteristics, financial support, and perceptions of the faculty in various combinations to affect grades, involvement in one’s program, satisfaction with the department, and alienation, all of which, would contribute directly to graduate student degree progress. This study found only three significant variables in the conceptual model of graduate student degree progress:
(1) involvement in one's program, (2) grades, and (3) no help in the financial support section. These factors explained 19% of the variability in graduate degree progress for African-American students.

This result is quite different from what Girves and Wemmerus' (1988) conceptual model predicted. However, Girves and Wemmerus' model was not tested on a specific ethnic group. Furthermore, two models of graduate student degree progress emerged in Girves and Wemmerus' study: one for master's students and one for doctoral students. In this study, there were only four variables that resulted in significant differences between master's and doctoral students: (1) involvement in one's program, (2) grades, (3) no help in the financial support section, and (4) having a mentor. The first three factors were found to be related to degree progress while the fourth, having a mentor, was not a significant predictor of degree progress.

The three factors associated with graduate student degree progress for African-American students do compare somewhat to the undergraduate retention models. For instance, grades and involvement in one's program are related to Tinto's (1975) concept of academic integration. His concept of social integration was not supported by the satisfaction with department and alienation intervening variables in Girves and Wemmerus' (1988) conceptual model. The no help category of the financial support variable was
included in Girves and Wemmerus’ model because it was considered a fundamental part of the graduate education experience.

The importance of these three significant factors of graduate degree progress are represented by the beta weights of each variable in the regression equation. Involvement in one’s program and no help in the financial support section were significant predictors ($b = -.223, t = .030$ and $b = -.257, t = .016$ respectively). These results indicate that these factors are negatively related to degree progress. However, grades had a beta weight of .227, which means it is positively related to degree progress. The implication of these results suggest that for African-American graduate students less involvement in one’s program and getting no help financially reduce the likelihood of degree progress while higher grades increase the likelihood of degree progress.

Involvement and Its Predictors

Girves and Wemmerus (1988) expected department characteristics, student characteristics, financial support, and perceptions of the faculty would be related to degree progress. This study found having fellowships or assistantships as a major source of support was positively related to involvement for African-American graduate students ($b = .360, t = .002$). Since fellowships/assistantships had the largest beta weight, this suggests
that it is a very important factor for African-American graduate students to increased involvement in one's program. This finding is not surprising and matches the results found in Girves and Wemmerus' study. African-American students with fellowships and/or assistantships are more involved in their graduate programs. These students are more likely to become socialized because they are working closely with faculty. By spending more time in the department, there is greater opportunity for more informal contacts with faculty.

The science dimensions of the department characteristics was negatively related to involvement in one's program (b = -.223, t = .043). Since this factor had the second largest beta weight, it appears to be an important factor associated with less involvement in one’s program. The nature of the department, including the attitudes, norms and expectations of the faculty and the activities they value and engage in determine the kind of experience the graduate student has. This finding would indicate that African-American students in the science departments are less likely to be involved in their programs and reducing the likelihood of degree progress.

Satisfaction and Its Predictors

Girves and Wemmerus (1988) expected department characteristics and perceptions of the faculty to be related to satisfaction with the department. This study found the advisor's concern, quality, and utility as the best
predictor of satisfaction with the department for African-American graduate students \((b = .561, t = .000)\). The role of the advisor is important at the graduate level, especially at the doctoral level. The advisor serves as a role model and becomes the primary socializing person in the department. The advisor establishes the standards of performance and the behavior norms for the advisee. These standards and norms are reinforced by the advisor, the other faculty, and the more experienced graduate students. This finding suggests that the advisor’s concern for the student as a person, his or her quality as a scholar and teacher, and his or her usefulness in providing information needed by the student to progress in his or her program increases the likelihood of satisfaction with the department. Those students whose relationship with their advisor is less favorable are more than likely to be less satisfied with their department.

**Alienation and Its Predictors**

Girves and Wemmerus (1988) expected department characteristics, student characteristics, financial support and perceptions of the faculty to be related to alienation. This study found the advisor and being worried about their financial situation as significant factors of alienation for African-American graduate students.

The advisor’s concern, quality, and usefulness was negatively related to alienation \((b = -.412, t = .000)\).
Since the advisor factor had the largest beta weight, this would indicate its importance as a predictor of alienation. This finding would suggest that the more the advisor’s concern with the student as a person, his/her quality as a scholar and teacher, and his/her usefulness in providing information to progress toward degree completion will reduce the likelihood of alienation. If the student’s perception of the advisor is less favorable, then the more likely the student will experience alienation. Loo and Rolison (1986) wrote about alienation of ethnic minority students at a predominately white university. African-American students often feel alienated or feel isolated, as though they do not fit in. Especially at the graduate level where the numbers of African-American graduate students are smaller, these feelings of alienation are reinforced. The degree to which faculty, especially the advisor, display feelings of acceptance, support, and encouragement will influence the student’s feeling of belonging, and reduce the likelihood of alienation among African-American graduate students.

The worry category of the financial concerns section was positively related to alienation ($b = .393$, $t = .002$). This variable had the second largest beta weight which indicates its importance after the advisor variable as a predictor of alienation. This finding would suggest that the more African-American students are worried about their financial situation, the more likely they will experience
alienation. Fellowships, assistantships, scholarships and grants in one form or another pay for part of graduate education, yet for African-American graduate students, these types are not the major source of financial support. This study found more than half (56.6%) of the students stated employment outside the university as their major source of financial support. Loans was the second major source of employment. Students employed outside the university are less likely to become involved in their programs and experience feelings of alienation. For these students, time is divided between work and academic performance. Employment outside the university can demand more time, which results in less time in the department, less time for socialization, and slow the student's progress toward degree completion. Matthews and Jackson (1991) found that financial support plays an important role in retention for African-American graduate students, especially females.

Summary of Recommendations

Based on the results found in this study, the following recommendations are provided for the Graduate School, administrators, faculty, and other individuals interested in the retention of African-American graduate students.

Financial Support

1. The Graduate School and academic departments should provide more financial support in the form of fellowships/assistantships.
The type of financial support provided may have an effect on reducing feelings of alienation, increasing involvement in one's program, and increasing progress toward degree completion. Fellowships, teaching or research assistantships would give African-American students greater opportunity to become more involved in their program, reduce feelings of alienation, and directly effect their degree progress.

2. The Graduate School and academic departments need to provide fellowships/assistantships at different stages during the degree progress.

Typically, fellowships and scholarships are used to recruit graduate students. If a fellowship or scholarship doesn't involve the student in the program as much as an assistantship, then offering more assistantships to new students might be a better way to improve degree progress of African-American students early in their programs. For graduate students near the end of their program (i.e., working on theses and dissertations, fellowships and assistantships should be provided to students to assist them toward degree completion. At this stage, graduate students are more likely to be employed or seek full-time employment outside the university. As a result, the time devoted to work becomes more important than time devoted to degree completion.
3. The Graduate School and academic departments need to provide more financial support for part-time students.

In this study, two-thirds (65.9%) of the African-American students surveyed were part-time when they first enrolled in their programs. More than half (56.6%) said employment outside the university was their major source of financial support. Since getting no help in the financial support section was found to be a significant predictor of degree progress, more assistance needs to be provided to influence degree progress. This study suggests that outside employment interferes with academic performance and slows down progress toward degree completion. For instance, almost half (47.7%) of the African-American graduate students surveyed said that employment interfered with their academic performance. Also, more than four-fifths (82.6%) of these same students said that employment slowed down their degree progress.

Involvement in One’s Program

4. Academic departments need to encourage and promote involvement of African-American students.

The nature of the department, including the attitudes, norms, and expectations of the faculty, the activities they value and engage in determine the kind of experience the graduate student has. For African-American graduate students, more emphasis on multicultural issues in the classroom and outside the classroom, supportive and
encouraging faculty, better access to information to complete their degree, increase minority faculty, and more practical applications of curriculum were issues stated by the students surveyed in this study to enhance retention and degree completion. Biglan's (1973) three dimensions can be used to help identify specific attitudes and behaviors of the faculty that lead to degree progress.

5. **Academic departments need to encourage better advisor/student relationships.**

The perceptions of the faculty, especially the advisor was found to be a significant factor related to satisfaction with the department. The support, guidance, and encouragement of faculty will result in more African-American graduate students being satisfied with the department. Feelings of alienation would be reduced and more students will become involved in their program, which directly relates to degree progress for master's and doctoral level student. However, the role of the advisor is even more critical at the doctoral level. The advisor's quality, concern, and usefulness play an important part in the African-American graduate students' experience. This experience can be rewarding or unrewarding, depending on the characteristics of the student and the characteristics of the faculty and the advisor. Since the advisor's quality, concern, and usefulness are directly related to alienation and satisfaction with the department, more departments need
to examine their role in the student/faculty relationship and in particular the advisor/student relationship. Faculty who serve as mentors to African-American students have a unique and close relationship with these students. This relationship may permit candid discussion as to what characteristics of the faculty are important, what characteristics need improvement and how to facilitate these changes.

Graduate Grades

6. The Graduate School and academic departments need to examine entrance criteria for African-American students. Grades was found to be a significant factor in degree progress for African-American graduate students. For master’s degree programs, which are usually two years, academic performance is typically assessed by graded courses, while 84% of the African-American students in this study had undergraduate grades between 2.6 and 4.0, their academic performance improved at the graduate level. Almost all the students (91.6%) had graduate grades between 3.1 and 4.0 (see Table 1). Despite lower undergraduate grades, African-American students are doing well academically and are more likely to progress toward degree completion.

Limitations of the Study

Three limitations can be noted about this study which limits its generalizability and application: (1) internal and external validity; (2) the conceptual model; (3) the
First, there is a problem with internal validity. This study used an adaptation of the questionnaire Girves and Wemmerus (1988) developed to measure degree progress. This instrument failed to minimize error variance which may be the result of measurement issues. For instance, the items in Girves and Wemmerus' questionnaire were grouped together to form scales and these scales were used as factors to predict degree progress. However, there is no clear evidence presented by Girves and Wemmerus that a confirmatory factor analysis technique was used to explain how these variables are linked to their underlying factors. These factors are important when determining a structural equation model. As a result, this study was not able to confirm the model Girves and Wemmerus developed using the structural equation modeling technique.

Also, since structural equation modeling takes a hypothesis testing approach, there are problems associated with failing to reject a false hypothesis. There were ten hypotheses tested in this study and six of the ten hypotheses were not rejected. However, not rejecting these hypotheses does not really prove that there were no relationships between the variables. One reason for not rejecting these hypotheses can result from not adequately minimizing error variance. The measurement issues discussed earlier contributed to error variance. The measurement
issues discussed earlier contributed to error variance. In addition, this study was not able to effectively control extraneous variance. This control of extraneous variance is achieved by using randomization and matching procedures when selecting individuals and assigning groups. This study did use the matching procedures, defined by Girves and Wemmerus' (1988) study, in which individuals were grouped based on the five steps of degree progress. However, the purpose of this study, was to test Girves and Wemmerus' model on African-American graduate students and the selection of this sample came from a small population to begin with and making it difficult to randomly select individuals and still have an adequate sample size. Hence, these factors relating to error variance and extraneous variance contributed to this study not finding relationships that may actually exist.

There is also the issue of power and whether or not power was large enough. In this study, the significance level was set at .05 and the sample size was basically determined because of the small population to begin with. However, in retrospect, estimates of the sample size can be determined in order to achieve significant results at the 95 percent level of confidence when the population effect size is determined. Hence, estimates of the sample sizes needed to reject hypotheses 2, 6, 7, 8, 9, and 10 were determined.
Hypothesis 2

There is no relationship between department characteristics, student characteristics, and grades. To reject this hypothesis with .95 probability at the .05 level of significance assuming the population effect size is .10, 183 individuals would be needed in this sample.

Hypothesis 6

There is no relationship between department characteristics, student characteristics, grades, and degree progress. To reject this hypothesis with .95 probability at the .05 level of significance assuming the population effect size is .10, 193 individuals would be needed in this sample.

Hypothesis 7

There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, involvement, and degree progress. To reject this hypothesis with .95 probability at the .05 level of significance assuming the population effect size is .10, 261 individuals would be needed in this sample.

Hypothesis 8

There is no relationship between department characteristics, perceptions of the faculty, satisfaction with department, and degree progress. To reject this hypothesis with .95 probability at the .05 level of significance assuming the population effect size is .10, 210 individuals would be needed in this sample.
Hypothesis 9

There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, alienation, and degree progress. To reject this hypothesis with .95 probability at the .05 level of significance assuming the population effect size is .10, 261 individuals would be needed in this sample.

Hypothesis 10

There is no relationship between department characteristics, student characteristics, financial support, perceptions of the faculty, graduate grades, involvement, satisfaction, alienation and degree progress. To reject this hypothesis with .95 probability at the .05 level of significance assuming the population effect size is .10, 272 individuals would be needed in this sample.

For each hypothesis, as the number of independent variables increased, the estimated sample size increased. However, the problems with internal and external validity must be addressed in order for the results to have true meaning.

Second, the conceptual model developed by Girves and Wemmerus (1988) was not intended to explain the causal effect among the variables. The statistical technique used to develop this model was correlation and regression. This technique tends to examine the regression of predictor variables on measures of educational outcomes, the criterion
variable. Its focus is on prediction among variables rather than causation. In order to determine causation among variables, techniques such as path analysis and structural equation modeling need to be used.

Lastly, the criterion variable, degree progress is questionable as a measured outcome. Girves and Wemmerus' (1988) conceptual model identified the criterion variable as degree progress not retention or attrition as found in the theoretical models of Spady (1971), Tinto (1975), Bean (1980) and others. Girves and Wemmerus defined degree progress as milestones attained in the graduate degree process which resulted in five steps or milestones identified. However, this criterion variable does not take into consideration the time factor involved and the movement from one step to the next. Rather, the measured outcome only identifies students who are currently at a given step or milestone and not the progression over time from one milestone to the next milestone.

Suggestions for Further Study

1. Since the initial hypothesized model did not fit the given data, the model should be modified and tested again with a larger African-American graduate student population. Several models may be tested in the process. Joreskog (1993) suggests that the goal of this model generating process should be to find a model that not only fits the data statistically but also that every parameter
have substantive meaningful interpretation. Every attempt should be made to remove all parameter condition codes so that the results can be interpreted appropriately.

2. Further research in retention should examine the differences between groups (African-Americans, Mexican-Americans, Puerto Ricans and gender) to assess the equality of the covariance matrices. Noña (1987) points out that if different groups can generate similar measures of goodness of fit, then the underlying factor patterns between the groups can be examined and tested.

3. Identification of factors affecting African-American graduate students and an understanding of the underlying structural patterns must be achieved. Matthew and Jackson (1991) speculated that determinants of retention of African-American graduate and professional students may include factors such as alienation, perceptions of progress, and the existence of mentors. Further research in retention of African-American graduate student populations including nontraditional factors in causal models is recommended.

Summary

This research examined degree progress among African-American graduate students. The purposes of this study were to test the validity of a causal model of degree progress developed by Girves and Wemmerus (1988), and to determine if the model fit an African-American graduate student population. Structural equation modeling using EQS were
used to examine the parameter estimates of the structural and measurement models of the hypothesized causal model. The measurement and structural models were not found to represent a causal model of degree progress among African-American graduate students. However, the hypothesis testing identified several significant relationships between the predictor variables and degree progress. Based on these findings, several recommendations were made that the Graduate School, administrators, and others interested in the retention of African-American graduate students may use to implement programs or strategies to improve retention at the graduate level.
APPENDIX A

LETTER OF PERMISSION
8607 South Champlain  
Chicago, IL 60619

April 7, 1993

Jean E. Girves, Ph.D.  
Assistant Director  
Committee on Institutional Cooperation  
302 East John Street  
Champaign, IL 61820

Dear Dr. Girves:

My name is Mary Toliver and I am a doctoral student in the Department of Counseling and Educational Psychology at Loyola University Chicago. I am in the process of starting my dissertation research and I need your help.

I am writing to request permission to use the instrument from your study titled, Developing Models of Graduate Student Degree Progress. In my study, I would like to see if the models you developed in your study apply to different ethnic groups.

We spoke briefly on the telephone a couple of weeks ago and I am following up with a letter. I would greatly appreciate it if you would send the survey to my home address given above. If you need to contact me, my home telephone number is 312-783-0971.

Thank you for your assistance.

Sincerely,

Mary F. Toliver
APPENDIX B

ADAPTATION OF GIRVES AND WEMMERUS' QUESTIONNAIRE
Go to Section 2 if you are still enrolled in the Graduate School at Loyola University Chicago.

SECTION 1 EMPLOYMENT HISTORY

1. How would you describe the first position you held after leaving graduate school at Loyola University Chicago? If more than one statement describes the position, circle the one that was most time consuming.

   01 faculty
   02 teaching at a primary or secondary school
   03 administration or management
   04 research
   05 professional practice in a clinic, agency or hospital
   06 clerical
   07 sales
   08 service
   09 self-employed or private practice
   10 homemaker
   11 continuing graduate or professional education
   12 not employed
   13 other position (please specify): ______________________

2. From which of the following sources did you learn about the first job you held after leaving Loyola University Chicago’s graduate school? (Circle one)

   1. college placement office
   2. faculty member in the department
   3. parent or relative
   4. newspaper/professional publication
   5. professional meeting
   6. another student/friend
   7. recruited by employer
   8. employment agency
   9. other (please specify): ______________________

3. How long did it take you to obtain your first full-time job after leaving graduate school? (Circle one)

   1. less than one month
   2. one to six months
   3. seven to 12 months
   4. over 12 months
   5. no full-time job
4. How well did your graduate experience prepare you for your first job? (Circle one)

1. excellent preparation
2. good preparation
3. adequate preparation
4. inadequate preparation
5. not applicable to first job

5. Please list the full-time jobs you have taken since leaving graduate school at Loyola University Chicago from the first job to the most recent. Please circle the number of those jobs that were related to your academic major.

1. ____________________________________________ (first)
2. ____________________________________________
3. ____________________________________________
4. ____________________________________________ (most recent)

6. Is your present job related to your academic major?

1. yes
2. no

SECTION 2 PROFILE

7. At the time you enrolled in graduate school, were you: (Circle one)

1. married/coupled
2. separated
3. single
4. single (divorced)
5. single (widowed)
6. other (please specify): __________________________

8. Did the above status change while enrolled in graduate school?

1. yes
2. no (skip to question 9)
8a. If yes to question 8, how did your status change? I become: (Circle one)

1. married/coupled
2. separated
3. single
4. single (divorced)
5. single (widowed)
6. other (please specify):__________________________

8b. How did this change affect your progress toward your degree?

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

9. How many children or other dependents did you have at the time you first enrolled? (Circle one)

1. none
2. one or two
3. three or four
4. five or more

10. Did you have additional children while pursuing your graduate degree? (Circle one)

1. yes
2. no (skip to question 11)

10a. If yes to question 10, how did it affect your progress toward your degree?

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

If you were not married or coupled at the time your first enrolled, go to SECTION 3.
11. At the time you enrolled, what was your spouse's/partner's educational attainment level? (Circle one)

1. high school education or less
2. some college
3. bachelor's degree
4. some graduate school
5. master's degree
6. professional degree after bachelor's degree
7. earned doctorate

12. Which of the following items best describes your spouse's/partner's employment while you were enrolled in graduate school? (Circle one)

1. was employed full-time
2. was employed part-time
3. not employed
4. student, employed
5. student, not employed

SECTION 3  FINANCIAL SUPPORT

13. Indicate whether each of the following was a major source, a minor source, or not a source of funds for your graduate education. (Circle the appropriate number for each item)

<table>
<thead>
<tr>
<th>Major Source of Funds</th>
<th>Minor Source of Funds</th>
<th>Not a Source of Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. personal savings</td>
<td>b. parents, relative, or friends</td>
<td>c. spouse's/partner's income</td>
</tr>
<tr>
<td>d. university employment (RA, TA, GA, Fellow)</td>
<td>e. university employment (staff)</td>
<td>f. employment outside the university</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
14. If you were ever employed while attending graduate school, do you feel that your employment affected the quality of your academic performance? (Circle one)

1. yes
2. no
3. does not apply

14a. If yes, please evaluate whether employment enhanced or interfered with your academic performance. (Circle one)

<table>
<thead>
<tr>
<th>interfered</th>
<th>enhanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

15. If you were ever employed while attending graduate school, do you feel that your employment affected the time it took to make progress toward your degree? (Circle one)

1. yes
2. no
3. does not apply

15a. If yes, please evaluate whether employment slowed down or speeded up your progress toward your degree. (Circle one)

<table>
<thead>
<tr>
<th>slowed down</th>
<th>speeded up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
16. Please indicate the item that best describes the length of time you held a non-university job(s) while attending graduate school. (Circle one)

1. entire time
2. less than a year
3. one to two years
4. more than two years less than three years
5. more than three years
6. did not hold a non-university job

17. Below is a list of items that might describe your financial situation while enrolled in graduate school. Indicate the extent to which each item posed a major, minor, or no problem to you in continuing in your graduate program. (Circle the appropriate number for each item)

<table>
<thead>
<tr>
<th></th>
<th>Major Problem</th>
<th>Minor Problem</th>
<th>Not a Problem</th>
</tr>
</thead>
</table>
a. I had large health or medical expenses. | 1 | 2 | 3 |
b. My education has placed me deeply in debt. | 1 | 2 | 3 |
c. I paid educational expenses for myself and my spouse/partner. | 1 | 2 | 3 |
d. I attempted to get financial aid but by application was not accepted. | 1 | 2 | 3 |
e. I received financial aid but it was inadequate to meet my expenses. | 1 | 2 | 3 |
f. I tried to find a part-time job but was not able to do so. | 1 | 2 | 3 |
g. I was often worried about my financial situation. | 1 | 2 | 3 |
SECTION 4 RELATIONSHIP WITH FACULTY

18. Below is a list of items that might describe your relationship with your faculty adviser. Circle the number after each item that best characterizes your adviser.

<table>
<thead>
<tr>
<th>Accessible</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Don't Know</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. accessibility</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>b. useful criticism of your work</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>c. concern for your professional development</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>d. scholarly or research excellence</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>e. knowledge of the field</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>f. interest in your welfare, including concern for you as an individual</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>g. value of the information provided</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

19. Was (is) your adviser the same gender as you?  
   Yes | No | Not Applicable | 1 | 2 | 9

20. Was (is) your advisor the same race as you?  
   Yes | No | Not Applicable | 1 | 2 | 9

21. Did (do) you consider you and your adviser to be professional colleagues?  
   Yes | No | Not Applicable | 1 | 2 | 9

22. Did (do) you have a faculty member who served as a mentor? (Assume that mentor is defined as a guide, counselor, or role model)  
   Yes | No | Not Applicable | 1 | 2 | 9

23. Was (is) your mentor also your adviser?  
   Yes | No | Not Applicable | 1 | 2 | 9

24. Was (is) your mentor the same gender as you?  
   Yes | No | Not Applicable | 1 | 2 | 9
25. Was (is) your mentor the same race as you?  
1 2 9

26. Please describe the qualities of your relationship with your mentor and their influence on completing or not completing your degree.

27. Please describe the qualities of your relationship with your adviser and their influence on completing or not completing your degree.

28. With how many faculty members did (do) you maintain regular professional interactions? (Circle one)

1. none
2. one
3. two
4. three
5. four or more

SECTION 5 INVOLVEMENT IN THE PROGRAM

29. Indicate which of the following statements described your involvement in your graduate program. (Circle the appropriate response)

a. I participated in at least one independent study. Yes No 1 2
b. I worked with a faculty member on a research project. Yes No 1 2
c. I worked with a faculty on a consulting project. Yes No 1 2
d. I participated in a study group (seminar) with other graduate students. Yes No 1 2
e. I participated in social activities with other graduate students. Yes No 1 2
f. I discussed educational issues outside the classroom with faculty members. Yes No 1 2
g. I received regular and periodic assessment of my academic progress (in addition to grades in courses). Yes No 1 2
h. I attended professional or scholarly meetings.  
\[1\]  \[2\]

i. I was introduced to faculty at other institutions.  
\[1\]  \[2\]

**SECTION 6 LEARNING ENVIRONMENT**

30. Indicate level of satisfaction with each of the following aspects of your department. (Circle one number on each line)

<table>
<thead>
<tr>
<th></th>
<th>Very</th>
<th>Satisfied</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
<th>Very</th>
<th>Dissatisfied</th>
<th>Don’t</th>
<th>Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>quality of instruction</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>quality of scholarly/research guidance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>intellectual ability of other graduate students</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>preparation you received for your career</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>research and scholarly opportunities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>requirements for the graduate degree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>opportunities for financial support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>fairness in providing financial support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>fairness with which degree requirements were enforced</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>fairness of evaluations of student academic progress</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>k.</td>
<td>fairness with which master’s, comprehensive, and final oral exams were administered</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
l. concern for you as a professional 1 2 3 4 8  
m. collegial atmosphere among the faculty and students 1 2 3 4 8  
n. communication between faculty and students 1 2 3 4 8  
o. accessibility of the faculty 1 2 3 4 8  
p. comments:__________________________________________

SECTION 7 POTENTIAL PROBLEMS OR BARRIERS TO DEGREE COMPLETION

31. The decision to leave graduate school may be motivated by a variety of reasons. Please indicate which reasons contributed to your decision to leave. Please respond to this question if you left before earning a master’s or doctoral degree or if you earned a master’s degree but did not begin a doctoral degree. Please skip to question 32 if you are still enrolled in a graduate program or you earned a doctoral degree.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. transferred to another graduate school</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b. needed a break from school</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c. courses/programs I wanted were not available</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d. did not have enough money to continue</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e. accepted a job</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>f. moved out of the area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>g. could not work and go to school at the same time</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>h. not interested in pursuing a doctoral degree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>i. other (please specify)</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

32. Below is a list of problems or barriers you may have encountered while enrolled in your graduate program. Indicate the extent to which each item posed a major, minor, or no problem to you in continuing your graduate program. (Circle the appropriate number of each item)
33. While enrolled in graduate school at Loyola University Chicago, were you ever subjected to any of the following?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. sexism</td>
<td>1</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>b. sexual harassment</td>
<td>1</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>c. racism</td>
<td>1</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>d. harassment</td>
<td>1</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>e. age discrimination</td>
<td>1</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

If you circled yes to any of the above, please comment on the nature of the problem and how it affected your ability to make progress toward your degree.
34. If you could start graduate school over, would you:

A. come back to Loyola  B. select the same department

1. definitely yes  1. definitely yes
2. probably yes  2. probably yes
3. uncertain  3. uncertain
4. probably no  4. probably no
5. definitely no  5. definitely no

Why: ______________________________________

35. If you changed departments while at Loyola, please give your reasons for the change:

_______________________________________________

36. Are there any departmental or university policies or practices that should be changed to enhance retention and graduate degree completion? Please feel free to make any other comments related to financial support, involvement in the program, the faculty, or the learning environment that might improve retention of graduate students through degree completion.

_______________________________________________

_______________________________________________

SECTION 8  STUDENT DEMOGRAPHIC INFORMATION

37. What is your gender?  1. Male  2. Female

38. What is your age?  ______


40. What was your undergraduate grade point average?

1. Below 2.0
2. 2.0 - 2.5
3. 2.6 - 3.0
4. 3.1 - 3.5
5. 3.6 - 4.0
41. What was (is) your graduate grade point average?
   1. Below 2.0
   2. 2.0 - 2.5
   3. 2.6 - 3.0
   4. 3.1 - 3.5
   5. 3.6 - 4.0

42. What was (s) your academic department? ________________

43. What was your enrollment status when you first enrolled in Loyola University's graduate school?
   1. Full-time
   2. Part-time

44. What is your current graduate degree status? (Circle one)
   1. Taken courses toward master's degree
   2. Earned master's degree
   3. Taken courses toward doctorate degree
   4. Completed comprehensive exams
   5. Earned doctorate degree

THANK YOU FOR YOUR PARTICIPATION!!
APPENDIX C

COVER LETTER TO GRADUATE STUDENTS
January 31, 1994

Dear Graduate Student,

My name is Mary F. Toliver and I am a doctoral candidate in the Department of Counseling and Educational Psychology at Loyola University Chicago. I am currently working on my dissertation research. I am writing to request your assistance.

My research study is focusing on identifying factors that facilitate and/or hinder African-American graduate students completing their masters or doctorate degree. Enclosed is a questionnaire that I would like you to complete. Please take a few minutes to answer the survey and send it back in the stamped, self-addressed envelope.

As a subject in this study, your participation is completely voluntary. However, if you are unable to participate, please return the blank questionnaire back to me in the envelope provided. Data that are collected will be kept confidential. Names of participants will not appear in the study. After this study has been completed, research findings can be made available to any participant at his/her request.

As a fellow graduate student, I am very interested in finding out whether your graduate studies have been successful or a challenge. In order for me to complete this project by my scheduled deadline, I would appreciate it if you would respond by FRIDAY, FEBRUARY 18, 1994. Thank you in advance for your participation. Good luck with your graduate studies!

Sincerely,

Mary F. Toliver

Enclosures: Questionnaire and return envelope
APPENDIX D

EQUATIONS USED IN THE HYPOTHESIZED AND ALTERNATIVE
STRUCTURAL MODELS OF DEGREE PROGRESS
LABELS
V1 = SCIENCE; V2 = RESEARCH; V3 = LIFESCI; V4 = Q37;
V5 = Q43; V6 = FLWSHIP; V7 = OWNRES; V8 = OTHEMP;
V9 = LOANS; V10 = WORRY; V11 = NOHELP; V12 = Q28;
V13 = Q21; V14 = ADVISOR; V15 = Q22
F1 = DEPT; F2 = STUD; F3 = FINSUP; F4 = PERFAC;
F5 = GRADES; F6 = INVOLVE; F7 = SATISFY; F8 = ALIENATE;
F9 = DEGPROG

EQUATIONS
V1 = F1 + E1;
V2 = *F1 + E2;
V3 = *F1 + E3;
V4 = F2 + E4;
V5 = *F2 + E5;
V6 = F3 + E6;
V7 = *F3 + E7;
V8 = *F3 + E8;
V9 = *F3 + E9;
V10 = *F3 + E10;
V11 = *F3 + E11;
V12 = F4 + E12;
V13 = *F4 + E13;
V14 = *F4 + E14;
V15 = *F4 + E15;

LABELS
V1 = FLWSHIP; V2 = OWNRES; V3 = OTHEMP; V4 = LOANS;
V5 = WORRY; V6 = NOHELP; V7 = ADVISOR; V8 = Q21;
V9 = Q22; V10 = Q28;
F1 = FINSUP; F2 = PERFAC; F3 = INVOLVE; F4 = DEGPROG;

EQUATIONS
V1 = F1 + E1;
V2 = *F1 + E2;
V3 = *F1 + E3;
V4 = *F1 + E4;
V5 = *F1 + E5;
V6 = *F1 + E6;
V7 = F2 + E7;
V8 = *F2 + E8;
V9 = *F2 + E9;
V10 = *F2 + E10;
F3 = *F1 + *F2 + D3
F4 = *F3 + DF;
EQUATIONS

\[ V_1 = F_1 + E_1; \]
\[ V_2 = *F_1 + E_2; \]
\[ V_3 = *F_1 + E_3; \]
\[ V_4 = F_2 + E_4; \]
\[ V_5 = *F_2 + E_5; \]
\[ V_6 = *F_2 + E_6; \]
\[ V_7 = *F_2 + E_7; \]
\[ F_3 = *F_1 + D_3 \]
\[ F_4 = *F_2 + DF; \]
\[ F_5 = F_3 + F_4 + D_5; \]
APPENDIX E

PEARSON CORRELATIONS AMONG ALL VARIABLES IN THE HYPOTHESESIZED MODEL OF DEGREE PROGRESS
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REFERENCES


Rodriguez, J.E., et al. (1984). Faculty mentoring of minority graduate and professional students: The Irvine experiment. Division of Graduate Studies and Research, University of California, Irvine.


VITA

The author, Mary F. Toliver, is the daughter of Francis Toliver and the late Mary Vernice Toliver. She was born in Chicago, Illinois on April 24, 1961. She attending John T. Pirie and Arthur Dixon elementary schools in Chicago, and was graduated from Lindblom Technical High School in Chicago in June, 1979.

She was graduate from Illinois State University in Normal, Illinois in May, 1983, earning the degree of Bachelor of Science, with a major in Economics. She was graduated from Atlanta University in May, 1986 with the degree of Master of Business Administration, with a major in Decision Sciences.

From 1990 to 1993 she served in a dual position at Loyola University Chicago. In the Department of Counseling and Educational Psychology, she was a Graduate Assistant. The second half of the dual role in the Department of Counseling and Educational Psychology was as a Lecturer, in which capacity she served as Instructor of Statistics. She served as student member of the Multicultural Development Committee, Academic Council in the School of Education, and Minority Recruitment and Retention Committee in the Graduate School at Loyola University Chicago.
In 1992 and 1994 she worked as an Instructor at the Adult Learning Resource Center in DesPlaines, Illinois. In the summer of 1992 she worked as a Research Assistant in the Nursing Services, Research and Support Department at Rush Presbyterian St. Luke's Medical Center of Chicago.

She was a member of the National Black Graduate Student Association. She served as Corresponding Secretary, Membership Secretary, and Registration Coordinator. She was also Founder and President of the African-American Graduate Student Association at Loyola University Chicago. She was awarded Outstanding Young Women in America in 1991. She received the President's Medallion from Loyola University Chicago in 1992.

Since 1993 she has worked as an Instructor in the Bachelor of Business Administration Program at Robert Morris College in Chicago and is the mother of Antoinette Vernice Hemby.
APPROVAL SHEET

The dissertation submitted by Mary F. Toliver has been read and approved by the following committee:

Dr. Jack A. Kavanagh, Director
Professor, Counseling Psychology, Loyola University Chicago

Dr. Carol G. Harding
Professor, Counseling Psychology, Loyola University Chicago

Dr. Suzette L. Speight
Assistant Professor, Counseling Psychology, Loyola University Chicago

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Date: 9/3/96

Director's Signature: [Signature]