

CHAPTER ONE

Introduction

Although their numbers are increasing, African Americans, many of whom are from low-income/first-generation backgrounds, continue to lag behind their middle and upper-middle class White peers in college enrollment and graduation rates (Harvey, 2002). This has a direct effect on the number of African American students who enter into and graduate from Ph.D. programs and pursue careers in which the Ph.D. is a prerequisite (e.g. college faculty).

There are a number of reasons why increasing the number of African American faculty members is important. Chief among them is that African American faculty can serve as role models for African American students who enroll in college. Research has shown that faculty mentors serve an important role in persistence of African American students on predominately White campuses. For example in a study of perceived social support on campuses, 80% of successful African American students reported positive mentoring relationships with a faculty member or older student of color (Gloria, Kurpius, Hamilton & Willson, 1999).

Between 1995 and 1999, the total number of African Americans enrolled in higher education increased by slightly more than 11% from 1,474,000 in 1995 to 1,641,000 in 1999. Despite the gains in college enrollment, the six-year graduation rate for African Americans decreased two percentage points from 40% in 1995 to 38% in 2000 (Harvey, 2002). As might be evident, enrollment and

graduation patterns among African Americans at the undergraduate level directly influence enrollment patterns of African Americans at the graduate level.

At the graduate degree level, African Americans posted an overall enrollment gain of 6.5% from 139,000 in 1998 to 148,000 in 1999. With this increase in enrollment also came a 3.9% increase in the number of doctoral degrees awarded to African Americans from 1,594 in 1999 to 1,656 in 2000 (Harvey 2002).

Although gains have been made in the number of doctoral degrees awarded to African Americans overall, the increase was due entirely to the gains made by African American women. African American women earned a total of 1,088 doctoral degrees in 2000 compared to 992 in 1999. This represents a 9.7% increase. During the same time period, the number of doctoral degrees awarded to African American men decreased by 5.6% from 652 in 1999 to 617 in 2000 (Harvey, 2002).

The encouraging news is that from 1991 to 2000, the number of doctorate degrees awarded to African Americans increased by 65% from 1,003 to 1,656. However, overall numbers still remain low. Out of a total of 27,888 doctorate degrees awarded in the year 2000, African Americans earned 1,656 or less than 6% (Harvey 2002), despite representing 12% of the U. S. population (McKinnon, 2003).

The low rate of Ph.D.s earned by African Americans has a direct affect on the number of African American faculty. For example, in 1999 African Americans represented 3% of all full professors, 5.1% of all associate professors, and 6.6%

of all assistant professors on college and university campuses (Harvey 2002). The low rate of Ph.D.s earned by African Americans also affects the number of Ph.D.s earned by students from low-income/first-generation backgrounds. African Americans are overrepresented at the bottom of the socio-economic strata accounting for 23% of the families living in poverty while representing just 12% of the total population (McKinnon, 2003).

The problem of low Ph.D. enrollment and completion rates among students from disadvantaged backgrounds begins before they matriculate to college. High school graduates who are from low-income/first-generation families are less likely to apply to and be accepted into institutions of higher education. Fewer than 20% of low-income students are qualified for admission into a four-year college, compared to 86% of upper-income students. Those who do apply and are accepted to college are less prepared academically and are less likely to enroll than their White peers. Those low-income students who do enroll in college have lower grade point averages, lower rates of retention, and lower rates of continuous enrollment to degree completion. The lower levels of academic preparedness and performance at the undergraduate level are linked to lower rates of application, acceptance, and enrollment in graduate programs (U. S. Department of Education, National Center for Education Statistics, 1999).

To address these problems, institutions have implemented programs and services designed to promote success of underrepresented and low-income, first-generation (LI/FG) students. Among the oldest and most popular are summer transition programs (Kezar, 2000; Garcia 1991). Participants in these

programs usually arrive between the summer of their high-school graduation and the first semester of the college career. The activities sponsored by these programs range from focusing on academic support such as developing writing, mathematics, and reading skills, to developing personal skills like time management and study strategies (Kezar, 2000). Most programs also offer classes for which the student can earn regular academic credit. No matter the focus, summer transition programs are designed to increase student retention among LI/FG and minority students (Garcia, 1991).

The populations served by summer transition programs vary. Some programs are designed for minority, low-income or first-generation students. Others are geared toward specific majors such as math or one of the sciences (Kezar, 2000). Research on these programs has shown them to be effective in easing the transition of underrepresented and LI/FG students (Ackerman, 1990; Garcia, 1991; Santa Rita & Bacote, 1996; Zhang & RiCharde, 1999).

Participants in transition programs are more likely to have higher levels of academic integration. Specifically, they use campus services more often, meet more frequently with faculty outside of regular class, are more likely to develop study groups, and generally are more satisfied with campus friendships (Garcia, 1991).

Rates of persistence are higher for students participating in transition programs than for similar students who do not participate (Ackermann, 1990; Santa Rita & Bacote, 1996; Zhang & RiCharde 1999). Transition programs also help LI/FG students adjust to college, prepare them to participate effectively in

the classroom, help them to assess their academic abilities, and facilitate interaction with others (Ackermann, 1990; Santa Rita & Bacote, 1996, Zhang & RiCharde 1999).

While transition programs are designed to increase the number of students going to college, other programs have been implemented to increase the number of underrepresented and LI/FG students attending graduate school and obtaining the Ph.D. In the mid-1980s in order to increase the number of low-income/first-generation students and underrepresented students in the Ph.D. pipeline, Congress passed legislation that created the Ronald E. McNair Postbaccalaureate Achievement Program (McNair Scholars Program). This program was named in honor of Ronald E. McNair, an African American and first-generation college student, who was killed in the Space Shuttle Challenger explosion. Dr. McNair, who earned his Ph.D. in physics at the age of 26 from the Massachusetts Institute of Technology, was a strong believer in educational opportunity for all. The McNair Program has grown from 14 funded programs in 1989 to 156 currently funded programs (U.S. Department of Education, Office of Postsecondary Education, 2002).

The purpose of the McNair Scholars Program is to prepare college students for doctoral studies through involvement in a summer research internship and other scholarly activities (U.S. Department of Education, Office of Postsecondary Education, 2002). The ultimate goal of the program is to increase the attainment of Ph.D.s by students from underrepresented segments of society. Program staff members work closely with participants through their

undergraduate years, encourage them to apply to graduate programs, and track their progress to successful completion of advanced degrees.

The McNair Scholars Program is one of seven Federal TRIO Programs funded by the Department of Education (DOE). TRIO Programs were established in the late 1960s as part of President Lyndon B. Johnson's War on Poverty. The term TRIO is used as the official name of the programs because originally there were three programs to help low-income students: Upward Bound, Talent Search, and Student Support Services. Upward Bound and Talent search serve students who are in middle to high-school, while Student Support Services serve students in institutions of higher education. More programs were added to the TRIO programs over the years. These include Educational Opportunity Centers, Upward Bound for Math and Sciences, and Veterans Upward Bound. The mission of TRIO Programs is to "...maximize educational opportunities for low-income and potential first-generation college students through direct services that provide access to education and encourage retention through the education pipeline" (U.S. Department of Education, Office of Postsecondary Education, 2002, p. 2).

McNair programs meet this mission through the students they serve. Two-thirds of all students who participate in the program must be both low-income and first-generation. Another one-third may come from groups that have been traditionally underrepresented in graduate education (African American, Hispanic, and American Indian). In addition, students who do not fit into one of the previously mentioned categories, but are underrepresented in a particular

field of study may also participate. For example, a White female intending to pursue a Ph.D. in computer science may be eligible since women are underrepresented in the computer science field. Currently, 72% of McNair participants are classified as low-income/first-generation, and 28% are classified as underrepresented (U.S. Department of Education, Office of Postsecondary Education, 2002).

McNair programs offer a number of services to participants to help prepare them for graduate study. These services include faculty mentoring, summer research internships, tutoring, academic counseling, seminars and other scholarly activities designed to prepare students for doctoral studies. Moreover, they provide assistance with securing admission to graduate programs and financial aid to pay for graduate education (U.S. Department of Education, Office of Postsecondary Education, 2002).

Of importance to the current study is the ability of the McNair Scholars Program to prepare African Americans for graduate study and careers in teaching and research at the college and university level. African Americans account for 44% of the McNair participants (U.S. Department of Education, Office of Postsecondary Education, 2002). This is important because while African Americans represent about 12% of the United States population, they represent only 5% of all full-time faculty members in higher education (Harvey, 2002). By preparing McNair students for academic careers, it is hoped that the number of African American faculty may increase, thus providing mentors and role models for minority college and university students.

One way in which McNair Scholar Programs may prepare students for careers in academia is through the development of students' self-efficacy. Self-efficacy is one's belief in his or her "...capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Self-efficacy beliefs are formed from four main sources of information that can act in any combination or alone to form efficacy beliefs (Bandura, 1997). The sources of information are: enactive mastery experiences; vicarious (modeling) experiences; verbal persuasion; and physiological and affective states.

Enactive mastery experiences serve as indicators of capability. This is the most influential source of efficacy information because it provides the most authentic evidence of whether one can muster whatever it takes to succeed. Successes build a robust belief in one's personal efficacy. If a person experiences only easy successes, he/she comes to expect quick results and is easily discouraged by failure. A resilient sense of efficacy requires experience in overcoming obstacles through perseverant effort. Some difficulties and setbacks in pursuits serve a beneficial purpose in teaching that success usually requires sustained effort. After a person becomes convinced that he/she has the ability to succeed, he/she perseveres in the face of adversity and can quickly rebound from setbacks (Bandura, 1997).

Vicarious experiences help to alter efficacy beliefs through transmission of competencies and comparison with attainments of others. People use modeling to compare themselves to others such as classmates, co-workers, competitors, or people in other settings engaged in similar pursuits. The people with whom

one regularly associates determine the types of competencies, attitudes, and motivational orientations that will be repeatedly observed. Visualizing oneself applying the modeled strategies successfully strengthens self-belief that one can accomplish a goal (Bandura, 1997).

Verbal persuasion and allied types of social influences serve as means of strengthening people's beliefs that they possess the capabilities to achieve what they seek. Sustaining a sense of efficacy is easier if significant others express faith in one's capabilities than if they convey doubts. Evaluative feedback highlighting personal capabilities raises efficacy beliefs in individuals (Bandura, 1997).

Physiological and affective states help people to judge their capabilities, strengths, and vulnerabilities to dysfunction. Somatic indicators of personal efficacy are especially relevant in domains such as coping with stressors (Bandura, 1997).

Efficacy beliefs are the product of cognitive processing of the various sources of efficacy information conveyed enactively, vicariously, socially, and physiologically. Once shaped, efficacy beliefs contribute to the quality of human functioning in diverse ways. Efficacy beliefs contribute to success by enlisting cognitive, motivational, affective, and decisional processes through which accomplishments are realized (Bandura, 1997).

High levels of self-efficacy are related to positive educational outcomes such as higher grades, higher rates of persistence in majors, and greater ranges of perceived career options for students (Lent, Brown & Larkin, 1984; 1986).

Graduate students who feel well prepared academically have higher levels of self-efficacy than students who feel less academically prepared. Conversely, graduate students who feel disadvantaged by their race have lower academic self-efficacy scores than students who do not feel disadvantaged by race (Santiago & Einarson, 1998). In addition, for many graduate students, the length of time spent in research activities, and the number of years in graduate school contribute to higher levels of research self-efficacy (Bishop, Bieschke & Garcia, 1993). Graduate students who have prior exposure to teacher training and/or prior teaching experience have higher levels of teaching self-efficacy (Prieto & Altair, 1994). African Americans with high levels of social self-efficacy are able to build strong social support networks (Coffman & Gilligan, 2002), which is associated with higher persistence and graduation rates (Gloria, Kurpius, Hamilton, & Willson, 1999).

In summary, African Americans are underrepresented at the undergraduate level in American colleges and universities (Harvey, 2002). This has resulted in limiting their representation in graduate and professional programs, particularly doctoral programs (Harvey, 2002). Since the Ph.D. is typically required of faculty members, this has led to a disproportionately low representation of African Americans among the faculty ranks (Harvey, 2002; U. S. Department of Education, National Center for Educational Statistics, 2002).

To address this problem, the federal government, in partnership with colleges and universities, has introduced initiatives such as the McNair Scholars Program to promote participation in graduate education among African

Americans and other underrepresented groups (U.S. Department of Education, Office of Postsecondary Education, 2002). One way in which McNair Scholars Programs may prepare students for graduate school is through the development of participants' self-efficacy (Bishop, Bieschke, & Garcia, 1993; Lent, et al., 1984, 1986; Prieto, & Altmair, 1994).

The literature on self-efficacy suggests that students with higher levels of academic self-efficacy persist to degree completion at higher rates than students with lower levels of academic self-efficacy (Lent, et al., 1984, 1986). Additionally, students with higher levels of research self-efficacy are more likely to complete their dissertation and other major research related projects (Faghihi, Rakow, & Ethington, 1999). Finally, students who have high levels of perceived social self-efficacy are able to form strong social support networks (Coffman & Gilligan, 2002), which increase the rates of persistence to degree completion (Gloria, et al., 1999).

An exhaustive review of the literature, however, revealed no studies that examined self-efficacy levels among McNair participants or studies that compared levels of self-efficacy before and after participating in the McNair Scholars Program. This study addressed that gap in the existing body of work on the development of self-efficacy by examining the self-efficacy beliefs among African American students who participated in a McNair program and analyzing differences in those beliefs prior to, and after participating in the McNair Scholars Program.

Purpose of the Study

The purpose of this study was to measure and compare the levels of self-efficacy among pre-McNair Scholar Program participants and post-McNair Scholar Program participants. Specifically, this study measured the levels of academic, research and social self-efficacy of African Americans who had attained senior status. Participants included African American seniors who were accepted into the McNair Scholars Program but had not participated in any McNair related activities at the time of the study (pre-McNair participants) and African American seniors who were continuing their participation in the McNair Scholars Program and had completed at least one McNair experience that resulted in the completion of a faculty-guided research paper (post-McNair participants). Data were collected by administering a survey designed specifically for this study to a national sample of African American McNair program participants. The survey was developed to measure levels of academic, research, and social self-efficacy.

Research Questions

The present study was designed to examine the following research questions:

1. What are the levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants?

2. Are there significant differences in the levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants?
3. Are there significant differences in the levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants by gender and college grade level?

Significance of the Study

The present study had significance for future professional practice, further research and future policy. In terms of professional practice, McNair administrators and administrators of similar programs might use the results of this study as they develop plans that prepare students for graduate school and careers in academia. As institutions develop such programs for undergraduates, the results may help administrators and faculty decide which components of the program they should include.

Graduate school admission committees might use the results of this study as they admit students into graduate programs. The findings provided them with data about the levels of self-efficacy among McNair participants and non-participants. Admission officers might use the findings to assess the way they evaluate applicants for graduate and professional programs.

Faculty members might also benefit from the results of this study. As faculty members interact with undergraduates, they are often the people who

convince students to pursue graduate studies. The findings informed faculty about self-efficacy and they might use this information to guide their interactions with undergraduates.

This study may also lead to future research. Since the current study focused only on African American participants, other researchers may wish to examine the levels self-efficacy among other students who are low-income, first-generation, or underrepresented in higher education and who participated in a McNair Scholars Program. Such a study would expand on the information available about McNair participants and self-efficacy in general.

Researchers may also wish to examine levels of self-efficacy in students who participated in other programs designed to prepare undergraduates for graduate study. Such studies would expand what is known about graduate school preparation programs.

It may also be beneficial for researchers to compare levels of self-efficacy among current graduate students who participated in the McNair Scholars Program and graduate students who did not participate to examine whether levels of self-efficacy are different for the two groups. Research of this nature might add to the body of knowledge about the lasting effects of preparation programs.

Finally, this study was significant in terms of policy. Federal policymakers might use the results of this study. The study provided them with data about self-efficacy and participants' graduate preparation programs. They might use those

findings to guide policy related to federally funded graduate preparation programs.

State policymakers might also use the results of this study. The data provided by this study might be used as state policymakers review funding policies related to state-funded graduate preparation programs.

University policymakers might also benefit from the results of this study. The study provided them with data about participants in graduate preparation programs. They might use those findings to examine admission policies.

Definition of Terms and Acronyms

For purposes of the present study, the following definitions and acronyms were used:

1. Pre-McNair Scholar Program Participant (pre-McNair participant): a student who has been accepted for participation in the McNair Scholars Program but has not yet participated in any McNair program related activities.
2. Post-McNair Scholar Program Participant (post-McNair participant): a student who has participated in at least one McNair Scholar Program experience that resulted in the completion of a faculty guided research paper.
3. McNair Scholars Program: The Ronald E. McNair Postbaccalaureate Achievement Program is a federal TRIO Program funded through a grant from the U.S. Department of Education. These programs are designed to encourage and prepare low-income/first-generation students for the Ph.D.

4. LI/FG: Low-income and first-generation students. Those dependent students whose parental income does not exceed 150% of poverty level income, and neither of whose custodial parent has attained a four-year baccalaureate degree from an accredited college or university. If an independent student, one's own, and one's spouse's income (if applicable) does not exceed 150% of poverty level income, and neither parent attained a baccalaureate degree.
5. Self-Efficacy: One's belief in her/his capabilities to organize and execute the courses of action required to produce a given attainment (Bandura, 1997).
6. Academic Self-Efficacy: A personal judgment of one's capabilities to organize and execute courses of action to attain designated types of educational performances (Zimmerman, 1995).
7. Research Self-Efficacy: The degree to which one believes in her/his ability to complete various research tasks (Bieschke, Bishop & Garcia, 1993).
8. Social Self-Efficacy: A person's belief in her/his ability to engage in the social interactional tasks necessary to initiate and maintain interpersonal relationships (Smith & Betz, 2000).
9. Graduate Program: A program of study leading to a master's or Ph.D. degree. For purposes of this study, professional programs (J.D., M.D., etc.) are not included.
10. African American: Students who identify themselves as African American/Black and Hispanic Blacks (McKinnon, 2003).

Delimitations of the Study

As with all research, this study had some initial delimitations. One of the delimitations is that the study included only students involved in the McNair Scholars Program. The results may not be generalizable to students who participated in other graduate preparation programs.

Another delimitation was associated with differences in McNair Programs. McNair programs sponsor different activities that promote graduate study. Some inconsistencies in program administration may exist that might have influenced the results of the study.

Delimitations of this study also include those commonly found in quantitative research. This study used a survey with closed-ended questions as a means of data collection. Closed-ended questions cannot probe deeply into participants' opinions and feelings (Gall, Borg & Gall, 1996). In addition, once the survey has been distributed, it is not possible to modify questions, even though they may be unclear to some participants. Response bias is another delimitation of this study. Response bias occurs when the responses of the sample do not match those of the population that it represents (Babbie, 2001).

In general, however, this was a worthwhile study. It provided initial insights into self-efficacy and participation in programs to promote success in graduate school among African Americans. This is an area that has not been explored in previous research and is important to the issue of diversifying the racial composition of graduate students and faculty in American colleges and universities.

Organization of the Study

This study was organized into five chapters. Chapter One introduced the research topic, the purpose of the study, research questions, significance of the study, definition of terms, delimitations, and organization of the study. Chapter Two provides an extensive overview of the existing literature relevant to the topic. Chapter Three describes the methodology used in the study including sampling procedures, and procedures employed to collect and analyze the data. Chapter Four reports the results of the study, and Chapter Five discusses those results and their implications for future practice, research, and policy.

CHAPTER TWO

Review of Literature

The purpose of this study was to measure the levels of self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants. Three measures of self-efficacy were explored in the present study: academic self-efficacy, research self-efficacy and social self-efficacy. Moreover, the study sought to compare these three measures of self-efficacy between African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants.

This review begins with an overview of self-efficacy. The second section examines the literature on the role of academic self-efficacy in the completion of graduate school and other academic programs. The role of research self-efficacy is examined next. Additionally, this review focuses on social self-efficacy and social involvement in persistence and completion of graduate school and other academic programs of study. Finally, this review examines the role of McNair Scholars Programs in preparing students for graduate school

Self-Efficacy

Self-efficacy is a person's belief in her/his capabilities to organize and execute the courses of action required to produce given attainments (Bandura, 1977; 1997). Highly efficacious people have a strong sense of personal well-being and approach difficult tasks as challenges to be mastered rather than threats to be avoided (Bandura, 1997). Self-efficacy beliefs help to determine a

person's choice of behaviors, activities, effort, quality of performance and persistence when confronted with obstacles (Lent, Brown & Gore, 1997).

People with high levels of self-efficacy set challenging goals and maintain a strong commitment to them (Bandura, 1997). During difficulties or personal setbacks, high efficacious people remain task-focused and are able to strategically think during difficulties. They attribute failure not to a lack of ability, but to insufficient effort. After failures or setbacks, they quickly recover their sense of self-efficacy and they approach stressors or threats with confidence that they can exercise a certain amount of control over them. High levels of self-efficacy enhance performance accomplishment, reduce stress, and lower vulnerability to depression.

Self-efficacy is a key player in the self-regulation of motivation (Bandura, 1997). People motivate themselves and guide their own actions by forethought. They form beliefs about what they can do, and anticipate the likely outcomes of their actions. People set goals for themselves and chart a plan of action to accomplish those goals.

Unlike other constructs such as self-confidence, self-esteem or self-concept, self-efficacy is concerned with the belief about one's capabilities and the strength of that belief. It is highly context specific and is measured in reference to specific tasks. Self-confidence, self-esteem and self-concept on the other hand are not context specific, but rather are concerned with general feelings that one may have with herself or himself. Factors that influence self-efficacy include

perceptions of ability, social comparisons, attributions, time available and perceived importance of the task (Schunk & Pajares, 2002).

Bandura's theory of self-efficacy has been applied in the study of higher performance and persistence in academic programs of study at the undergraduate and graduate level (Chemers, Hu, & Garcia, 2001; Lent, Brown, & Larkin, 1986; Multon, Brown, & Lent, 1986), research productivity of graduate students and academic researchers (Bard, Bieschke, Herbert, & Eberz, 2000; Bieschke, Bishop, & Garcia, 1993; Bishop & Bieschke, 1998; Bishop, Bieschke, Garcia, 1993; Faghihi, et al., 1999), as well as social interactions and building relationships with other students and faculty (Coffman & Gilligan, 2002; Gloria, Kurpius, Hamilton, & Willson, 1999; Patterson-Stewart, Ritchie, & Sanders, 1997; Smith & Betz, 2000). People with high levels of self-efficacy may believe that they can perform certain tasks, but still may choose not to because of the consequences or the outcome expectations associated with the completion of the task. Outcome expectations are judgments of the likely consequences any given performance will produce (Bandura, 1997). Outcome expectations and self-efficacy are intertwined in that outcome expectancies are partly governed by beliefs in personal capabilities. A person may believe that an activity, if done well, will produce valued outcomes but that person may not pursue that activity because they doubt they have the ability to succeed. For example, undergraduate students may believe that attainment of a doctorate degree will bring tangible rewards such as higher earning potential. Such students, however,

may not pursue graduate degrees because they feel that they lack the ability to accomplish the tasks necessary to complete the dissertation.

Efficacy beliefs help determine the extent to which people act on their outcome expectations (Bandura, 1997). In activities in which outcomes depend on a certain level of quality of performance, efficacy beliefs determine the types of outcomes that a person foresees. In environments that reward valued accomplishments, personal efficacy enhances aspirations, productive engagement in activities, and a sense of fulfillment (Bandura, 1997).

Bandura's theory of self-efficacy has been used to explain motivation in many different arenas. The following sections present an overview of the three that are pertinent to the current research: academic self-efficacy, research self-efficacy and social self-efficacy

Academic Self-Efficacy

Academic self-efficacy is a personal judgment of one's capabilities to organize and execute the necessary courses of action to attain designated types of educational performances (Zimmerman, 1995). Academic self-efficacy is related to academic expectations and performance (Jackson, 2002). Students who begin an academic program with confidence in their ability to do well usually perform better than students with less confidence (Chemers, Hu & Garcia, 2001). Higher levels of academic self-efficacy also contribute to higher grade point averages and persistence to degree completion (Lent, Brown & Larkin, 1986; Spitzer, 2000).

Enactive mastery (past performance) and vicarious (modeling) experiences have been touted as the biggest contributors to self-efficacy (Bandura, 1977, 1997). For White students past performance may be the largest source of self-efficacy, but for students of color, especially African Americans, vicarious experiences may play just as important a role (Gainor & Lent, 1998; Luzzo, Hasper, Albert, Bibby & Martinelli, 1999). For example, Luzzo, Hasper, Albert, Bibby and Martinelli (1999) found that for White students, past performance was the largest contributor to higher academic self-efficacy. Vicarious experiences were found to have a positive effect, but to a lesser degree. In contrast, Gainor and Lent (1998) found that for African Americans, past performance and verbal persuasion are equal sources of influence on academic self-efficacy. They examined social cognitive factors (academic self-efficacy and outcome expectations) that influence African American students' decision to pursue math-intensive college courses and majors. Contrary to previous research that showed past performance as the biggest influence on self-efficacy (Gainor & Lent, 1998), this study revealed that verbal persuasion has an impact on African American students' self-efficacy comparable to past performance.

For intellectually homogenous groups of graduate students with similar records of prior academic performance, students' academic self-efficacy appraisals at time of entry into graduate school may vary. As a consequence, their graduate academic performance may differ. Factors that lead to higher levels of self-efficacy for graduate students include feeling well prepared for

graduate school, undergraduate preparation, and positive expectations about student/faculty interaction. Students who feel disadvantaged by race have lower levels of self-efficacy than students who do not feel disadvantaged by race (Santiago & Einarson, 1998). African American and other minority students who feel that their undergraduate program adequately prepared them for graduate school tend to have higher levels of academic self-confidence and self-efficacy despite lower Graduate Record Examination (GRE) scores than White students (Einarson & Santiago, 1996).

High efficacious students view the university experience more as a challenge than a threat (Chemers, et al., 2001). Challenged students have higher expectations that are related to greater performance. Higher levels of efficacy help students deal with stressful situations, which help with adjustment to college. Assertiveness and academic self-efficacy are related to academic adjustment (Poyrazli, Arbona, Nora, McPherson & Pisecco, 2002). Students who have higher levels of assertiveness and academic self-efficacy have fewer adjustment problems than students who have lower levels of assertiveness and academic self-efficacy. Higher levels of self-efficacy help students approach challenging situations without extreme anxiety or confusion. High self-efficacy also helps students feel that they have the ability and competence to deal with academic problems. As a result of being able to deal with academic stressors, high efficacious and assertive graduate students experience better academic adjustment.

The aforementioned literature suggests that students with high levels of academic self-efficacy persist to graduation at higher rates than students with low levels of academic self-efficacy. At the graduate level however, research is also an integral part of success.

Research Self-Efficacy

The completion of the doctorate and other advanced degrees usually culminates with the defense of a major research project normally referred to as the dissertation. Many students begin a Ph.D. program but do not complete all the requirements for conferral of the degree. Students who do not complete the degree typically are referred to as A.B.D. (All But Dissertation). Many factors lead to A.B.D. status. These factors may include lack of financial resources or family obligations (Faghihi & Ethington, 1996). Another reason may be that many students do not believe that they have the ability to handle the research-related tasks associated with the completion of the dissertation and other major research projects. In other words, they may have a low level of research self-efficacy. Research self-efficacy is the degree to which a person believes in her/his ability to complete various research-related tasks (Bieschke, Bishop & Garcia, 1993).

Lower levels of research self-efficacy may explain why some graduate students lack an interest in research-related activities (Bieschke, Bishop & Garcia, 1993; Bishop, Bieschke & Garcia, 1993; Kahn, 2001). Sources of research self-efficacy may include previous research experience, modeling or observing others engaged in research, and verbal information about the research

process (Faghihi, et al., 1999; Kahn, 2001; Trimarco, 1997; Wilson & Onwuegbuzie, 2001).

The existing literature supports the role that research self-efficacy and outcome expectations play in dissertation and degree completion, research interests, and positive reactions to research training environments. Outcome expectations and research self-efficacy play important roles in future research interests of faculty and students (Bard, Bieschke, Herbert & Eberz, 2000). Research self-efficacy and outcome expectations have direct relationships to research interests (Bishop & Bieschke, 1998). Graduate students with higher levels of research self-efficacy and positive outcome expectancies have stronger interests in continuing research after completion of their graduate degree. In addition, graduate students who have high levels of confidence in their ability to find and research an idea, present and write about a topic, conduct research, analyze data, and write about and present research results are more likely to continue their involvement in research after receiving the doctorate degree (Bishop, Bieschke & Garcia, 1993).

Faghihi, Rakow and Ethington (1999) examined the relationships among research self-efficacy, doctoral students' background characteristics, research preparation, research environment, research involvement, student-advisor relationships and dissertation progress. In this study, research self-efficacy was defined as a student's level of confidence in conducting and executing different aspects of the dissertation such as the literature review, selecting a topic, writing, and the technical aspects related to the design and analysis in both quantitative

and qualitative methods. The findings of this study suggest that both students' research self-efficacy and students' relationship with dissertation advisors and other committee members significantly contribute to students' dissertation progress. Simply put, graduate students who have higher levels of research self-efficacy and positive and cooperative relationships with dissertation advisors and other committee members are more advanced in their dissertation progress. Doctoral students who are more satisfied with their research training and preparation and perceive this preparation as adequate are in more advanced stages of their dissertation.

Research training environments that consist of instructional and interpersonal elements and encourage students to become more involved in research in minimally threatening ways early in their research training can increase a student's level of research self-efficacy (Kahn, 2001). Positive research training environments also reinforce students' research efforts, emphasize social elements of conducting research and include faculty mentors and role models. Students trained in favorable research environments are more likely than others to feel confident and excited about research. Research self-efficacy is significantly predicted by perceptions of the research training environment (Kahn, 2001). Higher levels of research self-efficacy also significantly predict research outcome expectations.

Training in research early in a student's academic career helps to increase the student's research self-efficacy (Cash & Sanchez-Hueles, 1992). Graduate students' attitudes and self-efficacy toward research have the best opportunity to

be enhanced during the beginning stages of the graduate program. Forming and maintaining positive relationships between advisor and advisee is one way in which to enhance students' research self-efficacy and promote positive attitudes toward research (Gelso, Mallinckrodt, & Judge, 1996; Schlosser & Gelso, 2001). Positive mentoring experiences and research self-efficacy are also predictors of research productivity (Hollingsworth & Fassinger, 2002).

In many of the studies discussed thus far, mentoring relationships were mentioned as playing a role in the development of research self-efficacy. Interpersonal skills are associated with developing mentor-protégé relationships (Hollingsworth & Fassinger, 2002). Therefore, it is important to present an overview of social self-efficacy and the role that self-efficacy plays in forming positive interpersonal relationships with faculty and other graduate students.

Social Self-Efficacy

Graduate students with good interpersonal skills are able to build relationships with faculty and others on campus that are important to their success and navigating the tasks associated with completing the Ph.D. (Ellis, 2001; Patterson-Stewart, Ritchie & Sanders, 1997).

People who have high levels of social self-efficacy are able to create social networks that are more supportive than the social networks of individuals who have low levels of social self-efficacy (Bandura, 1997). Supportive relationships with others, in turn, enhance personal efficacy. Persons with higher levels of personal efficacy set higher goals for themselves and exercise more forethought in reaching those goals.

Social networks become even more important during periods of transition when long-standing ties with one's social groups are severed and new relationships must be established such as when one leaves an undergraduate institution and attends a different institution for graduate school. A high level of social self-efficacy is associated with high levels of social support, life satisfaction and lower stress (Coffman & Gilligan, 2002). On the other hand, low social self-efficacy is related to slow career development (Smith & Betz, 2000; Spitzer, 2000).

The existing literature supports the notion that strong social support networks are important in the success of students, especially African American students on predominately White campuses (Thomas, 2000). African American students who have strong social support networks tend to persist in college longer and have higher graduation rates than those who do not have strong social support networks (Gloria, Kurpius, Hamilton & Willson, 1999; Hinderlie & Kenny, 2002). These students also view the university setting more positively, report a greater degree of cultural fit between themselves and the university and experience less academic stress than students who do not have strong social networks. Social networks also help shield African American students from perceived discriminatory events and prevent such events from causing psychological impact, which could jeopardize their well-being (D'Augelli & Hersberger, 1993).

The need to build strong social networks at the graduate level is just as, if not more important as it is at the undergraduate level. This is because of the role

the advisor plays in the socialization and dissertation process of the graduate student. Good faculty-student mentoring relationships lead to higher levels of social and academic integration into doctoral programs and positively influence satisfaction with doctoral studies (Ellis, 2001). Students with good mentoring relationships are more likely to participate in research activities, teach more, and make more presentations at conferences. They are also more likely to present coauthored papers, be involved in the social activities of the department, and complete their coursework and qualifying examinations, as well as proceed to the dissertation in a timely manner.

For African American graduate students, good interpersonal relationships with faculty and peers both inside and outside of their academic departments are important (Clewell, 1987; Patterson-Stewart, Ritchie & Sanders, 1997). These relationships are important because in many instances there are no faculty or other students of color in their own departments and they have to go outside of their departments to build relationships with other African Americans. Within the department, African Americans who are able to build positive relationships with White peers who are culturally sensitive have better experiences during their doctoral studies. This is important because the African American students have someone to talk to about issues that are specific to their departments.

Undergraduate research programs such as the McNair Scholars Program have played a role in assisting students develop strong mentoring relationships (Grimmett, Bliss & Davis, 1998; Hathaway, Nagda & Gregerman, 2002;

Nnadozie, Ishiyama & Chon, 2001). Therefore, it is important to examine the role of the McNair Scholars Program in promoting graduate school success.

McNair Scholars Program

The McNair Scholars Program is designed to prepare and encourage undergraduate students to pursue graduate education. Few research studies have been conducted on undergraduate research programs designed to prepare undergraduates for graduate education. Of the studies that have been conducted, most are limited to programs at a single institution and the focal point is on the effectiveness of the program in getting its participants into graduate and professional schools. The research on single institutional programs has shown that participation in such programs is linked to the increased likelihood that a student will pursue graduate education (Grimmett, Bliss & Davis, 1998; Hathaway, Nagda & Gregerman, 2002; Nnadozie, Ishiyama & Chon, 2001).

One of the first studies on the McNair Scholars Program was conducted at Rutgers University (Thomas, 1994). Findings revealed that 88% of the students who participate in the McNair program enroll in graduate school. Several features of the McNair program are key to its success in getting its students accepted and enrolled in graduate programs. These features include supervised research and other scholarly activities, high quality mentoring and research internships, academic advising and counseling, introduction to graduate school life, and assistance in graduate school admissions and financial aid processes.

For McNair alumni, the mentoring relationships developed during participation in the program and the opportunities for undergraduate research are

very important. Alumni report that their mentors serve as teachers, advocates, guides and constructive critics during the undergraduate internship period. Internships are viewed by alumni as learning opportunities and as a chance to work with others interested in academic achievement (Grimmett, et al., 1998).

While most studies on undergraduate research programs examine a program at a single institution, one study surveyed the directors of 35 McNair programs throughout the country to assess the relationship between the rigor of the internship and the future success of McNair participants in graduate school (Nnadozie, et al., 2001). Responses from the directors were then compared with responses from McNair alumni on the perceived impact of the program. Both groups report the research internship has a positive effect in terms of graduate school placement, obtaining funding, and completing the graduate degree. Early and continuous exposure to research, along with high expectations seems to prepare students for graduate education.

Programs similar to McNair have investigated their effect on students. The Undergraduate Research Opportunity Program (UROP) at the University of Michigan has been examined on two different occasions. UROP is designed to increase retention and improve academic performance of participants. Another goal of the program is to increase participation of its students in graduate education and postgraduate research involvement. Originally designed for underrepresented students, the program is now open to all students who apply and are accepted. Students of color who participate in this program are more likely to pursue graduate education, pursue post-undergraduate research activity,

and use faculty for recommendations than students who do not participate in undergraduate research (Hathaway, Nagda & Gregerman, 2002).

Participation in the UROP program positively affects retention rates of students. Students who participated in UROP have attrition rates that are lower than non-UROP participants (Nagda, Gregerman, Jonidas, von Hippel & Lerner, 1998). African American students who participated in UROP but had low grade point averages had lower attrition rates than non-participating African Americans who had low grade point averages.

Mentoring is a key component of McNair and other undergraduate research programs (Grimmett, et al., 1998; Hathaway, et al., 2002; Nnadozie, et al., 2001). The mentoring relationship that students develop during the undergraduate years helps them persist to graduation and fosters application to and subsequent enrollment in graduate education (Arredondo, 1995; Wallace, Abel & Ropers-Huilman, 2000). The mentoring relationship is just as important for graduate students, especially African American graduate students. In comparison to White and Hispanic students, African Americans with good mentoring relationships with faculty are generally more satisfied with their doctoral programs (Nettles, 1990). Students who are most satisfied with their doctoral programs are those who feel that their institutions are the least discriminatory, have the greatest amount of support and encouragement from mentors, and experience the greatest amount of interaction with faculty.

Interactions with mentors and other faculty enhance students' perception of self-efficacy (Arredondo, 1995; Colbeck, Cabrera & Terenzini, 2001). The

more mentors and other faculty interact with students, provide detailed and frequent feedback, and provide opportunities to work together, the more students believe in their ability to complete degrees, take responsibility for their own learning, and gain confidence in their ability to succeed in their chosen careers (Colbeck, Cabrera & Terenzini, 2001). Mentoring is a key component of the McNair Scholars Program. This mentoring relationship, along with the undergraduate research experience, workshops and other activities associated with the McNair Scholars Program may increase a student's self-efficacy beliefs in her/his ability to accomplish the necessary tasks to complete a graduate degree.

The existing body of literature suggests that academic self-efficacy promotes better academic performance (Chemers, et al., 2001), persistence to degree completion (Lent, et al., 1986), and adjustment to academic programs (Poyrazli, Arbona, Nora, McPherson, & Pisecco, 2002). Additionally, research self-efficacy is associated with current and future interest in research (Bishop & Bieschke, 1998), dissertation progress (Faghihi, et al., 1999), and research productivity (Hollingsworth & Fassinger, 2002). Finally social self-efficacy has been linked to the ability of graduate students to build strong social networks (Coffman & Gilligan, 2002) which leads to higher rates of persistence to degree for African American students (Gloria, et al., 1999).

What seems to be missing in the body of literature on self-efficacy is the impact that participating in a program designed to prepare participants for graduate education has on African American students' academic, research, and

social self-efficacy. The McNair Scholars Program is one such program. The present study was designed to explore this gap in the existing body of literature by employing quantitative techniques that measured and compared levels of academic, research, and social self-efficacy of African American pre-McNair Scholar Program participants and post-McNair Scholar Program participants.

CHAPTER THREE

Methodology

The purpose of this study was to measure and compare the levels of academic, research, and social self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants. The study was guided by the following research questions:

1. What are the levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants?
2. Are there significant differences in the levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants?
3. Are there significant differences in the levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholar Program participants and African American post-McNair Scholar Program participants by gender and college grade level?

Sample Selection

The pre- and post-scholars from the 156 McNair Scholars Programs were invited to participate in this study. Only the programs established prior to September 2003 were used in this study to assure that the programs had both pre- and post-scholars who could be included in the sample. Programs

established after this date only had a pre-scholar group at the time of data collection.

As previously noted, the purpose of the McNair Scholars Program is to prepare college students for doctoral studies through involvement in a summer research internship and other scholarly activities (U.S. Department of Education, Office of Postsecondary Education, 2002). The services offered include mentoring, summer research internships, admission and financial aid seminars, and other activities designed to prepare students for doctoral studies.

Two independent samples were utilized for this study. The first sample consisted of African American students who were selected for participation in the McNair Scholars Program but had not yet participated in any McNair related activities. The second sample consisted of African American students who had participated in at least one McNair Scholars Program experience that resulted in the completion of a faculty guided research paper.

To obtain a representative sample of institutions and African American pre- and post-McNair students, two protocols were followed. The first protocol was used to garner the support of the McNair Scholar Program directors and/or coordinators. For this, the researcher solicited the assistance of the President of the Council for Opportunity in Education (COE). The COE, located in Washington D.C., is the organization that supports the federal TRIO programs through its training programs and relations with government agencies including the U. S. Department of Education. Most McNair directors and other TRIO personnel hold memberships in COE. A letter of support was written by the COE President (see

Appendix A) and forwarded to the directors of the McNair programs at the 156 institutions, accompanied by a letter from the researcher (see Appendix B) describing the purpose of the study, the type of assistance requested, proposed data collection methods and a copy of the Graduate Education Self-Efficacy Scale. In order to gain their cooperation, the researcher offered directors and coordinators the data from their respective program, as well as the results of the overall study. The researcher conducted follow-up phone calls and electronic messages to garner participation.

Once programs agreed to participate, the researcher sent an electronic message to the director or designated program personnel requesting information about the number of students participating in the program, the program start date and the postal address of the program. The program start date was requested so that the researcher could send all research materials by the beginning of each program. A packet of materials was sent to each program that agreed to participate. The packet included the following:

1. Cover letter (see Appendix C).
2. Specific instructions for the designated survey administrator (see Appendix D).
3. Survey instructions to be read aloud to each participant (see Appendix E).
4. One Informed Consent Form for each participant (see Appendix F).
5. One copy of the Graduate Education Self-Efficacy Scale (GESES) for each participant (see Appendix G).

6. One \$50 Cash Prize Entry form for each participant.
7. Self-addressed, stamped return envelope.

To encourage respondents to participate, those who completed the survey were eligible for a drawing for one of three \$50 prizes. Once they completed and submitted the survey to the survey administrator, they were given an entry form to complete. When all survey materials were collected, the survey administrator was instructed to return all survey materials in the self-addressed, stamped envelope provided by the researcher.

Instrumentation

The Graduate Education Self-Efficacy Scale (GESES) was a 57-item instrument designed specifically for this study (see Appendix G). The questionnaire was developed to elicit data from participants about their perceived levels of academic, research, and social self-efficacy. The GESES was constructed based on the existing literature on self-efficacy and graduate education.

The instrument was divided into four sections. The first three sections were designed to measure participants' perceived levels of academic, research, and social self-efficacy, respectively. Utilizing a 10-point Likert type scale, respondents were asked to rate the strength of their beliefs in their ability to complete certain tasks. The scale ranged from 1 (Not at all confident) to 10 (Completely confident). The 10-point scale utilized in this study was a simplified version of the 100-point scale suggested for use in measuring self-efficacy (Bandura, 2001).

The fourth section (7 items) gathered demographic information from participants. This section included items regarding participants' age, gender, race, grade point average, McNair participation status, and college (major). This information was gathered for three purposes. First, it was used to describe the sample. Second, it was used to verify the students' eligibility to participate in this study. Third, it was used to sort participants into pre- and post groups, and into groups by gender and college grade level.

Specifically, the 15 item Academic Self-Efficacy (ASE) scale asked participants to rate their confidence in their ability to organize and execute courses of action to attain designated types of educational performances. For example, students were asked to rate their confidence in their ability to score well on a graduate admission exam. Other questions on the academic self-efficacy subscale included questions related to persistence in a graduate program of study. For example, students were asked to rate their confidence in their ability to complete graduate school.

The 20 items on the Research Self-Efficacy (RSE) scale asked participants to rate their confidence in their ability to complete tasks related to accomplishing research related goals. For example, participants were asked to rate the degree to which they thought they would be able to complete a literature review for a scholarly research paper. Other questions from this subscale probed into respondents' ability to present their research. For example, participants were asked to rate their ability to report research results in writing and orally.

The 15 item Social Self-Efficacy (SSE) scale asked participants how confident they were in their ability to initiate and maintain interpersonal relationships on campus. For example, respondents were asked to rate their confidence in their ability to hold a conversation with a group of faculty members or to introduce themselves to a group of people that they may not know.

Validity and Reliability

The instrument utilized in this study was designed specifically for this research project and therefore steps were taken to establish validity and reliability. Validity refers to the extent to which an instrument adequately measures the concept under consideration (Babbie, 2001). For this study, the researcher was most concerned with construct validity, and content validity.

Construct validity refers to the extent to which the instrument measures the construct it was designed to measure (Babbie, 2001). Threats to construct validity occur when researchers rely on inadequate definitions and measures of variables (Creswell, 2003).

Content validity indicates how well the instrument measures the complete range of the construct under consideration (Crano & Brewer, 2003). To control for threats to content validity, instruments designed to measure self-efficacy should phrase items in terms of *can do* instead of *will do* (Bandura, 2001). Can do is a judgment of capability, will do is a statement of intention.

The researcher employed four steps to enhance validity of the instrument. First, to control for threats to construct validity, a panel of experts reviewed the instrument to assess whether the items measured academic, research, and

social self-efficacy. This panel of experts consisted of experienced researchers in the field of education and psychological research, including research in self-efficacy. This panel was able to judge whether the items posed measured self-efficacy. In order to assess the Graduate Education Self-Efficacy Scale and determine whether it represented three distinct scales, the ASE, RSE, and SSE, a principal component factor analysis was conducted on responses from the entire sample.

In order to reduce threats to content validity all items were phrased in terms of can do. Using can do measures enhanced content validity because it allowed participants to judge their ability to perform a task. Finally, a pilot study was conducted with a sample of African American students similar to those who would be included in the full study. The pilot study participants were asked to complete the survey and to answer the following questions regarding the survey:

1. How long did it take you to complete the survey?
2. Were any of the questions unclear? If so, identify which ones and explain why each was unclear.
3. Did you object to answering any of the questions?
4. Was the layout of the questionnaire clear/attractive?
5. Any additional comments?

The responses from the pilot study participants were used to revise the instrument before distributing it to study participants.

Reliability refers to the extent to which a measurement, applied repeatedly over time, yields the same results (Babbie, 2001). Two estimates of reliability

were computed for this study: item analysis and estimates of internal consistency reliability (coefficient alpha). The responses from the entire sample were utilized to conduct item analyses of each self-efficacy subscale of GESES. The results were used to decide which items to include or exclude from the survey. Item analyses were conducted on the 15 items of the ASE scale, the 20 items on the RSE scale, and the 15 items on the of the SSE scale of the GESES. Estimates of internal consistency reliability were computed for the ASE, RSE and SSE scales of the GESES.

Data Collection Procedures

Prior to data collection, approval was obtained from the Institutional Review Board for Research Involving Human Subjects (IRB) at the two institutions with which the researcher was affiliated (one as a student, the other as a professional). After permission to conduct the study was granted, the researcher mailed McNair directors and coordinators the packet of survey materials.

Information about the researcher, the purpose of the study, and instructions for completing and returning the instrument were included in the cover letter and instructions. The informed consent form provided participants with additional information describing the research, the topic and summary of the study and a statement assuring them that the confidentiality of their responses would be guaranteed. The informed consent form also explained the data collection procedures. Participants were informed that they could withdraw from participation at any time and their requests to do so would be honored.

To encourage participation, respondents were able to enter a drawing to compete for one of three \$50.00 cash prizes. To enter the drawing respondents, after returning the survey to the test administrator, were given an entry form to complete. When all survey materials were collected, the survey administrator was instructed to return all survey materials in the self-addressed, stamped envelope provided by the researcher. To protect the confidentiality of respondents, all entry forms were separated from other survey materials once returned to the researcher.

The intent of the present research was to measure self-efficacy of pre- and post-McNair students. For this reason, the GESES was sent to students in May, June and July 2004. Survey materials were mailed on several different occasions during those months depending on the start date of the program. Start date information was gathered from the directors/coordinators of the McNair programs that agreed to participate in the study.

Data Analysis Procedure

This study was designed to measure and compare the levels of academic, research, and social self-efficacy among pre-McNair Scholars Program participants and post-McNair Scholar Program participants. Utilizing the Statistical Package for Social Sciences (SPSS), the researcher conducted statistical analysis to answer the research questions posed in the study.

To answer the first research question that focused on levels of academic, research and social self-efficacy among pre- and post-McNair Scholar Program participants, simple descriptive statistics were obtained. The means, standard

deviations, and ranges of scores were calculated for each group for all items and scales.

The next research question tested for significant differences in the levels of academic, research and social self-efficacy between pre-McNair and post-McNair Scholar Program participants. To answer this research question, the researcher conducted multivariate analyses of variance (MANOVAs) to determine if there was a significant difference in the levels of academic, research and social self-efficacy (dependent variables) between the independent variables of pre-McNair and post-McNair Scholar Program participant status. Analyses of variance (ANOVA) on each dependent variable were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was tested at the .025 level. Bonferroni helps to control for Type I error.

The third research question tested for significant differences in academic, research and social self-efficacy among African American pre- and post-McNair Scholar participants by gender and grade level. To answer this research question, the researcher conducted a 3 x 2 MANOVA to test for significant differences in academic, research and social self-efficacy among pre- and post-McNair Scholar Program participants by gender and college grade level. Analyses of variance (ANOVA) on each dependent variable were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was tested at the .025 level.

In conclusion, the purpose of this study was to measure and compare levels of academic, research, and social self efficacy among African American

pre-McNair Scholar Program participants and post-McNair Scholar Program participants. The methodology described in this chapter was deemed sufficient to address the research questions posed in this study.

CHAPTER FOUR

Results

The purpose of this chapter is to report the findings of the study. The chapter begins by describing the sample. It concludes with the data analyses, which are organized around the three research questions posed in this study.

Characteristics of the Sample

A total of 61 McNair Scholars Program directors agreed to ask their students to participate in the study. As a result 1,082 surveys were mailed to McNair directors for distribution to students. Six hundred forty three (643) surveys were returned. Nineteen (19) surveys were missing demographic information needed for analysis and were deemed unusable for this study. The usable sample consisted of 624 McNair Scholars Program participants. This represents a response rate of 58%.

The demographic characteristics of the sample are summarized in Table 1. Approximately 48% of the study participants classified themselves as African American, 22% as White, 17% as Hispanic, 6% as Asian, 2% as Native American, and 5% as other. Females accounted for 71% (442) of the sample. Four-hundred and forty-one (441, 71%) of the students indicated that they completed at least one McNair Scholars research internship.

Participants represented a variety of academic majors. Approximately 40% of the students were majoring in Social Sciences/Education, 17% in Natural Sciences, 16% in Humanities, and 7% in Health Professions. Also included were

Table 1

Demographic Characteristics of the Sample (N=624)

Characteristics	n	%n
Race		
African American/Black	300	48
White/Caucasian	138	22
Hispanic/Latino	105	17
Asian	37	6
Native American/Alaskan Native	12	2
Other	32	5
Sex		
Female	442	71
Male	182	29
Completed at least one McNair Internship		
Yes	441	71
No	183	29
College Major		
Social Sciences/Education	247	40
Natural Sciences	105	17
Humanities	98	16
Health Professions	42	7
Business	38	6
Engineering	38	6

Table 1 (Continued)

Demographic Characteristics of the Sample (N=624)

Characteristics	n	%n
Arts	24	4
Other	32	5
Highest Degree Aspirations		
Doctorate	485	78
Professional	72	12
Masters	52	8
Other	14	2
College Grade Level		
Freshman	2	0.3
Sophomore	1	0.2
Junior	156	25
Senior	414	66
Other	51	8
Age		
18 – 22	440	71
23 – 27	103	17
28 – 31	34	5
32 and above	47	8

6% in Business, 6% in Engineering, 3.8% in the Arts, and 5% indicated they were pursuing some other academic major.

Highest degree aspirations were also reported. Seventy-eight percent (78%) of the students indicated that they planned to obtain the doctorate as their highest degree. Among the other response options for degree aspirations, 12% indicated they aspired to a professional degree, 8% indicated they planned to pursue a master's degree, and 2% indicated other degree aspirations.

Current grade levels were also reported. Sixty-six percent (66%) of the participants were seniors, 25% were juniors, 0.2% were sophomores, 0.3% were freshmen, and 8% fell into the other classifications. Of the sample, 71% reported being 18 – 22 years of age, 17% were 23 – 27 years of age, 5% were 28 – 31 years of age, and 8% were 32 years of age or older.

Results of Data Analysis

The Graduate Education Self-Efficacy Scale (GESES) is a 57-item self report questionnaire designed specifically for this study to measure and compare the levels of self-efficacy of McNair Scholars Program participants. The questionnaire is grouped into three scales: 1) Academic Self-Efficacy Scale (ASE), 2) Research Self-Efficacy Scale (RSE), and 3) Social Self-Efficacy Scale. The ASE is a 15 item scale designed to measure levels of academic self-efficacy. The RSE is a 20 item scale designed to measure levels of research self-efficacy. The SSE is a 15 item scale designed to measure levels of social self-efficacy. The remaining seven items of the GESES elicit demographic information for each participant.

Estimates of internal consistency reliability were computed for each of the three scales of the GESES (Table 2). Reliability scores of the scales on the GESES ranged from a high of .96 to a low of .89. Specifically, the coefficient alpha for the 20-item RSE was the highest at .96. The coefficient alphas for the 15-item SSE and the 15-item ASE were .92 and .89 respectively.

In order to assess the Graduate Education Self-Efficacy Scale and determine whether it represented three distinct scales (the ASE, RSE, and SSE) an analysis was conducted on responses from the entire sample using a principal component factor analysis. The principal component factor analysis initially resulted in nine factors with eigenvalues greater than 1.0. A scree test indicated that there was a break in size of eigenvalues between the third and fourth factors. The scree plot indicated that the eigenvalues began to change directions after the third factor. Based on the scree plot and the three scales of the GESES, three factors were rotated using a Varimax rotation procedure. The three factors labeled Research, Social and Academic, accounted for 50% of the total variance. Table 3 contains the factor correlation matrix.

The first factor, labeled Research had 20 items with factor loadings ranging from .47 to .79. This factor seemed to represent the behaviors associated with research self-efficacy such as brainstorming researchable ideas, choosing appropriate research techniques and completing a significant research project.

The second factor, labeled Social had 15 items with factor loadings ranging from .43 to .75.

Table 2

Results of Internal Consistency for each GESES Scale

Scale	alpha coefficient (α)
Academic Self-Efficacy Scale	.89
Research Self-Efficacy Scale	.96
Social Self-Efficacy Scale	.92

Table 3

Factor Analysis of the Graduate Education Self-Efficacy Scale (N=624)

Factor	Eigenvalue	% of Variance
Research	18.403	37
Social	4.099	8
Academic	2.638	5

This factor seemed to represent the behaviors associated with social self-efficacy such as interacting with other students and professors, introducing one's self to a group of unknown people, and participating in extra-curricular activities.

The third factor, labeled Academic had 15 items with factor loadings ranging from .32 to .67. This factor seemed to represent the behaviors associated with academic self-efficacy such as believing one's self to be well prepared for graduate school, scoring well on the graduate admission test, and making an informed choice on a graduate school to attend. These findings suggest that ASE, RSE and SSE are three independent scales, measuring separate and distinct constructs. Table 4 summarizes the rotated factors solution.

As a result of these analyses, the items were grouped into three distinct scales. The three scales (the ASE, RSE, and SSE) were used to address the research questions posed in the present study.

This study was guided by three research questions. The first question related to the levels of academic self-efficacy, research self-efficacy and social self-efficacy of African American pre-McNair Scholars Program participants and African American post-McNair Scholars Program participants. A total of 300 African American students participated in this study (207 women and 93 men). The demographic characteristics of the African American sample are summarized in Table 5. Thirty-six percent (36%) of the students indicated that they had completed at least one McNair Scholars research internship.

Table 4

Rotated Factors Solution (N=624)

Items	Factors		
	Research	Social	Academic
Item 1	.16	.22	.32
Item 2	.34	.11	.62
Item 3	.15	.11	.64
Item 4	.22	-.01	.58
Item 5	.23	.22	.64
Item 6	.10	.26	.59
Item 7	.11	.28	.58
Item 8	.16	.34	.37
Item 9	.11	.30	.63
Item 10	.10	.16	.67
Item 11	.33	.14	.63
Item 12	.29	.24	.56
Item 13	.35	.26	.46
Item 14	.36	.21	.43
Item 15	.33	.25	.53
Item 16	.66	.21	.18
Item 17	.66	.13	.23
Item 18	.69	.13	.23
Item 19	.53	.43	.19
Item 20	.47	.41	.15

Table 4 (Continued)

Rotated Factors Solution (N=624)

Items	Factors		
	Research	Social	Academic
Item 21	.65	.31	.14
Item 22	.70	.23	.15
Item 23	.77	.19	.14
Item 24	.76	.15	.20
Item 25	.80	.11	.21
Item 26	.70	.12	.20
Item 27	.78	.21	.18
Item 28	.79	.12	.24
Item 29	.78	.18	.20
Item 30	.77	.17	.22
Item 31	.74	.13	.25
Item 32	.74	.24	.16
Item 33	.51	.38	.13
Item 34	.57	.32	.15
Item 35	.60	.33	.27
Item 36	.26	.64	.24
Item 37	.18	.73	.17
Item 38	.16	.61	.22
Item 39	.21	.71	.17
Item 40	.12	.73	.19

Table 4 (Continued)

Rotated Factors Solution (N=624)

Items	Factors		
	Research	Social	Academic
Item 41	.20	.67	.22
Item 42	.17	.72	.10
Item 43	.31	.64	.11
Item 44	.18	.69	.29
Item 45	.25	.75	.17
Item 46	.28	.64	.29
Item 47	.09	.43	.09
Item 48	.18	.62	.10
Item 49	.07	.50	.28
Item 50	.11	.56	.23

Table 5

Demographic Characteristics of the African American Sample (N=300)

Characteristics	n	%n
Female	207	69
Male	93	31
Completed at least one McNair Internship		
Yes	107	36
No	193	64
College Major		
Social Sciences/Education	121	40
Natural Sciences	53	18
Humanities	29	10
Health Professions	27	9
Business	23	8
Engineering	19	6
Arts	13	4
Other	15	5
Highest Degree Aspirations		
Doctorate	217	72
Professional	46	15
Masters	31	10
Other	6	2

Table 5 (Continued)

Demographic Characteristics of the African American Sample (N=300)

Characteristics	n	%n
College Grade Level		
Freshman	2	0.7
Junior	78	26
Senior	197	68
Other	23	8
Age		
18 – 22	236	79
23 – 27	42	14
28 – 31	12	4
32 and above	10	3

Participants represented a variety of academic majors. Approximately 40% of the students majored in Social Sciences/Education, 18% were in Natural Sciences, 10% were in Humanities, and 9% were in Health Professions. Also included were 8% in Business, 6% in Engineering, 4% in the Arts. Five percent (5%) indicated they were pursuing some other college major.

Highest degree aspirations were also reported. Seventy-two percent (72%) of the students indicated that they planned to obtain the doctorate as their highest degree. Among the other respondents, 15% indicated they planned to pursue a professional degree, 10% indicated they aspired to the master's degree, and 2% indicated other degree aspirations.

Current grade levels were also reported. Sixty-eight percent (68%) of the participants were seniors, 26% were juniors, 0.7% were freshmen, and 8% fell into other classifications. Of the sample, 79% reported being 18 – 22 years of age, 14% were 23 – 27 years of age, 4% were 28 – 31 years of age, and 3% were 32 years of age or older.

For the three scales, participants were asked to assign a rating of 1 to 10 to indicate the degree to which they had confidence in their ability to perform certain tasks associated with graduate education. A rating of 1 indicated that the student was “Not at all Confident” in her/his ability to complete that specific task. A rating of 10 indicated that the student was “Completely Confident” in her/his ability to complete that specific task. Simple descriptive statistics were obtained by calculating the mean, range, and standard deviation for all items within each scale.

Higher scores reflected more confidence in students' ability to complete a task and lower scores reflected less confidence in students' ability to complete a task. Table 6 summarizes the scores obtained for each scale of the GESES.

Mean scores on the 15 items of the ASE were generally positive with scores ranging from 6.68 to 9.49. The highest mean scores were for the question regarding obtaining a strong letter of recommendation from at least one professor (9.49) and the question regarding choosing a graduate school that will fit ones' needs (9.10). The lowest mean score on the ASE was for the question related to scoring well enough on the graduate admission test to be accepted into one of students' top three choices of graduate school (6.68).

The mean scores of the RSE were generally positive with mean scores ranging from a low of 7.57 to a high of 8.78. The item with the highest mean score on the RSE was related to respondents' confidence in their ability to discuss research ideas with a professor (8.78). The lowest mean score on the RSE was related to confidence in respondents' ability to choose appropriate data analysis techniques (7.57).

The SSE scale dealt with participants' belief in their ability to establish relationships with others while in graduate school. Mean scores indicated that participants were generally confident with mean scores ranging from a low of 7.37 on the item related to visiting a professor in her/his home to a high of 9.00 on the item related to asking a professor to be a mentor.

Table 6

Sample Mean, Range and Standard Deviation for African Americans on the GESES (N=300)

Scale/Item	N	M	Range	SD
ASE	300	8.34	8.40	1.068
Obtain a strong letter of recommendation	300	9.49	9.00	1.266
Choose a graduate school that fits career goals	300	9.10	8.00	1.171
Choose a graduate school that fits academic aspirations	300	9.01	9.00	1.455
Earn a graduate degree	298	8.83	9.00	1.722
Persist in graduate school despite academic probation	300	8.75	9.00	1.634
Persist in graduate school despite failing one class	300	8.72	9.00	1.779
Graduate with high grades	300	8.61	9.00	1.620
Find information to make choice on graduate school	298	8.57	9.00	1.597
Seek out funding for graduate school	300	8.32	9.00	1.880
Graduate well prepared for graduate school	300	8.03	9.00	1.867
Pass a comprehensive examination	300	7.93	9.00	1.610
Obtain adequate funding for graduate school	300	7.81	9.00	1.945
Manage time effectively	300	7.79	9.00	1.837
Be accepted into top 3 choices of graduate school	299	7.53	9.00	2.129
Score well on the graduate admission test	296	6.68	9.00	2.196
RSE	300	8.07	8.45	1.325
Discuss research ideas with professor	299	8.78	9.00	1.390
Discuss research ideas with other students	300	8.67	9.00	1.456
Complete a significant research project	300	8.50	9.00	1.728
Evaluate journal articles for literature review	300	8.36	9.00	1.602
Conduct search for literature on research topic	300	8.35	8.00	1.539
Condense/explain literature specific to research idea	300	8.21	9.00	1.538
Report research results in writing	300	8.18	9.00	1.783
Generate researchable questions	300	8.11	9.00	1.767
Report research results orally to an audience	300	8.08	9.00	1.949
Brainstorm research ideas	300	8.06	9.00	1.692
Organize research ideas in writing	299	8.06	9.00	1.820

Table 6 (Continued)
Sample Mean, Range and Standard Deviation for African Americans on the GESES (N=300)

Scale/Item	N	M	Range	SD
Develop logical rationale for research idea	300	8.01	9.00	1.765
Identify needed research based on existing literature	300	7.98	9.00	1.727
Effectively edit writing to make logical and succinct	299	7.93	9.00	1.793
Organize collected data for analysis	300	7.85	9.00	1.923
Choose appropriate research design	300	7.68	9.00	1.898
Choose appropriate research methods	300	7.65	9.00	1.897
Defend research results to a critical audience	300	7.65	9.00	2.147
Analyze data using appropriate methods	300	7.63	9.00	1.886
Choose appropriate data analysis techniques	300	7.57	9.00	1.947
SSE	300	8.48	8.00	1.243
Ask a professor to be a mentor	300	9.00	9.00	1.534
Interact with other students in department	300	8.96	8.00	1.403
Seek out and obtain academic assistance from professor	300	8.94	9.00	1.505
Be involved in group activities with other students	300	8.87	9.00	1.492
Work one-on-one with a professor several days a week	300	8.78	9.00	1.510
Participate in extra-curricular activities	300	8.73	9.00	2.044
Hold leadership position in professional organization	300	8.65	9.00	1.925
Introduce self to a prominent/important person	300	8.51	9.00	1.844
Become friends with a professor	300	8.46	9.00	1.851
Interact with professors in social setting	299	8.42	9.00	1.810
Introduce self to a professor with whom not had a class	300	8.42	9.00	1.896
Discuss personal issues with someone of different race	300	8.39	9.00	2.254
Approach and introduce self to unknown group	299	7.93	9.00	2.316
Make contribution in conversation w/professors	300	7.83	9.00	1.954
Visit a professor in her/his home	300	7.37	9.00	2.437

The remaining two research questions examined differences in perceived levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholars Program participants and African-American post-McNair Scholars Program participants. To answer the second research question, multivariate analysis of variance (MANOVA) was conducted to determine if there were significant differences between the mean scores on the dependent variables of academic, research and social self-efficacy among African American pre- and post-McNair Scholars Program participants (Table 7). Significant differences were found among the African American pre-McNair participants and post-McNair participants on academic, research and social self-efficacy on the GESES, $F(3, 296) = 10.82, p < .01$.

Analyses of variance (ANOVAs) on each dependent variable were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was tested at the .025 level. The ANOVA on the ASE was significant, $F(1, 298) = 12.21$. The ANOVA on the RSE was also significant, $F(1, 298) = 30.54$. The ANOVA on the SSE was significant as well, $F(1, 298) = 4.49$.

In all instances, respondents who had participated in the McNair Scholars Program reported significantly higher scores than their counterparts who had not participated in the program (pre-McNairs).

Finally, a MANOVA was also conducted to answer the third research question which set out to determine if significant differences existed between African pre-McNair Scholars participants and post-McNair Scholars participants by gender and college grade level.

Table 7

Results of MANOVAs on Differences in Academic, Research and Social Self-Efficacy by McNair Participant Status (N=300)

Scale/Participant Status	M	SD	df	F	p
GESES			3	10.818	.00
Academic Self-Efficacy			1	.628	.00*
Pre-McNair Participant	8.19	1.099			
Post-McNair Participant	8.63	.949			
Research Self-Efficacy			1	1.378	.00*
Pre-McNair Participant	7.77	1.323			
Post-McNair Participant	8.60	1.149			
Social Self-Efficacy			1	3.375	.04*
Pre-McNair Participant	8.37	1.324			
Post-McNair Participant	8.68	1.061			

*p<.05

The MANOVA revealed nonsignificant effects for gender on the ASE $F(1, 292) = .103$, $p = .75$ (Table 8), the RSE, $F(1, 292) = .004$, $p = .95$ (Table 9), and the SSE, $F(1, 292) = .143$, $p = .71$ (Table 10). Nonsignificant effects for college grade level were found on the ASE, $F(3, 292) = 1.75$, $p = .16$ (Table 8), and on the SSE, $F(3, 292) = 1.67$ (Table 10). The test however did indicate a significant effect for college grade level on the RSE, $F(3, 292) = 5.41$, $p < .01$ (Table 9). The MANOVA also indicated significant interactions between gender and college grade level on the ASE, $F(3, 292) = 2.68$, $p < .05$ (Table 8), on the RSE, $F(3, 292) = 2.84$ (Table 9), $p < .05$, and the SSE, $F(3, 292) = 3.01$, $p < .05$ (Table 10).

Figures illustrating the slope and interaction between gender and college grade level are located in Appendix H. Figures H.1, H.2, and H.3 illustrates the gender and college grade level interactions of the ASE, RSE, and SSE respectively.

Analyses of variance (ANOVAs) on each dependent variable were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was tested at the .025 level. The ANOVA on college grade level scores was significant on the RSE, $F(3, 292) = 5.41$, $p < .01$. The ANOVA on the ASE was nonsignificant, $F(3, 292) = 1.75$, $p = .15$. The ANOVA on the SSE was also nonsignificant, $F(3, 292) = 1.67$, $p = .17$.

In summary, the results of this study revealed significant differences between African American pre-McNair Scholars Program participants and African American post-McNair Scholars Program participants. No significant differences in scores by gender were found on the ASE, RSE or SSE scales. Neither were

Table 8

Results of MANOVAs on Differences in Academic Self-Efficacy (ASE) by McNair Participant Status, Gender and College Grade Level (N=300)

Scale/Interaction	Gender/Grade level	n	M	SD	df	F	p
ASE x Gender					1	.103	.75
	Male	93	8.20	1.240			
	Female	207	8.41	.977			
ASE x Grade Level					3	1.753	.16
	Junior	78	8.13	1.335			
	Senior	197	8.40	.961			
	Other	23	8.41	.966			
ASE x Gender x Grade Level x McNair Status					3	2.683	.04*
	Male Junior	26	7.65	1.770			
	Female Junior	52	8.47	.961			
	Total Junior	78	8.20	1.335			
	Male Senior	56	8.41	.867			
	Female Senior	141	8.39	.887			
	Total Senior	197	8.40	1.068			
	Male Other	10	8.40	.888			
	Female Other	13	8.42	1.109			
	Total Other	23	8.41	.966			
	Pre-McNair Male Junior	20	7.34	1.841			
	Pre-McNair Male Senior	31	8.29	.918			
	Pre-McNair Male Other	5	8.10	.782			
	Pre-McNair Female Junior	39	8.29	.992			

Table 8 (Continued)

Results of MANOVAs on Differences in Academic Self-Efficacy (ASE) by McNair Participant Status, Gender and College Grade Level (N=300)

Scale/Interaction	Gender/Grade level	n	M	SD	df	F	p
	Pre-McNair Female Senior	93	8.29	.960			
	Pre-McNair Female Other	4	8.10	.702			
	Post-McNair Male Junior	6	8.70	1.033			
	Post-McNair Male Senior	25	8.56	.794			
	Post-McNair Male Other	5	8.56	1.450			
	Post-McNair Female Junior	13	9.02	.622			
	Post-McNair Female Senior	48	8.59	1.053			
	Post-McNair Female Other	9	8.53	.966			
	Total Male	93	8.20	1.241			
	Total Female	207	8.34	.977			
	Total Pre-McNair	193	8.19	1.099			
	Total Post McNair	107	8.63	.949			

*p<.05

Table 9

Results of MANOVAs on Differences in Research Self-Efficacy (RSE) by McNair Participant Status, Gender and College Grade Level (N=300)

Scale/Interaction	Gender/Grade level	n	M	SD	df	F	p
RSE x Gender					1	.004	.95
	Male	93	8.01	1.489			
	Female	207	8.01	1.248			
RSE x Grade Level					3	5.411	.00*
	Junior	78	7.70	1.603			
	Senior	197	8.14	1.186			
	Other	29	8.61	1.220			
RSE x Gender x Grade Level x McNair Status					3	2.843	.04**
	Male Junior	26	7.13	1.929			
	Female Junior	52	7.99	1.343			
	Total Junior	78	7.70	1.603			
	Male Senior	56	8.30	1.095			
	Female Senior	141	8.08	1.218			
	Total Senior	197	8.14	1.185			
	Male Other	10	8.64	1.309			
	Female Other	13	8.58	1.200			
	Total Other	23	8.61	1.220			
	Pre-McNair Male Junior	20	6.68	1.915			
	Pre-McNair Male Senior	31	8.00	1.017			
	Pre-McNair Male Other	5	8.49	1.537			
	Pre-McNair Female Junior	39	7.70	1.338			

Table 9 (Continued)

Results of MANOVAs on Differences in Research Self-Efficacy (RSE) by McNair Participant Status, Gender and College Grade Level (N=300)

Scale/Interaction	Gender/Grade level	n	M	SD	df	F	p
	Pre-McNair Female Senior	93	7.88	1.159			
	Pre-McNair Female Other	4	8.30	1.082			
	Post-McNair Male Junior	6	8.64	1.050			
	Post-McNair Male Senior	25	8.66	1.099			
	Post-McNair Male Other	5	8.80	1.196			
	Post-McNair Female Junior	13	8.84	.977			
	Post-McNair Female Senior	48	8.47	1.247			
	Post-McNair Female Other	9	8.70	1.290			
	Total Male	93	8.01	1.489			
	Total Female	207	8.09	1.245			
	Total Pre-McNair	193	7.77	1.323			
	Total Post-McNair	107	8.61	1.150			

*p<.01
**p<.05

Table 10

Results of MANOVAs on Differences in Social Self-Efficacy (SSE) by McNair Participant Status, Gender and College Grade Level (N=300)

Scale/Interaction	Gender/Grade level	n	M	SD	df	F	p
SSE x Gender					1	.143	.71
	Male	93	8.38	1.422			
	Female	207	8.53	1.155			
SSE x Grade Level					3	1.674	.17
	Junior	78	8.34	1.440			
	Senior	197	8.52	1.192			
	Other	23	8.58	.961			
SSE x Gender x Grade Level x McNair Status					3	3.011	.03*
	Male Junior	26	7.74	1.674			
	Female Junior	52	8.64	1.220			
	Total Junior	78	8.34	1.440			
	Male Senior	56	8.60	1.284			
	Female Senior	141	8.49	1.156			
	Total Senior	197	8.52	1.192			
	Male Other	10	8.63	1.016			
	Female Other	13	8.58	1.200			
	Total Other	23	8.60	.961			
	Pre-McNair Male Junior	20	7.48	1.769			
	Pre-McNair Male Senior	31	8.57	1.277			
	Pre-McNair Male Other	5	8.43	1.258			
	Pre-McNair Female Junior	39	8.54	1.299			

Table 10 (Continued)

Results of MANOVAs on Differences in Social Self-Efficacy (SSE) by McNair Participant Status, Gender and College Grade Level (N=300)

Scale/Interaction	Gender/Grade level	n	M	SD	df	F	p
	Pre-McNair Female Senior	93	8.43	1.213			
	Pre-McNair Female Other	4	8.35	1.116			
	Post-McNair Male Junior	6	8.62	.960			
	Post-McNair Male Senior	25	8.65	1.312			
	Post-McNair Male Other	5	8.83	.798			
	Post-McNair Female Junior	13	8.91	.934			
	Post-McNair Female Senior	48	8.62	1.038			
	Post-McNair Female Other	9	8.63	.938			
	Total Male	93	8.38	1.422			
	Total Female	207	8.53	1.155			
	Total Pre-McNair	193	8.37	1.324			
	Total Post-McNair	107	8.68	1.061			

**p<.05

significant differences found by college grade level on the ASE and SSE scales. However, significant differences were found based on college grade level on the RSE scale. There were also significant interaction effects between gender and college grade level on all three scales of the GESES. These results and their implications for future practice, policy and research are discussed in Chapter Five.

CHAPTER FIVE

Discussion

The purpose of this study was to measure and compare the levels of academic self-efficacy, research self-efficacy and social self-efficacy among African American pre-McNair Scholars Program participants and African-American post-McNair Scholars Program participants. This chapter summarizes the results of the study and discusses the findings as they relate to the research questions. Then the results of this study are explored in relationship to prior research. This is followed by a discussion of the implications of the findings for future professional practice, research and policy. Limitations to the study are also identified. Finally, the chapter concludes with a discussion about academic, research and social self-efficacy and African American students in McNair Scholars Programs and recommendations for enhancing the experiences of these students.

Discussion of the Results

This study was guided by three research questions. The first question measured the levels of academic, research and social self-efficacy of African American pre- and post-McNair Scholars Program participants. To examine this question, the researcher reported the means and standard deviations of each scale of the Graduate Education Self-Efficacy Scale (GESES). For each item, study participants reported the belief in their ability to perform certain tasks associated with graduate education. Each item was assigned a rating between 1 ("Not at all Confident") and 10 ("Completely Confident"). For the purposes of the current study, the researcher interpreted a value of 5 or greater as positively

confident in ability to perform that task. A value of 4.99 or less was interpreted as a negative belief in ability on that task.

Responses on the GESES items ranged from a low of 6.68 to a high of 9.49. These findings indicate that African American students who choose to participate in the McNair Scholars Program, no matter their participant status (pre or post), are confident in their ability to perform the academic, research and social tasks necessary to successfully complete a graduate program of study. The positive scores for both groups may indicate that students who participate in McNair whether they have completed a McNair experience or not, are at least somewhat confident that they can pursue and obtain a graduate degree.

The high levels of academic, research and social self-efficacy among the pre-McNair Scholars Program participants may suggest that students who apply for the McNair Program are already at least somewhat confident in their ability to perform the tasks associated with graduate education prior to applying. Due to the eligibility standards to participate in the program, students who apply have perhaps already achieved a certain amount of academic success. These same students may have also been encouraged to apply to the program by a faculty member which may in itself boost levels of self-efficacy among the applicants.

Another reason that pre-McNair participants may have high levels of self-efficacy is that acceptance into the program may boost levels of self-efficacy. Once accepted, students' levels of self-efficacy may increase because of the feeling of accomplishment associated with being admitted to a competitive program such as McNair.

The second research question compared the levels of academic, research and social self-efficacy of African American pre-McNair participants to African American post-McNair participants to determine if significant differences existed between the two groups. The results of the MANOVA indicated significant differences in the mean scores on each scale of the GESES between the two groups. Post-McNair Scholars participants reported having more academic self-efficacy (8.63) than pre-McNair Scholars participants (8.19). Post-McNair Scholars also reported having more research self-efficacy (8.61) than pre-McNair Scholars (7.77). The results were similar for social self-efficacy with post-McNair participants reporting higher levels (8.68) than pre-McNair participants (8.37).

Though both groups reported having positive academic, research and social self-efficacy beliefs, these findings are encouraging and suggest that participating in the McNair Scholars Program does increase levels of self-efficacy for African American students. In other words, involvement in the McNair Scholars Program enhanced beliefs about participants' ability to succeed in a graduate program of study.

Participating in the McNair program may increase academic self-efficacy because of the experiences gained during participating in the research internship. For example, the vast majority of programs offer graduate admission test preparation during the internship. This can increase levels of academic self-efficacy.

Students also participate in workshops and seminars such as those about choosing the appropriate graduate program that fits the participants' academic

and career goals. By participating in such activities, McNair participants gain confidence in their ability to choose the appropriate graduate program.

During the research experience, McNair participants have the opportunity to develop scholarly research papers much like those of graduate students and faculty members. Participants learn the components of a scholarly paper in their academic field and have the opportunity to develop these papers from inception to the final project. They also are given the opportunity to present the research findings to an audience of faculty, peers and others at local, regional and national research conferences. Once a participant has successfully completed these types of experiences, their levels of research self-efficacy may increase as well.

McNair Scholars also participate in social and cultural activities that may help boost levels of social self-efficacy. Scholars are encouraged to network with faculty, graduate students, and other McNair participants. In addition, participants are mentored by current faculty members and have the opportunity to interact with this person and the mentor's colleagues. Activities such as these can increase the level of social self-efficacy among African American McNair participants.

It should be noted that the present study measured and compared participants levels of self-efficacy in accomplishing certain tasks associated with graduate studies. It did not attempt to measure actual ability. However, students with higher levels of academic, research and social self-efficacy have higher levels of persistence to degree completion, academic performance and dissertation progress than students with lower levels of self-efficacy (Chemers, et al., 2001; Faghihi, et al., 1999; Lent, et al., 1986). It was assumed, therefore, that

participants with higher levels of self efficacy would succeed in graduate education programs.

The third and final question investigated differences in participants' levels of academic, research and social self-efficacy by gender and college grade level. The results suggest that no significant differences exist by gender in levels of academic, research or social self-efficacy. Further, there were no significant differences in levels of academic or social self-efficacy between the two groups by college grade level. There was however, a significant difference in research self-efficacy by college grade level.

On the RSE, seniors reported higher mean scores than juniors. These findings suggest that as McNair scholars progress through their college careers their levels of research self-efficacy increase. This may happen at least in part because advanced students have had more research experiences through normal classroom activities in addition to McNair activities.

What is interesting about the RSE mean scores is that students also reported a mean score of 8.61 in the Other category on the grade level item. This is of interest because the McNair Scholars Program is open to juniors and seniors. It is assumed by the researcher that several students who participated in the study had graduated, but were allowed to participate in the survey by the McNair director at their particular institution. Some of these students may have even been enrolled in graduate programs. Whatever the case, these students may have had higher levels of self-efficacy because of their more advanced status in conjunction with the fact that they participated in McNair activities.

In addition to significant effects on the research self-efficacy by college grade level, there were also significant interaction effects on academic, research and social self-efficacy by gender and college grade level. African American female juniors who completed the McNair program had higher mean scores across all scales of the GESES. African American male juniors who had not completed a McNair program had the lowest mean scores across all scales of the GESES.

The difference in mean scores between African American post-McNair female juniors and African American pre-McNair male juniors suggests that African American males are less confident in their ability to complete graduate school. This may be due, at least in part, to the lower academic credentials that many African American males have upon entering college. African American males enter college with lower grade point averages, lower scores on college admission's tests, and with lower rates of participation in college preparatory courses during high school (Harvey, 2002; U.S. Department of Education, Office of Postsecondary Education, 2002). The significant interaction effects may also be because there were too few respondents in some cells of the analyses. African American female respondents outnumbered African American male respondents by more than two to one.

It should also be noted that once they complete a McNair experience, African American male mean scores increased to 8.70 for juniors and 8.56 for seniors on the ASE, 8.64 for juniors and 8.66 for seniors on the RSE, and to 8.62 for juniors and 8.65 for seniors on the SSE. This suggests that once African

American males complete a McNair Scholars Program experience their levels of self-efficacy are comparable with that of African American females.

The increase in levels of self-efficacy on all three scales of the GESES suggests that for African American males, participating in graduate preparation programs such as the McNair program provides the opportunity to better prepare for graduate school by participating in activities that mimic the graduate experience. Programs appear to help prepare students for the application process and develop interpersonal skills. Once they have successfully completed this experience, their levels of self-efficacy increase.

Relationship of Findings to Prior Research

The findings of the present study support prior studies on self-efficacy. Previous research has found that enactive mastery (past performance) and vicarious (modeling) experiences are major contributors to self-efficacy beliefs (Bandura, 1977, 1997). For African American students, past performance and verbal persuasion are equal sources of influence on academic self-efficacy and outcome beliefs (Gainor & Lent, 1998). The results of the present study suggest that academic self-efficacy was enhanced by participation in the McNair Scholars Program. McNair programs involve students in hands-on research activities (enactive mastery), and seminars with former McNair students involved in graduate school or academia (vicarious experiences), and mentoring activities with supportive faculty and administrators (vicarious experiences and verbal persuasion).

By providing students the opportunity to gain research experience, the McNair program helps students gain confidence in their ability to conduct

graduate level research. For many participants, this may be the first opportunity for them to conduct research of this type. In many undergraduate classes, conducting research simply means going to the library and regurgitating what others have said about a particular subject. During the McNair experience however, participants develop research projects and have the opportunity to formulate researchable ideas, test hypotheses, and write about and defend their research findings. Once completed, the participants' level of self-efficacy increases through this enactive mastery experience.

The McNair program also gives students the opportunity to interact with mentors, graduate students and other McNair scholars. When possible, mentors are selected not only for their research and teaching experience, but also because they may come from backgrounds similar to the participants (underrepresented, and low-income/first-generation). McNair participants also have the opportunity to speak with former McNair participants who are either current graduate students or who graduated from a graduate program. In addition, McNair participants who have completed a McNair experience often participate in a second experience, thus serving as role models for first time participants. These role models provide the vicarious experiences that McNair participants need to increase levels of self-efficacy.

Mentors and former McNair participants who are either recent graduates or who are currently enrolled in a graduate program encourage current McNair participants to seek graduate studies. This is done by speaking with current participants about their graduate experiences and instilling in them the confidence needed to pursue graduate education. This type of verbal persuasion

from supportive others helps participants gain confidence in their ability to complete a graduate program.

It should also be noted that students who feel well-prepared for graduate school and who perceive their undergraduate experiences as having adequately prepared them for graduate school report higher levels of academic self-efficacy (Santiago & Einarson, 1998). This is especially true among African American students (Einarson & Santiago, 1996). By involving students in challenging activities at the undergraduate level, the McNair Scholars Program helps to prepare students for the challenges of a graduate education.

By providing participants with activities such as practical experience in graduate level research, workshops on the graduate application process and discussions with current and former graduate students they are able to increase their skill levels in these areas. This increase in skill levels lead to higher levels of self-efficacy for McNair participants.

This present study also supports previous studies related to research self-efficacy. Students with lower levels of research self-efficacy lack an interest in research related activities (Bieschke, Bishop & Garcia, 1993; Bishop, Bieschke & Garcia, 1993, Kahn, 2001). Research is an integral part of the graduate experience, especially for students in doctoral programs. African American students who participate in the McNair program have higher levels of research self-efficacy than African Americans who have not participated. McNair students are provided with opportunities to engage in research (enactive mastery) and observe and network with similar students participating in the research process (vicarious experiences). Faculty members who serve as mentors also provide

encouragement to students through the research process (verbal persuasion). This supports prior research that suggests that previous research experiences, modeling and verbal information are positive sources of research self-efficacy (Faghihi, et al., 1999; Kahn, 2001; Trimarco, 1997; Wilson & Onwuegbuzie, 2001).

Early involvement in research activities also raises levels of research self-efficacy (Cash & Sanchez-Hueles, 1992). McNair affords participants the opportunity to get involved in research activities relatively early in their academic careers, considering that many McNair students get involved during their junior year of college. For students pursuing a doctorate degree, they can expect to have on average, six more years of education before pursuing their professional careers. Having research experience at the undergraduate level may help to prepare participants for research expectations at the graduate level.

Previous research points to the role of higher levels of social self-efficacy in establishing the social networks necessary to persist in graduate school. Students with higher levels of social self-efficacy are able to establish the social networks that promote social integration of graduate students in their programs of study (Ellis, 2001). Good faculty to student mentoring relationships lead to higher levels of social self-efficacy (Ellis, 2001).

The findings of the present study support the previous research on social self-efficacy. Post-McNair students, who had already been involved in mentoring relationships with faculty, reported higher levels of social self efficacy than pre-McNair Scholars. This suggests that the activities of the McNair program such as mentoring, discussions with other students and attending conferences, enable

students to interact with various others, and may increase their social self-efficacy.

Previous research on the McNair Scholars Program suggests that early exposure to research along with high expectations seems to prepare students for graduate education (Nnadozie, et al., 2001). The present study supports this finding in that students who had completed at least one McNair experience had higher levels of academic, research and social self-efficacy and seemed to be better prepared for graduate school than students who had not completed a McNair experience.

Prior research also suggests that the McNair program experience has positive effects on students in terms of graduate school placement, obtaining funding, and completing a graduate degree (Nnadozie, et al., 2001). The present study supports this in that African American post-McNair students reported higher levels of self-efficacy in terms of being admitted to a one of their top three choices of a graduate program, being able to obtain funding for graduate education and persisting to degree completion than pre-McNair students.

Implications for Future Practice, Research and Policy

The findings of this study relate to self-efficacy in general and have implications for future professional practice, research and policy. The findings of this study suggest that self-efficacy can be learned, or enhanced through training. Many campuses desire to achieve higher graduation rates among both undergraduate and graduate students. By implementing programs that help to increase self-efficacy, campuses may be able to better enhance success among students.

In terms of professional practice, McNair administrators and administrators of similar programs might use the results of this study in developing programs that prepare students for graduate education and for careers in academia. Specifically, McNair administrators, especially those at newer programs may want to provide students with more of the experiences that increase academic, research and social self-efficacy.

To increase academic self-efficacy, administrators should concentrate their efforts on activities such as graduate admission test preparation. This item had the lowest score of all items on the GESES. African American McNair participants have the least amount of confidence in their ability to score well on graduate admission tests. Requiring participants to attend workshops on test preparation might increase their confidence so that they can score well enough to be admitted to a graduate program.

Time management is another aspect that McNair administrators should integrate into their programs in order to influence academic self-efficacy. Time management skills are an important aspect of being able to negotiate the time constraints of graduate school. McNair administrators would serve their participants well by including workshops on time management.

To increase research self-efficacy, McNair administrators should continue to provide faculty-guided research opportunities to participants. This gives aspiring scholars the opportunity to work with faculty in developing a research project from inception to writing about and defending the results. This may build students' confidence in their ability to complete a major research project.

In addition to the research opportunity, McNair administrators should implement a research methods component to the program. Choosing appropriate data analysis techniques and analyzing data using appropriate methods received the lowest mean scores on the RSE. By including a research methods component as part of the McNair program experience, McNair administrators may help to increase participants' levels of research self-efficacy.

Social interactions are an important part of the graduate school experience. To increase social self-efficacy among participants, McNair administrators should sponsor social events in which faculty and students interact with one another. Administrators can also encourage faculty mentors to invite McNair scholars to social events where other faculty members are present.

Networking is an important social aspect of the graduate experience and for career advancement once the degree is completed. McNair administrators should encourage students to attend professional conferences with their mentors. Mentors can introduce scholars to colleagues in their academic fields and serve as a networking coach to students.

Another important aspect of the McNair experience is the opportunity for students to present research findings to an audience. Administrators of programs like McNair can encourage students to attend conferences, research symposiums, and other academic events and present their research to an audience of professionals and peers. Such experiences provide students with opportunities to showcase their research abilities. They also give students an opportunity to listen to and network with professionals and other students who are involved in similar pursuits.

This study measured and compared levels of academic, research and social self-efficacy among African American pre- and post-McNair Scholars Program participants. Administrators and McNair staff can use these findings to develop orientation and training programs for mentors, instructors and others who work with McNair students. Specifically, mentor orientation programs should concentrate on the skills needed to help participants raise their levels of self-efficacy. These skills include mentoring skills, especially mentoring skills that deal with working with populations that have been historically excluded from participating in graduate education, including African Americans.

Graduate school admission committees might also utilize the results of this study as they make decisions about who to accept in their graduate programs. Prior research suggests that students with higher levels of academic, research and social self-efficacy persist to degree at higher rates than students with lower levels of self-efficacy (Lent, et al., 1999). The results of this study indicate that students who have participated in a McNair experience have higher levels of self-efficacy. Graduate school admission committees and admission officers can consider whether a student has participated in such a program and use this information as part of the admission decision. This may be especially true for African American students who traditionally score lower on graduate admission tests and have lower undergraduate grade point averages than White students (U.S. Department of Education, National Center for Education Statistics, 1999).

Faculty members may benefit from the results of this study as they interact with McNair and other students in their roles as mentors and advisors. Not only

do faculty members help graduate students through the research process, they serve as important conduits in the socialization process of students inside and outside of the classroom. Faculty may want to provide opportunities for out of class interactions with African American and other McNair students. These interactions can include inviting students to social gatherings for faculty and students, attending professional conferences in which the faculty member serves as a guide for the student who may be attending her/his first professional conference, or inviting the student to lunch so that the student can practice social/etiquette skills. These types of activities lead to more opportunities for students to practice interpersonal skills which may increase social self-efficacy.

In addition to professional practice, the present study has implications for future research. This study focused only on the research component of the McNair program. Future research might examine the effect of other components of the McNair program on self-efficacy of participants.

Additional research is also needed to explore the levels of self-efficacy of former McNair students currently enrolled in graduate programs to see if the effects of the program last over time. This type of research can help to determine if the effects of the McNair program last throughout the graduate careers of participants.

Other studies could examine self-efficacy and its' correlation to subsequent enrollment and completion of graduate school. The present study revealed higher levels of self-efficacy among post-McNair participants. Do these higher levels of self-efficacy lead to higher enrollment and completion rates

among African American participants? Research such as this would add to what is known about the McNair Program and its' effect on self-efficacy.

Another suggestion for a future study would be to compare levels of self-efficacy between McNair program participants and students who were selected for the program but who decided not to participate. Such a study might more clearly delineate the effect of the McNair program on students.

The present study assessed self-efficacy among only African American McNair scholars. Research is also needed that measures and compares levels of self-efficacy of pre- and post-McNair scholars of other racial and ethnic groups. Research of this type can be used to determine if significant differences exist for other groups of McNair scholar participants.

The present study employed quantitative techniques. Other researchers may want to engage in qualitative methods to further explore how the McNair program enhances academic, research and social self-efficacy. Such data might provide richer information about which components of the program help to increase self-efficacy among participants.

Finally, this study was significant in terms of policy at the federal, state and university level. Federal policymakers (both elected and civil servants) who are responsible for the allocation of funding, and the design and implementation of the program at the federal level can use the results of this study to guide policy. Programs that incorporate activities that promote increased levels of self-efficacy may be funded at higher levels, or receive special incentives so that they can serve a greater number of students.

Since McNair is administered by the Office of Federal TRIO Programs, policymakers can implement guidelines about the type of activities programs should focus on that enhance self-efficacy among participants. Establishing guidelines assures that programs have the components that promote higher levels of self-efficacy among participants.

Caution must be exercised however so as to ensure that programs have the flexibility to tailor initiatives that will best fit the needs of the students who attend that institution. There should not be a one size fits all model. The students at a large research extensive university may have different needs than students at a small baccalaureate granting institution. Federal policymakers can require that institutions conduct periodic assessments of students to determine the needs of the students. This information along with what is known about self-efficacy can help programs tailor services to fit the needs of the students that institution serves. This flexibility is crucial to a successful program.

The data provided by this study may also be used by state policymakers. Many states provide funding to universities to establish graduate preparation programs on their respective campuses. The findings of present study can help state policymakers establish guidelines for such programs. The results suggest that the McNair research experience increases academic, research and social self-efficacy among participants, therefore, policies might be designed to reward programs that offer the research component. Decisions can also be made regarding funding of such programs. Institutions that implement services that promote increasing self-efficacy among participants might be offered better funding from the state.

University policymakers can benefit from this study. University administrators decide which programs on campuses receive funding. As these decisions are made, programs that provide the services that increase students' levels of self-efficacy might be funded since increased levels since self-efficacy leads to higher persistence and graduation rates as well as higher grade point averages among students (Chemers, Hu & Garcia, 2001).

University administrators might also reward faculty who serve as research mentors to students. University administrators could encourage academic departments to implement programs such as research symposia that allow undergraduates to showcase their research abilities.

University administrators at the graduate level might also allow undergraduates to participate in graduate research symposiums. This might give undergraduates an opportunity to not only showcase their research talents, but also network with current graduate students and talk to them about their research and experiences in graduate school.

Limitations

Several limitations existed for this study. The first limitation was related to the sample. The sample consisted of students who voluntarily responded to the invitation to participate. Students who volunteered may have differed in some way from students who did not volunteer to participate. This may have led to results being biased in some unforeseen way.

A second limitation was related to sample size. Data were collected from 624 respondents, however, since only the African American respondents were utilized for the comparisons, the sample size was 300.

There were also issues related to the distribution of the survey instrument. The researcher relied on the assistance of McNair program directors and other staff to distribute surveys to program participants. A limited number of program administrators contacted the researcher to inform him that some students received the survey instrument several weeks into the program. This may have skewed some of the results.

A final limitation related to the self-reported data in some cases. For example, some respondents selected Other as their college grade level. Respondents could choose between Freshman, Sophomore, Junior, Senior and Other. The researcher assumed that respondents who selected Other were recent graduates who were allowed to participate in the survey by the McNair staff at their respective institution. There is no way of knowing this for sure.

Conclusion

In conclusion, it is important that the literature on self-efficacy examine different types of programs and how these programs affect self-efficacy among different populations of students. This study adds to the existing body of literature by examining the McNair program and its effect on levels of academic, research and social self-efficacy among the African American participants.

It would seem that participation in the McNair Scholars Program enhances academic, research and social self-efficacy among African American students. Since research is an integral component of faculty life, and McNair programs hope to increase the number of African American and other faculty from underrepresented backgrounds the findings of this study are encouraging.

In the present atmosphere of increased accountability, it is important that programs show a value added dimension. The results of this present study suggest that for African American students, participating in the McNair program does add value to their undergraduate experiences. The program increases their levels of self-efficacy and increased levels of self-efficacy should lead to increased levels of enrollment and success in post-graduate degree programs.

It is imperative that McNair administrators, policymakers and other stakeholders work to increase the number of students in the Ph.D. pipeline. With the information that the present research provided, programs such as McNair can assist in expanding the number of students who aspire to the Ph.D. This information can be used to better prepare students, especially African American and other underrepresented students, for graduate education leading to the Ph.D.

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