

CHAPTER 1

INTRODUCTION

“If I, a living witness, one who experienced those times, don’t speak about them, then others who did not experience or witness those times will invent their own version of them.”
Anatoyle Rybakov

The demographic landscape of America’s high paying aviation and scientific occupations consists primarily of White males (Hines, 1997). African Americans occupy less than three percent of all math, engineering, and science-related occupations (Hrabowski & Pearson, 1993); and less than one percent of the commercial airline pilot jobs. In fact, African Americans tend to be more represented in non-technical occupations such as education and human services (Powell, 1990). These occupation patterns have been predicted to remain relatively the same well into the 21st century (Hines, 1997). Such projections pose many threats to the United States’ technological workforce and global edge. This is especially true since White males numerically are unable to fill forecasted aviator jobs and ethnic minorities are both under-represented and have a high attrition rate in aviation majors. As a result, there is a necessity to produce more pilots from such populations as African Americans, Hispanic Americans, Native Americans, and women (Hermond, 1995; Hines, 1997; Sondgeroth & Stough, 1992).

In order to meet the demands of today’s technical workforce, initiatives need to be developed to attract more minorities and women to aviation and scientific occupations. Some historically black colleges and universities (HBCUs), such as Delaware State and Texas Southern, are now beginning to spend large sums of money on recruitment, retention, and the graduation of minorities in aviation.

According to the Hudson Institute’s Workforce 2000, immigrants, women, and ethnic minorities will occupy nearly 85 percent of the new jobs in America (Sonderoth & Stough, 1992). This change in the workforce demographics can be attributed to a number of factors such as the numerical decline in white males who traditionally filled such jobs; and the numerical increase and shift in the number of ethnic minorities and women in the United States. However, at the present time, it has been projected that African Americans and Hispanics will have the most problems finding jobs in occupations such as piloting, because of lack of educational attainment (Sonderoth & Stough, 1992).

Recognizing these trends, many foundations and governmental agencies are also beginning to take proactive stances by helping universities with their efforts to produce more Black pilots. They provide funds to help universities develop programs and initiatives that address the low minority representation in aviation and other scientific majors (Hermond, 1995; Hines, 1997). Other organizations (e.g., The Tuskegee Airmen [TAI], The Organization of Black Airline Pilots [OBAP], and Delta Airlines) have established programs to address these same concerns. These organizations provide a variety of services from scholarships, mentoring, hands-on flying and tutoring, to various outreach programs. As a result, the overall enrollment of Black male students in aviation is beginning to increase, but not in significant numbers.

Background of the Problem

Over the years, many authors (Cote & Levine, 1997; Hood, 1992; Levin & Wyckoff, 1995; Powell, 1990; Townsend, 1994) have attributed the consistently low African American persistence rates in math and science majors to poor retention programs, lack of pre-college preparation, and university environments. Based on Moore's (2000) speculations, African American males' non-persistence in science and math fields may be attributed to the stereotypic perception of African Americans in relation to aviation and other scientific disciplines. This stereotype – the notion that Black men are not capable of flying - over and over again is seen as an obstacle for them to overcome.

Statistics indicate that, compared to White males, Black males are less likely to enter and to persist in math and science programs such as aviation; ultimately they are poorly represented among the practicing profession (Henes et al., 1995). Some writers have attempted to explain African American's attrition from math and science. Schaer et al. (1991) identified six areas which function as barriers to the successful completion of a math and science degree: (1) personal and background variables, such as family support or social status; (2) financial concerns; (3) career awareness and maturity; (4) minority stereotyped views; (5) personality factors related to locus of control, responsibility, and self-esteem and; (6) abilities in math and science. Another study, a survey conducted at the University of California-Davis, identified environmental barriers to persistence in a math and science field. This survey indicated five major reasons why African Americans

leave or become discouraged with math and science: (1) isolation; (2) not seeing the relevance of highly theoretical basic courses; (3) negative experiences in laboratory courses; (4) the “chilly” classroom climate and; (5) lack of role models and mentors (Henes et al., 1995).

The dropout rate in aviation, very much higher for African American males than all other males, indicated that experiences in undergraduate programs may be situational or institutional. At one institute known for its leading edge in aviation education (Embry-Riddle Aeronautical University – Daytona, FL), the slight increase in Black male aeronautical science students is largely due to the enrollment of Caribbean blacks. For the academic year 2001-2002, freshmen enrollment totaled 1130; of which 14 were Black males (8 Caribbean blacks, 4 African Americans, 2 Africans). According to Embry-Riddle’s institutional research statistics, 75% of African American males enrolled in the College of Aeronautical Science drop out before completing their sophomore year, while Caribbean black males are persisting and graduating at a rate just under 100%. Few studies have been directed at understanding the twofold problem of the underrepresentation of Black males in aviation and the differences in performance among the African American and Caribbean black males. The relatively low increases and non-persistence, as well as performance issues, are indicative of a range of factors.

Statement of the Problem

Black males’ failure to choose or failure to persist in aviation results in their continuing plight with occupational segregation. Perceived segregation and discrimination had an affect on the African American’s academic performances as well as throughout their lives. The crisis of African American male students in science and math majors is well chronicled in the literature. It suggested that the future of African American males majoring in science and math looked bleak in contrast to that of their white male peers.

According to its statistics, less than 1% of the students enrolled at the Embry-Riddle’s College of Aeronautical Science are Black males (Lee, 2001). Within this small group, Caribbean blacks outnumber African American males 2 to 1. Caribbean black males are persisting through their aeronautical science program at a 98% completion rate while African American males experience a 25% graduation rate. This gap is largely due

to the drastic differences in how African American males and Caribbean black males perceive and act upon the same experiences. In a white, male-dominated, non-traditional major, African American males who fail to seek support while in the College of Aeronautical Science limit their future aviation occupational opportunities. African American males must come to believe that aeronautical science is for them, not only for others.

Research Questions

The study was guided by the following questions:

1. What experiences have been influential in a small group of Black males' selection of aeronautical science as a major, piloting as a career?
2. What factors outside of and previous to the collegial environment contribute to (and detract from) persistence in pursuit of completion of a major in piloting?
3. What factors in the collegial and occupational environment contribute to persistence in a major in piloting?
4. How do patterns of persistence compare for these Black males at a college of aeronautical science?

Purpose of the Study

The purpose of this study was to examine the experiences and persistence of a small group of Black male students in the College of Aeronautical Science at Embry-Riddle Aeronautical University. The few studies which do address persistence have been quantitative studies based on such indices as mathematics and science ability, grade point average, and Scholastic Achievement Test (SAT) scores. Though predictive of persistence, these indices do not tell the whole story. In-depth case studies of these students is lacking in the literature so that this study is designed to go beyond the surveys and quantitative studies of academic achievement, in order to understand how the issue of persistence operates in their real lives.

Qualitative data contributed further to our understanding of the career choice processes of these Black males in a non-traditional occupation (piloting), their experiences in that environment, and their strengths and ways of persisting. Qualitative

methodology included both individual in-depth interviews and small focus group interviews, which resembled small group conversations.

Significance of the Study

In general, research should contribute to knowledge, be useful and meaningful to the relevant policy arenas, and be useful to practitioners (Marshall & Rossman, 1989).

Black males' strengths and ways of persisting in the College of Aeronautical Science can be helpful in the planning and implementation of a theoretical model focusing on building such personal strengths. Findings provide insight into non-traditional major choice and implications for college advisors who are committed to broadening Black males' future options. This study was significant in terms of:

- Contribution to knowledge – the findings from this study have increased our understanding of the choice of major process for a small group of Black male students in aeronautical science and their ways of persisting in that choice. Berryman (1985) proposed the need for early interventions in order to increase minorities' share of the initial mathematical/scientific talent pool.
- Relevance to Policy – It is hoped that knowledge gained from this study will reinforce the need and importance of public policies aimed at educational equity for minority students from all educational systems and geographical areas.
- Usefulness to Practice – Factors that identify persistent and non-persistent performance may have implications for parents, teachers, and counselors in public schools, and faculty and program administrators in colleges of aviation at public universities. In addition to programs aimed at retention, such as those sponsored by the Caribbean Student Network, more useful strategies such as developing positive self-concepts, can be a guide to alleviating bias and chilling environments, perceived or otherwise, in mathematics, science and aviation programs in the school systems and institutions of higher education.

Limitations

With this type of methodology, data, in some instances, relied on participants' long-term recall, a methodology that has questionable limitations and reliability (Blasidell, 1995). In all likelihood, some participants may not have been aware of certain attributes, psychological or otherwise, that may have led to their persistence in aeronautical science while others were not able to accurately recall the specific influence that led to their non-traditional choice of major.

Delimitation

This study emphasized the experiences and performances of a small group of Black males in the College of Aeronautical Science at a particular university, therefore there was no attempt to generalize the findings to other populations of aviation students nor aviation programs at other universities.

Definition of Terms

- **Persistence** refers to a performance tendency to persevere and suggests an admirable striving against opposition (Reber, 1985). As an operational definition, persistence was defined as having completed a minimum of two years of study in aeronautical science in good academic standing and persons who have already graduated from the aeronautical science program and employed as pilots. **Non-persistence** was defined as having dropped out of aeronautical science sometime during the first two years of study as a result of grades, finances, or lack of interest.
- **Black** refers to persons of African descent. As an operational definition, Black was defined as African American, Caribbean blacks and Africans, collectively.
- **African American** refers to African descent people who are born, raised, and reside in the United States.
- **Caribbean black** refers to African descent people who are born in the West Indies. The Caribbean blacks in this study were raised in the United States.

Overview of the Chapters

Following Chapter 1, which contains the introduction; Chapter 2 provides a review of the literature; Chapter 3 contains the methodology utilized in the study;

Chapter 4 is a presentation of the data and analysis of findings; and Chapter 5 is the study's summary, conclusions, and recommendations for future research.

Chapter 2

LITERATURE REVIEW

After reviewing the literature on word combinations such as “persistence,” “aeronautical (aviation),” and “Black or African American males,” it was discovered that there was a dearth of information on the combined subject areas. However, it was discovered that the literature was replete with articles and books on different variables that influenced the academic success and persistence of African-American students majoring in science and mathematics. To capture this information, this literature review was divided into eight sections: (1) psychosocial- developmental characteristics of Black males; (2) under-representation of Black males in higher education; (3) pre-enrollment characteristics; (4) campus environment and climate; (5) motivation, performance and persistence; (6) math and science achievement; (7) retention and academic support programs; and (8) parental and familial support.

Since the body of literature was scant as it related to persistence of Black males in aeronautical disciplines, it was decided to use the mentioned eight sections to establish and develop the study. These points were consistently identified in the literature as contributing to persistence and academic success of African-American students in non-traditional majors at predominantly white institutes (PWIs). The study was formulated entirely on the identified variables and information.

Psychosocial-Developmental Characteristics of Black Males

First and foremost, Black males *collectively* are very diverse (Barnes, 1994; Lee, 1991; Priest, 1991). The group comprises various subcultures, backgrounds, and experiences but shares common grounds that can be linked to various facets of life in America (Elligan & Utsey, 1999; Pearson, 1994; Priest, 1991). Those experiences that are common to Black males are what distinguish them from their White male counterparts and even from their Black female counterparts (Moore, 2000).

Many Black males are often first seen as being a part of a group rather than individuals (Hilliard, 1985). This perception is a re-occurring image and theme of Black males, going back as far as the beginnings of slavery. Hilliard (1985) further articulates

that this perception is widespread and highly ingrained in the psyche of American culture. Both sociopolitical and historical-oppressive forces are influential in characterizing them as “objects of fear” (Hilliard, 1985; Lee & Bailey, 1998). These oppressive forces, in turn, have shared in preventing African American males from assuming traditional masculine roles that have been customarily afforded to their White male counterparts (Lee & Bailey, 1997). These forces have traditionally operated in such a way that they have impacted the psychosocial development and sex-role socialization of African-American males (Lee & Bailey, 1997).

What is most obvious about African-American males is that they are *black* and *male*. To fully understand their psychosocial development, many social scientists and behavioral theorists recommend that scholars understand how *blackness* and *maleness* intertwine with each other in America, how the two are interpreted by society and internalized by African-American males, and how African-American males respond to such interpretations (Allen-Meares, 1999; Duncan, 1999; Franklin, 1992; Hilliard, 1985; Locke, 1999). Generally speaking, when people are born, “they are socialized by members of their community to fit into social order” (Vontress, 1992, p. 459). For African-American males, this process of socialization is critical for successfully overcoming societal obstacles (Lee & Bailey, 1997). The psychosocial development for males (Havighurst, 1972; Piaget, 1970; Pollack, 1998) and African-American males in particular unravels (Harris, 1995; Lee, 1995) into a series of life stages (e.g., childhood, adolescence, and adulthood). Nevertheless, for many African-American males, it has been an up-hill struggle as they progress through these life stages (White & Cones, 1999). From infancy to adulthood, images of inferiority are communicated. These messages have made it difficult to assume a masculine posture (Grier & Cobbs, 1968; White & Cones, 1999).

During the early part of their development, African-American males are taught to be resourceful in increasing their life opportunities to counter societal structural obstacles (White & Cones, 1999). They are taught that they must out perform their White male counterparts, just to remain on equal ground.

However, Grier and Cobbs (1968), in their classic book *Black Rage*, state that Black males are taught how to perform at an early age, to “hold back, to constrict, to

subvert, and camouflage [their] normal masculinity” (p. 59). In more detail, the authors explain:

In the black household the man faces greater than usual odds in making his way. The care and rearing of children falls even more heavily on the wife; she is the culture bearer. She interprets the society to the children and takes as her task the shaping of their character to meet the world as she knows it. This is every mother’s task. But the black mother has a more ominous message for her child and feels more urgently the need to get the message across. The child must know that the white world is dangerous and that if he does not understand its rules it may kill him (p. 61).

The literature (Howard-Hamilton, 1997; Lee & Bailey, 1997; Vontress, 1992), suggests that many oppressive forces are stacked against African-American males and that it takes a resilient personality to overcome them. Those who are able to achieve are often scarred emotionally, psychologically, and socially, due to fighting institutional racism and seeing many of their African-American male peers falling victims of society’s oppressive forces (Franklin, 1992; Howard-Hamilton, 1997; Lee & Bailey, 1997; Moore, 2000). Howard-Hamilton (1997) recommends to educators and administrators to learn to infuse student developmental theories that are applicable to the African-American culture and that are able to empower and motivate African-American males to succeed in both non-traditional and traditional majors and on any college campus.

Other authors (Harris, 1995; McEwen, Roper, Bryant, & Langa, 1990) have pointed out that many of the present student development theories are not applicable for Black male students, due to cultural differences. When attempting to infuse developmental issues of Black males in existing theories, McEwen, Roper, Bryant, and Langa (1990, p. 430) suggested the following:

1. *Developing ethnic and racial identity*: inculcating ethnic identity and information and facts on African self-consciousness development.
2. *Interacting with the dominant culture*: discussing acculturation, assimilation, and association with White students on campus.
3. *Developing cultural aesthetics and awareness*: understanding and appreciating other cultures as well as one’s own.
4. *Developing identity*: enhancing one’s own unique and diverse characteristics, societal interaction, and group identification.

5. *Developing interdependence*: establishing personal relationships amid some separation from immediate family but with development of extended campus family.

6. *Fulfilling affiliation needs*: satisfying African American students' social needs outside the campus community.

7. *Surviving intellectually*: challenging African American students to compete with those who had educational privileges preparing them for the academic rigors of college.

8. *Developing spirituality*: understanding the role and importance of religion and spirituality in the growth and development of African Americans

9. *Developing social responsibility*: coming face-to-face with real and perceived social inequities, thus becoming social advocates on campus.

Under-Representation of African American Males in Higher Education

Over the years, many groups of the population have made considerable strides and gains in achieving a piece of the American dream, but this has not been the case for African-American males (Locke, 1999). Some have found themselves at a disadvantage, due to being “black” and “male” (Majors & Billson, 1992). These disadvantages are easily detected by examining various national statistical databases. Statistics indicate, when compared with their White male counterparts, African-American males have higher rates of imprisonment and criminality; drug and alcohol abuse; homicide and suicide; unemployment; and mental disorders (Austin, 1996; Majors & Billson, 1992; Roberts, 1994).

Majors and Billson (1992) stated, “dropout rates are high, failure is common, performance below grade level is pervasive, and alienation is epidemic” (p. 13). In comparison to White males, African-American males are more often recommended for remedial instruction and special education (Blake & Darling, 1994; Majors & Billson, 1992; Patton, 1981; Serwatka, Deering, & Stoddard, 1989) rather than college preparatory courses and programs (Duncan, 1999; Oakes, 1992). Serwatka et al. (1989) hypothesized that African-American males are disproportionately placed in classes for

the mentally and emotionally disturbed because they are perceived as threatening, disruptive, and incapable of learning (Majors & Billson, 1992).

Negative perceptions of African-American males communicate that they are lazy, unmotivated, unemployable, and intellectually inferior (Rowan, Pernell, & Akers, 1996). These perceptions have exacerbating effects in various areas of their lives. Such areas include, but are not limited to, prospective employment and eligibility for postsecondary education (Dyson, 1989).

Many scholars (Austin, 1996; George, 1993; Gibbs, 1984; Locke, 1999; Staples, 1986) attribute high unemployment to poor educational attainment and skill development. Due to their low reading and writing skills, African-American males are easily considered as “functional illiterates (Staples, 1987). Staples (1987) found that nearly 44% of African-American males were considered functional illiterates. Such statistics imply that African-American males are a group at risk.

In 1983, the National Commission on Excellence in Education (NCEE) forecasted in A Nation At Risk that there were direct consequences for not possessing basic skills of literacy. The NCEE reported that people who did not possess these basic skills were at risk of suffering from marginalization, both economically and socially. Austin (1996) reported in his book, Repairing the Breach, based on findings of the National Task Force on African-American Men and Boys, that many of the problems that African-American males face are correlated with the nation’s changing social and economic conditions. These conditions have evolved around a global economy that shifted from manufacturing to an information and service-oriented economy. The changing economy negatively impacted those individuals who lacked the education and technical skills to compete or add value to their respective vocations (Austin, 1996). It is imperative that African-American males equip themselves with the necessary skills and competencies to compete in this global economy. On the contrary, however, recent trends suggest that African-American males, even when well educated and trained, are often the last hired and the first to be laid off during corporate downsizing, reengineering, and merging. In more detail, Rowan et al. (1996) asserted:

African American males with the same educational achievements, occupational positions, employment history, and spanning well over the past 30 years – from around 1954 to the present – have received earned

income approximately 57 percent lower than that of their European American male counterparts (p. 10).

Over the years, the enrollment of African-American males in college has declined (Davis, 1994; Hrabowski & Pearson, 1993; Jackson, 1992; McJamerson & Person, 1989; Patterson-Stewart & Murry, 1993; Washington & Newman, 1991; Wingert, 1990). Though more African-Americans are graduating from high school (Hrabowski & Pearson, 1993) and performing better on college entrance exams (Wingert, 1990), fewer African-American males are enrolling in college to pursue postsecondary education. Within a ten-year span of time (e.g., 1976 to 1986), the enrollment for African-American males dropped from 4.3% to 3.5% (American Council on Education, 1997; Washington & Newman, 1991), and, within a four-year span of time (1980 to 1984), enrollment dropped nearly 6.3% (Gibbs, 1988).

Although high school dropouts among African-American males have declined steadily, educational data still suggest that they lag behind their African-American female counterparts in matriculating in college and obtaining degrees (Simms, Knight, & Dawes, 1993). Data, as recent as 1994, indicated that the male-to-female ratio for African-Americans was the lowest of all ethnic minorities (Cuyjet, 1997). Enrollment for African-American females was 24% higher than African-American males (Franklin, 1997). If this trend were to continue, Slater (1994) estimated that nearly 67% of the college degrees awarded to African-Americans would be given to African-American women.

Franklin (1997) attributes the disparity to better retention for African-American females and poorer retention for African-American males. In contrast, Cuyjet (1997) states that the disparity is difficult to pinpoint but should be viewed from a range of factors. The author divided the factors into two broad categories: “those preventing black men from ever getting to college in the first place, and those leaving them somewhat underprepared when they arrive on the campus and thus contributing to the higher rate of attrition often experienced by African American men” (Cuyjet, 1997, p. 6). Negative circumstances, such as high school dropout, are common inhibitors that prevent African-American males from matriculating and/or considering college (Majors & Billson, 1992). Students who make it to college but are unsuccessful in staying because of academic

reasons are often characterized as “unprepared” (Cuyjet, 1997). Brown (1997) asserted that lack of academic preparation was an important reason why African-Americans were not attaining their share of bachelor degrees.

Pre-Enrollment Characteristics

Making the transition from high school to college is a challenging process for any student, but for African-American males the adjustment is exceptionally challenging. In many cases, a significant portion of the group lacked the academic preparation necessary to succeed in higher education (Cuyjet, 1997; Tidwell & Berry, 1993), especially in non-traditional majors such as aviation, engineering, math, and science (Fullilove & Treisman, 1990; Hrabowski, 1991; Hrabowski & Pearson, 1993; Hrabowski, Maton, & Greif, 1998; Marrett, 1987). When comparing African-American males with their white male counterparts, they were less likely to take college preparatory courses (Carzile & Woods, 1998). “This stems from a number of conditions: attending academically poorer elementary and secondary schools, lowered expectations of peers and significant adults toward academic achievement, peer pressure to disdain educational accomplishments and education as an outcome, financial hardships limiting educational access, lack of appropriate role models, and other barriers owing to racism” (Cuyjet, 1997, p. 7).

As a way of combating poor retention and graduation rates, many academic institutions increased their admission standards to guarantee that students were prepared for the rigorous academic demands of their institution (Haralson, 1993; Hughes, 1987). Most universities and colleges wanted prospective students to show evidence of academic success in the following areas: (a) standardized tests such as Scholastic Aptitude Test (SAT) and American College Test (ACT); (b) cumulative grade point average (GPA); and (c) class rank (Brown, 1997; Scott, 1995). Students who do not show evidence of promise in these three areas are often identified as academically “unprepared” or “at risk.” Disproportionately, African-American males are identified under these categories.

Evidence of research suggested that a significant portion of the African-American student population that attended PWIs left by their sophomore year of college (Jackson, 1992). Aligned with these sentiments, Morgan (1980) found that high school GPA alone was not a strong enough indicator for predicating college success for African-American students. Morgan (1990) and Astin (1982) found that combining the high school GPA

and combined SAT scores (e.g., verbal and math parts) resulted in a stronger prediction of college GPAs for African-American students. On the contrary, Morgan's (1990) findings suggested that high school GPAs and SAT scores were not as reliable for Caucasian students. Regardless of the group, the intensity and rigor of the high school curriculum were stronger predictors of academic success than high school GPAs and SAT scores (Astin, 1982; D'Augelli & Hershberger, 1993; Morgan, 1990; Scott, 1995). Aligned with these findings, Adelman (1998) found that early exposure to trigonometry and higher-level mathematics were even better predictors of college success than high school GPA or SAT or ACT scores. He also reported that the academic curriculum intensity scale narrowly reduced the college completion margin between African-Americans and Caucasians. For example, African-Americans who were among the top 40% of academic curriculum intensity scale and who took trigonometry (or higher) had a 70% college graduation rate, compared with 84% of Caucasians with comparable backgrounds (Adelman, 1998). The graduation gap between the two groups was significantly reduced when using the academic curriculum intensity scale as opposed to using the high school GPA and SAT or ACT scores.

Unlike other researchers, Giles (1992) found that high school GPA, high school class rank, and SAT scores were inadequate in predicting academic performance for African-American students at Virginia Tech. Even with the best regression models, she stated that a significant part of the variance for the first year performance was unexplained by the information available (Giles, 1992). When looking at the top 15% of high school students, it was difficult to predict the level of academic success for students. For example, Pervin, Reik, and Dalrymple (1966), in their classic study, found similar results in the 1960s. The authors discovered that 45% of the students at the University of California dropped out before ever completing their degrees, though only the top 15% of high school graduates were eligible for admission.

MacGrath and Braunstein (1997) conducted a more recent study that examined the relationship between attrition and certain demographic, academic, financial, and social factors for freshmen. The sample was comprised of 353 students: Caucasian-Americans (64.3%), Hispanic-Americans (13.6%), African-Americans (7.7%), Asian-Americans (1.1%), and Others/Unknown (12.5%). The two authors' analysis indicated that

certain factors such as socioeconomic status, high school GPA, SAT scores, impressions of the institution, and participation in the financial aid program were significant predictors of retention. Students who stayed had higher high school GPAs, SAT scores, and first semester GPAs than those who left.

On a case-by-case basis, students are sometimes admitted to college provisionally. “Provisional status” means that the student’s acceptance is restricted as a result of not successfully taking and/or completing college preparatory courses or scoring high enough on the SAT or ACT while in high school. Most provisional students are required to participate in special summer programs prior to entering the university to bring their academic skills up to college level (Brown, 1997) and are required to complete their first semester or quarter in good standing. These special summer programs, referred to as “summer bridge programs,” consist of special advising, mentoring, tutoring, academic success workshops and various other components to enhance the academic success rate of under-prepared students (Hrabowski & Pearson, 1993).

These special programs are often “knee jerk” responses to dismal graduation rates of African-Americans in higher education. Many universities such as Embry-Riddle, Virginia Tech, University of Maryland-Baltimore County and various others offer special programs to minority students regardless of their admission status (e.g., regular or provisional admissions). This was especially true for minority students in non-traditional disciplines such as aeronautical, aviation, science, math, and engineering majors (Cheek, 1992; Hrabowski & Maton, 1995; Jibrell, 1990; Pearson & Bechtel, 1989).

In 1975, the National Academy of Sciences conducted a national study on the attrition of minorities in high tech colleges. This report indicated that “[minority] students had insufficient preparation in mathematics and the physical sciences, inadequate motivation toward aviation/aerospace and engineering as a career choice, lack of adequate financial resources and no self-confidence” (National Academy of Sciences, 1975). The National Academy of Science also found that high tech programs such as aeronautics, aviation, engineering and science, needed to do the following to increase retention of minorities: (a) develop and expand pre-college academic programs, (b) identify successful minority undergraduate and graduate students to tutor other students, (c) increase the presence of minority faculty, and (d) improve the personal interactions

between students, faculty, and staff. Other studies and reports have also indicated similar findings. For example, Hrabowski (1991) found that even those African-American students with high-standardized scores and high school grades do not always succeed in areas such as aeronautics. He discovered that many of these students earned well below a “C” in courses, such as chemistry, engineering, and calculus. In one particular science department at the University of Maryland Baltimore County, failure rates dropped from 60% to 40% when the science faculty began giving students more feedback on homework assignments, quizzes, and tests (Hrabowski, 1991).

Due to mentioned circumstances, it was not surprising that African-American males were not pursuing and graduating with aeronautical, engineering, and aviation degrees (Allen, 1988). Perhaps this was why African-American students were majoring in the social sciences and humanities at higher rates than disciplines such as math, science, aviation and engineering (Hines, 1997; Powell, 1990; Murry & Mosidi, 1993; Bandura, 1977). In order to change such trends, Murry and Mosidi (1993) recommended that educators develop programs and interventions that encouraged and prepared African-American students to pursue careers (e.g., aviation) that offered greater advancement and financial stability. The authors further suggested that such interventions needed to be innovative and creative to counter negative trends.

Campus Environment and Climate

Since the 1960s, the enrollment patterns of African-American students shifted from Historically Black Colleges and Universities (HBCUs) to Predominately White Institutions (PWIs) (Harvey & Williams, 1993; Tidwell & Berry, 1993; Townsend, 1994). The shift can easily be attributed to *Brown vs. Board of Education of Topeka, Kansas*, which was based on the monumental Supreme Court decision that declared “separate but equal” unconstitutional (Tidwell & Berry, 1993). It was this case that dramatically changed the demographic landscape of higher education (Allen, 1992).

The *Brown* case mandated that all public educational institutions (e.g., elementary, secondary, and higher education) abolish their segregation policies (Scott, 1995) and enroll minority students in their respective institutions. After the mandate, PWIs developed recruiting initiatives and educational opportunities to attract talented African-American students to their respective universities (Davis, 1998; Tidwell & Berry,

1993; Townsend, 1994). Unfortunately, many of the African-American students found it difficult to adjust to the environment (Fleming, 1984; Fordham & Ogbu, 1986; Tidwell & Berry, 1993; Weber, 1992; Willie & McCord, 1972). Some of their adjustment tribulations were common to all college students (Tinto, 1993), while others were specific to African-American students (Allen, 1992). Tidwell and Berry (1993) asserted, “It could be that years of functioning in a social system that mandated second class citizenship for minorities that ideas about the inferiority and superiority of various groups are too deeply entrenched for society to manage to change” (p. 466). Clearly, this suggested that institutions of higher education were microcosms of society, which reflected the beliefs and values of the majority culture.

Then and even today, African-American students often feel isolated and alienated at PWIs (Delphin & Rollock, 1995; Hughes, 1987; Schwitzer, Griffin, Ancis, & Thomas, 1999; Sedlacek, 1987). Consistent with these sentiments, Cuyjet (1998) found apparent differences between African-American students’ and non-African-American students’ (e.g., Hispanics, Whites, Native-Americans, and Asian-Americans) perceptions of PWIs’ environments. His study was conducted at six different universities around the country. These universities differ from each other in size, mission, location, and racial composition. The author used a quantitative instrument, *Perceptions on Community/Environment (PCE)*, to “assess students’ perception on matters pertaining to their relative acceptance in a college or university environment, with a particular emphasis on issues related to the racial/ethnic identity” (Cuyjet, 1998, p. 66). “The atmosphere in my classes makes me feel like I belong,” “My fellow students are condescending to me,” and “Campus rules and regulations seem to have been more for ethnic majority (white) students than for African-Americans” are examples of items on his quantitative instrument. Participants were able to respond to the questions using a Likert-type scale – *strongly agree*, *agree*, *disagree*, and *strongly disagree*. More specifically, the author found that African-American students responded overall more negatively to the questions than did non-African-American students. It can be assumed that these African-American students felt marginalized by their negative perceptions. In an earlier study, Davis (1994) examined the relationship between perceived social support and academic achievement of African-American males that attended HBCUs and

PWIs. The author found that the African-American males who attended HBCUs had higher GPAs than those who attended PWIs. One possible explanation for these findings might be that African-American students have more contact with professors at HBCUs than PWIs (Cokley, 1999).

Trujillo (1986) discovered in his research that Caucasian instructors paid less attention to African-American students and often ignored them in class, whether consciously or unconsciously. This was especially true when the representation of African-Americans was low (Campbell and McCabe, 1982). Gloria, Kurpius, Hamilton, and Wilson (1999) found, from a sample of 98, that social support, university comfort, and positive self-beliefs were highly associated with the persistence of African-American students at their PWI. These findings substantiate past studies (Fleming, 1990; Gossett, Cuyjet, & Cockriel, 1998; Kimbrough, Molock, & Walton, 1996) that emphasized the importance of personal, social, and academic support of African-American students at PWIs. Although the three constructs predicted persistence, social support and university comfort appeared to be the strongest predictors (Gloria et al., 1999).

In a qualitative study, Schwitzer et al. (1999) found that African-American students felt less supported and nurtured in their PWI than in their communities and high schools. In addition, the authors found that these students were less likely to approach their instructors for help, unless the instructor had the same gender, race, or both. Students' reservations were directly related to their fears of being perceived as needing help as a result of being African-American. This passive behavior was "rooted in the fears and self-doubt engendered by a major legacy of American racism: the strong negative stereotypes about black intellectual capabilities" (Howard & Hammond, 1985, p. 18).

Claude Steele (1997), a renowned social psychologist at Stanford University, referred to this notion of behavior as the "stereotype threat." He first coined the term to explain the structural barriers and achievement gaps of capable African-American students. He suggested that African-Americans' academic achievement had less to do with their academic ability than with the threat of negative stereotypes about their capacity to achieve. The premise of the author's theory began with the assumption that negative societal perceptions about particular groups can detrimentally impact the

intellectual and identity development of individual group members. The stereotype threat occurred most often when one was pursuing a career or education that was not perceived as common. “This predicament threatens one with being negatively stereotyped, with being judged or treated stereotypically, or with the prospect of conforming to the stereotype” (Steele, 1997, p. 14). More importantly, it intensified the fears and uncertainties of the person being negatively stereotyped (Howard & Hammonds, 1985). The stereotypes have negative effects that can cause anyone fatigue (Steele, 1992).

Nettles (1987) suggested that the needs of African-Americans and Caucasians were quite different. The author further explained that PWIs have fallen short in meeting the needs and expectations of African-American students, particularly in providing social support and nurturance that foster academic success. “Because social adjustment and interpersonal climate seem to be central factors in many African-Americans’ satisfaction and success on predominantly white campuses, counselors must understand how these issues operate to develop effective interventions for these individuals” (Schwitzer et al., p. 190).

As compared to whites, D’Augelli and Hershberger (1993) found that African-American students perceive their PWIs more negatively. Other studies (Allen, 1981; Hughes, 1987; Thompson & Fretz, 1991; Wright, 1981) even suggested that they perceive “greater racial tension and hostility in their environment, express lower levels of satisfaction and greater levels of isolation, and feel less identified with the institution than do white students” (Thompson & Fretz, 1991, p. 437). Fleming (1984) found that the environment was very important in fostering success for African-Americans both on HBCUs and PWIs. In her longitudinal study, she found that students who attended HBCUs made greater intellectual gains than their peers who attended PWIs. In addition, the author’s findings suggested that the development of African-American males more negatively suffered at PWIs than HBCUs. However, on the contrary, African-American females were more assertive and self-reliant at PWIs than HBCUs.

When there was incongruence between the student and environment, dissatisfaction and alienation were common symptoms of a poor fit. If the environment was in conflict with the student, there was a high probability that the student would have problems adjusting and would likely withdraw from college. Tinto (1987) found that

person-environment incongruence was highly correlated with students withdrawing or transferring from college. For African-American students, withdrawal was often the response to maladjustment and dissatisfaction with PWIs. Therefore, it can be assumed that the campus environment was central to the success of African-American students in PWIs (Schwitzer, et al., 1999).

The theory of person-environment congruence proposed that a good fit between the person and environment has a positive impact on student achievement and personal satisfaction (Thompson & Fretz, 1991). On the contrary, a poor fit has the opposite effect. For African-American students at PWIs, environmental characteristics of the institution were critical for retention, persistence, and academic success. Therefore, it was imperative that PWIs develop support programs and interventions to foster a more comfortable environment (Scott, 1995; Watson & Kuh, 1996).

According to Fordham and Ogbu (1986), African-American students have a limited amount of established resources to affirm their identity and to connect with their cultural heritage on PWIs. As a result, African-Americans often find it “necessary to create their own cultural networks to remedy their exclusion from the wider, White-oriented university community” (Allen, 1992, p. 29). Willie and McCord (1972) found that African-American students expected more social acceptance than they were actually receiving from PWIs. The authors also found that this contributed to African-American students segregating themselves from other groups. It was clear that the campus environment has devastating effects on the overall experience of African-American students. Perhaps just as important as the campus environment, informal contacts with faculty and administrators play vital roles in academic success of African-American students (Watson & Kuh, 1996).

Motivation, Performance, and Persistence

Over the last two decades, numerous studies have been published on motivation and persistence of students in higher education (Somers, 1995). Evidence from research (Graham, 1997; Moore, 2000; Scott, 1995; Somers, 1995; Wambach, 1993; Weiner, 1985; Wilson-Sadberry, Winfield, & Royster, 1991) indicated that persistence and motivation have a profound effect on academic performance. “Certain variables consistently associated with persistence are included in an integrationist theory of

persistence” (Donovan, 1984, p. 244). The variables were typically associated with learning environments, academic problems, relationships with instructors, and interactions with other students (Wilson-Sadberry, et al., 1991).

As a way of better understanding persistence, Tinto (1975) developed a conceptual model, which was derived from Durkheim’s (1951) theory of suicide, based on the assumption that suicide was likely to occur when individuals were inadequately integrated into and connected with society. Tinto (1975) focused his model on the interactions between individual students and the college environment. The author hypothesized that the two interactions influenced the educational outcomes of college students. He further suggested that lack of integration in the two main dimensions (e.g., academics and social life) of college life can or will lead to withdrawal. It was the individual’s integration into the academic and social environment that most determined whether or not the individual would persist in college (Wambach, 1993). For example, Tinto (1975) stated:

When one views the college as a social system with its own value and social structures, one can treat dropout from that social system in a manner analogous to that of suicide in the wider society... social conditions affecting dropout from the social system of the college would resemble those resulting in suicide in the wider society; namely insufficient interactions with others in the college and insufficient congruency with the prevailing value patterns of the college collectivity... lack of integration into the social system of the college will lead to low commitment to that social system and will increase the probability that individuals will decide to leave college and pursue alternative activities (pp. 91 – 92).

Another popular conceptual model for explaining persistence was Weiner’s (1985) attribution theory. This model was conceptualized that students attribute their academic performance, whether positively or negatively, to ability, effort, and task difficulty (Wambach, 1993). The explanations, which students attributed to their educational performance, were important determinants of motivation, self-esteem, and future plans (Scott, 1995; Wambach, 1993). Signer, Beasley, and Bauer (1997) found that, when poor performance was attributed to low ability, students often “gave up” and developed a nonchalant orientation toward academic-related topics.

Howard and Hammond (1985) asserted that everyone encounters failure, but unexpected failure affect students differently from expected failure. For example, a

student who is confident in his or her ability but happens to fail at a task was likely to attribute his or her failure to not working hard enough. On the contrary, a student who was expecting to fail was likely to attribute his or her failure to lack of ability and was likely to hesitate approaching the task again. It was clear that expectancy and cognition have a tremendous impact on educational performance. In more detail, Howard and Hammond (1985) lamented:

The negative expectancy first tends to generate failure through its impact on behavior, and then induces the individual to blame the failure on lack of ability, rather than the actual attribution in turn becomes the basis for a new negative expectancy. By this process the individual, in effect, internalizes the low estimation originally held by others. This internalized negative expectancy powerfully affects future competitive behavior and future results (p. 20).

Howard and Hammond's (1985) aforementioned quote was not limited to any specific group. However, it did provide a basis for explaining why some groups were achieving academically and why others were not. For African-American students, a notable difference between their attitudes and white students' attitudes in regards to academic success was that white students tended to expect to make good grades and black students just wanted to keep from failing (Erwin, 1976). Other research (Clark & Klotkin, 1964; Nettles, 1988) reported that academic performance was highly dependent on students' motivation, regardless of their pre-college academic performance and/or entrance examination scores. Consistent with these findings, Carson, et al (1991) found that African-American students who persisted at PWIs did so primarily because of their own personal motivation, high aspirations, and somewhat high degree of satisfaction with the academic life. The two authors' sample was comprised of African-American juniors and seniors (N=86). The study's overall purpose was to examine these students' perceptions and experiences at a large, Midwestern PWI. As a way of gathering the data, the authors used a quantitative instrument, based on a Likert measurement scale -- *strongly disagreed, disagreed, had no opinion, agreed, or strongly disagreed*. "It is important for me to graduate from college," "I foresee that I can be a success at this university," and "I feel that the services, information, and/or facilities that the university provides are conducive to the success of Blacks students" were examples of items on the

instrument. More specifically, these items were used to measure internal (e.g., self-concept, personal motivation, and aspiration) and external factors (e.g., academic quality, faculty relations, and sociocultural environment).

African-American students in Scott's (1995) study agreed that motivation and effort were key factors to their academic performance at Virginia Tech. These students also suggested "these things combined with the absence or presence of clear goals and good study habits made a major contribution to their grades since enrolling at the university" (p. 98). When making between-group-comparisons (e.g., below 2.0 group, 2.0 – 3.0 group, and 3.0 and above group), the author noticed that each group clearly recognized the importance of these factors, but approached the factors differently. For example, Scott (1995) revealed:

The successful students [3.0 and above] talked about investing extra study time, using campus resources, studying with peers, and talking to professors. The satisfactory students [2.0 – 3.0] also engaged in similar activities but not to the extent as the successful group. The less successful students [2.0 or less] admitted that academics were not a priority and that they had not spent adequate time on their studies (p. 98).

For students in aviation and other scientific majors, Lent, Brown, and Larkin (1984) found that students "who reported high self-efficacy for educational requirements achieved higher grades and persisted longer in technical and scientific majors over the following year than those with low self-efficacy" (cited by Graham, 1997, p. 65). The authors (Lent, Brown, and Larkin, 1987) also found in another study that self-efficacy was a more reliable factor in predicting students' academic performance in scientific fields than interest congruence and consequence thinking. Self-efficacy referred to one's confidence about his or her ability to accomplish a certain task or assignment. The outcome of performance was what usually predetermined the level of persistence (Wambach, 1993). Bandura (1986) identified four stimuli that were known for changing one's persistence: (a) performance accomplishments; (b) vicarious learning experiences; (c) encouragement and support; and (d) emotional arousal. According to Maddux and Stanley's (1986) research, performance accomplishment had the most influence on one's self-efficacy. Vicarious learning, encouragement, and arousal were the three main influential factors.

Math and Science Achievement

Many explanations have been given for the under-representation of African-American males in aviation, math, science, and engineering careers. The explanations range from a variety of factors, such as (a) inadequate secondary educational facilities and resources; (b) poor performance in mathematics and science; (c) low expectations from teachers and counselors in their academic abilities; (d) the lack of mentors in their lives to promote their interest in science and mathematics; and (e) inadequate parental support (Fullilove & Treisman, 1990; Hrabowski & Pearson, 1993; Hrabowski & Maton, 1995; Hrabowski et al., 1998; Peterson, 1993; Signer, Beasley, & Bauer, 1997). Regardless of the explanation, many researchers believe that more emphasis should be placed on improving the overall education for African-American males.

The futures of African-American males, in large measures, were highly predetermined by their academic performance at the different school levels – elementary, middle, secondary, and college. Each school level served as a feeder to the next. It was clear that the early years of education were crucial for students who anticipated majoring in aviation, engineering and other scientific fields. Mathematics and science courses were typically the classes that indicated whether or not students were in college preparatory tracks. More often than not, African-American males avoided college preparatory courses that prepared them for aviation, engineering and science disciplines (Hrabowski, 1991). They were disproportionately placed in special education tracks (Serwatka, 1993) and lower-leveled vocational tracks (Jibrell, 1999). Hrabowski and Pearson (1993) stated that these males “avoid advanced mathematics and science in high school, possibly because their teachers think they are unable to compete in these courses” (p. 234). Other authors (Fordham & Ogbu, 1986; Fries-Britt, 1997) argued that African-American males often shied away from college preparatory courses to avoid undue criticism from their peers. Within many African-American male circles, the perception of being smart was often viewed as “acting” or “being” white (Fries-Britt, 1997). Jones, Burton, and Davenport (1982) found that the following constructs influenced students’ mathematics learning: “achievement motivation, career expectations, influence and parents, parental education and occupation, enjoyment of mathematics, self-esteem as a mathematics student,

mathematics utility and relevance, teacher expectations, and locus of control” (Signer et al., 1997, pp. 378 – 379).

Howard and Hammonds (1985) posited that a negative stigma of inferiority followed African-Americans everywhere they went, especially in various academic arenas; subsequently, many avoided academic fields (e.g., aviation, engineering, math, and science) where the stigma might be deemed true. This clearly constituted an unwanted burden for African-American males who aspired to pursue aeronautical, engineering, and scientific fields in college. Howard and Hammond (1985) further posited that “black inferiority” is communicated in different venues of society. It is communicated in the classroom, media, and even on the job. These effects are debilitating and detrimental to African-American males’ self-concept, and self-confidence. In turn, it negatively tarnishes their academic performances. Other authors (Hrabowski, 1991; Hrabowski & Pearson, 1993; Cheatham & Shelton, 1987) echoed these same sentiments.

Other research suggested that white males were out numbering black males in taking college preparatory courses (Chung, Baskin, & Case, 1999; Carzile & Woods, 1988; Hrabowski & Pearson, 1993), and inevitably this trend has put a damper on the number of aeronautical and aviation degrees awarded to African-American males each year. In order for African-American males to be successful in aviation, many researchers have recommended that they be introduced and exposed to different careers available to them as a result of math and science. The best way to improve the present numbers is to start at an early age (Taylor, 1994). Early exposure was an important predictor of mathematical achievement (Ethington & Wolfe, 1984). It played a tremendous role in positively influencing students’ impression of science, both physical and natural. Along these lines, Peterson (1993) encouraged counselors to do the following:

As counselors, we need to be present in the planning of mathematics and science activities so we can support positions that represent all students. We must support gifts and talents of all kinds. We must make sure, too, that well-meaning mathematicians, scientists, and engineers do not force-feed higher order mathematics and science courses to students who could be better served by different types of curricular approach. We must make clear that our role is not to steer students into specific occupational fields... (p. 246).

Retention and Academic Support Programs

Over the years, retention and graduation rates of African-American males have become a growing concern for faculty, administrators, and staff members at PWIs. This was evident by a recent body of research (D'Augelli & Hershberger, 1993; Davis, 1994; Hrabowski, et al., 1998; Sherman, Giles, & Green, 1994; Townsend, 1994) on African-american males. Such studies (Hines, 1997; MacGuire & Halpin, 1995; Taylor, 1994) suggested that African-American male students needed to be cultivated and nurtured in order for them to persist in higher education, particularly in scientific fields such as aviation. Outreach programs for both middle and secondary school students, pre-college programs for entering freshmen, and academic support for undergraduate students were common interventions used to assist African-American males in succeeding in college, both at PWIs and HBCUs (Fortenberry, 1994; Scott, 1995; Hrabowski, et al., 1998).

When designing retention programs for African-American males, educators have identified different factors that contributed to academic success and persistence. Hrabowski, et al., (1998) identified four critical points that influenced African-American male students' academic success. The information was based on the authors' extensive literature review, applied research, and experience working with African-American males in science. Furthermore, the four points were the basis of the authors' Meyerhoff Program at the University of Maryland Baltimore County. This program was founded to recruit, retain, and graduate African-American males in science and engineering fields.

Knowledge and skills, motivation and support, monitoring and advising, and academic and social integration were the four key factors that positively or negatively influenced the academic performance of African-American males in aeronautics, science and engineering. The first point was related to basic intellectual ability and analytic and problem-solving skills. In order to be successful in aviation, science or engineering, it is essential that students have basic computational skills. Although students have different learning styles, backgrounds, strengths, and weaknesses, it was important that educators consider such diversity in their retention interventions. The availability of various resources for students with different backgrounds and needs made this an achievable goal.

The second point was related to students' motivation, interest, and support. Because aviation, science and engineering curricula were strenuous and challenging, it was considered necessary that students were genuinely interested in their chosen discipline of study and that they received the necessary support for success. Support was the main component that generated resiliency and persistence in African-American males, especially in trying times. The authors further suggested that support came from a range of sources, including family, faculty, administrators, mentors and peers.

The third point was associated with advising and monitoring students' academic progress. The authors asserted that good advising and follow-up were instrumental in helping African-American male students stay on track. Good advising and monitoring were key ingredients to counter academic mishaps and unwise decisions.

Perhaps more significant than any of the mentioned points was the fourth point, academic and social integration. The literature was filled with accounts and research that support the importance of African-Americans being fully integrated into the campus community. The authors recommended that every effort should be made to create a welcoming environment that help facilitate relationships across genders, race, class, and social status. Once students were comfortable with the environment, they were more able or willing to integrate both academically and socially into campus life. Landis (1991) argued that this could be achieved through interventions that included faculty involvement, study groups, course clustering, and learning centers for students. At many universities, similar interventions have been established (Hermond, 1995), regardless of whether the university is a PWI or HBCU, such as Morgan State University (Cheek, 1992), Florida A&M University (Fortenberry, 1994), University of Virginia (Townsend, 1994), and University of Akron (Lam, Doverspike, & Mawasha, 1997). Retention efforts comprised of tutoring, mentoring, counseling, and special workshops.

At Florida A&M University (FAMU), Fortenberry (1994) highlighted the strengths of its recruitment and retention of African-American students. Though it was a HBCU, it still had a national reputation for landing National Achievement Scholars. A disproportionate number of these scholars opted to major in engineering and other scientific disciplines. It should be noted that FAMU shares the same engineering program with Florida State University (FSU), a PWI.

As a way of attracting top African-American students, FAMU offered very competitive academic scholarships, referred to as the Life-Gets-Better Scholarship. These scholarships covered tuition, room, board, and fees. In addition, the recipients were guaranteed summer internships. As a way of retaining the students, they were enrolled in engineering-only sections of science and engineering courses. They were encouraged to study in groups with peers, and tutors were provided to help them in difficult courses. The author also reported that retention and graduation rates improved drastically but failed to provide any supporting data.

Retention interventions at the University of Virginia have received a lot of attention over the years (Townsend, 1994). In fact, this university was considered a national leader for its high graduation rate of African-Americans. Its efforts were not specific to aeronautics or engineering, but targeted at underrepresented students all around its campus, regardless of their majors. Institutional commitment, faculty involvement, mentoring, financial support, and maintaining a critical mass were identified as critical to the University of Virginia's success. Along these lines, other research suggested that such factors were instrumental in recruiting, retaining, and graduating African-Americans.

Lam et al. (1997) described a retention program that was developed by the University of Akron's College of Engineering. The program was entitled Increasing Diversity in Engineering Academics (IDEAs). Its purpose was to increase the representation, retention, and graduate rates of African-American students in the College of Engineering. In order to meet its purpose, the program placed a major emphasis on (a) improving the representation of African-American students, (b) enhancing their academic performance, and (c) helping them develop collaborative learning communities, which focused on academic success rather than remediation. Lam et al. (1997) reported that the program provided peer support networks, collaborative learning environments, academic success workshops, and financial incentives. Historically, such skills developed from the program have been difficult for African-American students to acquire on their own. The authors stated, "Any conclusions are speculative in that it would be impossible to tease out any true cause and effect linkages or to make any definitive conclusion on the utility

of the program...the results do suggest that whatever the reason the program works; more African-American students are being retained, graduating and finding employment” (Lam et al., 1997, p. 65).

Parental and Familial Support

Transitioning to college from high school is a stressful period for many students (Lafreniere, Ledgerwood, & Docherty, 1997). Whether it is meeting new friends, finding classes, or just being away from family, many students still need support in college. More often than not, support comes from parents and other family members. These individuals often are called upon to provide encouragement and reassurance about college. According to several authors (Baker, McNeil, & Siryk, 1985; Baker & Siryk, 1984), the adjustments of college life can be categorized into four areas: “(1) *academic adjustment* to college-level educational requirements; (2) *institutional adjustment* or commitment to college pursuits, academic goals, and eventual career direction; (3) *personal-emotional adjustments* or the need to independently manage one’s own emotional and physical well-being; and (4) *social adjustment* to roommate, peer, faculty, and other interpersonal relationships” (Schwitzer et al., 1999, p. 189). These areas usually cause students to question their ability, lose their motivation, or just fail out. Hrabowski, et al., (1998) found that parents and other family members were instrumental in fostering enthusiasm and increasing efforts of students. This was especially true of minority students such as African-Americans (Hrabowski, 1991; Hrabowski, et al., 1998; Scott, 1995; Smith & Hausfaus, 1998; Taylor et al., 1995).

A growing body of literature indicated that parental and familial support has had advantageous effects on students’ academic performance (Hrabowski, 1991; Hrabowski et al., 1998; Lafreniere, et al., 1997; Sanders, 1998; Scott, 1995; Taylor, Hinton, & Wilson, 1995) and career development (Blustein, Walbridge, Friedlander, & Palladino, 1991; Fisher & Griggs, 1995; Fisher & Padmawidjaja, 1999; Middleton & Loughead, 1993; Young & Friesen, 1992) of students. Parental support was manifested in different ways – emotionally, socially, and financially. In an integrated framework, Middleton and Loughead (1993) identified the different ways as *positive involvement*, *non-involvement*, and *negative involvement*. An example of positive involvement was parents who were actively involved in their child’s educational development. Non-involvement illustrated

parents who took a “hands-off” approach to their child’s educational development. Such students often reported that their parents were not concerned about their futures. Negative involvement was an illustration of parents who made all the educational decisions and choices for their child. These parents were accused of trying to live their dreams through their child’s.

When examining the academic achievement of minority students in math and science, Smith and Hausfaus (1998) found that parents played a significant role in their children’s academic achievement. The authors further discovered that students did better in math and science when their parents were involved and supportive of their education. Parental support was closely linked with academic success of minorities in math and science. Likewise, Solorzano (1992) found that a college education was held in high regard for African-American families. When researchers controlled for socioeconomic status, they found that African-American families expected their children to attend college to a higher degree than Caucasian parents. Hrabowski (1991) found that parental involvement was a strong element in student success in his Meyerhoff Scholars Program at the University of Maryland Baltimore County, a million-dollar initiative designed to increase the number of African-American males who were successful in scientific disciplines.

Hrabowski, et al., (1998) presented interesting results from the Meyerhoff Program. The overall grade point average (GPA) of three different cohorts (N=69) of Meyerhoff Scholars was a 3.5, which was significantly higher than comparable-historical cohorts (mean=2.8). These Meyerhoff Scholars even out-performed prior cohort groups in specific science and math courses (means of 3.4 and 2.4, respectively). Although many of the components of the program (e.g., recruitment, bridge program, scholarship support, faculty involvement, etc.) were highlighted, family involvement was the component that distinguished this program from other retention initiatives around the country, especially in scientific fields. For this program, “parents are kept informed of student progress, invited to special counseling sessions as problems emerge, included in various special events, and have formed a mutual support resources, the Meyerhoff Family Association” (Hrabowski & Maton, 1995, p. 22).

Additional data from a comprehensive qualitative study of the Meyerhoff Program (Hrabowski et al., 1998), involving the students (N=60) and their parents (e.g., mother and/or father), revealed a number of factors contributing to the success of the African-American males in the Meyerhoff Program. These factors were “(1) the importance of reading, beginning with parents (especially mothers) who read to their sons at a young age, (2) the parents’ view that education is both necessary and valuable, (3) active encouragement on the part of parents toward academic success, (4) close interaction between the parents and their son’s teachers, (5) strong parental interest in homework, and (6) considerable verbal praise” (Hrabowski et al., 1998, p. 194). The authors also found that the students and their parents were virtually on the same page about critical parenting components, such as love, encouragement, discipline, and reassurance. Furthermore, the authors indicated that these parents did a great job of encouraging and instilling the importance of academic achievement.

Summary

This chapter has summarized the literature relevant to the topic: Black males in nontraditional fields, persistence in aviation, and the effects negative perceptions and/or stereotyping can have on the intellectual development of individual group members. The literature, mostly quantitative studies, attributed the low persistent rates of African Americans in math and science to poor retention programs and the lack of pre-college preparation. In his literature, Moore (2000) speculates that the stereotype-threat poses obstacles and plays a vital role in Black males’ ability to persist in math and science majors. Presented in this chapter was literature, with theories and frameworks, relevant to Black males and career development conducted over the past 20 years; literature relevant to occupational choice, including family, individual, and environmental factors; literature on persistence; and literature relevant to differences in African American and non-African American (e.g., Caribbean blacks) perceptions and attitudes relating to “stereotype threat”, and racism.

The current literature does not address the whole story. What is beyond the quantitative indices and how persistence operates in the lives of these Black males must be addressed through qualitative research.

CHAPTER 3

METHOD

Introduction

The purpose of this qualitative study was to examine the performance of a small group of Black males who persist in a College of Aeronautical Science. In addition to their ways of persisting, this study also contributed further to an understanding of (a) the process of nontraditional major choice, (b) this small group of Black males' experiences in the culture and climate of aviation education and (c) differences and similarities in perceptions among African American and Caribbean black males. It was believed that this research would become an example of how persistence can be investigated from the perspective of Black male students themselves.

In regards to qualitative research, many authors (e.g., Krueger, 1994; Mason, 1996) recommend that qualitative researchers carefully develop their research questions, so they would be able to generate meaningful and useful data. In other words, the research questions should be an integral part of qualitative research. Good research questions combined with a strong interview protocol would allow for highlighting the points that Black males identify as contributing to their success and persistence in aviation. Therefore, every attempt should be made to (a) better understand the institutional barriers that were perceived as having to overcome in order to persist as an aviation student and (b) pinpoint the factors that most influenced their decision to pursue a piloting career. Given the nature and complexity of this study, a qualitative research methodology seemed more aligned with the type of data that would render in-depth information (Mason, 1996; Miles & Huberman, 1984; Patton, 1980) reflective of Black males' experiences in the College of Aeronautical Science.

For this study, the qualitative research methodology employed focus groups and individual interviews. The objective of the interviews was to allow the participants to respond to the research questions "in their own words without preconceived notions imposed by the researcher" (Scott, 1995, p. 70). Using these two research methodologies strengthened the research design because they provided a different context for inquiry and discovery (Graham, 1997; Merton, Fiske, & Kendall, 1990) and the two combined allowed for triangulation of the data, which helped validate the study's findings

(Jorgensen, 1989; Mason, 1996; Miller & Fredericks, 1994; Patton, 1980, 1991; Silverman, 1985). In addition, the multiple research methodologies (e.g., focus group and individual interviews) helped to reduce bias, in turn allowing for a more complete picture of the researched phenomenon (Silverman, 1985). Although each of the qualitative research methodologies has its own particular approach to collecting and analyzing data, what they share is a common conceptualization of human behavior (Patton, 1991) and a strong history in student affairs research (Graham, 1997; Kuh & Andreas, 1991; Patton, 1990, 1991; Scott, 1995). Therefore, the two approaches are most advantageous for the study.

For this study, focus group interviews provided opportunities for Black males to share their stories and experiences through group interactions. Therefore, these focus group interviews were considered an excellent method for gathering information related to “persistence” and “aviation.” They seemed to work best when group participants were given opportunities to express their thoughts, feelings, and emotions in a non-disruptive way (Krueger, 1994, Mason, 1996). Data from focus group interviews provided insights that may not have been possible through other research methodologies like questionnaires and surveys (Krueger, 1994; Kuh & Andreas, 1991). Through this particular qualitative methodology, a natural atmosphere for sharing and disclosing was provided. More often than not, focus group interviews inherently encouraged dialogue and conversational exchange that often prompted participants to investigate their own attitudes, perceptions, and experiences on the given topic or subject area (Krueger, 1994; Morgan, 1998). It allows for probing deeper into the subject matter, which was not always possible through other structured methodologies, such as mail-out questionnaires and surveys (Krueger, 1994).

The primary purpose of the individual interviews was to obtain data that validated the person’s experience (Brenner, 1985). In many ways, the individual interviews were complementary to focus group interviews (Graham, 1997, Moore, 2000). These particular interviews generated in-depth analysis of each person’s own story (Graham, 1998, Moore, 2000). The objective was to get the person to disclose useful information from his own perspective, without collaboration from others. For this to happen, a rapport with the interviewee was established to obtain information related to the phenomenon (Graham,

1997, Moore, 2000). “For it is only when the researcher and the respondent have the possibility of communicating directly with each other that the subtleties of the mutual understanding between the two parties can be harnessed” (Brenner, Brown, & Canter, 1985, p. 3). Keeping this in mind, it is just as important that the researcher not “bias” or “taint” the interviewing process by guiding the interviewee to answer the questions in a particular manner. Instead, a framework of neutrality was created that does not impose one’s views or belief system on the person being interviewed (Brenner, 1985). This was easily achieved by allowing the interviewed person to tell his story in his own way, completely without any intrusions (McCracken, 1988).

Validity, reliability, and generalizability of findings have been identified as just as important to qualitative studies as to quantitative research. The three measures are primarily achieved through the objectivity and impartiality of the researcher (Scott, 1995). Therefore, the researcher should be sensitive to one’s own bias and prejudice (Jorgensen, 1989). As a way of countering personal bias, selective colleagues should be used to bounce ideas off of for the improvement and credibility of data analysis (Lincoln & Guba, 1985; Ross, 1995; Scott, 1995). Also, the following three points should be performed: (1) spend sufficient time with each participant to check for discrepancies, (2) explore each participant’s experience meticulously, and (3) utilize multiple forms of data (e.g., field notes, literature reviews, etc.) to explain the researched phenomena (Graham, 1997; Moore, 2000). Lincoln and Guba (1985) referred to the three points as (1) prolonged engagement, (2) persistent observation, and (3) triangulation. Aligned with this, Graham (1997, p. 83) wrote, “A program of cooperative research that utilizes more than one technique within the same research project compensates for the inherent weaknesses in both techniques and provides a means of triangulation.”

These two methods of data generation (e.g., individual and focus group interviews) should be strategically conducted, yet sensitive to the researched phenomenon (Mason, 1996). In other words, the primary objective of qualitative research is to plug gaps in knowledge by exploring, identifying, and examining the researched phenomenon. A qualitative approach provided the most appropriate framework for the study of this group of Black males’ performance and stories of persistence in aviation and best answered the following research questions:

1. What experiences have been influential in a small group of Black males' selection of aeronautical science as a major, piloting as a career?
2. What factors outside of and previous to the collegial environment contribute to (and detract from) persistence in pursuit of completion of a major in piloting?
3. What factors in the collegial and occupational environment contribute to persistence in a major in piloting?
4. How do patterns of persistence compare for these Black males at a college of aeronautical science?

Type of Research

Since Black males' experiences often go unheard, qualitative research was "best-suited to discover or investigate the inner person" (Ross, 1995, p.45). In other words, this particular methodology allowed the opinions, perspectives, and emotions of this group of Black males to be observed in the research, qualities which often do not emerge through quantitative research methodologies (Greenbaum, 1998; Kruegar, 1994; Mason, 1996; Patton, 1980; Rubin & Rubin, 1995). Qualitative data were generated in participants' own words, expressions, and phrases (Scott, 1995). According to Kuh and Andreas (1991; cited by Graham, 1997, p. 78), a qualitative research methodology shared the following three assumptions:

- (1) a holistic view which seeks to understand phenomena in their entirety in order to develop a complete understanding of a person, program, or situation,
- (2) an inductive approach in which the researcher does not impose much of an organizing structure or make assumptions about the interrelationships among the data prior to making the observations; and,
- (3) naturalistic inquiry, a discovery-oriented approach in the natural environment.

Campus Setting

The setting for this study was a large, predominately white institution located in Daytona Beach, Florida, the southeastern part of the United States. The University was founded 76 years ago by barnstormer John Paul Riddle and entrepreneur T. Higbee Embry as the Embry-Riddle School of Aviation, specializing in skilled aviators and mechanics. Historically, the original School's student composition was comprised of white males - women and people of color did not attend. The school remained dormant during most of the 1930s, mirroring the casualties of the Great Depression. However, by the end of the decade when World War II erupted in Europe, the demand for skilled aviators and mechanics grew significantly, thus Embry-Riddle began a second life. Allied nations reportedly sent thousands of fledgling airmen to Embry-Riddle to become pilots, mechanics, and aviation technicians.

In 1965, with the support of Daytona civic leaders, Embry-Riddle expanded its international outreach while strengthening its academic programs, which signaled the start of its odyssey to world-class status in aviation higher education. In 1970, Embry-Riddle became a university. The University currently offers more than 30 degree programs for students pursuing careers in aviation and aerospace, with nine offered at the master's level. Embry-Riddle Aeronautical University is reportedly the world's largest independent aeronautical university and boasts a student body of 22,000 - part-time, full-time, undergraduate and graduate students - who come from all 50 states and more than 100 nations. While the university's demographic composition is inconsistent with the country's demographic composition, it does mirror that of the aviation industry, that is, less than 1% of all pilots are Black. In general, the Caribbean blacks out number African Americans in the College of Aeronautical Science 2 to 1. Table 3.1 shows the total number of freshmen and Black male students enrolled in the College of Aeronautical Science for the academic year 2000-2001.

Table 3.1

| Total Freshmen 2000-2001 | African American | Caribbean Black | African |
|---------------------------------|-------------------------|------------------------|----------------|
| 1130 | 4 | 8 | 2 |

The College of Aeronautical Science tends to overshadow the other colleges with its cutting edge technological advancements and worldwide recognition and participation. As a result, the aeronautical science program receives a lot of interest from prospective students and employers, both nationally and internationally. Today, Embry-Riddle offers a full scale of extra curricular activities including basketball, tennis, golf, and women's volleyball. Additionally, several chapters of Black Greek organizations (fraternities and sororities) are forming, as well as the establishment of an on-campus chapter of the Society of Black Engineers. However, there are "no specific programs designed to recruit, retain or graduate underrepresented students".

Sample Selection

Persistence was defined in Chapter 1 as having completed a minimum of two full years of study in aeronautical science in good academic standing and persons who have already graduated from the aeronautical science program and are employed as pilots. Non-persistence was defined in Chapter 1 as withdrawal from the aviation program prior to completion due to grades, finances, or lack of interest. The population for this study was 15 Black males who were at the junior/senior level currently enrolled in the College of Aeronautical Science, persons who had completed the program and are currently employed as airline pilots, and persons who left the College of Aeronautical Science prior to completion.

Qualitative samples tend to be purposive, rather than random (Miles & Huberman, 1994). Participants were recruited through a purposive sampling frame, that is, participants were selected after aspects of the study were defined. Persisters were contacted either through an active listing from Embry-Riddle, referrals by members of the Tuskegee Airmen, Inc. [TAI], the Organization of Black Airline Pilots [OBAP], or by the referral of other participants. The "snowball sampling" technique (Bogdan & Biklen, 1992), was the most logical and efficient way to solicit participation from the non-persisters. The snowball sampling technique is considered an acceptable technique as long as a credible explanation of the researched phenomenon being studied is provided (Kaase & Harshbarger, 1993; Lincoln & Guba, 1985). Persisters were able to name and refer Black males (non-persisters) they knew who had left their aeronautical science program prior to completion. In some instances, they were able to offer reasons for the

non-persisters’ choice to leave the program or switch majors. These proposed reasons were often confirmed in actual interviews with the non-persisters. Participants were contacted through a personal email in the form of a letter (Appendix 1). The final participant group is shown in Table 3.2.

Table 3.2 - Sample of Final Participants

| | African American | Caribbean black | Totals |
|-----------------------------------|-------------------------|------------------------|---------------|
| Persisters | 2 | 4 | 6 |
| Current Student Persisters | 1 | 4 | 5 |
| Non-persisters | 4 | 0 | 4 |
| Totals | 7 | 8 | 15 |

Since the study focused on the phenomenon of persistence, a greater number of persisters were included in the final sample. The non-persisters provided a useful comparison and increased the range of reported experiences.

Procedures

Individual and small focus group interviews were the chosen methods of data collection. The focus of these techniques is on what the person experiences in a language that is as loyal to the lived experience as possible (Rudestam & Newton, 1992). Qualitative research utilizes the self as an instrument, and in-depth interviews and focus group interviews are two primary examples of the self as instrument. Miles & Huberman (1994) outline criteria of a good qualitative researcher-as-instrument method: (1) some familiarity with the phenomenon under study; (2) strong conceptual interests; (3) a multidisciplinary approach, as opposed to a narrow grounding or focus in a single discipline; and (4) good “investigative” skills, including the ability to draw people out and the ability to ward off premature closure.

The “hallmark of focus groups is the explicit use of group interaction to produce data and insights that would be less accessible without the interaction found in a group” (Morgan, 1998). One of the main advantages to the focus group methodology is the opportunity to observe a large amount of interaction on a topic in a limited period of time. Morgan (1998) emphasizes the use of focus groups to learn about participants’

experiences and perspectives. Small focus groups were designed and conducted utilizing texts by Morgan (1998), and Moore (2000).

Individual interviews provided a means for in-depth analysis of each participant's story. Moore (2000) provided guidelines for in-depth, confidential face-to-face interviews. Interviewing involved two distinct but complementary processes: (1) developing rapport, and (2) eliciting information (Spradley, 1979). Spradley (1979) refers to rapport as a "harmonious relationship between the interviewer and the participant/respondent. It means that a basic sense of trust has developed that allows for free flow of information" (p. 79). Developing rapport involves the following sequential process: Apprehension; Exploration; Cooperation; Participation. This process, involving probing and establishing a common effort, creates a natural atmosphere for sharing and disclosing.

As a way of countering personal bias, selective colleagues were used to bounce off ideas and for the improvement and credibility of data analysis (Lincoln & Guba, 1985; Ross, 1995; Scott, 1995). The following points, as recommended by Graham (1997) were also followed: (a) spend sufficient time with each participant to check for discrepancies, (b) explore each participant's experience meticulously, and (c) utilize multiple forms of data (e.g., field notes, literature reviews, etc.) to explain the researched phenomenon. Lincoln and Guba (1985) refer to the three points as (1) prolonged engagement, (2) persistent observation, and (3) triangulation.

Pilot Study

The first phase of data collection, one small focus group, was a pilot study with Black male persisters, who had primarily attended HBCUs. All participants in the pilot study were contacted via electronic mail and/or telephone (see Appendix 1). In an effort to maximize participation, the focus group was held at the conclusion of the East Coast Chapter, Tuskegee Airmen, Inc. (ECCTAI) monthly meeting. During the course of ECCTAI's monthly meeting, participants were reminded of the focus group taking place at the conclusion of the meeting. Each participant completed the consent form (see Appendix 2) prior to participation.

The purpose of the pilot study was to test the procedures, the interview guide, the equipment and the time needed to conduct such a session. Following the pilot study focus

group, participants were asked to provide feedback on the wording and content of questions. Collecting focus group data in the pilot study aided in revising the interview guide and in the clarification and exploration of issues surrounding the aviation community.

Data Collection

An interview guide with open-ended questions was used as the interviewing protocol (see Appendices 3 & 4). Data collection consisted of 1 focus group and 15 interviews, as shown in Table 3.3, conducted Fall, 2000, Spring, 2001 and Summer, 2001. The interview protocols allowed the participants to express their perceptions and opinions in their own words. The protocol also helped to minimize leading or directing participants to answer the question in a particular manner (Brenner, 1985; Schwitzer, Griffin, Ancis, & Thomas, 1999). Both interview protocols served as a reference sheet to ensure all relevant topics and questions were covered (Patton, 1987).

Focus Group Interviews

The focus groups ranged from 2.5 to 3.0 hours. A total of 2 small focus group interviews, including the pilot study, were conducted. The setting of the small focus group interview was a conference room in the student center at Embry-Riddle during the evening hours. After completing a consent form, the session began with an icebreaker activity which allowed each participant to make an individual statement about himself. The interviewing protocol with open-ended questions was then used to gather data. The interview was audiotaped and transcribed verbatim. Field notes, in the form of a journal, described participants' reactions and views, as well as the research process itself, were kept by the researcher. Careful attention was paid to the nonverbal aspects of the interaction, for example, turn-taking, eye contact, and pauses in interaction (Morgan, 1998). The use of a diary or journal to record impressions, reactions, and other significant events that may occur during the data collection phase of research can be a useful source of information (Rudestam & Newton, 1992). Three days after the focus group interview, each participant was contacted via telephone or email for a brief thank-you and given the opportunity to express any other thoughts that may have occurred following the focus group (see Appendix 5).

Table 3.3 - Interview Schedule

| Date | Method | Location | Participant(s) |
|--------------|------------------------|-------------------|-----------------------|
| Fall, 2000 | Interview (persist) | San Antonio, TX | African American |
| Fall, 2000 | Interview (persist) | San Antonio, TX | Caribbean black |
| Fall, 2000 | Interview (persist) | San Antonio, TX | Caribbean black |
| Fall, 2000 | Interview (nonpersist) | San Antonio, TX | African American |
| Fall, 2000 | Interview (nonpersist) | San Antonio, TX | African American |
| Spring, 2001 | Focus Group (persist) | Daytona Beach, FL | Black males |
| Spring, 2001 | Interview (persist) | Daytona Beach, FL | Caribbean black |
| Spring, 2001 | Interview (persist) | Daytona Beach, FL | African American |
| Spring, 2001 | Interview (persist) | Daytona Beach, FL | Caribbean black |
| Spring, 2001 | Interview (persist) | Daytona Beach, FL | Caribbean black |
| Spring, 2001 | Interview (persist) | Daytona Beach, FL | Caribbean black |
| Summer, 2001 | Interview (persist) | Memphis, TN | Caribbean black |
| Summer, 2001 | Interview (persist) | Memphis, TN | Caribbean black |
| Summer, 2001 | Interview (nonpersist) | Memphis, TN | African American |
| Summer, 2001 | Interview (nonpersist) | Memphis, TN | African American |
| Summer, 2001 | Interview (persist) | Memphis, TN | Caribbean black |

Note: Interviews conducted at Daytona Beach, FL consisted of students at the junior/senior levels.

Individual Interviews

The setting of the in-depth interviews (Fall, 2000 & Summer, 2001), was in a hotel meeting room, at various hours convenient to the participants, during the Tuskegee Airmen/Organization of Black Airline Pilots Annual Conferences in San Antonio, Texas and Memphis, Tennessee, respectively. The setting for the in-depth interviews held in the Spring, 2001 was a conference room in the student center at Embry-Riddle during the morning hours. The individual interviews ranged from 30 minutes to 1 hour. The interview guide was basically a semi-structured interview protocol with open-ended questions designed and intended to establish a conversation with the participants. A consent form and biographical questionnaire (see Appendix 6) was distributed prior to the interview.

The researcher operated the tape recorder and a secretarial service transcribed all tapes verbatim. Immediately following the interview, the researcher made field notes and recorded impressions. Spradley (1979) recommended the journal contain a record of experiences, ideas, fears, mistakes, confusions, breakthroughs, and problems that arise during the data collection process. "Making an introspective record of field work enables a person to take into account personal biases and feelings, to understand their influence on the research (Spradley, 1979, p. 76).

Each individual interview began reviewing a few of the biographical questions, which allowed the researcher to ascertain the simple descriptive details of the participant's life, that is, geographical origin, birth order and siblings, parental educational levels and household income. The "first objective of the qualitative interview is to allow respondents to tell their own story in their own terms" (McCracken, 1988, pp. 34-35). The primary goal of the interview protocol was to develop a theory of persistence through the use of open-ended questions, thus allowing the participants the flexibility to frame and structure their responses. A fundamental component of qualitative research is that the phenomenon under study must unfold through the participants eyes (Marshall & Rossman, 1989). Three days after the individual interview, each participant was contacted via telephone or email for a brief thank-you and given the opportunity to express any other thoughts that may have occurred following the interview.

Data Analysis

As an aid to data analysis, Brown & Gilligan (1992) suggest techniques of listening to the voices of participants and becoming immersed in the data. It is crucial to have understood the dynamics of each particular case before proceeding to cross-case explanations (Miles & Huberman, 1994). "To be sensitive to and work with the particular nuances, climate and atmosphere of the setting," Brown & Gilligan developed a method of data analysis they termed a "Listener's Guide." Their Listener's Guide, "attends to realities of race, class, and gender – who is speaking in what body, telling what story from whose perspective, and in what societal and cultural frameworks" (Brown & Gilligan, 1992, p.29). "Listening joins conversations with listening to audiotapes and reading over interview transcripts" (Brown & Gilligan, 1992, p. 25).

Guided by their voice-sensitive methods, they listened to a person’s story at least four times, each “listening” attending to a different focus as follows:

Table 3.4 - Listener’s Guide for Interview Transcripts
(Brown & Gilligan, 1992)

| Listening | Goal of the Listening |
|-----------------------------------|--|
| First Listening | To get a sense of what was happening, to follow the unfolding of events, to listen to the drama (the who, what, when, where, and why of the narrative) |
| Second Listening | To listen for “self” – the voice of “I” – and responding to the text both emotionally and intellectually |
| Third and Fourth Listeners | To attend to the ways people talk about relationships, especially institutionalized restraints and cultural norms and values |

Initial analysis of the interview transcripts utilized this technique. The matrix in Appendix 7 was used to keep track of all listenings.

Following the listenings of interview transcripts, a basic qualitative analysis process, as outlined by Miles & Huberman (1994) was followed. Steps including:

- affixing one to several word codes to the interview transcripts in the left-hand margins;
- noting reflections and other remarks in the right-hand margins;
- sorting and sifting through the materials to identify similar phrases, relationships between variables, patterns, themes and common sequences;
- elaborating on a small set of generalizations that cover the consistencies discerned in the database; and
- confronting these generalizations with a formalized body of knowledge in the form of constructs or theories.

Since qualitative analysis implies that the data are in the form of words as opposed to numbers, this process facilitated the reduction and interpretation of data into themes or categories.

Coding is analysis; the goal of coding is to review a set of notes, transcribed or synthesized, and to dissect them meaningfully, while keeping the relationships between the parts intact (Miles & Huberman, 1994). Followed by each interview, the researcher,

along with selected colleagues from the qualitative analysis coding class at Virginia Tech, discussed recommendations on findings, interpretations, and codings. The class meets weekly and focuses on coding qualitative data and receiving immediate feedback from the instructor, Dr. M. G. Cline. Additionally, data interpretations were reviewed regularly by Dr. Albert Wiswell, advisor and committee chair.

The researcher relied heavily on the transcripts for analyzing the data. This process was referred to as *transcript-based analysis* (Morgan, 1998). All interviews were coded and analyzed utilizing the grounded theory approach. *Grounded theory* (Glaser & Strauss, 1967; Mason, 1996; Scott, 1995) refers to collecting and analyzing data simultaneously for the purpose of developing theoretical and thematic explanation. This process involved the following steps: “(1) comparing the data applicable to each conceptual category; (2) integrating the categories and their properties; (3) delimiting the emergent theory; and (4) writing up the theory” (Jorgensen, 1989, p. 113). Field notes and information from the biographical questionnaire were also included in the analysis.

Strauss (1987) and Lincoln and Guba (1985) suggest that coding and recoding are over when the analysis itself appears to have run its course, that is, when all of the incidents can be readily classified, categories are “saturated,” and sufficient numbers of “regularities” emerge. The process of coding the data and identifying recurring themes continued throughout the study until saturation and redundancy occurred (Scott, 1995). Saturation and redundancy suggested that generated data were not producing new information.

Trustworthiness of Study

In qualitative research, it should be assured that all responses are accurately reported and represented (Scott, 1995), and multiple sources should be used to triangulate the data to increase the study’s credibility (Miles & Huberman, 1994). For this study, multiple sources, such as literature reviews, interviews, biographical questionnaires (descriptive surveys), field notes, and telephone follow-up statements, were used to address triangulation and credibility issues.

Wolcott (1990) presented nine points to satisfy the validity (correctness or credibility) question of qualitative studies:

- (1) Talk a little, listen a lot – A sociable “sit and visit” situation should exist where the subject feels comfortable discussing topics with the researcher. The researcher must be attentive and responsive without talking too much and hearing too little.
- (2) Record accurately – The researcher should make every attempt to record precise words of the participants. Words should be recorded as soon as possible to prevent the reinterpreting of behavior before it has been recorded.
- (3) Begin writing early – The intent of writing early is to record what one suspects and to identify holes in the information.
- (4) Let readers “see” for themselves – It is a good idea to include primary data in the final report. This allows the researcher to let the expressed thoughts of others become a point of focus rather than focus only upon what the researcher observed and interpreted.
- (5) Report fully – Every discrepant detail is not reported; however, if an issue is not fully resolved the inclusion of such discrepancies may lead to possible interpretations every bit as valid as the researcher’s.
- (6) Be candid – Subjectivity is seen as a strength of qualitative approaches.
- (7) Seek feedback – Having a continual source of feedback checks for accuracy and completeness. Feedback also provides a reality check where the reporting or the interpretation of the event needs to be more developed or is overblown and needs to be brought back to reality.
- (8) Try to achieve balance – Achieving a balance between events that occurred or statements made is warranted in order to avoid a disproportionate amount of attention being given to outlying, yet more provocative, data.
- (9) Write accurately – This process checks for coherence and internal consistency as well as for style and grammar. (pp. 128-134)

Wolcott’s nine points aided in the strive for a valid study and valid reporting of the results.

Summary

One of several advantages to using the qualitative approach is that it provides a holistic and developmental view of the participants’ experiences, that is, the interaction of individual, educational, environmental and social conditions occurring

from early childhood through the present time. Participants were asked to recollect most of their experiences, and for the most part, they were able to do so. Another advantage of the qualitative approach was the opportunity to allow the participants to be spontaneous and flexible with the interview guides. This flexibility proved to be valuable by enabling the exploration of each participant's unique experiences through additional probing questions relating to specific events. A third point is the advantage and importance of good counseling and interviewing skills in facilitation of the data collection and analysis process. The ability to be sensitive, responsive, and empathetic was crucial. Likewise, the simultaneous use of listening, questioning, probing, and summarizing facilitated the process of analysis and interpretation. A final advantage was the wealth of information obtained through this qualitative process.

Qualitative research requires an enormous amount of time and effort to coordinate many overlapping and ongoing aspects of the process. The logistics of scheduling out of town interviews, focus groups, and having proper equipment on hand proved to be very challenging. While the process of qualitative data collection proved to be somewhat overwhelming, this approach provided the most appropriate framework for an in-depth study of this phenomenon. Through individual interviews and focus group discussions, the meanings participants gave to their experiences as Black males in the College of Aeronautical Science contributed to a more in-depth understanding of the reasons these former and current aviation students left or remained in their aviation majors.