

CHAPTER IV

RESULTS OF STUDY

This chapter highlights central themes that emerged from the data. It includes (1) an overall thematic analysis of the study, (2) a summary of the biographical questionnaires for each sample group, and (3) a brief thematic summary for each sample group. As highlighted in Table 3, a variety of sources was used to collect data. These sources were used as the basis for triangulating the data and developing thematic analyses. As a way of highlighting these themes, quotes are used to illustrate the findings.

OVERVIEW OF DATA ANALYSIS

As mentioned in Chapter III, all of the focus groups and individual interviews were audio taped, transcribed verbatim, coded, and analyzed utilizing the grounded theory approach. The researcher and selected colleagues analyzed all of the data in tandem throughout the study, and they discussed and reviewed the field notes, biographical questionnaires, and note cards. Any data that emerged became the basis of the preliminary analysis. Field notes from individual interviews were included with the preliminary findings from the focus groups. This procedure of data analysis began to formulate a picture of the different sample groups and answer some of the research questions.

After completing all of the focus groups and individual interviews, transcripts, field notes, summaries of the biographical questionnaires, and any other information from the follow-up telephone calls and/or emails were given to the selected colleagues. This information was bound in three inch notebooks and divided into five sections, according to the different sample groups: *Ultimate-Persistent Group*, *Exemplary-Persistent Group*, *Satisfactory-Persistent Group*, *Unsatisfactory-Persistent Group*, and *Non-Persistent-Group*. The selected colleagues were

instructed to look for patterns in the data and asked to code the data so patterns could easily be identified.

During the process of analyzing, these individuals went more in depth than they did with the preliminary analysis. The data were coded using the transcripts, field notes, summaries of the biographical questionnaires, and any other information from the follow-up telephone calls and/or emails. The individuals involved in this process initially coded the data independently and then met collectively to discuss the patterns in the data and to present how they coded the data patterns in their notebooks. Items were identified that the researcher had overlooked or vice versa. In such cases, they discussed “how” and/or “why” this information should or should not be weighed in the analysis. This entire process allowed the data to be constantly compared and organized as recommended by the grounded theory approach (Glaser & Strauss, 1967; Graham, 1997; Scott, 1995). Many codes and themes were expanded, refined, edited, and/or corrected as a result of the meeting.

ARRANGEMENT OF FINDINGS

The findings were presented in three parts: (1) the emerging themes for the entire study, (2) a summary of the biographical questionnaires, and (3) a brief thematic summary for each of the sample groups. Quotes from the transcripts and field notes were used to present the themes. A special code was also utilized to identify members of the different sample groups. Members of the *Ultimate-Persistent Group* (n=10) were identified as *UPG*. In addition, codes 50 – 59 referred to the members’ numbers used to differentiate the participants in the group. Members of the *Exemplary-Persistent Group* (n=10) were identified as *EPG*, and codes 10 – 19 were assigned to different participants in the group. The *Satisfactory-Persistent Group* (n=7) was referred as *SPG* and was assigned codes 20 – 26. The *Unsatisfactory-Persistent Group* (n=7)

was referred as *USPG* and was assigned codes 40 – 46. Members of the *Non-Persistent-Group* (n=8) were identified as *NPG*, and these members were assigned codes 30 – 37. *NPG30* was an example of the coding scheme. When the participant could not be identified in the focus groups, the first initials of the sample group (e.g., UPG, EPG, SPG, USPG, and NPG) were used.

REVIEW OF SAMPLE GROUPS

A total of 42 people participated in this study. Again, the participants were divided into five sample groups: *Ultimate-Persistent Group* (ten participants), *Exemplary-Persistent Group* (ten participants), *Satisfactory-Persistent Group* (seven participants), *Unsatisfactory-Persistent Group* (seven participants), and *Non-Persistent Group* (eight participants). The data were allowed to emerge in an inductive manner similar to Graham's (1997) study. In many ways, this can be attributed to how the focus group and individual interview protocols were designed. More importantly, the multiple sources allowed profiles to be developed and themes identified for the different sample groups. Note that terms like "participants" and "respondents" were used interchangeably throughout this chapter.

An Overall Thematic Analysis of the Study

After analyzing all the data from the focus groups, individual interviews, and field notes, the following themes emerged and were identified: (1) social environment within the College of Engineering, (2) factors that impact decision to major in engineering, (3) childhood environment, (4) factors of persistence, (5) factors for success, and (6) personal characteristics. Within these themes, the researcher also identified sub-themes. All themes and sub-themes are presented in Table 4. Quotes were used to present the themes and sub-themes in this section.

Table 4

The Emerging Themes and Sub-themes for the Study

Themes	Sub-Themes
Social Environment Within College of Engineering	(1) Social Isolation, (2) Power Over Gender Privilege, (3) Stereotype Threat, (4) White Peer Degradation, (5) Internal Search for Identity, (6) Lack of Opportunity to Develop Psychosocial Identity, (7) Lack of Role Models/Mentors, and (8) Challenging/Frustrating/Fun/Rewarding
Factors that Impact Decision to Major in Engineering	(1) Special Programs, (2) Family (Father), (3) Math/Science Aptitudes, (4) Interests, and (5) Schools
Childhood Environment	(1) Legos, (2) Home Highly Structured Towards Success, and (3) Lack of Role Models/Mentors
Factors of Persistence	(1) “Prove Them Wrong” Attitude, (2) Family (Mother), (3) Role Models for Siblings, (4) Faith, and (5) Jobs
Factors for Success	(1) Engaging Professors, (2) Peer Networking, (3) Knowing the System, and (4) Crossing Racial Barriers
Personal Characteristics	(1) “I represent...”, (2) Introverts vs. Extroverts, and (3) Lack of Social Versatility

Social Environment Within the College of Engineering

While many of the African-American males in this study were able to persist through engineering, some were unable or just decided not to persist. African-American males in the College of Engineering were often perceived as not having the potential to persist in engineering majors. Regardless of their individual situations, what they had in common was the constant pressure of feeling like they had to prove themselves in the College of Engineering. Inadvertently, they worked harder to prove both to their white engineering classmates and professors that they belonged in engineering and at Virginia Tech.

For some, their motivation was to dispel the stereotype of black intellectual inferiority. Claude Steele (1999) termed such behavior of motivation as the “stereotype threat.” The author defined the term as “the threat of being viewed through the lens of a negative stereotype, or the fear of doing something that would inadvertently confirm that stereotype” (p. 46). The effects of the stereotype threat influenced all aspects of the lives of African-American male engineering students. More specifically, it often impacted their grades and confidence in a negative way. Some even became so discouraged, dissatisfied, and disengaged with the College of Engineering that they decided to transfer to non-engineering majors. However, those who did persist consciously sustained and/or developed positive attitudes, relationships, and academic strategies, which empowered them to persevere in spite of the challenges.

Most of the African-American males experienced challenges in the College of Engineering directly or indirectly related to social isolation, stereotype threats, white peer degradation, and lack of role models/mentors. These challenges also influenced various areas of these African-American males’ lives, which caused some to search internally for their identity. The challenges also made it difficult to develop psychosocial identity because of the necessity to put all their concentration and energy in engineering coursework, assignments, and projects.

The nature of engineering is inherently difficult for most students, regardless of their race and/or gender. The workload and the other added pressures were extremely strenuous and tiresome. However, the rewards at the end out weighed the challenges and made it worth enduring. Among these African-American males, they recognized that there was a certain degree of privilege associated with being a man. They acknowledged that women in general, and African-American women in particular, had even more obstacles stacked against them than African-American male engineering students. Throughout the data, the sub-themes below were

found to be linked with this theme. Example statements were presented to illustrate the relationship between the theme and sub-themes in *italics*:

Social Isolation

The biggest problem I have with Blacksburg is the fact that there is no [cultural] foundation, not only for African-American students but Indian students, Chinese students, [or] whatever students it may be. There is no [cultural] foundation outside of Virginia Tech... You're so limited that it makes you not want to be here sometimes... [EPG *from the focus group*]

While there is stuff to do, it's not particularly focused as to what African-American males like to do... the culture is not focused towards minority. [EPG11]

Virginia Tech has all the culture in the world if you're white and blue eyed. But, if you're black, there's nothing for you to do. [SPG *from focus group*]

I'm not very socially active, I guess. I go to some of the functions for African people even though sometimes it's like, "how many times can I do the same thing with the sample?" [SPG26]

Power Over Gender Privilege

The females have a harder time because predominantly engineering is a male degree and the professors are men... [EPG *from focus group*]

For some of my professors, I think it would be gender more than skin. [EPG10]

Some professors have a whole wall of prejudices if a woman came through the door and asked a question as opposed to a male. [EPG *from focus group*]

I going to say it is a positive [thing to be a man]... I mean it's predominately male in the first place... so males already feel comfortable with it. [SPG *from focus group*]

We [African-American males] don't have the worse of it though. Think about being "black" and being a "female" in the College of Engineering. I really look up to them... the black women that are in the College of Engineering and doing well... If you do get down, I think you should reflect on black females in the College, like "they can do it, I know I can do it"... [SPG *from focus group*]

I think black females in engineering had it worst. My wife was a Chemical Engineering major and hated every year of Tech. [UPG54]

Stereotype Threat

You have to deal with stereotypes... you push harder – a feeling that you have to perform better than anybody else. [EPG *from focus group*]

Like I said, I feel like that I should know this stuff and if I ask this question, I am the only one that doesn't know this stuff, that maybe I should already know... [NPG *from focus group*]

White Peer Degradation

I guess outside of EF... you're in a classroom of at least a hundred people... it's a lot easier for you to be a number and be evaluated basically on numbers and not identities. There's no group work so you don't have to deal with the "BS" of having groups of [white] students who don't want to be in your group... [EPG *from focus group*]

I remember one time in class I was sitting there in calculus and the teacher was like, "We're going to try to get into groups of four to do this project," and everyone around me turned their backs to form their groups. [EPG14]

They [white students] have an advantage because they have tendencies to help each other. If you're black, it's hard for you to get into that [study] group with them. [SPG *from focus group*]

I was doing a group project last year with three other Caucasians, and I felt I was doing my fair share of the work; in fact, I know I was... It was a student evaluated-type thing, and they said I did a poor job, and he [the professor] trusted them. I asked the whole time "how am I doing?" They [the group] said fine, so I got the feeling that everything was fine. We get the highest grade in class, but they graded me as poor, so I got an "F." [SPG26]

Internal Search for Identity

Like it makes you really ask yourself, "do you really want to be doing this, especially trying to figure out difficult problems?" [EPG *from focus group*]

When I think of soul searching, I think of the experiences of people you meet that help -- that direct how you interact with other people, and that helps basically your self-esteem and how you feel about yourself and not focusing on oneself like in the College of Engineering. [EPG *from focus group*]

You keep asking yourself, "Do you have it in you?" "Is it worth it?" You ask yourself, "Is it worth it?" "Is it worth it?" "Can I deal with it?" You know... the internal struggle. [EPG *from focus group*]

Lack of Opportunity to Develop Psychosocial Identity

I don't get a chance to get out and do what I would like to do because [the] College of Engineering is so time consuming. [When] you're an engineer, you always [have to] put work first. [EPG *from focus group*]

Once I go out and get a job and all, you have time to do other things, but while I'm here my focus is to get good grades... I want it a lot so I'll be effective once I get out in the workplace. [EPG17]

I'm just always, always doing work. [EPG13]

Lack of Role Models/Mentors

I know that I haven't had anyone before me that has gone through engineering in my family or someone that I can personally relate to, so I feel like in order for me to feel confident about myself and, at the same time, have the people reviewing my performance feel confident about me...I have to reassure myself so that I can do well. [EPG from focus group]

If we as black males could be around other African-American [who] have excelled and succeeded, it would be easier on us... I have never had a black professor for any engineering class and even the only time I saw anyone [was at] a NSBE meeting, where they had some professors come talk. We're like "we've never seen these people before"... they aren't really the role models, where you see people aspire to stuff and you feel like you can do it too. [EPG14]

Challenging! It takes a lot of effort [to overcome] a lot of obstacles. You don't have very many role models... you don't have many people to look up to, or to go by. [EPG16]

Challenging/Frustrating/Fun/Rewarding

The ultimate bliss is you getting that hard problem done. Oh yeah! [EPG from focus group]

I would say the joy of succeeding in school because, although the homework may be hard, the best feeling is once you get the homework done and other people can't do it and other people asking for help that makes me feel good about myself. [EPG10]

It's like I enjoy this stuff: I enjoy working on homework, I enjoy solving problems, [and] I enjoy doing projects... If you enjoy what you do, then it's not work. [EPG17]

What words – Struggle and challenging. It also has its rewards. [EPG12]

Being at Tech taught me how to deal with most every personality type I have ever come across... that has helped me in the workplace. People cannot upset me, and I know how to get through to them. [UPG58]

Factors that Impact Decision to Major in Engineering

All of the African-American males were asked to identify their reasons for selecting engineering as a major. Although they reflected different basic demographic differences and experiences, the five *italic* sub-themes were found most instrumental in influencing these African-American males' decisions to pursue engineering as a major and career choice. Many of the identified influences were consistent with the research literature (Hrabowski et al., 1998; Graham, 1997). More specifically, the vast majority of the African-American males mentioned the influencing of participating in special pre-college initiatives such as the Young Astronauts, PCI, CHROME, RAPME and SHARP. Some even identified their fathers as impacting their decision to pursue engineering. In general, fathers were mentioned more often than any other family member, including mothers. These African-American males frequently commented how their fathers took active roles in helping them develop their math and science problem-solving skills. The fathers were regarded as credible sources of inspiration. In many cases, they served as role models, at least during the early childhood years, because they had engineering occupations or jobs that functioned as engineers.

Some of the African-American males, from elementary school to high school, were clearly gifted in math and science. High aptitudes in these subject areas made engineering a logical choice of major. In other words, many of these participants found their niches in math and science. Some even commented that they concentrated and excelled in math and science because they hated classes that involved a lot of reading and writing such as English. Such dislikes, again, made engineering a logical choice of major.

Perhaps as important as special programs and high aptitudes in math and science, it was discovered that interest and schools played a major role in influencing these African-American

males to pursue engineering. Some commented that they knew that they wanted to be an engineer, at an early age, because they were fascinated with automobiles, highways, and just simply taking things apart and putting them back together. As a result of their genuine interest, it was mentioned that they came into the College of Engineering with the attitude they were going to accomplish their lifelong dream – becoming an engineer. Their interest, in many ways, became the catalyst to do well in engineering.

Schools were also identified as being a major contributor in making their decision to pursue engineering. Various components of schools were identified such as teachers, advanced curricula, technical courses, and schools specializing in math and science. These different entities that make-up schools around the country were beneficial to many of these African-American males in the study. Some commented that their math and science teachers nurtured their problem-solving skill development and encouraged them to pursue something in these areas. Taking courses in drafting and technology were also mentioned as helping confirm or develop their interest in engineering. In addition, many talked frequently about the benefits of attending special schools such as Governor’s Schools that specialize in math and science. These special schools were regarded as both helpful in making their decisions to pursue engineering; they also attributed some of their success in the College of Engineering to these earlier educational experiences. An open-ended question in this study pertaining to factors that contributed to African-American males’ decision to major in engineering evoked many responses. Sample statements indicated that the sub-themes below contributed to these African-American males’ decision to major in engineering:

Special Programs

In like fourth and fifth grade, I was involved in the Young Astronauts program, where we met these astronauts, and they were aerospace engineers... so I was like

“oh, I want to be an aerospace engineer,” and since then engineering has been on my mind. [EPG17]

I did go to some of the PCI programs that they had here, and they helped too. They kind of gave you an inside view of engineering. [EPG16]

When I was in high school, I was selected to participate in a program. It was an internship or apprenticeship back with NASA... it was called the SHARP program... it taught me the basics of UNIX programming language. Also, I was a member of CHROME in Hampton Roads. [NPG35]

I think it was a program I had did here with Dr. X. It was about Industrial Engineering, where we had to make the little trucks out of wax. I still have my program, the computer codes, the diagrams... back then that made me think “I can do this, I can do Industrial Engineering, I can do engineering, I’m going to go to school and be an engineer.” After that program, it made me clinch it that I was going to Tech and be an engineer. [NPG30]

I was introduced to engineering when I was in the eighth grade through an engineering program. This is when I determined I was going to be an engineer. [USPG41]

Family (Father)

He [his father] was in the Air Force, and he was an engineering technician. So math and science, he was really into it, I think he wanted me to be an engineer... I think that kind of had an effect on me. [EPG17]

My dad more so than my mom... He started always to push all of my brothers and sisters... He was always pushing us do the best. [EPG12]

I was talking to my dad about robotics and electronics... he told me how you could get a degree [in engineering]. [SPG21]

... him [my father] not having an engineering degree but the type of job he does is basically engineering-type of work... He is a real creative person. He is a big influence in my life. [NPG35]

Math/Science Aptitudes

I was sectioned off in the high math classes and that’s when I began to know...so, those classes let me know “hey this might be a good area to study in.” [EPG19]

I’ve never had a great interest in math, but it was just something I was able to do with ease... [NPG30]

Interests

I've been interested in [engineering] ever since I was a little kid. I've always wanted to do something with highways or roads, or bridges. [EPG11]

My love for automobiles... My love for taking things apart... I took apart so many things as a kid. Then, we take a lot of road trips and see a lot of different model cars... I have kept that focus. [EPG12]

Schools

I would probably have to name my fifth grade teacher who really got me interested in math. I thought that, if engineering had a lot to do with math, I was going to major in engineering. [EPG10]

... as I was taking the technical drawing class in high school, I was like "yeah, I like this" and that confirmed my decision. [EPG11]

I've always been pretty good at math, but I guess it was when I was in high school when we had the engineering classes that I took for a semester... I liked [them] so I stay with it. [EPG16]

Childhood Environment

To gain a better understanding of academic persistence for these African-American males, it was postulated that one had to learn how they interpreted their childhood environment and how it contributed to their persistence in the College of Engineering. Through such interpretations, one could begin to understand the influence that childhood environment had on academic persistence for this population. The participants' childhood environment had a profound impact on their persistence in the College of Engineering. The childhood environment, in many ways, was the crux of their academic foundation and stirred the beginnings of their interests in engineering.

Not only was it an atmosphere of love and high expectations, but it was also an informal educational lab – a place where these African-American males were exposed to educational games and toys in the homes of their parents. The vast majority of these participants indicated that their parents highly valued and encouraged education. It was seen as a necessity for

happiness and financial security. In addition, the participants indicated that parents tried to supplement their formal education with meaningful experiences and activities.

During early childhood, these African-American males were exposed to various kinds of educational materials and toys. These learning resources ranged from Legos, books, flashcards (math and spelling), computers and educational software, and various kinds of board games. All were regarded as helpful in developing logical reasoning, creativeness, and basic problem-solving skills. These skills were considered critical for engineering majors. In addition to the educational toys and games, participants continuously mentioned the importance of growing up in a supportive and loving home. Many commented that they grew-up in structured homes of high expectations, which groomed them for academic success. Such homes were found to be consistent with both two parent and single parent homes. On contrary, many of the African-American males commented about the shortage of engineering role models and mentors.

More specifically, they commented that there were few African-American male students with close family members who were engineers. Many of them never had the experience of interacting with engineers and gaining a sense of what it entailed. As a way of compensating these limitations, parents had to fulfill these roles, even when they were not trained engineers. Sample statements were presented to illustrate the identified sub-themes of this section:

Legos

Lots of math things, I don't remember the names of the programs, but I do remember a lot of math programs [and] lots of spelling programs. [EPG10]

They [his parents] started when I was young, and my dad would take me around teaching me shapes around the house... My mom would read to me See Dick and Jane Run at a very young age and teaching me to read as I got older. [EPG17]

I played Scrabble...that was always a brainteaser. [EPG15]

Instead of buying me Chutes and Ladders or Uno, she [my mother] bought me Trivial Pursuit... she bought me math books instead of regular literature. [EPG18]

Maybe, it just geared me toward just basic problem solving and trying to look at a whole picture... in terms of basic, logical reasoning... [USPG46]

There's always more than one way to solve something and Lego teaches you to adhere to the instructions or else it's not going to come out right. Even when you reach your final goal, there's more than one way to get there. [EPG18]

What helped me the most was when I was learning math, my dad always had me doing math so I got flashcards... He had me doing long division, four numbers and all that stuff. [SPG21]

We've always had a computer in the house... we had the old Apples. [USPG45]

Home Highly Structured Towards Success

When I was in elementary or middle school, my parents would help me with homework all of the time. [EPG10]

Well, they [parents] put down a good foundation, where I could start out. Encouraging you to read, encouraging you to do your homework, [and] encouraging you to play those little games and stuff. [EPG11]

They [my family] believe strongly in pursuing an education. My mother continued over a number of years taking classes here and there until she received her teaching degree... my father is taking courses and I think that he has an Associate's degree... the basics are this... when you turn eighteen you better go to school or military, but you got to get out of the house. [UPG58]

Lack of Role Models/Mentors

That's when I got the inside look [at engineering], people from my neighborhood didn't get to see. They didn't get a chance to see engineers in suits and to see how they live, how freelanced, and un-stressful their life could be working in this environment. [EPG19]

A lot of times in the classroom I feel I have to prove myself. It may be based on the fact that I can't draw from experience on how we're supposed to act in the college environment. I can't really call my mom and say, "how do I ask this question?" It's sort of a behavior that some people been able to model or, when I say some people, I mean white people have been able to model throughout their history. Just take a look at mom and dad how they ask a question, how they carry on a conversation, how they move their hands when they talk... [EPG19]

My family did not have the previous experience to fall back on in order to pass on this knowledge to me. Therefore, I had to learn it the hard way, which means later rather than sooner. [UPG57]

Factors of Persistence

Through research, Bandura (1977) found that “self-efficacy” was an important determinant of motivation. Self-efficacy was defined as the overall confidence one has in his or her ability to accomplish a certain task or assignment. Many of the African-American males in this study were able to persist through the challenges in the College of Engineering because they were confident they could obtain their engineering degrees. Though it may have required working twice as hard, reducing other extra-curricular activities, and/or extending their stay in school, they still felt that an engineering degree was attainable. Many of the persistent participants made comments such as “failure was not an option” and “I am here for the long haul.” These comments suggested that they were not leaving Virginia Tech without their engineering degree.

The persistent participants had a “prove them wrong” attitude. The premise of this attitude was to prove to white students and professors that they were not only capable of obtaining an engineering degree at Virginia Tech, but they were going to get a degree in their chosen engineering discipline. The participants in this study consistently alluded to this sub-theme throughout the data. The other sub-themes were role models for siblings, family (mother), faith, and jobs. These sub-themes were all factors of persistence for the persistent African-American males. For example, many of the participants commented that their motivation for persisting was to be a role model for their younger siblings. This was especially true for first generation college students.

In regards to support, most of the participants commented that they relied heavily on their mothers for encouragement and guidance. On the contrary, this was not the case when choosing engineering as a major. The participants, in this case, relied more on their fathers in choosing engineering as a major. The vast majority them commented that they often communicated with their mothers, either via email, telephone, or mail. Faith was another factor that helped them persist through engineering. Some commented on how prayer helped them get through tough times (e.g., examinations, courses, etc.). Last but not least, obtaining a high-paying job served as the ultimate motivation to persist through engineering. Many of them commented that they wanted to get a good job in their field, so they would be able to provide financial support to their family, and/or have job security for themselves. It was clear that the five sub-themes were major factors in the persistence of these African-American males. These examples illustrate the sub-themes for the umbrella theme, factors of persistence.

“Prove Them Wrong” Attitude

... a lot of the professors think that freshman year you're not capable of doing well... I mean it's not as if there's a big history of blacks excelling in engineering... so it's like you don't have the potential to do well... unless you show [professors] that you can... so you have to work harder to prove them wrong. [EPG from focus group]

So basically, you're working twice as hard, not only to overcome what they think of you but [also] to eventually rise to what you know you can do... work twice as hard proving someone wrong as opposed to proving someone right. [EPG from focus group]

A lot of times when we're in study groups or in the classroom, I feel like I have to prove myself. [EPG19]

Nobody is going to rob me of the opportunity to complete my engineering degree. If I couldn't do it [engineering], I wouldn't have been here in the first place... Being poor in college really hurts you too. It hurts you a lot... [For example], I didn't have a printer for a whole year. Everyday, I had to run around to labs to see if they had printers so I could print out my work, or I had to get my friends to print it out for me. That was time wasted and a headache in itself. I remember also one semester, for at least four weeks, I didn't have many of my books, so I

used to go to the bookstore and read my homework assignments. There are a lot of factors that you have to overcome to be successful in academics. [USPG41]

Family (Mother)

My mother is always there supporting me. She keeps telling me she wanted me to succeed, and lots of times I feel like I keep continuing in engineering because that's what she wants me to do... [EPG14]

If it's something I don't understand, she [his mother] might take it to one of her friends. [EPG14]

I just talked to my mom last night about this test I had on Friday, and I was just telling her this test was hard. She was telling me the whole time "you can do it, you can do it," and nobody else around here is not going to tell me that and just the fact that she's my mom and she has known me my whole life and knows what I'm capable of... reassures me that I can do it. [EPG19]

She [my mom] told me, "do what you enjoy... go as far as you can... go for those higher degrees." She was tickled to death that I got a bachelor's degree, but you know she says if I'm capable of doing more she's not going to have me settle... [EPG18]

My mom sends me biblical quotes every now and then. My mom is a little more insane about it [college] because she didn't really go to school. [USPG45]

My mom tried everything to make sure I had all my supplies. [USPG42]

My mom called everyday. I think that she stayed up praying every single night, all night, when I pulled all-nighters. [UPG53]

Role models for siblings

...trying to set an example for my little brothers and sisters, that ties into the family being proud of me. It is not pressure, but it is something you have to live up to, and it is a standard you have to shoot for. [EPG12]

In a sense, I am blazing a trail. I go home and show my little brothers [engineering]. [USPG41]

Faith

I know my faith. I wouldn't be anywhere without it... just the love, joy, encouragement, peace, and especially the strength to carry on. I don't how many times I've been down on my knees asking for strength to get through this test, get through this class, or whatever. [EPG from focus group]

I pray. I really pray a lot, all the time, you know. [SPG from focus group]

If there is nothing or no one else, there is the faith. Everything is going to be all right. [SPG *from focus group*]

Jobs

I want to be a family man, have a wife, and children, so you need to get a degree and get a good job... that motivates me to be successful academically. [EPG17]

I want to have a good QCA, so I can get or have a large option of jobs when I get my degree. [EPG11]

Factors for Success

Lam and his colleagues (1997) developed a conceptual framework that was used to understand the success of African-American students in engineering. The basis of this framework was used to design an Office of Minority Engineering Programs for African-American students in engineering. The framework was conceptualized with the following variables in mind: “(a) *math and science knowledge* (e.g., math courses completed, math achievement, math self-efficacy, science courses completed, science achievement); (b) *career orientation* (e.g., commitment to engineering as a career reasons for pursuing engineering as a career, opportunity to pursue career); (c) *educational and occupational values and beliefs* (e.g., value of cooperative versus individualistic approaches to learning, value of community versus individualism); (d) *social support* (e.g., role models, family support, peer support, faculty support); and (e) *self-concept* (e.g., general self-efficacy, instrumentality, competence)” (Lam et al, p. 57). The different variables were regarded as critical for success in engineering. Therefore, it could be assumed that the variables of this framework could be generalized to other African-American students in engineering majors. For this study, it was clear that some of the variables mentioned by Lam and his colleagues (1997) were critical for success among these African-American male engineering students. The following sub-themes were identified: (1) engaging professors, (2) peer networking, (3) knowing the system, and (4) crossing racial barriers. These sub-themes were linked with the umbrella theme, factors of success.

The participants in this study consistently commented on the importance of being proactive engineering students. Because of stereotype threats, white peer degradation, the lack of faculty expectations, and lack of engineering role models, many of these African-Americans felt they had to work twice as hard to achieve success in the College of Engineering. As a way of assuring their success, they frequently used professors' office hours to discuss engineering content, networked with African-American peers, developed relationships across racial lines, and made every attempt to learn the ins and outs of engineering. Sample statements highlight the four sub-themes:

Engaging Professors

Make it a point that he [the professor] knows who you are... it takes all of two weeks that they know your name, where you're from, who you used to date last year...it doesn't take much because you're the only one. [EPG *from focus group*]

You know how the system works, what you want and what you've got to do to get it. [EPG *from focus group*]

As an African-American male, you have to visit the professor during office hours... It is very difficult to take care and do your work on your own. You're one person and you're trying to battle everyone else in the class basically because of grades... You are basically battling everybody, and then you are battling your professor because he or she may not believe you are capable of doing that. [EPG12]

You have to take advantage of your resources and opportunities like teacher office hours and prodding for more points on test. [UPG57]

Peer Networking

I think it's not just how well you do in a class but it's not the fact that you're "physically" an engineer that affects your academic performance. There's still outside factors – your social life as far as the people you hang with... It's not strictly being book smart all the time. I think it's your social environment, [and] the way you interact with students in the class. [EPG *from focus group*]

If you can't adapt socially to the culture that's already here or if you can't talk to the people that are engineers that are white or Asian or whatever, then academically you can't succeed. I mean – I don't see how [you can succeed]. [EPG *from focus group*]

You got to build a network of people in class, people in your major at least... You have to do that, if you're not doing well... [EPG15]

Basically, what is needed is to network with other students and older students... [SPG24]

Knowing the System

I have one more strategy... things improve if you make a good first impression... improves when you get to know the system. [EPG from the focus group]

... quite a few professors' grades are subjective and not objective and although some people may think that's unfair, [but] that's how the academic game is played... I'd go see my professors more, and I would ask them what I would need to do to get better grades. I would think most professors would be willing to help [me] – that comes with sincerely trying to learn more and get a better grade in that class. [EPG10]

Crossing Racial Barriers

Sometimes, it depends on if you're proactive... because if you wait for them [white students], it will probably never happen. I mean they have their groups formed before the class even starts... I haven't really had anybody come up to me and say, "Do you want to be in my group?" If you wait them [white students], they'll probably never walk up to you. You'll just be sitting there. [EPG from focus group]

You learned to know the people [white students] that were okay. Because I co-oped, most guys I hung with to study were also co-ops because we would be on the same cycle. [UPG54]

After that BEST experience... I had to start branching out and networking with the white people and so forth. [UPG51]

Personal Characteristics

Most of the African-American males in this study have proven to be very persistent in the College of Engineering. They demonstrated their degree of persistence in their attitudes, behaviors, and, of course, simply by remaining or not remaining in engineering. It was their attitudes and behaviors of determination that propelled the persistent participants to persevere through the oppressive environmental challenges (e.g., social isolation, white peer degradation, lack of role models, etc.). Many of these individuals made a conscious effort to "prove them

wrong.” They did this by committing and/or dedicating themselves to their education, even if it required reducing extra-curricular activities.

Many of the African-American males commented on how they felt like they “represented” all African-Americans in the College of Engineering. These perceptions were communicated to them repeatedly. Howard and Hammond (1985) suggested that a stigma of feeling intellectually inferior often follows African-Americans everywhere they go, especially in academic circles. This notion was found to be consistent with this study. As a result, the motivation to succeed in engineering became an obsession, not only for themselves but also for their families, friends, and other African-American engineering students. As one could imagine, the drive to succeed in engineering was tiresome and, at times, made them question why they remained in engineering.

Some, such as the non-persistent participants, decided that engineering was not for them. A number of reasons were given for not persisting, such as lack of academic background, lack of interest, and unbearable learning environment. Furthermore, the data suggested that oppressive conditions within the social environment had negative effects on these African-American males, especially the non-persistent participants. It was even more challenging for those with introverted and laid back personalities. These personalities posed problems integrating into the academic and social environment. Not only did they have to work twice as hard to overcome the environmental obstacles, but they also had to work just as hard to overcome their lack of social versatility and interpersonal skills. It was evident that the some of the participants had improved a lot in this area, but others still had a ways to go. Example statements illustrate the sub-themes for the umbrella theme, personality characteristics:

“I represent...”

Well, in my family, I’m the first B.S. degree... it’s not pressure – [it’s] like an obligation that you have to succeed... [EPG from focus group]

It looks bad when we [African-American students] drop out or move on compared to when whites do the same because there’s so many of them... just more attention is focused on us. [EPG from focus group]

Most of you guys didn’t know Person X and Person XX – they really paved the way for a lot of the black students in the Chemical Engineering Department. Those dudes – they did it, they were out there, they got their grades, they were presidents... they really paved the way for a lot us [African-American students] because they really killed a lot of the myths and perceptions. Not killed them but, at least, made it a lot easier for us. [EPG from focus group]

I’d say that I feel like I represent the entire African-American population. [EPG10]

I got such a good support system back home that I don’t want to let anyone down. [EPG11]

Introverts vs. Extroverts

I know most people tell me that I’m a pretty quiet person... I have a slight speech impediment. I would say that kind of encourages me not to be vocal about certain things. [EPG10]

I think sometimes I’m sort of more introverted, where I like to keep things inside, and I like to just sit there and think about stuff. [EPG14]

Lack of Social Versatility

This is negative on my part. I’m not involved in a lot of organizations... I’m not real social, but in that I think it makes easier for me to stay focused on my goals than someone involved in a lot of organizations and really out going. I wish I had a little bit more of that in me... [EPG17]

If you’re a black engineering student, the only thing you got is that student lounge [Minority Engineering Center] over there and that is it, unless you’re good with the professors. [SPG from focus group]

No, I did not reach out. Why? I did not think that I would be received warmly. [UPG50]

I was able to use my NSBE [African-American] friends through my sophomore year, so I did not have to interact with everybody else. My NSBE buddies dropped off after year two, and I was left to fend for myself. [UPG53]

Ultimate-Persistent Group and Biographical Questionnaires

Members of the *Ultimate-Persistent Group* had many similarities and dissimilarities. However, their similarities tended to outweigh their dissimilarities. Characteristics of this group were presented in Table 5. It is comprised of descriptive data from the biographical questionnaires, which is often referred to as “self-report data.” The data indicated that the average age of the participants was *25.3 years old. Nine (90%) out of ten of the participants were born in the United States. All ten (100%) of the participants had at least a 3.0 cumulative GPA in high school (mean=3.944). In fact, six (60%) of the members had a 3.8 and above. When exploring their combined SAT scores, it was discovered that all ten participants scored at least 1000 (mean=1170).

Through both the focus group and individual interviews, this group communicated a strong commitment to complete their engineering degrees. This was also reflected in the biographical questionnaires. For example, many of the participants indicated that they decided to major in engineering before high school, and all (100%) of them indicated that they started their first year in engineering. When initially enrolling in engineering, the group members all together expected to take 8.4 semesters to complete their engineering degrees. Furthermore, only one (10%) of the ten had ever been on probation and/or suspended from Virginia Tech. In general, these participants communicated “high” expectations of themselves; however, only 10% of them met their expected accumulative QCA goal (mean=2.837).

As a way of getting descriptive data on their family, the researcher asked specific questions. The participants were asked whether or not they had any siblings and, if so, were asked how many of them completed college. Eighty percent (80%) of them had at least one

* The ages were much higher than the other sample groups because these participants had already graduated. Most of the participants have been out of school at least 2 years.

brother and/or sister, and the majority (40%) of the participants were the youngest. Only five (50%) out of the ten had siblings that had completed college. When asked about their parents' educational background, it was found that all (100%) of the participants' parents completed high school. The data further indicated that sixty percent (60%) of the mothers and thirty percent (30%) of the fathers had at least a bachelor's degree.

Questions were asked to get a sense of the participants' upbringing. For example, participants were questioned on the following: the racial make-up of their schools and communities, geographical environment, parental presence, family income both in high school and college, and related areas. Most (40%) of the participants indicated that they attended predominately white schools and lived in comparable communities. Out of the ten participants, six (60%) lived in the suburbs, three (30%) lived in rural areas, and one (10%) lived in an urban community. It was also found that 80% of the participants came from two-parent homes with family average incomes of \$30,000 or more during both high school and college. Even with such family average incomes, six (60%) out of the ten participants indicated that they were employed at least three semesters, and most them (90%) indicated that they were on some form of scholarship during their tenure at Virginia Tech.

Although individuals communicated a "strong" work ethic and "high" career goals, their biographical questionnaires did not reflect this for the following question, "While at Tech, what were your career goals?" Many of the participants mentioned something related to getting a job in their chosen fields. Furthermore, only 30% had career goals of obtaining a graduate degree. This stood out perhaps more than anything else about this group because all the other sample groups had higher percentages.

These students were very active in extra-curricula activities during their tenure at Virginia Tech – 90% of them had been involved at least one extra-curricula activity, but collectively the group averaged 3.1 extra-curricula activities. Many of these activities were directly or indirectly related to the Office of Minority Engineering Programs and Virginia Tech’s student chapter of National Society of Black Engineers and other engineering organizations/activities. Also, from the questionnaire, it was found that parents, teachers, guidance counselors, summer programs, field trips, money, and role models impacted many of these participants’ decision to major in engineering. These findings were consistent with the literature. Graham (1997) also found this to be true for women.

Exemplary-Persistent Group and Biographical Questionnaires

From the biographical questionnaire (see Table 6), the researcher collected information about the *Exemplary-Persistent Group*. This group was regarded as the most successful sample group in the study outside of the *Ultimate-Persistent Group*. In other words, these individuals were regarded second in the hierarchy of sample groups simply because they had yet to graduate. However, when these individuals do finally graduate, they probably will have much higher accumulative QCAs than members of the *Ultimate-Persistent Group*.

These participants were not only intelligent but also motivated and confident in themselves. They were also very goal-oriented. This was indicative not only by the focus group and individual interviews but also by the biographical questionnaires. The average age for this group was 21 years old, and ninety percent (90%) of them were born in the United States. The one person that was not born in the United States came to America with his parents when he was 3 years old. He has spent most of his life in the United States. Therefore, one could assume that

this person has adopted some of the Western traditions. If dress and mannerisms can be considered an indication of this, one could easily believe that he has been Westernized.

When asking the participants about their pre-entry characteristics, it was discovered that all (100%) of the members of the *Exemplary-Persistent Group* had at least a 3.0 cumulative high school GPA (mean=3.884), and seventy percent (70%) of them had a 3.8 cumulative GPA and above. It was clear that these participants were good students because their SAT scores (mean=1194) complemented their GPAs. Ninety percent (90%) of them scored a 1000 or better on their SAT scores. During high school, these participants were also very active in extra-curricular activities. All of them had been involved in at least two extra-curricular activities, whether it was sports, clubs, or marching bands.

Many members of the *Exemplary-Persistent Group* indicated that they made their decision to major in engineering before even entering high school. These results were comparable to the *Ultimate-Persistent Group*, which was the only group with similar replies. Also, like the *Ultimate-Persistent Group*, these individuals expected to complete their degree in 8.4 semesters when they initially enrolled at Virginia Tech. These students would average 9.2 semesters in completing their engineering degrees.

None of the participants had ever been on probation and/or suspended. The data also revealed that seven (70%) of the ten were not meeting their expectations in terms of accumulative QCA (mean=3.114). This sample group had the highest overall accumulative QCA (mean=3.114) compared to the other sample groups. Worth noting was that this sample group all (100%) had siblings. Five (50%) of them were the oldest, two (20%) of them were somewhere between the oldest and youngest, and three (30%) of them were the youngest.

However, only twenty percent (20%) of the sample group's siblings had completed college. This percentage was next to the lowest, right above the *Satisfactory-Persistent Group*.

When the respondents were asked about their career goals, eight (80%) out of the ten indicated that they wanted to pursue a graduate degree. In general, they responded most favorably to attending graduate studies than all the other sample groups. The numbers clearly illustrated that these respondents have educational aspirations beyond their bachelor's degrees. In fact, two participants stated, during their individual interviews, that they were planning to start their graduate studies the up-coming fall semester. They are both planning on attending two reputable universities with outstanding engineering programs.

When the participants were asked about their family backgrounds, interesting descriptive data were discovered. All of the participants' parents had at least a high school diploma and 40% of the mothers and 30% of the fathers had a four-year degree or above. Seventy percent (70%) of them came from two-parent homes during high school years. This number decreased from seventy percent (70%) to sixty percent (60%) during college. The data also indicated that forty percent (40%) of the sample group's family average income was at least \$30,000 during high school. While in college, these percentages increased slightly to fifty percent (50%). This sample group had the lowest family average income than any of their peers. All (100%) ten members of the *Exemplary-Persistent Group* used scholarships to pay for their education, and fifty percent (50%) of them had been employed for at least three semesters. In addition, this sample group also had the highest percentage of students with this mark of distinction. Perhaps one could make the case that these scholarships were highly correlated with their academic achievement and success.

When asked about participants' communities and upbringing, it was found that sixty percent (60%) of them went to school and lived in predominately white neighborhoods. The respondents described their neighborhoods as suburban (70%), rural (20%), and urban (10%). The following reasons were given why these participants decided to attend Virginia Tech: different engineering program choices, price/scholarships, friends, geographical location, and reputation of engineering programs. Relatives, courses/high schools, science programs, and having an interest in math/science were reasons given for majoring in engineering. Other miscellaneous information suggested that this sample group was very involved in extra-curricular activities both in high school (e.g., averaged 4 activities) and Virginia Tech (e.g., averaged 3.2 activities).

Satisfactory-Persistent Group and Biographical Questionnaires

Table 7 highlights characteristics of the *Satisfactory-Persistent Group*. This data provided an overall illustration of this sample group. These individuals were very similar to participants in both the *Ultimate-Persistent Group* and *Exemplary-Persistent Group*. However, there were some distinctions between these two sample groups and the others. This section highlights the distinctions found in this sample group's biographical questionnaires. The average age was 21.3 years old and that all of the participants were born in the United States.

When asked the question related to their academic preparedness, six (85%) of the seven respondents indicated that they had at least a 3.0 GPA in high school, and only one participant had at least a 3.8 GPA. The one respondent who did not have a 3.0 indicated that he had a 2.89 GPA. This sample group's cumulative GPA average (mean=3.313) was much lower than the *Ultimate-Persistent Group* (mean=3.944) and *Exemplary-Persistent Group* (mean=3.884). Even the number of participants who had at least a 3.8 GPA was lower than the first two sample

groups, but it was higher than both the *Unsatisfactory-Persistent Group* and *Non-Persistent Group*.

Eighty-five percent (85%) of this sample group scored at least a 1000 on their SATs, and the overall average was 1032. Generally speaking, the data indicated that the *Satisfactory-Persistent Group* had the lowest SAT scores out of the five sample groups, but these individuals from this group did participate in extra-curricular activities (at least two), comparable to the other sample groups. These relatively low pre-entry characteristics may explain why some of these respondents did not initially start out in engineering. Compared to the other sample groups, the *Satisfactory-Persistent Group* was tied with the *Unsatisfactory-Persistent Group* for the lowest percentage (85%) of participants who started out in engineering.

The data from the biographical questionnaires also showed that these respondents, when first enrolled in Virginia Tech, expected to graduate in 8.43 semesters or less, while in reality it took 9.71 semesters and more. This sample group's graduation expectancy was similar to all the other sample groups, but the tentative graduation expectancy, based on needed number of semesters, was among the highest of the sample groups. All (100%) of the respondents indicated that they were not meeting their expectations in terms of their cumulative QCA (mean=2.260). These percentages are equal to the *Unsatisfactory-Persistent Group* and *Non-Persistent Group* but the cumulative QCA averages were not. The *Satisfactory-Persistent Group* had a slightly higher QCA than the other two sample groups. Also, this sample group indicated that four (57%) of the seven participants had been on academic probation at least once, but none of them indicated that they had been suspended.

When indicating whether or not they had siblings, it was discovered that seventy-one percent (71%) of these respondents had them, and only twelve percent (12%) completed college.

These numbers were lower than all of the other sample groups. Also, sixty percent (60%) of the participants indicated that they had attended predominately white schools, and forty percent (40%) marked that they resided in predominately black communities. In regards to the school make-up, this sample group had the highest percentage of whites in their schools than all other sample groups, but it was tied with the *Ultimate-Persistent Group* for the lowest percentage of participants who resided in predominately black communities. The majority of these participants lived in suburban communities (57%), but the rural (29%) and urban communities (14%) were represented. Compared to the other sample groups, the *Satisfactory-Persistent Group* was right below the *Ultimate-Persistent Group* with the highest number of respondents who resided in rural areas; it was tied with the *Unsatisfactory-Persistent Group* for the second highest percentage of respondents who resided in urban areas.

After closely examining the percentage of two-parent homes, the researcher found that all of the respondents grew-up and lived with both their fathers and mothers. In addition, it was discovered that all of the respondents, during high school, came from families with combined household incomes of \$30,000 or more, which was tied for first with the *Ultimate-Persistent Group*. This percent fell to eighty-six percent (86%) when enrolled in Virginia Tech, but the data indicated that this group remained second only to the *Ultimate-Persistent Group*. Related to financial support, the data indicated that fifty percent (50%) of the respondents were employed at least three semesters. This percentage of employment was comparable to all of the other sample groups.

Like the *Exemplary-Persistent Group*, this sample group collectively had strong aspirations to pursue graduate studies after completing the bachelor's degree. Sixty percent (60%) of the respondents indicated such aspirations on the question related to career aspirations.

The most prevalent reasons for attending Virginia Tech were (1) reputation of engineering programs, (2) money/scholarships, (3) athletic programs, (4) university's recruiting initiative, (5) university's campus appearance, (6) person-environment fit, and (7) other extra-curricular activities. *Please note that these reasons were not given in any particular order.* It was evident that extra-curricular activities were important to these participants because the sample group averaged 2.2 activities while in college. Also, when asked what influenced their decision to major in engineering, the respondents marked similar responses to the *Ultimate-Persistent Group* and *Exemplary-Persistent Group*. Such responses indicated that the following impacted their decision to major in engineering: relatives, teachers, high school/courses, interest in math and science, past academic performance in math and science, television, Virginia Tech's recruiting initiative, money/job availability, and the programs offered by the Office of Minority Engineering Programs.

Unsatisfactory-Persistent Group and Biographical Questionnaires

The researcher used Table 8 to highlight the characteristics of the *Unsatisfactory-Persistent Group*. The average age for this sample group was 22.3 years old. Six (86%) of the seven respondents indicated that they were born in the United States, and eighty-six (86%) percent of them indicated that they had a 3.0 cumulative GPA or better (mean=3.146) in high school. Although these percentages were comparable to the *Satisfactory-Persistent Group* and *Non-Persistent Group*, it was discovered, after examining the data, that none of these participants had a 3.8 GPA or better. This number was tied for the lowest with the *Non-Persistent Group*, but, on the contrary, this sample group had the highest average SAT score (mean=1200) out of the five sample groups.

As indicated in the focus group and individual interviews, the data in the biographical questionnaires suggested that this sample group have endured many academic hardships in the College of Engineering. These hardships were negatively reflected in the respondents' QCAs, but the biographical questionnaires did not reflect this. They illustrated an unrealistic depiction of these individuals' academic performance in the College of Engineering. The data showed that these individuals average QCA was a 2.125*. As a result, the researcher decided to explore these data more carefully because six (86%) of the seven participants had been on probation at least one-time (mean=1.44), and two (29%) of the seven had been suspended at least 1-time since being enrolled at Virginia Tech. Compared to the other sample groups, the *Unsatisfactory-Persistent Group* had the highest percentage of probations and the second highest suspensions – finishing right behind the *Non-Persistent Group*.

From the questionnaires, it was discovered that eighty-five percent (85%) of the respondents started out in engineering when they first enrolled in Virginia Tech. On average, these respondents expected to complete their engineering degrees in 8.3 semesters; however, the data did indicate that it would take 11 semesters. The tentative/actual number of semesters was slightly skewed because one respondent had been enrolled in Virginia Tech since fall semester 1993. Again, related to expectations, the researcher asked whether or not they were achieving their expected cumulative QCA, and one hundred percent (100%) indicated that they were not reaching their expectations. All of these expectations, except the actual/tentative semesters, were comparable to the other sample groups. In fact, four (57%) of the seven respondents indicated that they had plans to pursue a graduate degree. This percentage was the third highest, right before the *Non-Persistent Group* and *Ultimate-Persistent Group*.

* This sample group's actual QCA average was 1.87 rather than the 2.125. Please note that incorrect information is a common problem associated with self-reporting questionnaires.

The biographical questionnaires also indicated that one hundred percent (100%) of the respondents had brothers and/or sisters, but only forty-three percent (43%) of them completed college. In regards to parents, ten (100%) of the ten respondents' parents had completed high school, and forty-three percent (43%) of the mothers and forty-three percent (43%) of the fathers had completed a bachelor's degree or higher. This sample group had the third highest percentage of mothers and second highest percentage of fathers with at least a bachelor's degree.

During both high school and college, seventy-one percent (71%) of the respondents marked that their family yearly incomes were \$30,000 and above. Fifty-seven percent (57%) of the respondents indicated that they had been employed for at least three semesters. In addition, this sample group had the second highest percentage of employment, finishing second to the *Ultimate-Persistent Group*. Twelve percent (12%) of the respondents have received some form of scholarships since being enrolled in Virginia Tech. This percentage was the lowest for all the other sample groups. When asked about extra-curricular activities, the researcher discovered that the respondents averaged 2.6 activities in high school and 1.4 activities in college.

Related to up-bring and community, most (86%) of the participants resided in the suburbs, and the rest (14%) lived in urban communities. A more explicit breakdown indicated that eighty-six percent (86%) of the respondents attended predominately white schools and lived in predominately white neighborhoods. Compared to the other samples, this percentage was the highest. Perhaps these factors had some bearing on the level of persistence of this sample group. The researcher decided to wait to discuss this point until the thematic analysis for this sample group. These individuals did give the following reasons for attending Virginia Tech: reputation of engineering programs, proximity of university from home, cost, and opportunities to participate in different extra-curricular activities. The most prevalent factors cited for

influencing their decision to pursue engineering were relatives, summer science/math programs, teachers, money, and the Office of Minority Engineering Programs. Many of these factors were mentioned for the other sample groups.

Non-Persistent Group and Biographical Questionnaires

From this group of eight students (see Table 9), the average age was 21.3 years old. One hundred percent (100%) of the participants were born in the United States. Eighty-eight percent (88%) of them had a 3.0 GPA and above in high school. Like the *Unsatisfactory-Persistent Group*, this sample had no participants with a 3.8 GPA and above. The actual GPA average for this sample group was a 3.146, which was the lowest for all the sample groups. However, this average GPA did not reflect the scores of these participants' SATs (mean=1200). Compared to the other sample groups, this sample group had the highest mean for SATs. It was clear, just by looking at the cumulative GPA averages and SAT scores, that these students had the potential to be successful in engineering. This notion suggested that other factors had more to do with this sample group's lack of persistence in engineering. The researcher went more in-depth with this matter in the section where the thematic analysis was presented.

From the biographical questionnaires, it was verified that eighty-seven percent (87%) of the participants initially started out in engineering. One hundred percent (100%) of them indicated that they were not meeting their expectations in terms of cumulative QCA. Although this group transferred out of engineering, the average cumulative QCA was still a 2.037. Also, while in engineering, the sample group initially expected to spend on average 8.3 semesters completing their degrees, but realistically these individuals will spend on average 9.4 semesters to complete their degrees in another major. These percentages were comparable to the other sample groups even though these individuals transferred out of engineering. In addition to

expected number of semesters, six (75%) out of the eight respondents indicated that they had been on academic probation at least once since being enrolled at Virginia Tech, and also three (37%) out of the eight indicated that they had been suspended at least once.

When asked whether or not they had siblings, the majority (88%) indicated that they did have a brother and/or sister, but only fifty percent (50%) of them had completed college. This sample group, tied with the *Ultimate-Persistent Group*, for the highest percentage of siblings who had completed college. One hundred percent (100%) of the respondents' parents had at least a high school diploma, and thirty-seven percent (37%) of the mothers and twelve percent (12%) of the fathers had a four-year degree or above. This sample group had the least educated parents out of the five sample groups, but it had the second highest family average income. Although the family average income was relatively high, fifty percent (50%) of the participants still worked at least 3 semesters since being enrolled in Virginia Tech.

Perhaps the family average incomes were associated with this group's 2-parent household. Seventy-five percent (75%) of the participants grew up with both parents. This sample group lived in geographical environments such as the suburbs (50%), urban areas (38%), and rural (12%) communities. Sixty-two percent (62%) of the participants' schools and communities were predominately white. This sample group comprised the second highest percentage of such demographics.

Even though this sample group transferred out of engineering, fifty percent (50%) of the respondents still indicated that they planned to pursue a graduate degree. This sample group finished next to last compared to the other sample groups. The most prevalent reason given for attending Virginia Tech was directly or indirectly related to the following: reputation of engineering programs, proximity of university, cost of tuition, and multiplicity of extra-curricular

activities. This sample group attributed their desire to pursue engineering to the following reasons: relatives, personal interests, summer science programs, teachers, money, and the Office of Minority Engineering Programs.

Table 5

Biographical Questionnaire Data for the Ultimate-Persistent Group

Biographical Questionnaire										
Code	50	51	52	53	54	55	56	57	58	59
Birthday	01/12/1972	09/01/1976	05/26/1976	10/02/1974	04/12/1970	03/18/1976	10/22/1975	08/04/1973	10/24/1973	05/08/1975
Place of Birth	US	US	US	US	US	US	Other	US	US	US
City, State	Richmond, VA	Martinsville, VA	Annapolis, MD	Columbia, SC	Richmond, VA	Petersburg, VA		Wilkes-Barre, PA	Richmond, VA	Petersburg, VA
If not US, what year?							1985			
Why did you move?							Better economically			
Major	ME	ME	EE	EE	EE	CpE	ChE	ME	ME	CPE
Year of enrollment	1990	1994	1994	1992	1988	1994	1994	1991	1991	1993
HS GPA	3.3	3.8	3.76	4.5	4.2	4.3	3.3	3.2	4.1	4.98
SAT	1190	1000	1050	1120	1380	1080	1120	1140	1170	1450
When decide on eng.	Soph. year HS	Senior year of HS	Junior year HS	Before HS	Senior year HS	Freshman year HS	Junior year HS	Sophomore year HS	Before HS	Before HS
Expected graduation, initially	Spr. 1995	Spr. 1998	Spr. 1998	Spr. 1996	Spr. 1993	Spr. 1998	Spr. 1998	Spr. 1995	Spr. 1995	Spr. 1997
Expected graduation, present										
Start 1st year in eng.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Expected overall QCA initially	3	1	3	3.5	3.5 - 3.8	3.4	3	3	3	3.7
Overall QCA now	2.3	N/A	2.43	2.97	3	3.27	2.7	2.2	2.3	3.5
Expected # of semesters initially	10	8	8	8	14	8	8	8	8	8
# of semesters to date	14	9	11	8	15	8	8	10	10	8
Probation and/or Suspension	No	No	No	No	No	No	No	Yes, 2 probation, 1 suspension	No	No
Educational goals	Meet or exceed	Dean's list, learn lots,	BS in ME with a		Graduate with a 3.0 QCA or	Graduate with at least a 3.0		Graduate with degree	BS degree in ME	Learn a lot about various

	average grade in class	graduate quickly	business minor		better					things
Career Goals	BSME, MBA, later an entrepreneur	Good paying job, co-op for experience	Become a hardware design engr.		Eventually a PhD	Job with Fortune 500 company		Comfortable living in cutting edge	Eventually own his own business	PhD eventually, become professor
Brothers or sisters	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
If yes, how many	1 brother	1 sister	1 brother	1 brother	3 sisters			2 brothers, 1 sister	1 sister	1 brother, 1 sister
If yes, what is your birth order	1st born	Youngest		Oldest	Youngest			Youngest	2nd born	2nd born
If yes, # that completed college	1 brother	1	None	None	1 sister			None	1 sister	1 sister
Highest edu. level of Mother	4 year degree	Business or Trade school	Graduate or Professional degree	4 year degree	Some college	Graduate or Professional degree	Some college	Some graduate or professional	4 year college	Some college
Highest edu. level of Father	Some college	HS diploma or equivalent	Graduate or Professional degree	Business or trade school	Some graduate or Professional	HS diploma or equivalent	HS diploma or equivalent	2 year college	HS diploma or equivalent	4 year degree
Racial/ethnic makeup of schools	Predominately White	Predominately African-American	Predominately White	Predominately African-American	Predominately African-American	Evenly distributed	Predominately White	Evenly distributed	Evenly distributed	Predominately White
Racial/ethnic makeup of comm.	Predominately White	Predominately African-American	Predominately White	Predominately African-American	Evenly distributed	Predominately African-American	Predominately White	Evenly distributed	Predominately African-American	Predominately White
Upbringing, geographic	Suburban	Rural	Suburban	Urban	Rural	Rural	Suburban	Suburban	Suburban	Suburban
Upbringing, home environment	2 parent home	2 parent home		2 parent home	2 parent home	2 parent home	2 parent home	2 parent home	Single-parent home	2 parent home
If single parent home, w/ whom									Mother	
Payment for education	Parents, co-op job	Scholarships, parents, jobs	Scholarships, loans, parents	Scholarships, loans	Scholarships, grants, loans, co-op	Scholarships, grants, loans, parents	Scholarships, grants, loans, parents	Scholarships, grants, loans, parents	Scholarships, grants, loans, parents	Scholarships
Family yearly income in HS	> 40K	> 40K	> 40K	> 40K	35K - 40K	> 40K	> 40K	> 40K	35K - 40K	> 40K
Family yearly income now	100K	Same	Same	Same	Same	Same	Same	Same	Same	same
# semesters of employment	3	3	5	2	2	0	4	6	2	none

If yes, where?	Philip Morris (co-op)	Hillcrest and night monitor	MEP				OMEP	OMEP, VT residential office, others	RHF, OMEP	
If yes, how many hours?	40 hrs/wk	6 hrs/wk	10 hrs/wk	20 hrs/wk	15 hrs/wk		4 hrs/wk	12-25 hrs/wk	varies	
Extra-curr. in HS?	Karate, Soccer	Football, track, NHS, art club	Track, Basketball, SGA	Soccer, band, football, debate, etc		SCA, tennis, X-country, NHS, Latin	Track, SGA	Track, Science club, CHROME, chorus	Track	Band, Spanish, NHS, Academic team
Extra-curr. at VT?	NSBE, Black Male Coalition, ASME	NSBE, A PHI A, BSA, NPHC, baja car	NSBE, BEST	NSBE	NSBE, Mentoring,	NSBE, IEEE, intramural basketball, BEST	NSBE, Kappa Alpha Psi	BEST, BOOM, Black Male Coalition	NSBE, BSA, MEP team leader	NSBE, various honor societies
Main reason for attending VT?	Great technical reputation	Money	Good engineering and MEP	Scholarships	Engineering program	Engineering program	Great educational value	Scholarships	Engineering reputation	They were going to pay for me
Order significance of influences	Parents; money; quest for knowledge	Science teacher in high school; money	Strong math background; father;	SECME; teachers; dad's profession	Relatives; minority engineering	RAPME; Mom; INROADS	Teachers; guidance counselors	Math and science; relatives; HS teachers;	Neighbor who was a ME major	Challenging skills required; I thought
			Liked electronics		Summer camp at VT and Ga.Tech					I would be good at it.
Order of challenges in eng.	Professors; classmates; textbooks;	Time; motivation	Coursework; large classes; class	Studying; finding study partners;	Studying; getting help; professors;	Work load; classmate competition;	Ignorant professors	Motivation; complex concepts; study	Few blacks; weed out classes	
	Much work.		Environment	Not much in common w/ other students	Racism in general	Complex courses; social life		Skills; overwhelming feeling		
Advice to VT	Hire more black professors, require	Pair them freshman year; show them		More support system for black males	Continue mentor programs	Promote team work/group		Group and counseling programs		
	professors to have min # office hours.	The resources available.				Activities, encourage summer camps				

Table 6

Biographical Questionnaire Data for the Exemplary- Persistent Group

Biographical Questionnaire										
Code	10	11	12	13	14	15	16	17	18	19
Birthday	08/10/1979	03/04/1979	03/05/1978	10/28/1978	10/18/1980	09/14/1977	03/07/1978	02/05/1980	05/27/1977	03/23/1978
Place of Birth	US	US	US	US	Other	US	US	US	US	US
City, State	Jacksonville, NC	Rocky Mount, VA	Richmond, VA	Ft. Belvoir, VA		Decatur, VA	Camp Lejeune, NC	Ellsworth AFB, SD	Richmond, VA	Newport News, VA
If not US, what year?					1983					
Why did you move?					Parents chose to come					
Major	ChE	CE	ME	CpE	CpE	ChE	EE	AE	ChE	EE
Year of enrollment	Fall 1997	Fall 1997	Fall 1996	1996	1998		1996	1997	1995	Fall 1997
HS GPA	4.12	4.441	3.8	3.9	3.6	3.8	3.98	4	3.8	3.4
SAT	1330	1180	970	1370	1150	1260	1080	1290	1280	1030
When decide on eng.	Before HS	Soph. year of HS	Soph. year of HS	Soph. year of HS	Senior year of HS	Freshman year of HS	Junior year of HS	Before HS	Before HS	Before HS
Expected graduation, initially	Spr. 2001	Spr. 2002	Spr. 2000	Spr. 2000	Spr. 2002	Spr. 1999	Spr. 2000	Spr. 2001	Spr. 1999	Spr 2002
Expected graduation, present	Spr. 2002	Spr. 2002	Spr. 2000	Spr. 2000	Spr. 2002	Spr. 2000	Spr. 2001	Spr. 2002	Spr. 2000	Fall 2001
Start 1st year in eng.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, what was other major?										
Expected overall QCA initially	3.7-4.0	3.4+	3	3.7	3.5	3.5	3	3.7	3.5	3.5
Overall QCA now	3.8	2.6	2.9	2.86	2.6	3.37	3.11	3.8	3.1	3
Expected # of semesters initially	8	8 (+3 co-op)	8	8+	8	8	8	8	8	10
# of semesters to date	5	5	8	8	4	8	7	5	10 (12 counting full summers)	5
Educational	B.S., M.S.,	B.S, perhaps	QCA of 3.0 or higher	B.S., M.S.,	B.S. and	B.S., M.S.	B.S. and	B.S., M.S.,	B.S., M.S,	B.S., M.S., PhD

goals	PhD	M.S.	and B.S	perhaps PhD	Co-Op		perhaps M.S.	PhD	PhD	
Career goals	Accomplish meaningful work.	Government job, then private.	Design automobiles	Work in industry, own business.	Start own Eng. company		Work in high tech industry	Teaching or R&D work	Work in industry, then teach	Teaching, entrepreneur
Brothers or sisters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If yes, how many	1 brother, 1 sister	1 brother	2 brothers, 2 sisters	1 brother	4 brothers, 1 half sister	2 brothers	1	1 sister	1 sister	1 sister
If yes, what is your birth order	2nd	Youngest	2nd oldest	1st born	1st born	1st born	1st born	1st born	Youngest	Youngest
If yes, # that completed college	None	None	1 sister	None	1 half sister	None	None	None	0	0
Highest edu. level of Mother	4 year degree	HS Diploma	HS Diploma	Grad or Prof	HS Diploma	4 year degree	Some Grad of Prof School	HS Diploma	HS Diploma	2 year degree
Highest edu. level of Father	Some grad/prof.	HS Diploma	HS Diploma	Grad or Prof	Business or Trade School	4 year degree	2 year degree	2 year degree	Some College	
Racial/ethnic makeup of schools	Predominately White	Predominately White	Predominately White	Predominately White	Even between Blacks/Whites	Predominately White	Even between Blacks/Whites	Predominately White	Predominately African-American	Even/Predominately Black (varies)
Racial/ethnic makeup of comm.	Predominately White	Predominately White	Predominately White	Predominately White	Predominately African-American	Predominately African-American	Predominately White	Predominately White	Predominately African-American	Predominately African-American
Upbringing, geographic	Suburban	Rural	Rural	Suburban	Suburban	Suburban	Suburban	Suburban	Suburban	Urban
Upbringing, home environment	2 parent	2 parent	2 parent	2 parent	2 parent in HS, now 1 parent	Single parent	2 parent	2 parent	Single Parent	Single Parent
If single parent home, w/ whom					Mother	Mother			Mother	Mother
Payment for education	Scholarships, loans	Scholarships, grants, jobs	Scholarships, grant, loans, parents	Scholarships, jobs, loans, parent	Scholarships, grants, parents	Scholarships	Scholarships, loans	Scholarships	Scholarships, jobs	Scholarships, grants, jobs
Family yearly income in HS	>40K	20K - 25K	15K - 20K	>40K	20K - 25K	30K - 35K	>40K	35K - 40K	20K - 25K	15K - 20K
Family yearly income now	130K	same	20K - 25K	Same	16K	50K	Same	40K - 50K	Same	>20K
# semesters of employment	3	1co-op	0	2 + 3 co-ops	0	6	4	2	7	3
If yes, where?	Center of Acad. Enrichment &	Federal Highway Admin.		Eng. Workshops, TA, IBM		MEP programs, Univ. Honors	Mentor, Tutor	Dietrick, BEST leader	GBJ, OMEP (Tutor), monitor, RA	RA, Tutor

	Excellence	USDOT								
If yes, how many hours?	2-5 hrs/wk	40 hrs/wk		40 hrs/wk		10 hrs/wk	10 hrs/wk	10 hrs/wk	10-15 hrs/wk	7 hrs/wk Tutor, all the time RA
Extra-curr. in HS?	Band, Church	Wrestling, drama, NHS, SGA, etc	SADD, History/Beta/Language	Chess, Model UN, Basketball...	Basketball, volunteer work	NHS, employment, UMOSA	Beta club, wrestling, band	Track, weightlifting	Beta, FBLA, Football, Baseball	Football, Student Council, Pres.
Extra-curr. at VT?	Tutor, NSBE	NSBE, Dean's Team, BSU, choir	NSBE, ASME, BSA	Tae Kwon Do, Gym, IEEECS	NSBE, Basketball, volunteer	NSBE, employment, Black council.	Phi Beta Sigma, NSBE	Weightlifting, design teams	ACO, FASO, BSA, NSBE	NSBE, Dean's team, SEC
Main reason for attending VT?	ChE. degree	Good eng. Program, good price	Good eng. Program	Good engineering program	Friend convinced me	Financial convenience	Scholarships, reputation	Reputation	Reputation, instate, low cost	Job, diversity, scholarship, locale
Order significance of influences	Father; uncle; 10th grade teacher;	Childhood interest; HS design class	Interest in cars; money;	Myself; parents; OMEP; BEST,	Mother; Young Astronauts;	Father; Dr. X (EF Prof);	HS classes; PCI program;	Young Astronauts Program;	James Weldon Johnson; NSBE;	BEAMS; jobs; job outlook;
	5th grade teacher; 7th grade		Friend who went to VT	NSBE; CHROME; friends	Counselor	Mother	Governor's school; interest in	Father; HS classes	Imhotep; Dr. Watford; James F.	Mother; guidance counselor
	Teacher; HS						Math		Powell; The Challenge	
Order of challenges in eng.	Lack of time; careless errors;	Time management; professors	Fresh.. Statics, time management,	Time management; sleep; profs;	Keeping interest; personal life;	Time management; prof. relations	Being a minority; prof. relations; classmate relations	Motivation on HW; prof. relations;	Sacrifice; no sleep; prof. relations;	Academics vs. social; progress;
	Boring profs		prof. Office hrs, asking questions	Knowing limits; social; money			being a minority	exams; understanding	White culture;	
Advice to VT		Push involvement in NSBE & Manage time well	Create and maintain open feel		Do more hands on activities		Help minority students in getting help if they need it.	Increase # of black professors		Bring more African Americans to Tech.

Table 7

Biographical Questionnaire Data for the Satisfactory Persistent Group

Biographical Questionnaire							
Code	20	21	22	23	24	25	26
Birthday	05/31/1979	09/28/1978	04/04/1978	11/03/1978	05/12/1976	08/28/1979	11/11/1978
Place of Birth	US	US	US	US	US	US	US
City, State	Frederick, MD	Cambridge, MD	Jackson, Mississippi	Charlottesville, VA	Falls Church, VA	Covington, VA	Petersburg, VA
If not US, what year?							
Why did you move?							
Major	ME	EE	ISE	ISE	EE w. business minor	ISE	Mining Engineering
Year of enrollment	1997	1996	1996	1996	1995	1997	1996
HS GPA	3.5	3.3	3.7	3	3	3.8	2.89
SAT	1000	1000	1090	1040	1060	1060	980
When decide on eng.	Before HS	Junior year HS	Junior year HS	Freshman year HS	Junior year HS	Senior year HS	Before HS
Expected graduation, initially	Fall 2001	Spr. 2000	Spr. 2000	Spr. 2000	Fall 1999	Spr. 2001	Spr. 2001
Expected graduation, present	Fall 2002	Fall 2001	Fall 2000	Spr. 2000	Spr. 2000	Spr. 2002	Spr. 2001
Start 1st year in eng.	Yes	Yes	Yes	No	Yes	Yes	Yes
If no, what was other major?				University Studies			
Expected overall QCA initially	3	3.4	3.5	3.2	3	3	3
Overall QCA now	2.2	2.0991	2.4	2.2	2.5	2.42	2
Expected # of semesters initially	8 to 9	8	8	8	8	8	10
# of semesters to date	6	7.5	8	8	10	6	8
Probation and/or Suspension	Yes, 2 times probation	Yes, 2 times probation	No	No	No	Yes	Yes, 1 time probation

Educational goals	Graduate with good grades and B.S.	B.S. EE	At present, B.S. in ISE	Graduate degree	MBA at Duke	B.S. then go on to graduate	Masters degree
Career goals	Graduate school, work for car maker	Robotics engineering	Well paying job with a company	Eventually own his own business	CEO of a Fortune500 company	To be successful	Research in mineral processing
Brothers or sisters	No	Yes	Yes	Yes	Yes	Yes	No
If yes, how many		2 brothers, 3 sisters	2 brothers, 2 sisters	1 brother	2 brothers, 2 sisters	1 brother	
If yes, what is your birth order		5th born	1st born		Youngest	1st born	
If yes, # that completed college		None	None		2 brothers, 2 sisters	None	
Highest edu. level of Mother	Graduate or Professional Degree	HS diploma	4 year degree	Graduate or Professional Degree	Some College	4 year degree	4 year degree
Highest edu. level of Father	4 year degree	HS diploma	4 year degree	Some college	Business or Trade School	4 year degree	4 year degree
Racial/ethnic makeup of schools	Predominately White	Even African-American/White	Predominately White	Predominately White	Predominately White	Predominately White	Predominately African-American
Racial/ethnic makeup of comm.	Predominately White	Predominately African-American	Predominately African-American	Predominately White	Predominately African-American	Evenly distributed	Predominately African-American
Upbringing, geographic	Suburban	Rural	Suburban	Suburban	Suburban	Rural	Urban
Upbringing, home environment	2 parent home	2 parent home	2 parent home	2 parent home	2 parent home	2 parent	2 parent home
If single parent home, w/ whom							
Payment for education	Loans, parents	Scholarships, loans, father	Scholarships, grants, loans	Scholarships, loans, parents, job	Parents	Parents, scholarships	Loans, parents, jobs
Family yearly income in HS	> 40K	35K - 40K	> 40K	> 40K	> 40K	> 40K	25K - 30K
Family yearly income now	Same	Same	Same	Same	Same	> 50K	Lower
# semesters of employment	None	None	4	6	7	0	2
If yes, where?			The Weight Club	Office of Athletic Academic Enrich.	ME dept, Corporate Research Center		Crossroad Music
If yes, how			20 hrs/wk	20 hrs/wk	20 hrs/wk		6 hrs/wk

many hours?							
Extra-curr. in HS?	Key Club, Tennis, Varsity Basketball	Marching Band, Church Choir	Football and basketball	Football, track, NSBE, choir, etc	BSA, football, basketball, math club, etc	Basketball, track, SGA, TSA	Basketball, X-country, etc
Extra-curr. at VT?	Varsity tennis team	Church Choir, Marching Band	Weight lifting and intramurals	NSBE	BSA, BHM, etc	None	Track, Society of MinE
Main reason for attending VT?	Engineering, campus, tennis	Engineering and Band	Engineering	Engineering is best in VA	Black Student Preview, school rank	Scholarships, close to home	Engineering
Order significance of influences	Knight Rider; money; math/science; cars;	Myself; father	HS engineering class; parents	Father	Brother; Fairfax co. schools;	Math/science; parents/teacher;	Personal interest; jobs; parents;
	ASPIRE; parents				Black Preview	Knowledge; money	Money; HS teachers
	Time management; tests; extra-curricular;	Motivation; focus	Statics; Statistical Quality Control;	Communication; prof. relations;	EF; Diff EQ; atmosphere	Tests; time management;	Falsely accused of cheating;
Order of challenges in eng.			Classmate relations; no black faculty	EF department; no blacks		Dynamics; deciding on major	Student/faculty relations; time
		More focus groups	More African-American students and	Encourage more blacks to apply	Increase social atmosphere, help	Send people to talk to black	Teach them to help themselves
Advice to VT			Faculty.	for engineering and faculty	Sessions, career development.	HS students about engineering.	and each other.

Table 8

Biographical Questionnaire Data for the Unsatisfactory- Persistent Group

Biographical Questionnaire							
Code	40	41	42	43	44	45	46
Birthday	05/05/1978	09/04/1977	07/03/1978	11/10/1975	09/17/1977	03/25/1978	09/14/1976
Place of Birth	US	US	US	US	US	Other	US
City, State	Chester, PA	Miami, FL	Covington, VA	Richmond, VA	Los Angeles, CA		Meesport, PA
If not US, what year?						1979	
Why did you move?						Military	
Major	International Studies	CpE	CpE	EE	EE	ISE	MineE
Year of enrollment	1996	1995	1996	1993	95	1996	Summer 96
HS GPA	3.32	3	3.5	3.4	3.1	3	2.7
SAT	1310		1240	1300	1290	1160	900
When decide on eng.	Junior year HS	Before HS	Junior year HS	Senior year HS	Senior year HS	Junior year HS	After HS
Expected graduation, initially	Spr. 2001		Spr. 2000	Spr. 1997	Spr. 1999	Spr. 2000	Spr. 2000
Expected graduation, present	Fall 2000	Spr. 2001	Dec. 2000	Spr. 2002		Spr. 2001	Spr. 2001
Start 1st year in eng.	Yes	Yes	Yes	No	Yes	Yes	Yes
If no, what was other major?				Undecided			
Expected overall QCA initially	3		3	3.5	3		2.5 - 3.0
Overall QCA now	1.98	1.98	2.8	1.99	< 2.0	2	2
Expected # of semesters initially	10		8	8	8	8	8
# of semesters to date	7	9	6	15	8	8	7
Probation and/or suspension	Yes, 2 times prob.	Yes, 1 time on prob.	No	Yes, 2 times prob., 2 times susn	Yes, 2 times prob., 2 times susn	Yes, 1 time prob.	Yes

				susp.	susp.		
Educational goals	Graduate and go into Marine Corps	B.S. in CpE, maybe masters	Graduate CpE degree/business minor	Complete current degree	Finish college, higher degree later	graduate, the get masters	B.A., then M.B.A
Career goals	Military service, then other gov't job.	Important job in major company	Work and grow with a small company	Become wireless comm. engr.		improve the industry	Pilot, CEO
Brothers or sisters	Yes	Yes	Yes	Yes, 2 times prob, 2 times susp.	Yes	Yes	Yes
If yes, how many	1 sister	2 brothers	2 brothers	5 brothers, 3 sisters	1 brother	1 sister	1 brother, 2 sisters
If yes, what is your birth order	Youngest	1st born	Oldest	Youngest	Oldest	1st born	Youngest
If yes, # that completed college	1 sister		None	1 brother, 1 sister	None	None	2 sisters
Highest edu. level of Mother	4 year degree	4 year degree	2 year degree	Some college	HS diploma equivalent	2 year degree	4 year degree
Highest edu. level of Father	4 year degree		Some college	Middle School	2 year degree	Some graduate or Professional	Graduate or Professional school
Racial/ethnic makeup of schools	Evenly distributed	Predominately White	Predominately White	Predominately White	Predominately White	Predominately White	Predominately White
Racial/ethnic makeup of community	Predominately White	Predominately White	Predominately White	Predominately African-American	Predominately White	Predominately White	Predominately White
Upbringing, geographic	Suburban	Suburban	Urban	Suburban	Suburban	Suburban	Suburban
Upbringing, home environment	2 parent home	Single parent home	Single parent home	2 parent home	2 parent home	2 parent home	2 parent home
If single parent home, w/ whom		Mother	Mother				
Payment for education	Scholarships, loans, parents, job	Grants, loans, parent, job	Loans	Grants, loans, job	Grants, loans, job	Loans, parents, job	Scholarships, grants, loans, parents
Family yearly income in HS	> 40K	30K - 35K	20K - 25K	N/A	30K - 35K	> 40K	> 40K
Family yearly income now	Same	> 35K	Same	N/A	Same	Same	Same
# semesters of employment	4	5	0	All semesters	2	2	4
If yes, where?	Taco Bell, Schultz	Computer Labs, Fast food		Kroger, Hardee's, ALI Comps.		Kroger	Convenience store, etc.

If yes, how many hours?	20 - 25 hrs/wk	4 - 5 hrs/wk		30 hrs/wk	20 - 40 hrs/wk	12 hrs/wk	8 hrs/wk
Extra-curr. in HS?	Wrestling, football, track, band	Band, track	Basketball, football, track	Could not remember	Yearbook, SGA	Cross-country, baseball, basketball	Church, sports
Extra-curr. at VT?	ROTC	Non-intramural sports	Basketball		RHF	SEC, IIE, intramural sports	USMC, exercising, reading
Main reason for attending VT?	Good engineering and ROTC	Good engineering, close to home	Engineering	It was either VT or UVA	Engineering	Engineering	Price, education quality
Order significance of influences	Me; ROTC; Father; VT; ASPIRE;	R.A.P.M.E.; neighbors, family;	Family; advisor; Project Discovery	The prospect of providing a		Lack of interest other fields;	Salary, father
	HS teachers	ASPIRE	Program; Talent Search Program	Comfortable life for my family.		Reputation; career/money	
Order of challenges in eng.	Grasping concepts; requirements; time; corp/ROTC; professors	Money; professor relations; many requirement; study groups	Finding help; communication; time; Limiting other activities	Comprehension of certain Subjects.	Working part-time; time management	Some classes	Myself; grades
Advice to VT	Continue with help groups, work closely with professors.		Make study time mandatory.				

Table 9

Biographical Questionnaire Data for the Non-Persistent Group

Biographical Questionnaire								
Code	30	31	32	33	34	35	36	37
Birthday	11/27/1977	05/12/1978	04/24/1979	09/26/1977	08/24/1977	07/13/1978	07/09/1977	09/01/1977
Place of Birth	US	US	US	US	US	US	US	US
City, State	Roanoke, VA	San Jose, CA	Jacksonville, FL	Mount Vernon, NY	Hampton, VA	Fairfax, VA	Red Bank, NJ	Newport News, VA
If not US, what year?								
Why did you move?								
Major	IDST	Poli Sci and Soc	Econ	Econ	Biology	Econ	Psychology	Engineering
Year of enrollment	1995	1996	1997	1995	1995	1996	1995	1995
HS GPA	3.2	3.25	3.65	3.4	3.3	2.7	3.3	3.1
SAT	1030	990	1310	1030	1020	1000	1000	900
When decide on eng.	Sophomore year HS	Junior year HS	Junior year HS	Before HS	Senior year HS	Senior year HS	Senior year HS	Before HS
Expected graduation, initially	Spr. 1999	2nd term 2000	Spr. 2001	Spr. 2000	Spr. 1999	2nd term 2000	Spr. 1999	Spr. 1999
Expected graduation, present	Fall 2000	2nd term 2000	Spr. 2002	Summer 2000	Spr. 2000	Fall 2000	Summer 2000	Spr. 2001
# of times changed major	3 times	1 time	1 time	2 times	1 time	1 time	3 times	No
Reason for changing major from engineering	Difficulty in math and EF	Difficulty in math	Curriculum was not what anticipated	Didn't want to do engineering	Struggled in it, wanted different career	No more interest in engineering	Got behind in EF and couldn't get help	
Expected overall QCA initially	2.8	3	3	3	3.5	3	3	3
Overall QCA now	2.048	2.45	1.7	2	2.2	1.9	2.3	1.7
Expected # of semesters initially	8	10	8	10	N/A	9	8 to 9	8
# of semesters to date	10	8	5	10	N/A	8	10	10
Probation	Yes, 3 times	No	Yes, 1 time	Yes, 2 prob., 1	Yes, 1 time	Yes, 2 times	No	Yes, 2 times

and/or suspension	probation		probation	time suspension	probation	probation		prob., 1 time suspension
Educational goals	Get degree, graduate school	Earn a Master's degree	Earn degree, later graduate school	Graduate with a 2.5 or higher	B.S. now, MBA later maybe	Graduate with degree and good QCA	Looking forward to graduating	Successfully finish college
Career goals	Research or administration	Become a local politician	Corporate consulting or info. systems	Comfortable paying job	Entry level, later own small business	Respectable, high paying job	Don't know yet	One day own his own business
Brothers or sisters	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes,
If yes, how many	3 brothers	1 brother	1 sister	1 sister	2 brothers, 1 sister	2 brothers		1 brother
If yes, what is your birth order	Youngest	1st born	1st born	Youngest	Youngest	Middle		Youngest
If yes, # that completed college	2 brothers	None	None	1 sister	1 brother, 1 sister	1 brother		
Highest edu. level of Mother	2 year degree	2 year degree	HS diploma or equivalent	2 year degree	Graduate or Professional degree	4 year degree	HS diploma or equivalent	4 year degree
Highest edu. level of Father	HS diploma or equivalent	Some college	2 year degree	2 year degree	Some college	Graduate or Professional degree	2 year degree	Some college
Racial/ethnic makeup of schools	Predominately White	Predominately African-American	Predominately White	Predominately White		Predominately White	Predominately White	Evenly distributed
Racial/ethnic makeup of comm.	Predominately White	Predominately African-American	Predominately White	Predominately White	Predominately African-American	Predominately White	Predominately White	Evenly distributed
Upbringing, geographic	Rural	Urban	Suburban	Suburban	Urban	Suburban	Suburban	Urban
Upbringing, home environment	2 parent home	Single-parent home	2 parent home	Single-parent home	2 parent home	2 parent home	2 parent home	2 parent home
If single parent home, w/ whom		Mother		Mother				
Payment for education	Loans	Scholarships, grants, loans, job	Loans, parents	Grants, loans, jobs	Loans, parents, jobs	Grants, loans, jobs	Loans, parents	Loans
Family yearly income in HS	> 40K	20K - 25K	> 40K	> 40K	> 40K	> 40K	> 40K	> 40K
Family yearly income now	Same	Same	> 50K	Increased	Same	Same	75K	Same
# semesters of	8	2	2	8	4	3	0	0

employment								
If yes, where?	Army National Guard & Library	Intramural basketball official	New River Valley Mall	MEP, Dietrick, Burger King, etc	Night monitor, fitness room monitor	Rec. Sports		
If yes, how many hours?	20 hrs/wk	15 hrs/wk	25-30 hrs/wk	20 - 40 hrs/wk	14 hrs/wk	20 hrs/wk		
Extra-curr. in HS?	SGA, tennis, football, band, Kiwanis	Tennis; band; cross-country; Church	Class Treasurer, CHROME, NHS, etc	Basketball, Baseball	Football, CHROME	Football and basketball	Spanish club, student council, sports	Band, CHROME, SHARP
Extra-curr. at VT?	Army National Guard	Basketball; tennis; lifting		Intramural basketball	MANRRS, NSBE, intra-football, etc	Intramural sports, lifting	Intramurals, delta sigma pi	None
Main reason for attending VT?	Engineering program	Good school reputation	Engineering reputation	Only place accepted	In-state, good engineering, near home	Reputation of school and engineering	No main reason. Liked orientation	Engineering
Order significance of influences	Guidance counselors; engineering	Cousins; Mother; Myself;	Family; Counselor; employment	Middle school program; parent; money	Money; CHROME; family	Parents; HS counselors	Support of parents	Father; CHROME; SHARP
	Programs in HS; HS teachers	Guidance counselor	Outlook; ISE and business combo.					
	Corp of Cadets; social life; getting	Math; science; being young;	Lack of interest in technical classes;	Statics; calculus; physics	Time management; overloading classes;	Understanding some material; time	Getting help; feeling comfortable in	Computer programming; Statics
Order of challenges in eng.	Help	No motivation	Requirements, lack of electives; time.		Getting help; less engr background	Management	Class	
Advice to VT	Remove the weed out EF programs, more counseling for engr students.	More minority special programs to keep blacks together.	Interest in engineering.	Early support for struggling students	Expand ASPIRE/BEST, time manage, more seminars, less weeding out.	There are many programs for us, which has been very helpful.		More all black male student gatherings at the university.

Ultimate-Persistent Group and Thematic Summary

The *Ultimate-Persistent Group* served as the “flagship” sample group because it epitomized what the other sample groups had hoped or planned to accomplish – obtaining an engineering degree and employment in the field – when initially enrolling at Virginia Tech. The *Ultimate-Persistent Group* identified stories and experiences very similar to its counterparts such as the *Exemplary-Persistent Group* and *Satisfactory-Persistent Group*. The researcher attributed these similarities to the range of ages and experiences encountered by the *Ultimate-Persistent Group*. In more detail, members of this sample group did not have the same rigid criteria as the two sample groups. The members were *only* required to have completed an engineering degree. Such factors as cumulative QCA were not even considered. For this reason, it was expected that the *Ultimate-Persistent Group* would identify similar stories and experiences. For example, many of these participants would have been in the *Exemplary-Persistent Group*, and some would have been in the *Satisfactory-Persistent Group* if they had still been enrolled in the College of Engineering.

The *Ultimate-Persistent Group* talked candidly about their experiences in the College of Engineering, Virginia Tech, and Blacksburg. Many of the participants commented about enjoying their time in the College of Engineering. Such favorable comments were more consistent with this sample group than any of the others. Even though they overall enjoyed their experiences in the College of Engineering, many of the participants commented that they had to overcome many obstacles related to race. Like members in the other sample groups, several found it difficult to study with white peers and engage their engineering professors and advisors. Many commented that their white

peers were reluctant to share resources and even study with them. As a result, many relied on other African-American students to complete assignments and to get through engineering courses. Others commented that their white peers were more willing to study with them after they “prove” themselves academically. This was usually done by doing well on homework assignments, projects, and examinations.

This sample group relied heavily on the OMEP. It was evident by the frequent responses related to persistence, resources, and support. All of the participants spoke favorably about the OMEP and its director and staff. OMEP provided programs that compensated for the deficits in the College of Engineering. Mentoring (e.g., BEST), tutoring, and advising were regarded as the most significant initiatives offered by OMEP. Also, OMEP, faith, familial support, networking with both African-American and non-African-American students, and using professors’ office hours were regarded as the most influential factors in their persistence.

In spite of the challenges endured in the College of Engineering, these participants were determined to graduate with an engineering degree. These participants embraced the attitude that “failing was not an option.” This attitude propelled them to do whatever it took for them to succeed. In addition, this attitude helped them not only to persist but also to help other African-American students persist, too. Many of them commented that they served as a mentor for other African-American students and also helped contribute to OMEP and its mission.

These participants, like members of the *Exemplary-Persistent Group*, stated that they viewed themselves as persistent, academically successful students. In addition, they stated that they were happy that they persisted through engineering - the rewards at the

end of the rainbow made it well worth it. This point was best illustrated with the following quote:

When I tell my co-workers (mostly white males) that I graduated from Virginia Tech in Engineering, it's like instant respect. [UPG55]

After this comment, the researcher asked the sample group during the focus group discussion, "Do they attribute this reaction to Virginia Tech or to the lack of black males graduating with engineering degrees?" Everyone attributed the reaction to both the reputation of Virginia Tech's engineering programs and the shortage of African-American males with engineering degrees.

Exemplary-Persistent Group and Thematic Summary

Like the *Ultimate-Persistent Group*, the *Exemplary-Persistent Group* perceived itself as being persistent, academically successful. This sample group was very focused and motivated. They had good time management skills and study habits. The participants all matriculated in the College of Engineering expecting to succeed. The quotes below indicated this point.

You've got to be in it to win it or you're not going to succeed like you want to. [EPG from focus group]

...you don't give yourself the option that you're going to drop out of school or you going to change majors...You only have the motivation to go forward because you told yourself, "I won't go back." [EPG13]

These participants in this sample group were also willing to do whatever it took to become an engineer, whether it was reducing their number of extra-curricular activities, studying more, or seeking tutoring. Seeking assistance was not viewed negatively, but instead it was viewed as "doing whatever it took to be successful." In fact, many of the

participants lamented that making sacrifices were synonymous with majoring in engineering. This notion was best illustrated with the following quotes:

It is like if you had a dozen things that you are interested in and engineering being one of them. Engineering gets developed and it progresses so rapidly that everything else gets behind. I came in doing gymnastics, [but] I have not been in the gymnasium in two years and there are so many other things that get left behind. [EPG *from focus group*]

I think it's personal sacrifice. You have to sacrifice...You have to sacrifice most of your comfort and it takes away more of the stuff you like to do. [EPG *from focus group*]

[As] an engineer, you always put work first. A lot of times it is just part of being disciplined. [EPG *from focus group*]

This sample group, outside of the *Ultimate-Persistent Group*, seemed to have the best understanding of the effort required in becoming an engineer and, more importantly, willing to devote the needed effort to it. Although money was important, it was not regarded as the main focus of emphasis. They also recognized the value of engineering courses that may have lacked specific relevance to their areas of interest. Such courses were viewed as valuable in helping improve their analytical and problem-solving skills. This was especially the case for courses in the Engineering Fundamental Department.

Many of them indicated that they knew they wanted to become engineers from a young age. Becoming an engineer was considered a lifelong dream. The sample group's desire to become an engineer was motivated by genuine interest and high aptitudes in math and science. Similar to the *Ultimate-Persistent Group*, these participants had been exposed more to the engineering culture through special programs, friends, and family. All were regarded as instrumental in stimulating their interests and persistence in engineering.

The participants in this sample group were clearly more academically successful than any of the other sample groups, and this included even the *Ultimate-Persistent Group*. The big difference between the two was that members of the *Ultimate-Persistent Group* had their engineering degrees, and members of the *Exemplary-Persistent Group* did not have their engineering degrees yet. As a result of high QCAs, the *Ultimate-Persistent Group* experienced lower resistance in accessing study groups. Both African-American and white students sought help from these participants. The quote below indicates this point:

They [white students] can't hold a prejudice against me since I'm teaching them the material. [EPG from focus group]

Regardless of the slights, these participants felt that they had to work twice as hard to overcome the negative perceptions of African-American males in society in general and engineering in particular. The negative stereotypes affected this sample group a lot differently from the other sample groups. In many ways, it served as a motivation to "prove them wrong." The quotes below illustrated this point about this sample group.

He's [the professor] going to assume to know your background. Basically, he's going to assume okay – single parent at home, SATs are pretty iffy, and probably a sports figure. Basically, you have to work to dispel his beliefs...try to revert his stereotypes...you have to prove that you belong to the College, next you have to prove you belong in his class, [and] then you have to prove you can do well in his class. So you know... you're working two or three times as hard in the same class versus someone else. [EPG from focus group]

...a lot of the professors think that freshman year you're not capable of doing well...unless you show [them] you can do it...so you have to work harder than ever. [EPG from focus group]

I do feel it's pressure but I pretty much know, when I come into a class that I'm either getting an A, B+, or B-. B- is the lowest I'm going to get, no matter what. [EPG10]

A lot of times, when we're in study groups or in the classroom, I feel I have to prove myself...Using my hands and trying to make sure my words are pronounced correctly, I feel like all those things are under the scope and so I have to be careful. [EPG19]

With all the work, you got to study twice as hard...you've got to work twice hard as everybody else. [EPG13]

...there's so much you have to overcome as an African-American male and let alone the difficulty of regular engineering curriculum, which is enough to knock most, knock a lot of people out. Then, you also have to overcome a lot of the stereotypes that you face being an African-American, so that's why it's so tough and challenging because all of the obstacles you have to overcome. [EPG17]

It's like you can't get any respect until after the first test. It's like...if you're working hard and...you perform well, it's like he's not just some dumb [African-American] or whatever... [EPG from focus group]

Other factors such as family support, faith, and friends were instrumental helping these participants persist in the College of Engineering. In addition, the notion of "knowing the system" was also regarded as critical in helping African-American males persist. This terminology was referred to having an understanding of how the university, College of Engineering, and professors functioned and operated. For example, many participants commented on the importance of stopping by professor's offices during office hours, so the professor could learn the student's name. Some even discussed the importance of connecting with engineering peers who were doing well.

Satisfactory-Persistent Group and Thematic Summary

Most of the participants in this sample group viewed themselves being between persistent academically successful and persistent academically unsuccessful. Common themes that emerged from the data were issues of time management, test-taking skills,

and lack of focus through over-involvement in other activities. More importantly, there was a greater lack of preparation for the demands of the field. The consequence of this behavior was less self-confidence and a tendency to be affected more by the social environment.

I believe society has established a standard or set evaluation for blacks as underachievers in education. It makes us believe we cannot do as well. [SPG *from focus group*]

I knew before I came...I knew that I was at the bottom of the barrel trying to climb up like when I was a kid. Virginia Tech didn't make me realize nothing except it gets worse and worse the older and higher you go. [SPG *from focus group*]

...you walk around here and you don't see any black faces, and the ones you do see – they want to look at the ground, see what a rock looks like today or something. Like they've got something else on their mind, this is crazy. [SPG *from focus group*]

Although the participants had between a 2.0 – 2.5 QCA, this was not done without extreme highs and extreme lows. Many of these participants commented on the continuous struggles experienced in the College of Engineering.

For me, it was a roller coaster ride because I started off kind of high my first semester and then from there it was a bumpy ride downhill. [SPG *from focus group*]

Yeah, it's like up and down; sometimes, you want to go downtown or you want to do whatever your friends are doing, instead of sticking to what you should be doing. So, it results in you having good grades one-semester and average grades the next semester. It's just a constant roller coaster ride. [SPG *from focus group*]

There were also constant discrepancies among the participants. Many stated that race had nothing to do with their academic performance, and others stated differently. The most common discrepancy among the participants occurred over the objectivity or lack of objectivity of professors' exams. For example, one participant made the following responses:

You have to do one hundred fifty percent and another one hundred percent even to make them [professors] happy. [SPG from focus group]
You don't get a test strictly objective – you know, abc, multiple choice. If you look under the test where teachers' [disclaimer is located], it's up to their discretion [what grade you received]...I mean you're at their mercy...I mean, if they have issues dealing with race [issues], they'll get you [SPG from focus group]

One participant disagreed with this person's opinion. For example, this participant made the following statements, but please note that the first statement was the statement directed at the other participant's first response and the second response directed towards his second response:

Like if you know the stuff, you know the stuff. If you don't, you don't...If you are black, I don't think you're going to get a less grade than someone white sitting beside you. [SPG from focus group]

Alright, they have issues, but [if] your answers [are] right and you can show your answers right, there's nothing they can do. [SPG from focus group]

Unsatisfactory-Persistent Group and Thematic Summary

The participants in this sample group perceived themselves as being somewhere between persistent academically unsuccessful and non-persistent academically unsuccessful. All of the participants were determined to complete their degrees in engineering, in spite of their low QCAs. Examples of this were presented with the following quotes:

Nobody is going to rob me of the opportunity. Cause if I couldn't do it, I wouldn't have been here in the first place. Just some things went wrong in college. [USPG41]

No matter how bad my grades get I am here for the long haul. [USPG43]

I'm not ignorant...I say anybody that can at least get in the College of Engineering is intelligent... everybody makes good grades, and everybody makes bad grades. I like to look at history that's how I try to keep myself motivated... just say "I can do this." [USPG46]

Although their grades were unsatisfactory, many possessed a greater determination to persist in engineering, due to the possibility of being suspended from the university as a result of low QCAs. Not only were these participants fighting to remain in school, but they were also fighting to complete the qualifications for an engineering degree. This was indicated by the comments made throughout the focus group and individual interviews. In general, this sample group seemed least integrated in the social and academic life of the College of Engineering. This was attributed, in large measures, to the dire need for employment. In other words, many of the participants had to work part-time and full-time jobs to support themselves financially. The effects of working impacted many of the participants' grades. The statements below illustrated this point:

Right now, what I would like to do is make enough money that I can just go to school and not work during school and put all my effort into [school]... I tend to do better that way. Last semester, I had to work through school but the semester before that I did better than I usually do because I wasn't working that whole semester...I [did] not have to tie up those extra hours working. [USPG44]

Being poor at college really hurts you. It hurts you a lot. Resources when it comes to money and having to work. If you are working, it takes away from your study time... I remember one semester for at least four weeks I didn't have many of the books. So, I used to go to the bookstore and work store and read my homework assignments. [USPG41]

Many of the participants in this sample group made unwise academic decisions in the College of Engineering. A number of these decisions resulted in setting back some of the participants. The following statements indicated how these participants were set back academically:

I got behind in the beginning on one thing, and it was a really small thing...if you ever get behind, then you're just in trouble through the whole way because you can never catch up again or never do anything about getting back on even footing with everybody else. It's like for the

rest of the time you're behind, even though it was just one class or one requirement that you may not have made... [USPG *from focus group*]

If you decide to drop one class...every class you dropped just pushed your graduation further and further ahead. [USPG *from focus group*]

By and large, this sample group did not capitalize on the resources available on campus. Most of the participants relied on themselves to complete homework assignments and projects. In addition, most of the participants did not think that the social environment had any bearing on their academic performance.

Non-Persistent Group and Thematic Summary

Poor study habits and non-persistence were common to this group. Most spoke of their lack of time management, study skills, work ethic, and poor prioritizing while in the College of Engineering. Many of their statements implied that they had many problems getting themselves together. Examples of these statements appeared in the focus group discussion.

It's not really the College of Engineering. It was just like...I didn't have good work habits or study skills; [therefore], it was just hard trying to get adjusted to how you [do] things in college. Honestly, I think the first couple of years...If I was in any other major, I'd probably be having the same difficulties just because of my own personal habits that I had. (NPG *from focus group*)

I think it's more an issue of having either good habits or bad habits or no habits at all. [This] affected the performance more than you know... [NPG *from focus group*]

It's what you make it...it's like something that may have been harder, but most of it, like anything in college, is what you make it. It's like you get out what you put into it, so maybe, at that time, we were all young and didn't put into it as much as we should have and taken it as serious as we should have. [NPG *from focus group*]

Some even attributed their lack of persistence in the College of Engineering to poor academic preparation. The effect of the academic background and inadequate

academic preparation comes across clearly. The interview protocol for the focus group evoked responses relevant to this topic. Sample statements indicated that lack of academic preparation contributed to these participants' lack of persistence and success in the College of Engineering.

Many white males also have problems in engineering. [NPG *from the focus group*]

A lot of the freshman classes are just to weed people out anyway, so they're making [them] intimidating. I know with me – I hear people talk about, when they were in high school, they had all these engineering programs [and] advanced math courses. I know our school system didn't have anything like that, so a lot of [freshman students] came in already [knowing this stuff], but I had no idea – I'm like "What is this?"

I think it was poor [academic] preparation coming here...the classes I didn't take in high school. [NPG *from focus group*]

There were things I didn't know coming in here, and things I really couldn't learn just because I didn't have a basis and a foundation... [NPG *from focus group*]

I mean the teachers are expecting you to know something to do with calculus...if you don't know this...[you are] overwhelmed by the course...I don't think that I was too focused on learning but still I felt like a failure. [NPG *from focus group*]

Personally for me, it [engineering] was hard just because I wasn't prepared for the classes I was going to be taking, and I didn't have a choice of the classes, being a freshman, so I tried to prepare myself after the first semester...I went back and took some pre-calculus classes and stuff...I just wasn't prepared, and I couldn't prepare myself for engineering. Basically, it was hard and very stressful. [NPG30]

Unlike the *Ultimate-Persistent Group*, *Exemplary-Persistent Group*, *Satisfactory-Persistent Group*, and even the *Unsatisfactory-Persistent Group*, most of these participants did not know what to expect when pursuing courses in engineering. Examples of this appeared in the focus group transcripts.

In high school when you chose engineering, you really didn't know what it was about. [NPG *from focus group*]

The reason you might not be doing as well as you could is [because] you are just not motivated to try to do better [and] because you realize this is not what you wanted to do. [NPG *from the focus group*]

I think a lot of people have heard of engineering but not a lot of people know what engineering is. It's one of those things where "I'm going to school to be an engineer," and you get here and you get into the school of engineering and you're like "Okay, what do I want to do now that they say I can be an engineer?" [NPG *from the focus group*]

Most of the participants lacked adequate exposure to engineering during the early years of childhood. As a result, many had to rely on external factors to help make their decision to major in engineering. Family and money were cited as the most common reasons for majoring in engineering. This sample group clearly lacked interest and in some cases aptitude in engineering. Although most said race was not instrumental in their academic performance, some did find that the academic staff and faculty were not supportive enough, especially when it concerned engineering concepts they were expected to know. Ironically, some found the African-American faculty to be demanding. Sample statements were given to illustrate this point:

Dr. X was my minority advisor, and I would talk to her a lot, and she had high expectations of us and our work ethic. She wanted me to work hard, and she wanted me to put in the time and I did that and things just didn't come to me...when I told her things didn't come to me and I was going to leave engineering, she felt disappointed and I felt disappointed in myself...I thought she added more stress on the academic excellence than other people did. So that was kinda stressful for me at the time. [NPG *from the focus group*]

I got a lot of pressure from Dr. X and some of my friends. I got a minority scholarship from her so I had to see her every month. I kept telling her "I can't do this," and she kept telling me to stick it out and I knew it wasn't going to make a difference, but I did it anyway...I felt bad because I think I let my people down, and, at the same time, I felt like she was pressuring

to me too much...I felt like the minority engineering programs kind of added stress when they were just trying to help us out. [NPG30]

Overall, the social climate in the College of Engineering presented a greater obstacle for this sample group. Many commented on the competitiveness in the College of Engineering and how this atmosphere turned them off. In addition, many commented on negative responses they experienced in the College of Engineering. Examples of these comments are presented below:

There is no teamwork when working with white males who are competing against you. It just doesn't work. [NPG *from the focus group*]

I think they [College of Engineering] kinda breed people to be arrogant and stuff...it comes across to the students so does the workload. [NPG *from the focus group*]

Engineers are not the friendliest...and that again is an obstacle. [NPG *from the focus group*]

...like sometimes you have to do group work or ask someone for help and when you asked like a white person for help, I felt they were completely against me...They were just like "you're on your own buddy." . [NPG *from the focus group*]

A lot of them [white students] probably do think that you're [African-Americans] joined at the hip because of Affirmative Action or you're on the football team or whatever. I've had people ask me "What sport do you play?"