

THE RECRUITMENT AND RETENTION OF ETHNIC MINORITY STUDENTS IN
COLLEGIATE AVIATION PROGRAMS

by

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I dedicate my thesis to my family. Thank you all for your love and constant words of encouragement.

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ABSTRACT

An underrepresentation of minorities exists in the aviation industry. This underrepresentation can also be seen in collegiate aviation programs. Colleges and universities as well as other organizations have attempted to recruit and retain more minority students into STEM majors. The purpose of this study was to examine the perceptions of minority and non-minority student on the effectiveness of recruitment and retention strategies used within the Middle Tennessee State University Aerospace Department. To collect responses, a survey was utilized. It was found that the majority of students, both minority and non-minority, believe racial bias does not exist in their aviation program. While students felt their aviation program lacked effective recruitment strategies, they were satisfied with strategies used to retain students.

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CHAPTER I: REVIEW OF LITERATURE

Ethnic minorities (i.e. African American, Asian, Hispanic/ Latino, Native American, etc.), have been involved in aviation throughout its history. Whether it was participating in wars or setting new records, minorities have played a special role in making aviation what it is today. While the number of minorities working in the aviation industry has increased over the years, statistics show that minorities represent under a third of employees working in the aviation field. Similar numbers are also reflected when looking at minorities entering collegiate aviation programs.

These numbers can be attributed to a number of factors, and it is important that the industry look for ways to increase the number of minorities working in the field. Most research suggests efforts in increase diversification must start early on. Providing minorities with effective methods for entering collegiate aviation programs and graduating from those programs can ensure that minorities are receiving the same opportunities to be successful in aviation.

Minorities in Aviation History

Since its beginnings, the aviation industry has had an under-representation of minority groups. Aviation became popular during the first and second World Wars. Most pilots that participated in flying at the time were Caucasian males. Although women and minorities faced many struggles, they were able to enter the aviation field and were successful. Eugene Jacques Bullard was the first African American military pilot. Bullard was an American volunteer in the French army. He is the only known black pilot to fight in World War I (San Diego Air & Space Museum, n.d.b.). In 1910, Aberto Braniff

became the first person in Mexico to complete a powered flight. In 1921, Bessie Coleman became the first African American female pilot. She could not earn her license in America, so Coleman traveled to France to receive flight training (San Diego Air & Space Museum, n.d.b.).

In 1927, Emilio Carranza, a lieutenant in the Mexican Air Force, completed the third longest non-stop solo flight in the world. The first and second longest flights were completed by Charles Lindbergh (San Diego Air & Space Museum, n.d.d.). Katherine Cheung, often called China's Amelia Earhart, became the first African American woman to become a pilot. Although her first career choice was music, after experiencing one day at an airfield, Cheung knew she wanted to become a pilot. At the time, around 1932, only 200 women were licensed pilots. This group of women made up one percent of all licensed pilots in the United States (Woo, 2003).

The Civilian Pilot Training Program (CPTP) was a government sponsored flight training program whose purpose was to increase the number of civilian pilots in the United States. The CPTP provided many minorities with opportunity to learn to fly. The program was operated by flight schools and colleges/universities, including historically black colleges and universities, including Hampton University, Howard University, and Virginia State University (San Diego Air & Space Museum, n.d.b.). The Tuskegee Airmen were taught how to fly in Alabama and went on to be extremely successful in World War II. Their efforts also helped convince the government to desegregate the armed forces (American Airlines, n.d.). The Aztec Eagles, an all Mexican air force unit,

were also involved in World War II. They worked alongside the United States in the Philippines to help defeat the Axis Powers (Carnes, 2010).

There were other individuals that were able to get their start during the war as well. Arthur Chin became the first person of Chinese American flying ace (San Diego Air & Space Museum, n.d.a.). He led formations against the Japanese and participated in many battle against their army. Hazel Ying Lee was one of the first Asian American women to become a military pilot. Lee first tried joining the Chinese Air Force but was turned down because she was a woman. In 1944, Hazel Lee joined the Women Air Force Service Pilots (WASP) in American, where she learned how to fly aircraft, such as the P-63 King Cobra and the P-51 Mustang (San Diego Air & Space Museum, n.d.a.). Oscar Perdomo, a Mexican American, is now known as the “last ace of World War II.” He became an ace in one day, shooting down four fighters and a biplane trainer (San Diego Air & Space Museum, n.d.d.).

Minorities continue to make strides in aviation today. In 2004, Kenny Roy became the youngest African American licensed pilot to fly (under Canadian law) at the age of 14 (San Diego Air & Space Museum, n.d.c.). Another teenager, Kimberly Anyadike became the youngest African American female pilot to fly across the country in 2009. Also in 2009, the first commercial flight flown by an all-African American female crew was completed from Hartsfield-Jackson Atlanta International Airport to Nashville International Airport (San Diego Air & Space Museum, n.d.c.). Most recently, in 2013, Michael Huerta, a man of Hispanic descent, was sworn in to his position as the

Administrator of the Federal Aviation Administration (Federal Aviation Administration [FAA], 2013b).

Statistics

While the above mentioned groups and individuals were able to break down barriers and open doors for minorities in the future, there is still a low percentage of minorities entering the aviation field. In 1998, the FAA employed 50,249 people. During that time, the workforce consisted of only 18.2% minorities (National Black Coalition of Federal Aviation Employees, 2003). In 2011, an increase in the percentage of minorities was seen to 22.2% (FAA, 2013a); however, this number is still quite small. There were a total of 47,739 people employed with the Federal Aviation Administration in 2012. Of those employees, 10% were African American/Black, 6.7% were Hispanic/Latino, around 4% were Asian, 1.3% of were American Indian/Alaska Native, and 0.3% were Native Hawaiian/Pacific Highlander. The number of all Hispanics, African American females, and Asian females were all below Civilian Labor Force averages (Federal Aviation Administration, 2013a).

An under representation of minority students is also present in Science, Technology, Engineering, and Math (STEM) programs in colleges and universities nationwide, including aviation programs. From 1996 to 2006, the number of bachelor degrees earned by African Americans and Hispanics increased by only two percent. During those years, minorities accounted for fewer than 20 % men and women earning STEM degrees (Valla & Williams, 2012). In 2010, a total of 507,143 students (U.S. citizens and permanent residents) earned bachelor degrees in STEM majors.

Asian/Pacific Islander/Native Hawaiian students represented 9.9%, African American students represented 8.6%, Hispanic students represented 9.1%, and American Indian/Alaska Native students represented 0.7% (National Science Foundation, 2011).

Why are Minorities Under-represented in Aviation?

One-third of the school age population in the United States is African American, Latino, and Native American. However, these groups represent only 11% of those in STEM occupations. So what factors are contributing to the low number of minorities in STEM fields, particularly aviation? Lisa Tsui (2007) suggested that cultural, structural, and institutional barriers can cause a student to choose pursuing a non-STEM program and occupation. Public school funding depends largely on property taxes (Williams, 2013). This means that school districts that consist of low-income neighborhoods, which are often times highly populated with minorities, do not receive adequate funding for teachers and resources.

Affluent school districts provide students with newer textbooks and equipment, experienced teachers, and a variety of advanced classes because they have the funding to do so. Less affluent school districts will often have out of date textbooks, lack of equipment and technology, inexperienced teachers, and teachers that are required to instruct classes outside of their degree majors. These school districts will also lack in the number advanced placement (AP) courses (Williams, 2013). Research shows that students who take more advanced science and mathematics courses during high school are more likely to enter into STEM majors in college (Tsui, 2007). Many minority students do not have the opportunity to get this type of experience.

Cultural opposition is another factor in minority under-representation in aviation. John Ogbu, anthropologist and professor, explained that those belonging to minority groups may feel pressured into abandoning their own culture to conform to the culture and traditions of the majority (Williams, 2013). This pressure can create feelings of resentment, inadequacy, and resistance amongst minority students, and consequently affect school performance. The end result could lead to minority students dropping out school.

Stereotype threat is also a factor affecting minority students. Stereotype threat is defined as “being at risk of confirming... a negative stereotype about one's group” (Steele & Aronson, 1995). In 1995, Claude Steel and Joshua Aronson conducted a study to examine the effects of stereotypes on student performance. The study used two difference scenarios. In the first, black and white college students were asked to take a test that would indicate students’ intellectual ability. In the second scenario, black and white college students were asked to take the same test with no mention of intellectual indication.

Results showed that black students in the second group performed as well as white students and higher than the blacks students in the first group (Steele & Aronson, 1995). Whether race and competence are emphasized in school by teachers and peers or at home with parents, it can create a loss of interest and self-confidence within students. Furthermore, feelings of failure could lead to a student performing poorly on school work.

Possible Solutions to Address Minority Under-representation in Aviation

The aviation industry has attempted to find ways to diversify itself in the past. These attempts have come as soon as the elementary school level. There have been a number of strategies used to try to heighten minority students' awareness and interest in aviation. Strategies have also been used to recruit minority students into collegiate aviation programs and to ensure that those students are retained. A number of the most common of these strategies are discussed below.

After School Programs and Summer Camps.

Common strategies for elementary and middle school students are after school programs and summer camps. Two examples such strategies are Find Your Wings program and Sisters in Science (Valla & Williams, 2012). The Find Your Wings program was geared towards informing young girls of the importance of math and science, improving math and skills, changing the girls' opinions of math and science classes, and exposing the girls to aviation careers. The program lasted six weeks and included in-school workshops led by women of different occupations, particularly pilots, and weekend field trips. The Sisters in Science program was also focused on increasing interest in STEM fields through field trips and in class discussions. The after school program met once a week and included Saturday classes (Valla & Williams, 2012). Although these programs are exclusively designed for girls, also minorities in aviation, similar programs could be effective for ethnic minorities as well.

After school programs and summer camps are similar for high school students, however they involve more in-depth workshops, lectures, and field trips. The Gateway to

Higher Education program, targeted towards ethnic minorities, included after school activities such as math and science tutoring, as well as summer portion that included SAT and college admissions preparation (Valla & Williams, 2012). Another example of a high school summer camp is the Kansas State University at Salina's Aerospace Flight Academy Camp. Over a 10 day period, minority students were exposed to a variety of aviation careers, including air traffic control, airport management, and piloting (University Aviation Association, n.d.). Students lived on campus and attended college-styled lectures.

Middle Tennessee State University (MTSU)'s Aerospace Department also conducted a summer camp for minority high school students. The week long program began with a flight into the Murfreesboro Municipal Airport. While staying in the campus dorms, students were able to interact with minority graduate students and participate in workshops, where they learned information about the aviation fundamentals and careers. Each was also able to complete a three hour flight using the school's training airplanes.

Summer Bridge Programs.

Another example of such a program is Wright State University's Science, Technology, and Engineering Preparatory Program (Yelamarthi & Mawasha, 2008). Participants completed a 4 year program where they participated in workshops, classroom instruction, and hands on experience. Researchers Yelamarthi and Mawasha (2008) conducted a study to observe the progress of students. Results showed an increase in the number of students interested in STEM fields and the retention of those students.

Mentoring.

Mentoring is another strategy that can be used to retain students in aviation programs (Tsui, 2012). Mentoring involves partnering a minority student with a mentor that can motivate and support the student. Studies have shown that minorities who enter into mentoring programs have higher grade point averages and increased self-efficacy. Interest in graduate school is also increased when minorities are partnered with faculty members in mentorship programs. Race/ ethnicity do not seem to be factors when choosing mentors. In the *Striving for Effective Retention: The Effect of Race on Mentoring African American Students*, it was found that most students did not mind if their mentor was of another race, as long as the mentor was in their desired career field (Lee, 1999).

Instructor Race.

This fact seems to be different when relating race with faculty members. Price (2010) examined the relationship between minority persistence in STEM majors and instructor race. Data was collected from 14,448 black students and 1,613 black faculty members at Ohio universities. The study revealed that black students were more likely to persist in STEM majors after freshman year when they were taught by black teachers (Price, 2010). This conclusion could lead to the recommendation of more minority faculty members in higher education institutions.

Tutoring.

Tutoring is a strategy that can be used to improve student performance and persistence. A 1975 study examined the effectiveness of tutoring. Students taking a

remedial mathematics course were divided into three groups (Tsui, 2007). The first group did not receive tutoring, while the second and third groups received tutoring in different amounts. Results showed that although the achieved course grades and grade point averages of all students did not differ, dropout rates and attitudes did. Students that received tutoring had an overall more positive attitude about the mathematics course than those who did not receive tutoring. Consequently, fewer of these students withdrew from the course compared to their untutored peers (Tsui, 2007).

Financial Support.

Financial aid can affect whether or not a minority student chooses to enter and stay in college. During the 2012-2013 school year, total costs (tuition/fees and room/board) for in-state, four year public universities averaged \$17, 817. Out-of-state, four year public universities averaged an even higher \$30,704. Both figures consider students are full time or taking 12 hours of courses (CollegeBoard, 2012). This means that these prices would increase if more course hours were taken. In 2012, the median household income in the United States was \$51,017 (Hargreaves, 2007). The household incomes of African Americans and Hispanics, \$36,000 and \$33,000 respectively, are under the averages for the country (Hargreaves, 2013). When considering household bills, unforeseen circumstances, and other expenses, it can be difficult for students to come up with money for a college education as well.

Minority students have the option of receiving financial support for a number of sources, including the federal funds and aid from schools. Financial aid, whether in the form of loans, scholarships, grants, or work study, can provide students with a means of

paying for increasing college tuitions. A U.S. Department of Education study reported a positive correlation between receiving financial aid from colleges/universities and completing a degree in science and engineering (Tsui, 2007).

Multicultural Courses and Clubs.

Depperschmidt and Bliss (2007) conducted a study on perceived bias and barriers in collegiate programs. Female aviation students were asked to provide their views on any negativity present in their collegiate program. Although results were positive in this study, it is still possible that in some environments minority students feel distant or isolated from their peers because of their race. It is also possible that the majority could have difficulty working with people that different from them. In "*The Right of Passage? The Experiences of Female Pilots in Commercial Aviation,*" researchers found that female pilots, working in a male dominated field, experienced some level of harassment, i.e. inappropriate jokes and comments (Mattson, Johnson, Olson, & Ferguson, 2007). Other female pilots expressed feelings of having to conform to more masculine traditions and values because male crewmembers were reluctant to change their behavior or make compromises (Mattson, Johnson, Olson, & Ferguson, 2007).

Courses such as crew resource management, which are offered in collegiate aviation programs now, can help aviation students learn how to work effectively as a team. However, providing students with courses that explore different races, ethnicities and cultures could also be used to eliminate bias and barriers. An example of a course is Women in Aviation. This course teaches students about the role of women in aviation and contributions made throughout history.

St. Cloud State University has a requirement for students to take three MGM (multicultural, gender, and minority) courses to “foster respect for human dignity and differences...” (Mattson, Johnson, Olson, & Ferguson, 2007). Results from the study revealed that students did not feel these courses were adequately planned, and because of this, many did not feel taking the courses were necessary. While these courses do not provide instruction on teamwork specifically, learning about people of different backgrounds can lead to better communication and create a more positive school and work environment. If more research could be performed to improve St. Cloud’s MGM courses, it could provide students with more insightful and meaningful courses.

Problem Statement and Research Questions

The under-representation of ethnic minorities in aviation is a serious issue that must be handled. Despite the numerous strategies that have been attempted to attract and retain minority students in aviation, the number of minorities involved in aviation remain very low. The first step to diversifying the aviation industry is to spark an interest in minority students. Next is ensuring that, once minority students are interested in aviation and have made it their chosen majors, these students remain in their aviation programs. Knowing why students are not entering or persisting in the aviation field can provide collegiate programs with methods to increase minority presence. It is important that once minorities have chosen aviation as a major, research is performed to gain insight on their experience and opinions of their collegiate programs.

My study examined the experience of students in the Aerospace Department at Middle Tennessee State University. It involved using survey questions, asked of both

minority and non-minority students, to gain insight on students' opinions of strategies used by the Aerospace Department and the effectiveness of each strategy. Upon receiving feedback on students' experience, this study attempted to answer the following research questions: (1) Do students believe racial bias exists in their collegiate aviation program? (2) Do students believe their collegiate aviation program pro-actively recruits other students? If not, how are minority students becoming interested in aviation? (3) Do students believe their collegiate aviation program has provided effective strategies to retain its minority students?

CHAPTER II: METHODOLOGY

To fully understand the experience of minority students at MTSU, a combination of qualitative and quantitative research methodologies was chosen. A survey with both Likert Scale and open-ended questions was developed to interact with students. This mixed method approach allowed the researcher to retrieve valuable information of student perceptions of their collegiate program. The qualitative method produces descriptive data (McLeod, 2008). This method was used to produce survey questions that provide information on students' thoughts and feelings. Because data collected using the qualitative approach can be difficult to analyze (McLeod, 2008), the quantitative method was used as well. Quantitative research produces numerical data (McLeod, 2008), which will be used to analyze data retrieved from survey questions

The final methodology for this study had to be modified slightly from what was anticipated in the planning stages. Originally, participants of the study were to be minority students of freshman and senior classifications at both MTSU and a HBCU (historically black college and university). At the data analysis stage of the study, the responses to the survey instrument of minority students from a predominately-white school and a predominately-black school were going to be compared. The researcher extended an invitation to three HBCU institutions. Two schools declined and a response was not received from the third school. Given this, the methodology was revised to capture responses of all levels of MTSU Aerospace students.

An "exempt review" application was submitted to MTSU's Institutional Research Board on April 24, 2013. Once the IRB reviewed the researcher's application, an

approval of the study, Protocol 13-337 Exempt Approval, was received on April 26, 2013 (see Appendix A).

Participants

As stated above, the decision was made to work with students from MTSU's Aerospace Department. The only requirement for participation was being an Aerospace Department student. All classifications and concentrations were accepted. Students of all races were asked to participate in the study in order to obtain a comparison between the perspectives of minority and non-minority students.

Instrumentation

The instrument used in this research study was a survey questionnaire (see Appendix B). Research questions were developed based on information discussed in Chapter I. Universities have utilized a number of methods to increase the number of minority students entering their aviation programs. Some of the most common and effective included summer camps and summer bridge programs, tutoring and mentoring, and financial support. Once those strategies, along with several others, used for recruitment and retention were found, questions were created to find out whether or not students felt those strategies were being used in their program. Bias and barriers, also discussed in Chapter I, were seen to be a factor in minority students opting not to enter STEM majors. Therefore, eight questions geared towards racial barriers were also used in the survey.

The survey, created on SurveyMonkey.com, consisted of four sections and a total 31 questions. The first section, Demographics, used multiple-choice questions to obtain

information on gender, age, concentration, classification, and ethnicity. The second section, Racial Bias, included six Likert-scale questions that asked students about their perceptions bias in their aviation program. These questions helped answer the first research question: Do students believe racial bias exists in their collegiate aviation program? The third section, Recruitment Strategies, contains a combination of nine yes/no and open-ended questions that focus on efforts made by Aerospace Department to recruit minority students. This section corresponds to the second research question: Do students believe their collegiate aviation program pro-actively recruits minority students? If not, how are minority students becoming interested in aviation? Retention strategies, the final section, consists of 12 Likert-scale and yes/no questions that asked students about their perceptions on retention strategies used by their schools. Financial aid, multicultural clubs/organizations and courses, and mentors have all been proven methods to retain students. These questions will help to answer the final research question: Do students believe their collegiate aviation programs have provided effective strategies to retain its minority students?

A Likert-scale style question was chosen to give the researcher an idea of the extent to which a respondent agreed or disagreed with a statement made about their experience in the Aerospace Department. Likert-scale responses ranged from strongly disagree to strongly agree, with the option to respond “not sure” or “not applicable” as well. Open-ended questions were combined with several questions to receive additional information that was specific to the responder. A pilot testing of the research instrument was conducted with people of aviation and non-aviation backgrounds. Feedback was

received pertaining to the design of the survey and the ease of answering the survey questions.

Procedure

Contact was first made with the Chair of the Aerospace Department to request permission to include students in the research study. A copy of the researcher's proposal was provided via email and included a brief literary review, problem statement, research questions, and survey questions. Once an approval was received from the Department Chair, an application to begin the study was submitted to the MTSU IRB. Upon IRB review and approval to move forward with the study, the researcher obtained a list complete with 627 Aerospace students' email addresses. The initial email (see Appendix C), sent to all 627 email addresses, and included information about the researcher and the researcher's thesis. An invitation to participate in the study was also given, along with a website link to follow to complete the survey.

Prior taking the survey, students were directed to an informed consent document (see Appendix D). By clicking the "NEXT" button, students agreed to the document's term and proceeded to take the survey. Participants were given 10 days to complete the survey. On day 5, a reminder email (see Appendix E) was sent to the same 627 email addresses. In addition to that email, another email encouraging participation was sent out to just minority student (refer to Appendix F). This email list was obtained through the Aerospace Department. On day 10 at 11:59:59 pm, the survey was closed. Once all surveys were collected, the process of data analysis was started.

CHAPTER III: DATA ANALYSIS

All survey data was analyzed through the online SurveyMonkey tool and Microsoft Excel. Demographic information was calculated into percentages. For survey questions 6 through 31, statements were provided and participants were asked to provide a response which corresponded to a four point Likert-scale: (1) Strongly Disagree, (2) Disagree, (3) Agree, and (4) Strongly Agree. Using the Likert-scale, a mean response was calculated for each question, along with its standard deviation. Calculations of the standard deviation and the mean helped to compare and contrast the results of students. Yes/No questions were calculated into percentages, providing a clear picture of the opinion of the majority. Open-ended questions were analyzed using typology, or grouping responses into common themes. Percentages were used to display comparisons among open-ended responses. A comparison of the responses of minority and non-minority students was examined as well. In Appendix G, raw data from the survey can be seen.

Demographics

Of the 627 students that were contacted via email, 118 students responded and participated in the research survey. Male students represented 83% of the responses and 17% were female. The majority of participants were between the ages of 17 and 25. Only one person skipped this question. Nearly 30% of participants were freshmen, with almost an equal amount of responses from sophomores, juniors, and seniors. Only one graduate student participated in the study. More than half of the participants are majoring the Professional Pilot concentration.

As shown below in Figure 1, approximately 75% of participants were Caucasian/White. Black participants represented around 10% of respondents, and 4% of participants were Asian. Nearly 3% of participants selected Hispanic/Latino as their race, while less than 1% of participants were Indian. Approximately 7% of participants selected “Other” as their race and ethnicity. Those who made this selection had the option of entering their own response.

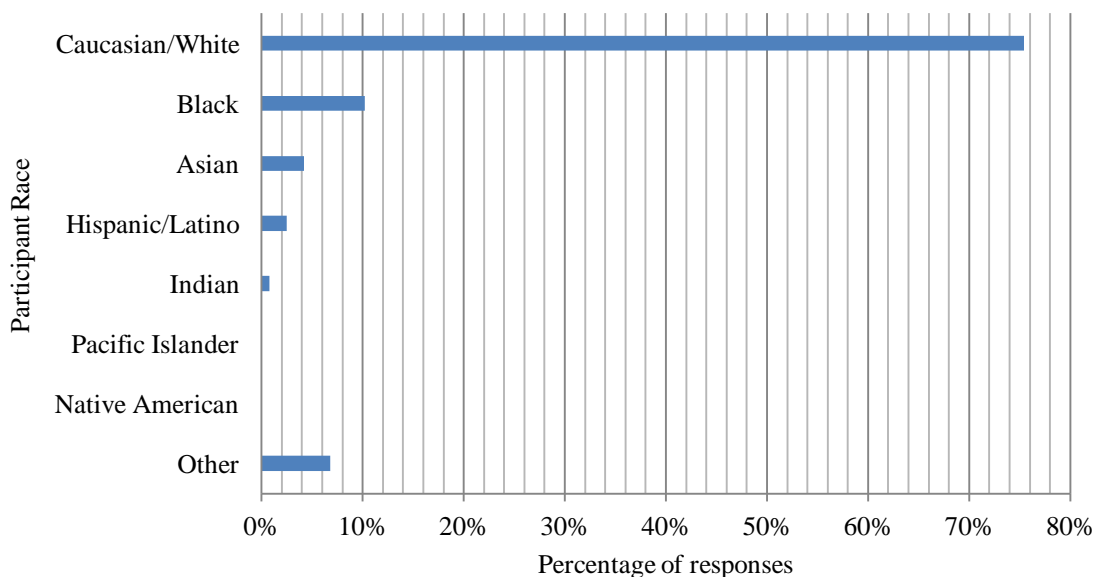


Figure 1. Race/ethnicity of participants in percentages.

For comparing responses, the participants selecting “Other” were added one of two categories, non-minority or minority, based on their response. Two participants responded they were Moldovan, and because generally those in the U.S. who are of European descent are considered part of the majority, they were added to the non-minority category. Thus, there were 91 participants in the non-minority category. Four participants responded that they were of Arabic ethnicity and two responded that they

were biracial, one being Caucasian/African American and the other being Caucasian/Asian. These six participants were added to the minority category, which made a total of 27 minority participants. Typically, those of Asian and African descent are considered minorities in the United States. The percentages of minority and non-minority participants are seen in Figure 2.

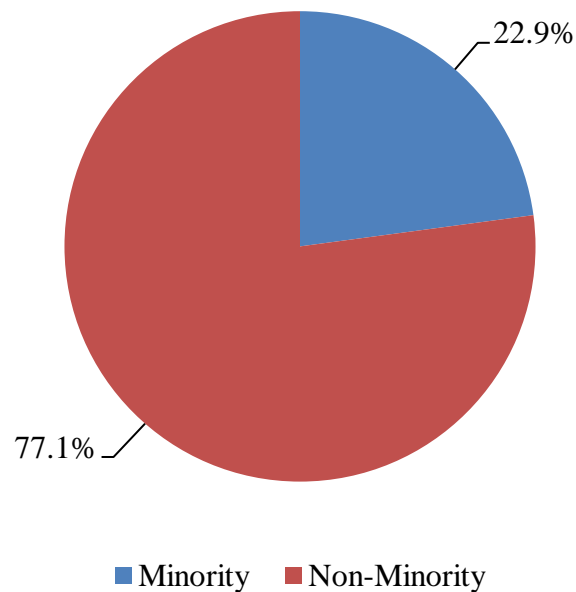


Figure 2. Percentages of minority and non-minority participants.

Racial Bias and Barriers

Questions 6 -11 (see Table 1) examined the presence of racial bias and barriers within the Aerospace Department. Thirteen participants opted to skip this section; therefore, only 105 responses were calculated.

Table 1

Racial/Ethnic Bias and Barriers: Questions and Statistics

		N	Mean	SD
Q6	Ethnic/racial bias exists in my aviation program.	105	1.71	0.756
Q7	I have experienced racial/ethnic bias as a student in my aviation program.	105	1.44	0.635
Q8	I have witnessed a minority student treated unfairly by a teacher because of their race/ethnicity.	105	1.35	0.554
Q9	I have witnessed a minority student treated unfairly by another student because of their race/ethnicity.	105	1.62	0.764
Q10	My collegiate aviation program consists of teachers from various racial/ethnic backgrounds.	105	2.39	0.753
Q11	I would have benefited from having teachers from various racial/ethnic backgrounds.	105	2.37	0.697

In Question 6, almost half (45.7%, n=48) of students strongly disagreed that racial/ethnic bias existed in the program (see Figure 3). When comparing responses among the minority and non-minority students, the majority of both groups strongly disagreed with the statement as well. Five minorities (26.3%) agreed with the statement, while 12 non-minorities (13.9%) either strongly agreed or agreed.

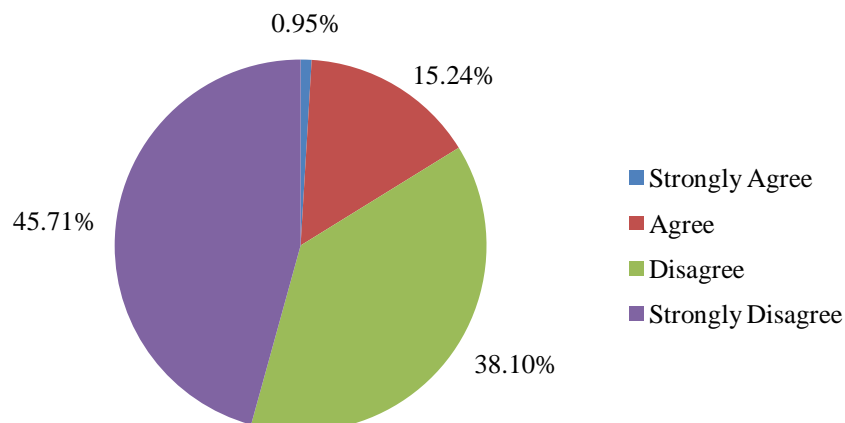


Figure 3. Question 6 Racial bias exists in program.

Nearly 63% (n=66) of all students strongly disagreed with Question 7, while 7.6% (n=8) agreed. Of those eight students, five were in the minority category. Questions 8 and 9 asked students about observing minorities treated unfairly, by teachers or other students because of their race. Approximately 69% (n=72) of participants strongly disagreed with witnessing unfair treatment of a minority student by a teacher. Four students (3.8%) agreed with the statement, with three of those students being non-minorities. The average response for Question 9 was strongly disagree (53.3%, n=56) can be seen in Figure 4. Around 13% of students (n=14) agreed that they witnessed a minority student being treated unfairly by another student. Approximately 11% (n=2) of minorities agreed with the statement, while around 14% of non-minorities chose the “agree” response.

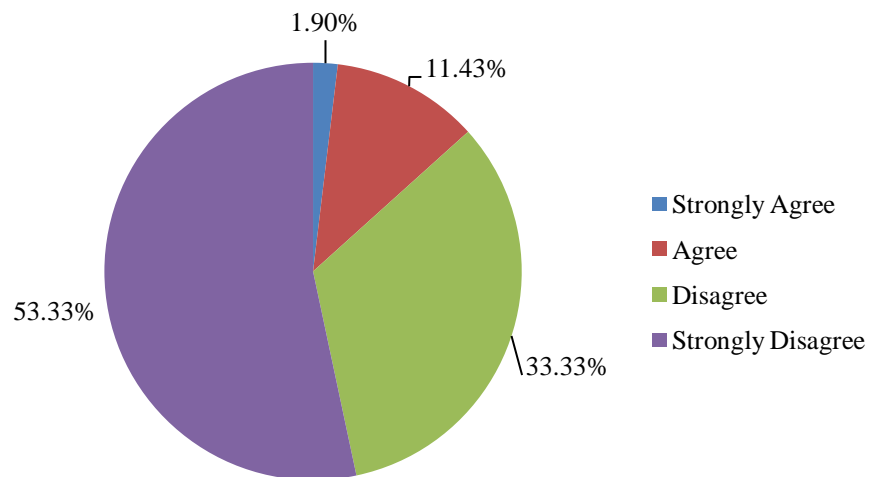


Figure 4. Question 9 Witnessed minority student treated unfairly by another student.

Approximately half (48.6%, n=51) of the students felt the Aerospace Department does not have teachers from a variety of racial/ethnic backgrounds (refer to Table 1, Question 10). Nearly 35.2% (n=37) of students agreed with the statement. However, the majority of minority students (73.7%, n=14) either strongly disagreed or disagreed with the statement. The majority of non-minority students (54.7%, n=47) either gave a “Strongly agree” or “Agree” response. There was an even amount of “Agree” and “Disagree” responses (43.8%, n=46) for Question 11 (I would have benefited from having teachers from various racial/ethnic background). As shown in Figure 5, the majority of minority students (63.1%, n=12) either strongly agreed or agreed that having more teachers of different racial/ethnic backgrounds would be beneficial. The majority of non-minorities, on the other hand, either strongly disagreed or disagreed with the statement.

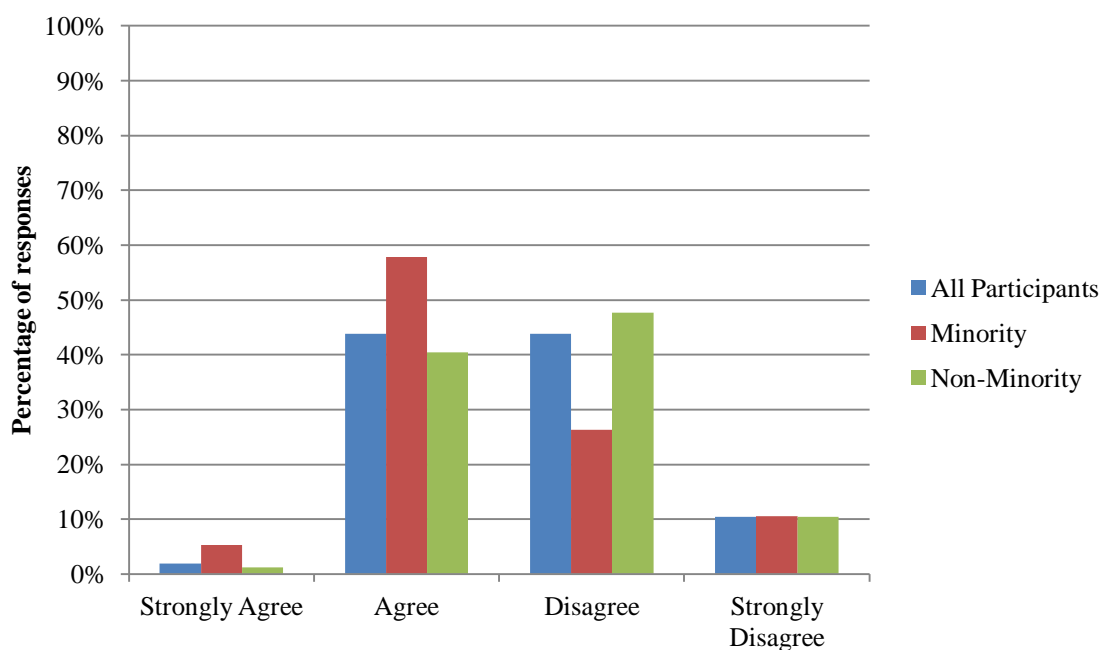


Figure 5. Question 11 Participants benefit from having teachers of various racial backgrounds.

Recruitment Strategies

Questions 12-20 asked students about recruitment strategies used in the Aerospace Department (refer to Table 2). Questions in this section had “Yes” or “No” responses that were calculated into percentages. Two questions asked for supplemental open-ended responses, which were placed into categories and calculated into percentages to make comparisons. Only 101 responses were calculated because 17 people skipped the section.

Table 2

Recruitment Strategy Questions and Results

		Yes	No	N/A
Q12	I am in a collegiate aviation organization that has participated in recruiting students from middle school and high school	20.8%	18.8%	60.4%
Q13	I am in a collegiate aviation organization that has participated in recruiting racial/ethnic minority students from middle school and high school.	16.8%	21.8%	61.4%
Q14	My aviation program sent recruiters to my high school to increase interest in the program.	7.9%	92.1%	
Q15	Prior to entering college, I participated in an aviation summer camp hosted by my current aviation program.	4%	96 %	
Q16	Prior to entering college, I participated in an aviation summer camp hosted by a college/organization other than my current aviation program. (If yes, please give the name of the organization.)	3%	97%	
Q17	I chose my current aviation program for reasons other than recruitment from that school. (If yes, please list the reason(s).)	76.2%	23.8%	
Q18	I have family members who work in the aviation industry.	24.8%	75.3%	
Q19	I have friends who work in the aviation industry.	66.3%	33.7%	
Q20	I know people, other than friends and family (i.e. neighbors), who work in the aviation industry.	75.3%	24.7%	

Question 12 was only applicable to 40 students. Of the 40 students, 20.8% (n=21) participated in a collegiate aviation program that recruited students from middle and high schools. Nearly 67% (n=6) of minority students were members of a student organization,

while nearly 47% (n=15) of non-minorities belonged to an organization involved in recruiting middle and high school students. Question 13 was applicable to 39 students. Overall, 15.8% (n=17) of students were involved in an organization that recruited middle and high school minority students. A total of 21.8% (n=22) of students responded that their organizations did not recruit younger students. Nearly 67% (n=6) of minority students answered yes to Question 13, while almost 36% (n=11) of non-minority students gave a “Yes” response.

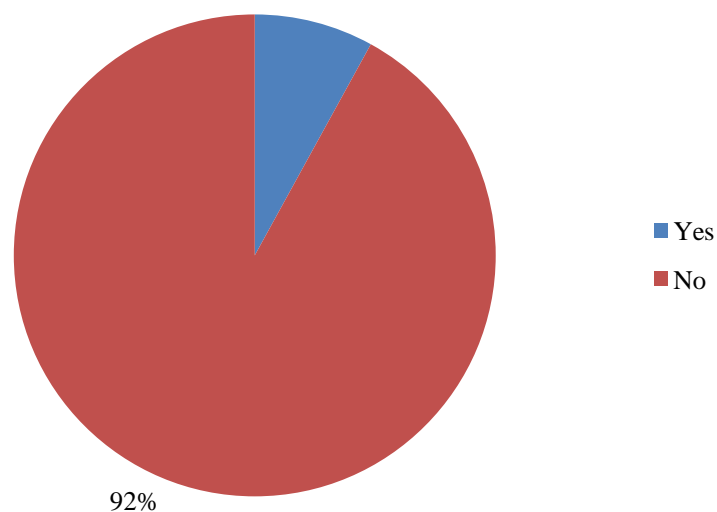


Figure 6. Question 14 Aviation program sent recruiters to participants’ high schools.

When asked if the Aerospace Department sent recruiters to their high schools, (92% , n=93) of students answered no (see Figure 6 above). Only eight students confirmed that recruiters were sent to their schools. An equal number of minority students (n=4, 22.2%) and non-minority students (n=4, 4.8%) answered yes to the recruiting question. In Question15, it was found that the majority of student (96%, n=97)

did not participate in a summer camp hosted by the Aerospace Department. Four students did participate in an Aerospace Department camp, with three of those students being minorities.

Nearly the same percentage of “No” responses (97%, n=98) were seen in Question 16. Three students responded they participated in a summer camp hosted by a school or organization other than MTSU. These students were asked to provide the name of the camp. One minority student answered that he attended Aviation Career Enrichment program in Atlanta. One non-minority student attended a program with Embry-Riddle Aeronautical University. The other student did not provide a response.

In Question 17, it was found that the majority of students (76.2%, n=77) chose MTSU’s Aerospace Department for reasons other than recruitment from the program. Responses from minority students showed opposing results. Most minority students (61.1%, n=11) chose MTSU due to direct recruitment. Students whom responded “Yes” provided their own reasons for choosing MTSU’s aviation program. Seventy students provided 88 responses. Those responses were then reviewed and placed into categories (see Figure 7). A quarter of responses given related to having a general interest in aviation. The cost of tuition accounted for approximately 20% of responses. The reputation of the university and the aviation program accounted for 17% of responses. The fourth most common responses, around 14%, were the location of the university.

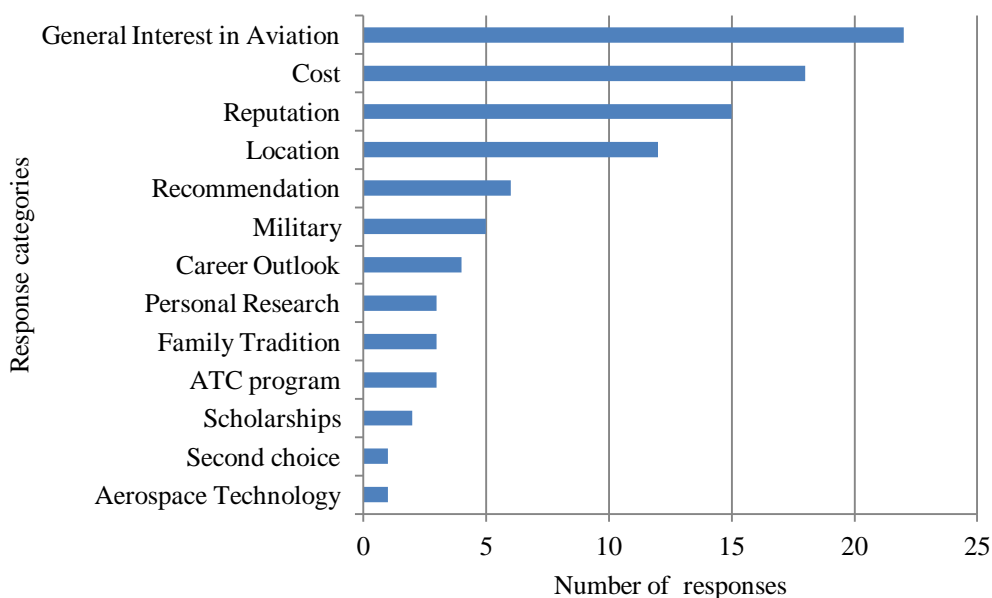


Figure 7. Question 17 Reasons for choosing MTSU Aerospace Department.

In Question 18, it was found that nearly 25% (n=25) of students have family member that work within the aviation industry. Of these students, only four were minorities. In Question 19, approximately 66% (n=67) of students indicated having friend in the aviation industry. About 55% (n=10) of minority students gave a “Yes” response. Sixty-nine percent (n=57) have friend within the aviation industry. When asked if they knew people other than family and friends that worked in the aviation industry (Question 20), 75.3% of students (n=76) replied yes. Seventy-two percent of minorities (n=13) answered yes to Question 20, while 76% of non-minority students (n=63) gave a “Yes” response.

Retention Strategies

In the final section of the survey (Questions 21-31), statements were given to find out student's perceptions of retention strategies used in the Aerospace Department (refer to Table 3). A combination of Likert-scale questions and Yes/No questions were asked. Seventeen participants skipped this section, so only 101 responses were calculated.

Table 3
Retention Strategy Questions

Q21	My aviation program provides a variety of scholarships for its students.
Q22	My aviation program provides scholarships specifically for minority students.
Q23	I have received a scholarship from my aviation program.
Q24	My aviation program has a tutoring program for its students.
Q25	I have benefited from participating in a tutoring program.
Q26	My aviation program has a mentorship program.
Q27	I was assigned a mentor/mentee in the mentorship program.
Q28	I believe I would have benefited from having a mentor during college.
Q29	My aviation program provides multicultural courses for all students to attend.
Q30	My aviation program provides multicultural clubs and organizations for all to join.
Q31	Providing multicultural courses, clubs, and organizations will help students work better with each other

In Question 21, most students indicated that they (84.2%, n=85) strongly agreed or agreed that a variety of scholarships were available in the Aerospace Department. The perceptions amongst minorities and non-minorities reflected the same opinion. Almost 40% of students (n=40) were unsure if scholarships specifically for minority students were available within the department. As seen below in Figure 8, twenty-six percent (n=5) of minority students were unsure of these types of scholarships. Approximately 44% (n=44) of students indicated that they applied for an Aerospace scholarship in

Question 23. The majority of these students were non-minorities (n=36). More than half of minorities (55.7%, n=10) had not applied for a scholarship.

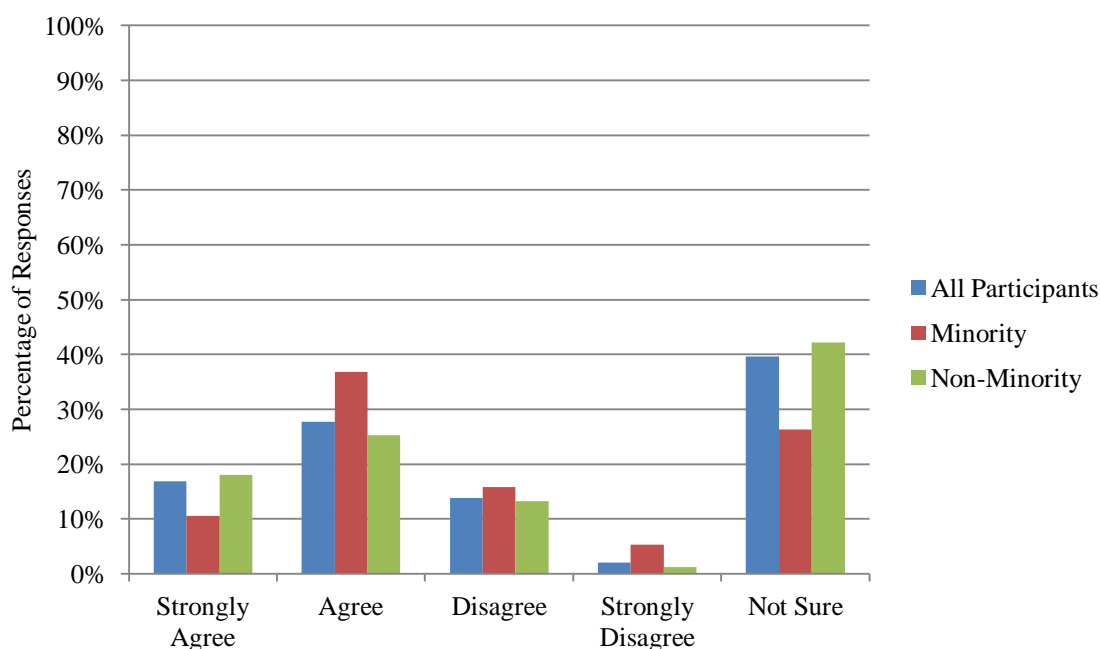


Figure 8. Question 22 Aviation program provides scholarships specifically for minority students.

Of the 44 students that reported applying for a scholarship, 18 students (17.8%) received a scholarship through the department (see Table 3, Question 24). Nearly 77% of these recipients were non-minority students. In Question 25, nearly 35% of students (n=35) agreed that the Aerospace Department had a tutoring program for its students. Roughly the same number of students (n=36, 35.6%) were unsure if a tutoring program was available. Five minority students (27.8%) accounted for almost 14% of students that were unaware of a tutoring program.

Question 26 was only applicable to 38 participants. The question asked if student participated in and benefited from an Aerospace Department tutoring program. The majority of those student (16.8%, n=17) agreed with the tutoring program was beneficial (see Figure 9 above). Nine minority students (90% of minority category) accounted for more than of the student that agreed to Question 26. The majority of non-minority students (53.6%, n=15) did not feel the tutoring program was beneficial for themselves.

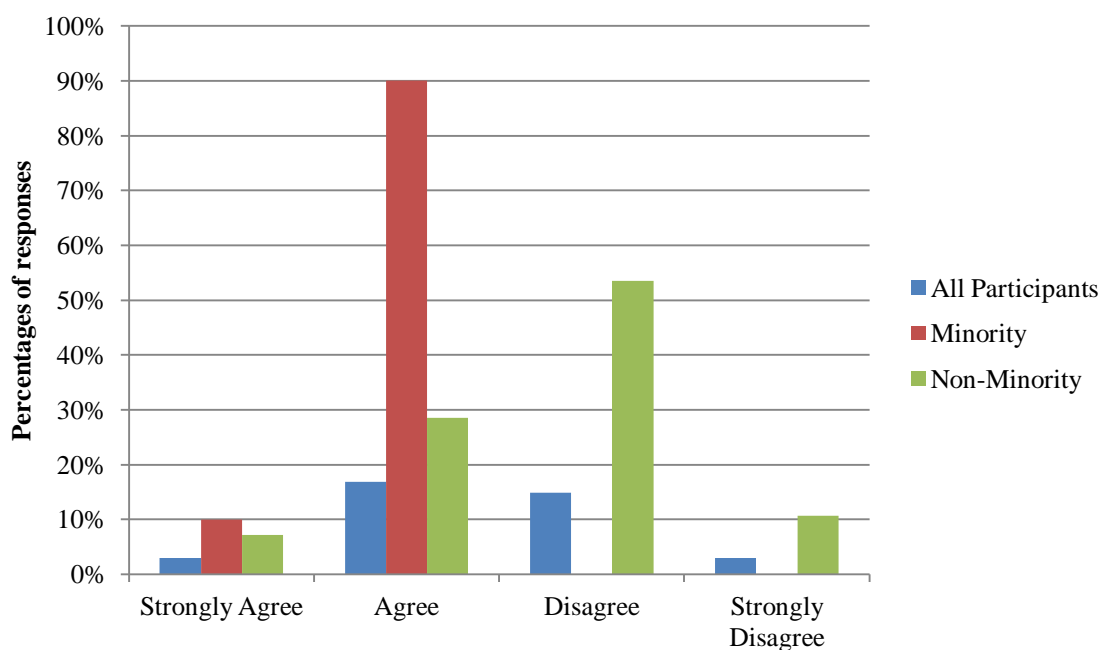


Figure 9. Question 26 Aviation program has a mentorship program.

Questions 27 through 29 asked student about mentorships. Question 27 asked if Aerospace Department had a mentorship program. Most students (60.4%, n=61) responded that they were unsure if a program like that existed. Sixty-one percent (n=51)

of non-minorities shared this opinion with 55.6% of minority students (n=10). The majority of non-minority students (14.5%, n=12) disagreed, indicating that the Aerospace Department does not have a mentorship program. The majority of minority students (33.3%, n=6) agreed that the department had such program.

The next question asked students if they were assigned a mentor or mentee while participating the mentorship program. Question 28 was only applicable to 47 students. Only 5 students (4.95%) of student gave a “Yes” response. Three of these students were non-minority students. Question 29 asked students if they felt participating in a mentorship would have been beneficial, and 67.3% (n=68) students agreed that it would be helpful. Fifteen students (15.8%) of students strongly agreed with Question 29. All minority students either agreed or strongly agreed with participating in a mentorship program, while nearly 80% of non-minority students shared the same opinion.

Questions 30 and 31 asked survey participants about the presence and benefits of joining multi-cultural clubs and organizations. When asked if such organizations were present in the Aerospace Department, the majority of student (47.5%, n=48) gave an “Agree” response. Twenty-nine students (28.7%) strongly agreed, while roughly 14% (n=14) were unsure if multi-cultural clubs were offered in the department. Question 31 asked if having such organizations would help students work better together. The majority of students (62.3%, n=63) agreed with the statement (see Figure 10 below). This opinion was reflected amongst all minority students. Nearly 15% of students (n=15) disagreed, indicating that multi-cultural clubs would not affect students and how well they work with each other. All of these students were in the non-minority category.

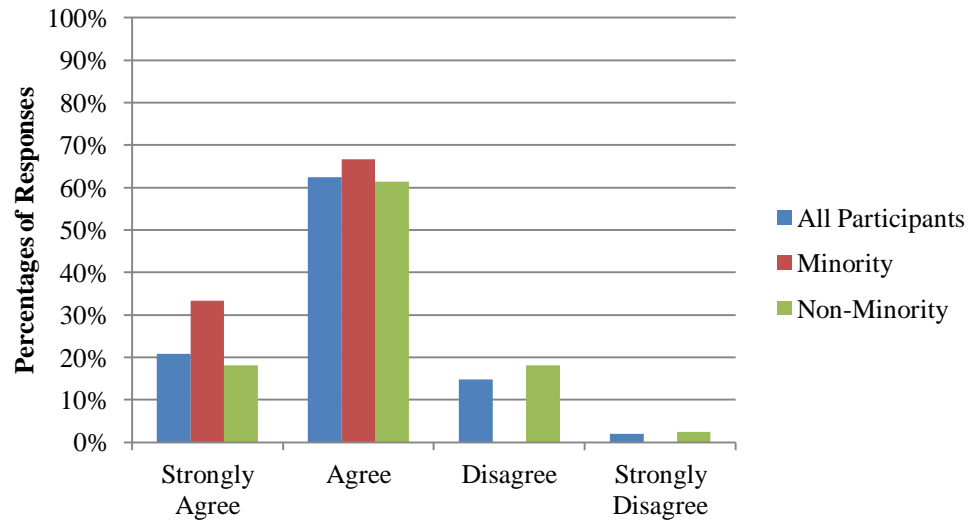


Figure 10. Question 31 Multicultural program will help students work better with each other.

CHAPTER 4: CONCLUSION

At the conclusion of the study, the analyzed survey data was used to answer the following research questions (1) Do students believe racial bias exists in their collegiate aviation program? (2) Do students believe their collegiate aviation program pro-actively recruits minority students? If not, how are minority students becoming interested in aviation? (3) Do students believe their collegiate aviation program has provided effective strategies to retain its minority students?

Discussion of Findings

Section one survey results (Racial/Ethnic Bias and Barriers) indicated that most students do not believe that racial bias and barriers exist in the Aerospace Department. However, there were 45 responses that reflected the opposite opinion. Nearly half of those responses were in regards to questions about mistreatment of minority students by teachers and other students because of the race and ethnicity. The majority of minority students felt the Aerospace Department did not consist of faculty members of different racial/ethnic backgrounds. The majority of minority students also believed that students would benefit from having a more diverse faculty. The majority of non-minority students disagreed.

From the responses, it can be seen that most students, in both the minority and non-minority categories, felt racial bias was not an issue in the Aerospace Department. However, in the opinion of minority students, there was a racial/ethnic barrier present. Most Aerospace faculty members are Caucasian, and minority students believed that having teachers of similar backgrounds could improve their experience in the aviation

program. This perception was different in the non-minority category, as these students felt diversification of faculty members would not affect their experience in the aviation department. This could be due to an existing bond between non-minority students and faculty members. Having teachers of the same race can be used as a motivator to continue pursuing a career in aviation. As non-minority students and Aerospace faculty members have the same racial background, non-minority students would not see a need for diversification.

Results from the second section of the survey (Recruitment Strategies) were used to answer research question #2. Overall, the majority of participants indicated that the Aerospace Department does not effectively recruit minority students. Approximately 40% of participants were members of aviation organizations. While most students did report that their organizations were involved in recruiting middle and high school students, most indicated that it did not involve recruiting minority students specifically. Over 90% of students replied that the Aerospace Department did not send recruiters to their high schools. Only four students answered yes to attending a summer camp hosted by the Aerospace Department. From these responses, it can be seen that there is a lack of outreach from the Aerospace Department to potential students.

These facts lead to the second half of research question #2: How are minority students becoming interested in aviation? Nearly 80% of students said that they chose MTSU for reasons other than recruitment. A variety of reasons was received with the most common reasons being the cost of tuition, the location of the university, and the reputation of the university and department. Many students, and the majority of minority

students, responded that they had a general interest in aviation and chose MTSU because the major was available. One minority student chose MTSU after receiving a full academic scholarship to the school. Most students, and the majority of minority students, have friends or personally know of other people (i.e. neighbors, family friends, etc.) that work in the aviation industry. From these responses, it can be seen that students are being influenced by a number of sources outside of the Aerospace Department. Prior to entering college, most students, minority students in particular, were already interested in aviation. It was not specified how this interest was developed. Most minority students have some connection with aviation employees. Having a relationship with these people could have also contributed to minority students entering the aviation field.

Research question #3 was answered using the results of section three of the survey (Retention Strategies). The majority of students believe the Aerospace Department offers a variety of scholarships, however, around 36% of students did not know if any scholarships were specifically for minority students. Most students agreed that the Aerospace Department had a tutoring program, while 36% of students and a third of minority students were not sure if such program existed. All minorities believed that tutoring would be beneficial to students, while the majority of non-minority students did feel that a tutoring program would be advantageous to their academic career.

Sixty percent of students were not sure if the Aerospace Department had a mentorship program. Five students reported that they were assigned a mentor some time during their years in the department. The majority of participants, which included all minority students, believe that having a mentor during college would be beneficial.

Lastly, the majority of participants indicated that Aerospace had a multicultural organization. They also felt that providing such clubs and organizations would help student work well as a team.

From the responses received in section three, it was found that students are satisfied with retention strategies used in the Aerospace Department. Financial support, tutoring, and mentoring are three of the most common retention strategies. The Aerospace Department offers a number of scholarships for students. Students are made aware of scholarships in class and outside of class via email and flyers. While the department does not offer minority scholarships, there are scholarships outside of the department that are available. While students were unsure of the existence of a mentoring program, all students indicated the importance of including tutoring, mentoring, and multicultural clubs in the aviation program.

Recommendations

After reviewing the results from the survey, four recommendations can be made to improve recruitment and retention strategies within the Aerospace Department. These recommendations include actions that can be taken by both the Aerospace Department and Aerospace students.

Recommendation #1: Increase recruitment efforts.

Prospective MTSU students have the option of scheduling a tour of the campus and the Aerospace Department, but efforts can be made by the department to reach out to middle and high school students, especially those within close proximity of Murfreesboro, TN. Most participants, minority students especially, reported that the

MTSU Aerospace Department did not reach out to them during years in high school. They also reported that while they were involved in recruiting through their student organizations, there was no emphasis placed on recruiting minority students. The majority of participants chose MTSU for reasons other than the recruitment from the aviation program. Restarting the MTSU InFlight Program, a summer camp that targeted high school minority students, is one strategy that should be considered. Studies have shown that students who participate in STEM summer camps are more likely to persist in STEM majors in college.

Recommendation #2: Increase awareness of the department tutoring program.

The Aerospace Department offers tutoring sessions three nights a week. Even though this program began last semester, over a third of research participants were unaware of the program's existence. Information on the tutoring program can be distributed in classrooms, by flyers, or through email. Many students struggle with science and mathematics courses. Tutoring is another strategy that has been proven to improve a student's likelihood of persisting in STEM major.

Recommendation #3: Create a mentorship program.

Currently, the Aerospace Department does not have a mentorship program. Interestingly, some students reported the department had a program and a few students even agreed that they were assigned a mentor. It can be assumed that the student may have formed a close bond with an advisor or an instructor, viewing that adult as their mentor. While these relationships developed on their own, the department should

consider assigning students with mentors, whether a faculty member, upperclassman, or a graduate student. Mentors could be assigned at the beginning of a students' freshman year to help student become acclimated with being a new college student.

Recommendation #4: Maintain student organizations.

This recommendation is not necessarily for the department itself, but rather its students, as it is the responsibility of students to keep organizations up and running. Most participants agreed that the department had a multicultural club/organization. Legacy, a student organization celebrating minorities in aviation, was once present on campus, but has been inactive in recent semesters. Students also felt that having a multicultural organization would be beneficial to developing positive working relationships between students. If students believe that being involved in multicultural clubs can improve how students interact with each other, then efforts should be made to ensure that these clubs are sustained.

Limitations

This study was limited in that the survey was only distributed to MTSU Aerospace students. This is a small percentage of students in aviation programs across the country; therefore it should not be considered the consensus among all minority students enrolled in aviation programs. The study also lacked full participation of student in the MTSU Aerospace Department. The department consists of 627 students, and only 118 students started the research survey. Of that number, only 101 students actually completed the survey. While the data collected from surveys was beneficial for the study,

over 500 students did not respond, which means that other valuable responses were not collected.

Another limitation of the study was a lack of background information. Prior to completing the survey, a literary review was completed. While aviation falls under the STEM umbrella, of the literature that is available, only a small percentage covers research specifically on minorities in aviation. Most literature focused on minorities in STEM majors as a whole, with many emphasizing engineering and mathematics majors. Strategies used in the research instrument were identified as effective for STEM majors, and while these strategies may not vary greatly from those necessary for aviation, it would have been favorable to find more studies that focused primarily on minorities in collegiate aviation programs.

Recommendations for Future Research

Because the research study only consisted of participants from MTSU, it would be extremely beneficial to continue this research with students from multiple universities. Not only would this method increase the number of responses received, it would also provide insight on recruitment and retention strategies used in different collegiate aviation programs. Universities such as HBCUs are ideal for this type of research, as populations of minority students are high. It is also recommended that the research instrument be modified. It should be noted the survey that was used consisted of the most common strategies used to recruit and retain minority students. It did not include a full list of recruitment and retention strategies proven to be successful in minority student enrollment in aviation programs. Asking additional questions could result in more insight

on factors contributing to minorities choosing collegiate aviation programs, graduating from those programs, and finally entering the aviation industry as employees.

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APPENDICES

APPENDIX A

IRB Approval



April 26, 2013

Kabrina Webb, Wendy Beckman
Department of Aerospace
kdw4i@mtmail.mtsu.edu, wendy.beckman@mtsu.edu

Protocol Title: "The Recruitment and Retention of Ethnic Minority Students in Collegiate Aviation Programs"

Protocol Number: 13-337

Dear Investigator(s),

The exemption is pursuant to 45 CFR 46.101(b) (2). This is because the research being conducted involves the use of survey materials, interviews or observation of public behavior.

You will need to submit an end-of-project report to the Compliance Office upon completion of your research. Complete research means that you have finished collecting data and you are ready to submit your thesis and/or publish your findings. Should you not finish your research within the three (3) year period, you must submit a Progress Report and request a continuation prior to the expiration date. Please allow time for review and requested revisions. Your study expires on **April 26, 2016**.

Any change to the protocol must be submitted to the IRB before implementing this change. According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance before they begin to work on the project. **Once your research is completed, please send us a copy of the final report questionnaire to the Office of Compliance.** This form can be located at www.mtsu.edu/irb on the forms page.

Also, all research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Andrew W. Jones

Compliance Office
615-494-8918
Compliance@mtsu.edu

APPENDIX B

Survey Questions

Recruitment and Retention Strategies for Collegiate Aviation Programs

Informed Consent

Hello! Thank you for choosing to participate in this research survey concerning recruitment and retention strategies in collegiate aviation programs. You are being asked to participate provide insight on effective recruitment and retention strategies. Ethnic minorities represent small percentages in collegiate aviation programs and the aviation industry. This percentage can be increased through a number of strategies performed by colleges and universities. Students currently enrolled in aviation programs can provide insight on efforts made by their programs to recruit and retain other minority students. They can also provide information on their personal experiences in their current programs.

The following survey includes 31 questions. Please answer each question honestly and to the best of your ability. The survey will take approximately 15 to 20 minutes to complete.

Participation in this survey is voluntary and failure to participate will not result in any penalty. The responses you provide will also remain confidential and will not be used for any purpose outside of the research being performed. No personally identifiable information, including your computer's IP address, will be collected and you may discontinue the survey at any time without penalty. You may leave any question you do not wish to answer blank, and it will not affect your participation in the survey.

If you should have any questions about this research study, please feel free to contact me, Kabrina Webb, at kdw4i@mtmail.mtsu.edu or my Faculty Advisor, Dr. Wendy Beckman, at wendy.beckman@mtsu.edu. Additional questions regarding this research or the Institutional Review Board (IRB) approval process should be directed to the Middle Tennessee State University Compliance Officer at compliance@mtsu.edu.

By clicking the "NEXT" button, you agree to the above terms and agree to participant in this study.

Demographic Information

*1. Gender

Female

Male

2. Age

17-20

21-25

26-30

31+

3. Classification

Freshman

Sophomore

Junior

Senior

Graduate

APPENDIX B (cont).

Recruitment and Retention Strategies for Collegiate Aviation Programs

4. Major/Concentration (check all that apply)

- Administration/Management
- Air Traffic Control
- Flight Dispatch
- Maintenance
- Pilot
- Technology

***5. Race/Ethnicity**

- Caucasian/White
- Black
- Asian
- Hispanic/Latino
- Native American
- Indian
- Pacific Islander
- Other (please specify)

Racial Bias

***6. Ethnic/racial bias exists in my aviation program**

Strongly Disagree Disagree Agree Strongly Agree

***7. I have experienced racial/ethnic bias as a student in my aviation program**

Strongly Disagree Disagree Agree Strongly Agree

***8. I have witnessed a minority student treated unfairly by a teacher because of their race/ethnicity.**

Strongly Disagree Disagree Agree Strongly Agree

***9. I have witnessed a minority student treated unfairly by another student because of their race/ethnicity.**

Strongly Disagree Disagree Agree Strongly Agree

APPENDIX B (cont).

Recruitment and Retention Strategies for Collegiate Aviation Programs	
<p>*10. My collegiate aviation program consists of teachers from various racial/ethnic backgrounds.</p> <p>Strongly Disagree Disagree Agree Strongly Agree</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p>	
<p>*11. I would have benefited from having teachers from various racial/ethnic backgrounds.</p> <p>Strongly Disagree Disagree Agree Strongly Agree</p> <p><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p>	
Recruitment Strategies	
<p>*12. I am in a collegiate aviation organization that has participated in recruiting students from middle schools and high schools. If you are not in a collegiate aviation organization, select N/A.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> N/A</p>	
<p>*13. I am in a collegiate aviation organization that has participated in recruiting minority students from middle schools or high schools. If you are not in a collegiate aviation organization, select N/A.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> N/A</p>	
<p>*14. My aviation program sent recruiters to my high school to increase interest in the program.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	
<p>*15. Prior to entering college, I participated in an aviation summer camp hosted by my current aviation program.</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	

APPENDIX B (cont).

Recruitment and Retention Strategies for Collegiate Aviation Programs	
<p>*16. Prior to entering college, I participated in an aviation summer camp hosted by a college/organization other than my current aviation program. (If yes, please give the name of the college/organization.)</p> <p> <input type="radio"/> Yes <input type="radio"/> No </p> <p>Name of college/organization</p> <input type="text"/>	
<p>*17. I chose my current aviation program for reasons other than recruitment from that school. (If yes, please list the reason(s).)</p> <p> <input type="radio"/> Yes <input type="radio"/> No </p> <p>Reasons</p> <input type="text"/>	
<p>*18. I have family members who work in the aviation industry.</p> <p> <input type="radio"/> Yes <input type="radio"/> No </p>	
<p>19. I have friends that work in the aviation industry.</p> <p> <input type="radio"/> Yes <input type="radio"/> No </p>	
<p>*20. I know people other than family member or friends (i.e. neighbors, church members) who work in the aviation industry.</p> <p> <input type="radio"/> Yes <input type="radio"/> No </p>	
Retention Strategies	
<p>*21. My aviation program provides a variety of scholarships for its students.</p> <p>Strongly Disagree Disagree Agree Strongly Agree</p> <p> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> </p>	
<p>*22. My aviation program provides scholarships specifically for minority students.</p> <p>Strongly Disagree Disagree Agree Strongly Agree Not sure</p> <p> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> </p>	

APPENDIX B (cont).

Recruitment and Retention Strategies for Collegiate Aviation Programs				
*23. I have applied for a scholarship from my aviation program.				
<input type="radio"/> Yes				
<input type="radio"/> No				
*24. I have received a scholarship from my aviation program.				
<input type="radio"/> Yes				
<input type="radio"/> No				
*25. My aviation program has a tutoring program for its students.				
Strongly Disagree	Disagree	Agree	Strongly Agree	Not Sure
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*26. I have benefited from participating in a tutoring program.				
Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*27. My aviation program has a mentorship program.				
Strongly Disagree	Disagree	Agree	Strongly Agree	Not Sure
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*28. I was assigned a mentor/mentee in the mentorship program.				
<input type="radio"/> Yes				
<input type="radio"/> No				
<input type="radio"/> N/A				
*29. I believe I would have benefited from having a mentor during college.				
Strongly Disagree	Disagree	Agree	Strongly Agree	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
*30. My aviation program provides multicultural clubs and organizations for all to join.				
Strongly Disagree	Disagree	Agree	Strongly Agree	Not sure
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*31. Providing multicultural clubs and organizations will help students work better with each other.				
Strongly Disagree	Disagree	Agree	Strongly Agree	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

APPENDIX C

Email to Aerospace Department Students

Subject: Aerospace Thesis Research—Participants Need

Hello

My name is Kabrina Webb, and I am a graduate student here at MTSU. Currently, I am working on my thesis and would like to extend an invitation to participate in my research study. My study involves completing a survey on effective recruitment and retention strategies that can be used in collegiate aviation programs. If you would like to participate, my survey can be found at the following link:

<http://www.surveymonkey.com/s/ZKWLC25>

Thank you in advance for your help!

APPENDIX D

IRB Consent Form

Hello! Thank you for choosing to participate in this research survey concerning recruitment and retention strategies in collegiate aviation programs. You are being asked to participate provide insight on effective recruitment and retention strategies. Ethnic minorities represent small percentages in collegiate aviation programs and the aviation industry. This percentage can be increased through a number of strategies performed by colleges and universities. Students currently enrolled in aviation programs can provide insight on efforts made by their programs to recruit and retain other minority students. They can also provide information on their personal experiences in their current programs.

The following survey includes 32 questions. Please answer each question honestly and to the best of your ability. The survey will take approximately 15 to 20 minutes to complete. Your participation in this survey is completely voluntary and failure to participate will not result in penalty. Personal/identifiable information will be kept confidential.

If you should have any questions about this research study or possible injury, please feel free to contact Kabrina Webb at kdw4i@mtmail.mtsu.edu or my Faculty Advisor, Dr. Wendy Beckman at wendy.beckman@mtsu.edu.

By clicking the “NEXT” button, you agree to the above terms and agree to participant in this study.

APPENDIX E**Reminder email to Aerospace Department Students**

Subject: REMINDER: Aerospace Thesis Research—Participants Needed

Hello!

This is just a reminder that my research study is still open and will remain open until Monday, February 10th. If you have already participated, I appreciate your help!

Below is a link to the survey:

<http://www.surveymonkey.com/s/ZKWLC25>

Thank you,
Kabrina Webb

APPENDIX F

Email to Aerospace Department Minority Students

Subject: REMINDER: Aerospace Thesis Research—Participants Needed

Hello!

This is just a reminder that my research study is still open and will remain open until Monday, February 10th. My research study is open to all students in the Aerospace Department, but my primary focus is on minority participants. If you have already participated, I appreciate your help!

Below is a link to the survey:

<http://www.surveymonkey.com/s/ZKWLC25>

Thank you,
Kabrina Webb

APPENDIX G

Raw Data from Survey

	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
ALL										
Freq. Skip	13	13	13	13	13	13	15	15	15	15
Freq Ans	105	105	105	105	105	105	102	102	102	102
Mean	1.714286	1.447619	1.352381	1.619048	2.390476	2.371429	X	X	X	X
STDev	0.755929	0.635201	0.55437	0.764362	0.753138	0.696932	X	X	X	X
SA 4	1	0	0	2	7	2	X	X	X	X
% SA 4	0.95%	0.00%	0.00%	1.90%	6.67%	1.90%	X	X	X	X
A 3	16	8	4	12	37	46	X	X	X	X
% A 3	15.24%	7.62%	3.81%	11.43%	35.24%	43.81%	X	X	X	X
D 2	40	31	29	35	51	46	X	X	X	X
% D 2	38.10%	29.52%	27.62%	33.33%	48.57%	43.81%	X	X	X	X
SD 1	48	66	72	56	10	11	X	X	X	X
% SD 1	45.71%	62.86%	68.57%	53.33%	9.52%	10.48%	X	X	X	X
Yes	X	X	X	X	X	X	21	17	8	4
% Yes	X	X	X	X	X	X	20.70%	16.83%	7.92%	3.96%
No	X	X	X	X	X	X	19	22	93	97
% No	X	X	X	X	X	X	18.81%	21.78%	92.08%	96.04%
Not Sure	X	X	X	X	X	X	X	X	X	X
% Not Sure	X	X	X	X	X	X	X	X	X	X
N/A	X	X	X	X	X	X	61	62	X	X
MINORITY (27)										
Freq. Skip	8	8	8	8	8	8	7	7	9	9
Frequency	19	19	19	19	19	19	9	9	18	18
Mean	2	1.894737	1.631579	1.842105	2.157895	2.578947	X	X	X	X
STDev	0.745356	0.809303	0.597265	0.764719	0.60214	0.768533	X	X	X	X
SA 4	0	0	0	1	0	1	X	X	X	X
% SA 4	0.00%	0.00%	0.00%	5.26%	0.00%	5.26%	X	X	X	X
A 3	5	5	1	1	5	11	X	X	X	X
% A 3	26.32%	26.32%	5.26%	5.26%	26.32%	57.89%	X	X	X	X
D 2	9	7	10	11	12	5	X	X	X	X
% D 2	47.37%	36.84%	52.63%	57.89%	63.16%	26.32%	X	X	X	X
SD 1	5	7	8	6	2	2	X	X	X	X
% SD 1	26.32%	36.84%	42.11%	31.58%	10.53%	10.53%	X	X	X	X
Yes	X	X	X	X	X	X	6	6	4	3
% Yes	X	X	X	X	X	X	66.67%	66.67%	22.22%	16.67%
No	X	X	X	X	X	X	3	3	14	15
% No	X	X	X	X	X	X	33.33%	33.33%	77.78%	83.33%
Not Sure	X	X	X	X	X	X	X	X	X	X
% Not Sure	X	X	X	X	X	X	X	X	X	X
N/A	X	X	X	X	X	X	11	11	X	X

APPENDIX G (cont.)

	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
NON-MINORITY (91)										
Freq. Skip	5	5	5	5	5	5	8	8	8	8
Frequency	86	86	86	86	86	86	83	83	83	83
Mean	1.651163	1.348837	1.290698	1.569767	2.44186	2.325581	X	X	X	X
STDev	0.747819	0.548097	0.5284	0.759887	0.776185	0.676355	X	X	X	X
SA 4	1	0	0	1	7	1	X	X	X	X
% SA 4	1.16%	0.00%	0.00%	1.16%	8.14%	1.16%	X	X	X	X
A 3	11	3	3	11	32	35	X	X	X	X
% A 3	12.79%	3.49%	3.49%	12.79%	37.21%	40.70%	X	X	X	X
D 2	31	24	19	24	39	41	X	X	X	X
% D 2	36.05%	27.91%	22.09%	27.91%	45.35%	47.67%	X	X	X	X
SD 1	43	59	64	50	8	9	X	X	X	X
% SD 1	50.00%	68.60%	74.42%	58.14%	9.30%	10.47%	X	X	X	X
Yes	X	X	X	X	X	X	15	11	4	1
% Yes	X	X	X	X	X	X	46.88%	35.48%	4.82%	1.20%
No	X	X	X	X	X	X	17	20	79	82
% No	X	X	X	X	X	X	53.13%	64.52%	95.18%	98.80%
Not Sure	X	X	X	X	X	X	X	X	X	X
% Not Sure	X	X	X	X	X	X	X	X	X	X
N/A	X	X	X	X	X	X	51	52	X	X

APPENDIX G (cont.)

	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31
ALL								
Freq. Skip	15	15	15	15	15	15	15	15
Freq Ans	102	102	102	102	102	102	102	102
Mean	X	3.109375	2.527778	2.5	X	2.970297	3.206897	3.019802
STDev	X	0.737159	0.774084	0.905822	X	0.623786	0.667134	0.663026
SA 4	X	20	3	5	X	16	29	21
% SA 4	X	19.80%	2.97%	4.95%	X	15.84%	28.71%	20.79%
A 3	X	35	17	16	X	68	48	63
% A 3	X	34.65%	16.83%	15.84%	X	67.33%	47.52%	62.38%
D 2	X	8	15	13	X	15	9	15
% D 2	X	7.92%	14.85%	12.87%	X	14.85%	8.91%	14.85%
SD 1	X	2	3	6	X	2	1	2
% SD 1	X	1.98%	2.97%	5.94%	X	1.98%	0.99%	1.98%
Yes	18	X	X	X	5	X	X	X
% Yes	17.82%	X	X	X	4.95%	X	X	X
No	83	X	X	X	42	X	X	X
% No	82.18%	X	X	X	41.58%	X	X	X
Not Sure	X	36	X	61	X	X	14	X
% Not Sure	X	35.64%	X	60.40%	X	X	13.86%	X
N/A	X	X	63	X	54	X	X	X
MINORITY (
Freq. Skip	9	9	9	9	9	9	9	9
Frequency	19	18	18	18	18	18	18	18
Mean	X	3.076923	3.1	3	X	3.055556	3	3.333333
STDev	X	0.493548	0.316228	0.534522	X	0.235702	0.5547	0.485071
SA 4	X	2	1	1	X	1	2	6
% SA 4	X	11.11%	10.00%	5.56%	X	5.56%	11.11%	33.33%
A 3	X	10	9	6	X	17	10	12
% A 3	X	55.56%	90.00%	33.33%	X	94.44%	55.56%	66.67%
D 2	X	1	0	1	X	0	2	0
% D 2	X	5.56%	0.00%	5.56%	X	0.00%	11.11%	0.00%
SD 1	X	0	0	0	X	0	0	0
% SD 1	X	0.00%	0.00%	0.00%	X	0.00%	0.00%	0.00%
Yes	4	X	X	X	2	X	X	X
% Yes	28.57%	X	X	X	22.22%	X	X	X
No	14	X	X	X	7	X	X	X
% No	73.68%	X	X	X	77.78%	X	X	X
Not Sure	X	5	X	10	X	X	4	X
% Not Sure	X	27.78%	X	55.56%	X	X	22.22%	X
N/A	X	X	8	X	9	X	X	X

APPENDIX G (cont.)

	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31
NON-MINOR								
Freq. Skip	8	8	8	8	8	8	8	8
Frequency	83	83	83	83	83	83	83	83
Mean	X	3.134615	2.321429	2.375	X	2.95122	3.246575	2.95122
STDev	X	0.792832	0.772374	0.941858	X	0.683174	0.68274	0.683174
SA 4	X	18	2	4	X	15	27	15
% SA 4	X	21.69%	7.14%	4.82%	X	18.07%	32.53%	18.07%
A 3	X	25	8	10	X	51	38	51
% A 3	X	30.12%	28.57%	12.05%	X	61.45%	45.78%	61.45%
D 2	X	7	15	12	X	15	7	15
% D 2	X	8.43%	53.57%	14.46%	X	18.07%	8.43%	18.07%
SD 1	X	2	3	6	X	2	1	2
% SD 1	X	2.41%	10.71%	7.23%	X	2.41%	1.20%	2.41%
Yes	14	X	X	X	3	X	X	X
% Yes	16.87%	X	X	X	7.89%	X	X	X
No	69	X	X	X	35	X	X	X
% No	83.13%	X	X	X	92.11%	X	X	X
Not Sure	X	31	X	51	X	X	10	X
% Not Sure	X	37.3%	X	61.4%	X	X	12.0%	X
N/A	X	X	55	X	45	X	X	X