

CHAPTER IV

RESULTS OF STUDY

The following chapter consists of data analysis and results describing the participants in the sample. The categories of comparison are centered on race, gender, classification, grade-point-average (GPA), and major. Descriptive information is provided for these variables. Chi Square test of independence is used to test relationships between race, gender, classification, GPA, major, and demographics. In this chapter data will be presented of the advising style received and advising style preferred (prescriptive or developmental). The Academic Advising Inventory (AAI) evaluates what type of advising a student is currently receiving and what type of advising they prefer. Scores below 57 indicate that the engineering student is receiving or prefer prescriptive advising, and scores 57 and greater indicate that they are receiving or prefer developmental advising (Winston & Sander, 1984a).

A two-way Analysis of Variance (ANOVA) and *t*-test were conducted to analyze differences in advising style when categorized by race, gender, classification, GPA, and major. There were additional questions asking students about their satisfaction and relationships with their advisors, and *t*-tests were conducted to see if there were differences in advising style by race. A brief summary will follow the results.

Demographic Data

All participants completed the Academic Advising Inventory (AAI) developed by Roger B. Winston, Jr. and Janet Sandor. The participants completed the AAI on-line via the Internet. The sample consisted of a total of 373 undergraduate engineering students, 265 males and 108 females. The sample consisted of 29% females and 71% males.

African Americans made up 35% ($n = 132$) of the sample and Whites 65% ($n = 241$). The sample consisted of 25% ($n = 93$) African American males, 10% ($n = 39$) African American females, 46% ($n = 172$) White males, and 19% ($n = 69$) White females. The Chi Square test for independence indicated African Americans and Whites were independent meaning that the proportions of male and female respondents do not differ between the African American and White samples, $X^2(3, N=373)=1.67, p=.664$. Table 12 displays the demographics of the samples.

A total of 132 African American students participated in the study, 93 (70.5 %) males and 39 (29.5%) females. The total population of African American undergraduate engineering students is 217; thus the response rate was 60.8%. A total of 241 White engineering students participated by completing the online Academic Advising Inventory, 172 males and 69 females. Of the White population 70.1% were males and 28.6% females. The total White population sample in the College of Engineering included 3,668 students; thus the response rate was 6.6%.

Table 12

Demographics

Gender	African American	White	N
Male	93	172	265
Female	39	69	108
N	132	241	373

Note. N= sum of the rows and column.

Chi Square test for independence showed that male and female are proportionate in both samples of African American and White, $X^2(3, N=373)=1.67, p=.664$.

The ages of the African American student participants were from 18 to 25 and older. Approximately 45% of the African American participants were 18 and 19 years of

age. Over 79% of the participants ranged from 18-21 years of age (See Table 13). The majority of the participants were between 18-22 years of age, and there were fewer participants over 22 years of age. Approximately 84% of the White population were between 18-21 years of age. Similar to the African American population there were fewer participants above age 22 in the study. The Chi Square test for independence indicated that age is associated with race, $X^2(7, N=371)=22.88, p=.002^*$. The results show that Whites have more students' 21-25 years of age from this sample, suggesting that there were more junior and senior White students that participated in this study. Table 13 displays the age ranges between the African American and White students who participated in this study.

Table 13

Age of Participants by Race

Age	18	19	20	21	22	23	24	25 or older	Total
Race									
African American	30	30	26	19	16	7	1	3	132
White	18	72	52	60	21	10	2	6	241
Total	48	102	78	79	37	17	3	9	373

Note. $X^2(7, N=371)=22.88, p=.002^*$ Indicate Race and age are associated meaning that age of the student in engineering is influenced by race. There are more White students in the 21-25 age range than African Americans indicating more White students are in the junior and senior level of engineering.

Participants in the study were all underclassmen, and the largest group of participants were the senior class (34%). Juniors consisted of 28% of the participants, sophomores made up 24% of the study, and freshman participants were 13.6%. (See Table 14). The African American sample included all undergraduate students and 33% of the students were freshmen, 23% sophomores, 15.2% juniors, and 28.8% seniors. The

White sample consisted of 3.3% freshmen, 25% sophomores, 28% juniors, and 34% seniors. The Chi Square test for independence indicate that classification is associated with race indicating that they are not equal proportions of African American and White students in the four class standings. Frequency data revealed a higher proportion of White students are in the junior and senior level class standing in the sample.

Table 14

Class Standing and Race Relationships

Class	Freshmen	Sophomore	Junior	Senior	Total
Race					
African American	43	31	20	38	132
White	8	59	85	89	241
Total	51	90	105	127	373

Note. The values represent the number of students in each class by race that participated in this study. Chi Square analysis indicate higher number of Whites in the junior and senior classes from this sample, $X^2(3, N=373)=67.35$, $p=.000$.*

College of Engineering Student Population of African Americans and Whites

Class	Freshmen	Sophomore	Junior	Senior	Total
Race					
African American	81	36	37	63	217
White	967	812	785	1104	3668
Total	1048	848	822	1167	3885

There are 12 engineering majors at Virginia Tech: aerospace and ocean, biological, chemical, civil, computer, electrical, science/mechanical, general, industrial, material science, mechanical engineering, and mining (Table 15). The largest group of

the engineering participants in this study majored in general engineering 17.7% ($n = 66$), mechanical 14.7% ($n = 55$), computer 13.7% ($n = 51$), and electrical 12.6% ($n = 47$).

The largest group, 38% ($n = 50$) of the African American participants were registered in general engineering. Other considerable enrollments for the African American population were in mechanical [15% ($n = 20$)], electrical [14.3% ($n = 19$)], and computer [11.3% ($n = 15$)]. The least enrolled were material science [1.5% ($n = 2$)] and biological engineering [0% ($n = 0$)].

Out of the 12 different majors of engineering the majority of the White students who participated in this study were in mechanical [18.7% ($n = 45$)], computer [14.9% ($n = 36$)], aerospace and ocean [12.8% ($n = 31$)], electrical [11.6% ($n = 28$)], and industrial engineering [11.6% ($n = 28$)]. The White population had only [6.6% ($n = 16$)] in the general engineering program. The least enrolled were material science [1.2% ($n = 3$)] and biological engineering [1.2% ($n = 3$)]. Further results of White and African American major classification can be seen in Table 15.

Table 15

Classification of Major by Race

Major	African American	White	Total
Aerospace & Ocean	3	31	34
Biological	0	3	3
Chemical	4	16	20
Civil	5	20	25
Computer	15	36	51
Electrical	19	28	47
Science/Mech.	3	8	11
General	50	16	66
Industrial	11	28	39
Material Science	2	3	5
Mechanical	20	45	65
Mining	0	7	7
Total	132	241	373

Note. The values above represent the number of participants in this study in each major partitioned by race.

College of Engineering Student Population of African Americans and Whites by Major

Major	African American	White	Total
Aerospace & Ocean	3	228	231
Biological	0	33	33
Chemical	4	131	135
Civil	7	288	295
Computer	16	363	379
Electrical	29	270	299
Science/Mech.	2	62	64
General	121	1382	1503
Industrial	18	237	255
Material Science	0	59	59
Mechanical	16	549	565
Mining	1	66	67
Total	217	3668	3885

Race

The AAI inventory evaluates what type of advising students are currently receiving and what type of advising they prefer. A low mean score between 14 to 56 indicates that they are either receiving or preferring a prescriptive style of advising. A high mean score between 57 and 114 indicates that they are either receiving or preferring a developmental style of advising (Winston & Sander, 1984a).

African American students participating in this survey scored a group mean of 54.27 when asked what type of advising they perceived that they were currently experiencing, indicating that the Virginia Tech faculty is providing a prescriptive type of advising style to the majority of African American students. Illustrations are given in Table 16 and Figure 1. The inventory score also indicated students preferred a developmental style of advising instead of a prescriptive style (90.12). African American females scored a group mean of 60.77 while African American males scored a group mean of 51.54 showing that African American females reported receiving developmental advising while African American males reported receiving a prescriptive style. When asked what type of advising preferred, African American males and females scored a mean 87.02 and 97.51 (developmental advising) respectively.

Table 16

Advising Style Received and Preferred

Race	African American				White			
Gender	AA Male		AA Female		W Male		W Female	
	Received	Preferred	Received	Preferred	Received	Preferred	Received	Preferred
Mean	51.54	87.02	60.77	97.51	66.20	90.22	67.45	92.57
SD	23.88	18.68	19.80	12.25	16.45	12.51	19.89	11.63
Median	55.00	89.00	64.00	101.00	65.00	92.00	64.00	94.00
% Pres	55.00	1.00	38.00	---	30.00	1.00	44.00	---
% Dev	45.00	99.00	62.00	100.00	70.00	99.00	56.00	100.00

Results indicate that the majority of African American females (62%) reported receiving developmental advising and prefer developmental advising. The majority of African American males (55%) reported receiving prescriptive advising, but they prefer a developmental style of advising. The type of advising style desired by the African American participants rendered a score higher than what they reported receiving from Virginia Tech faculty. Illustrations are given in Figures 1, 2 and 3. However, both scores reveal students prefer a more developmental style of academic advising from Virginia Tech engineering faculty.

The White engineering students scored a group mean of 66.56 when asked about the type of advising they received. This score indicates that they reported receiving a developmental style of advising. Male White students scored a mean of 66.20, and female White students scored 67.45 when asked what type of advising received. The inventory mean score also indicated undergraduate White engineering students prefer a more developmental style of advising than what they reported that they are currently receiving; White males at 90.22 and females at 92.57.

A statistical analysis was run to test whether White students are receiving a more developmental advising style than African Americans. A *t*-test was used to compare the difference of the advising style received between African Americans and Whites. Results of the *t*-test indicated that Whites reported receiving a more developmental style than African Americans, $t(214.64, N=373)=-5.783, p=.000$. A second analysis was run to test whether there is a difference between the style of academic advising that African American or White engineering students prefer based on race. Results of the *t*-test, $t(201.94, N=373)=-.494, p=.656$ revealed that there was no difference in preferred advising style. African American and White students prefer a developmental style of academic advising. Graphic presentations are given in Figures 1, 2 and 3.

Figure 1

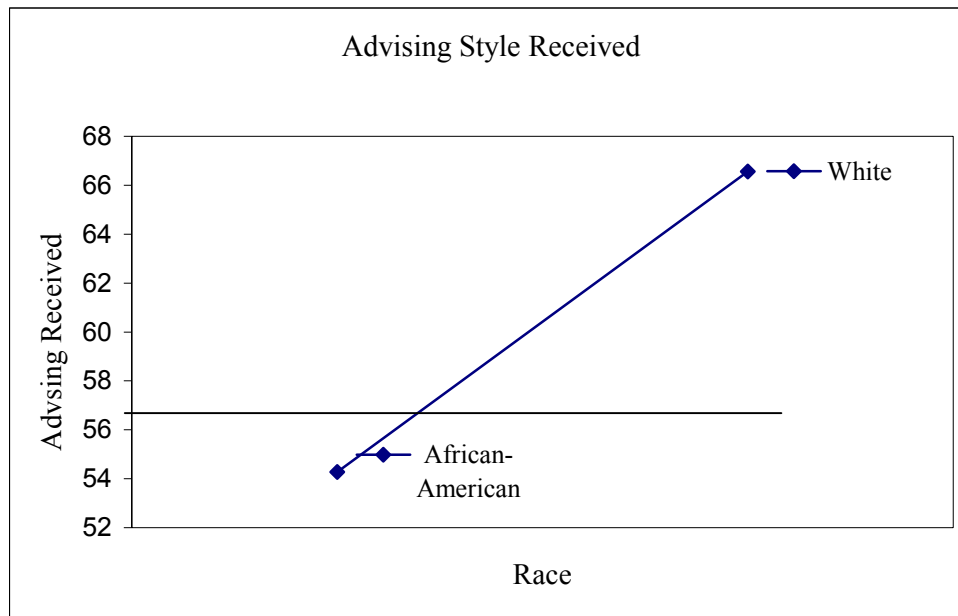


Figure 1. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Figure 2

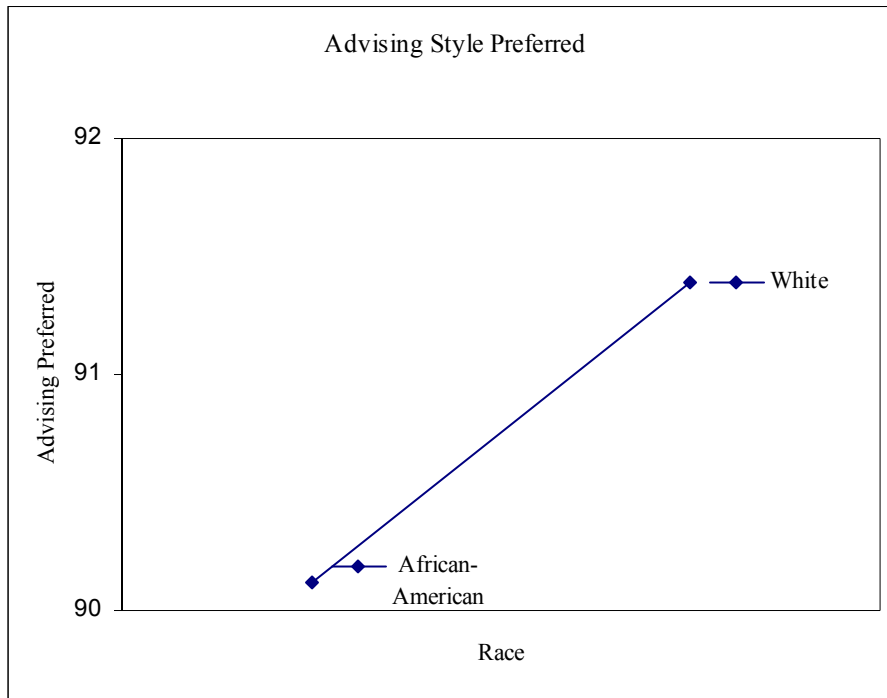


Figure 2. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Figure 3

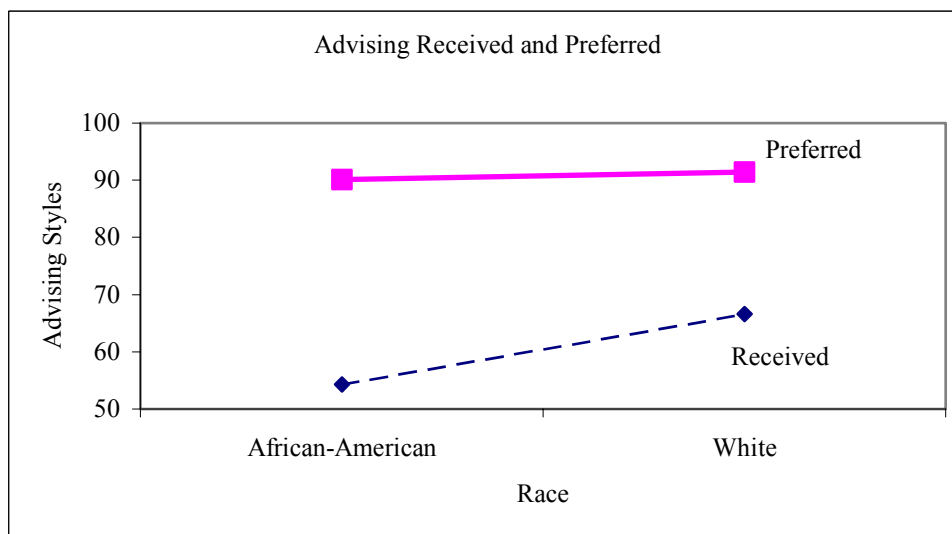


Figure 3. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Gender

Two-way Analysis of Variance (ANOVA) was used to analyze whether African American males and females differed from White males and females in the types of advising received and preferred. The significance level was tested at .05. The null hypothesis that there is no difference between the style of academic advising currently perceived by male and female African American and White engineering students was rejected. The two-way ANOVA indicated a significant main effect of gender, $F(1,938)=5.09$, $p=.025$ and race, $F(8,0312)=21.09$, $p=.000$. The significant main effect on race indicates that the majority of African Americans males perceive that they are receiving prescriptive advising more than Whites. Refer to Tables 17 and 18 and Figure 4.

The second null hypothesis that states that there is no difference between the style of academic advising that male and female African American or White engineering students prefer is also rejected. The two-way ANOVA revealed a significant main effect on gender, $F(2,906)=14.53$, $p=.000$. The ANOVA test also indicated a significant interaction between gender and race, $F(1,171)=5.86$, $p=.016$. Although both genders prefer developmental advising, African American females scored significantly higher than African American males. White males and females are the same. See Table 19 and Figure 5 below.

Table 17

Means of Advising Style Received

	African Americans	Whites	Average
Male	51.54	66.20	58.87
Female	60.77	67.45	64.11
Mean	54.27	66.56	61.49

Means of Advising Preferred

	African Americans	Whites	Average
Male	87.02	90.22	88.62
Female	97.51	92.57	95.04
Mean	90.12	91.39	91.83

Note. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Table 18

Two-way Analysis of Variance based on Gender and Race for Advising Received

Source	df	MSE	F	P
Gender (G)	1	1932.21	5.09*	.025
Race (R)	1	8031.67	21.09*	.000
G X R	1	1123.10	2.95	.087
error	369	380.77		

*p ≤ .05.

Figure 4

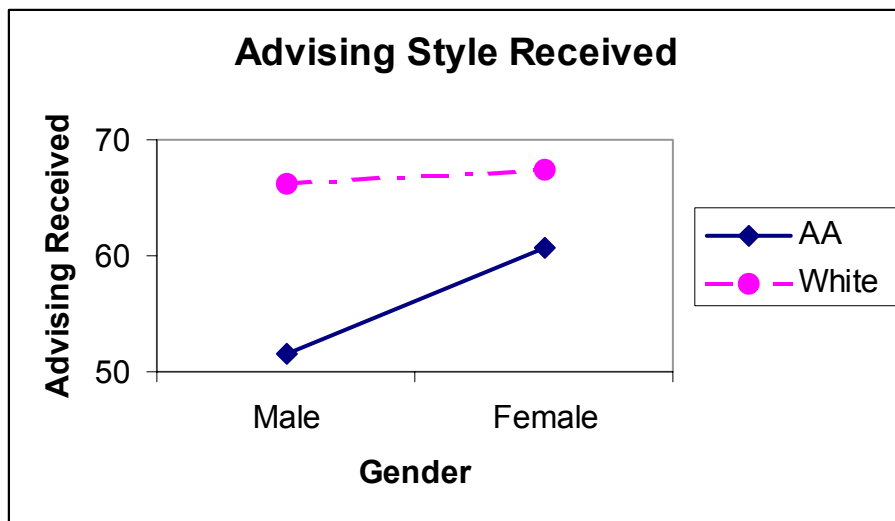


Figure 4. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114

Table 19

Two-way Analysis of Variance based on Gender and Race for Advising Preferred

Source	df	MSE	F	P
Gender (G)	1	2905.67	14.53*	.000
Race (R)	1	53.90	.27	.604
G X R	1	1170.61	5.85*	.016
error	369	199.89		

*p ≤ .05.

Figure 5

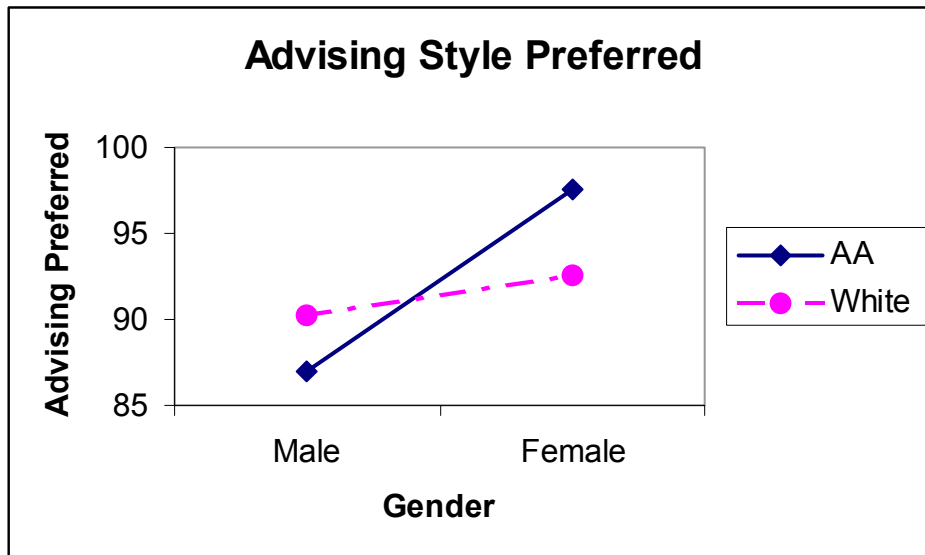


Figure 5. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Classification

Two-way ANOVA was used to analyze whether African Americans and Whites differed from the type of advising received and preferred when looking at ones classification in the College of Engineering. There is a main effect of race, $F(10,822)=27.89$, $p=.000$. Results show that there is no difference between classes in received advising, all African American classifications, freshmen, sophomore, and seniors reported receiving primarily prescriptive advising. Of note, the type of advising reported by the junior class of African Americans could be described as borderline between prescriptive and developmental with a group mean score of 56.80. Results are displayed in Tables 20 and 21 and Figure 6a.

Table 20

<i>Two-way Analysis of Variance based on Race and Classification for Advising Received</i>				
Source	df	MSE	F	P
Race (R)	1	10822.03	27.89*	.000
Classification (C)	3	258.24	.67	.574
R X C	3	299.34	.77	.511
error	365	388.10		

* $p \leq .05$.

Table 21

Advising Received and Class Comparisons

Race	African American	White
Freshmen	54.40	76.38
Sophomore	53.10	65.36
Junior	56.80	65.12
Senior	53.74	67.88

Advising Preferred and Class Comparisons

Race	African American	White
Freshmen	90.16	101.5
Sophomore	94.16	91.20
Junior	93.30	90.44
Senior	85.11	90.16

Note. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

The second null hypothesis states that there is no difference between the style of academic advising that African American or White engineering students prefer based on classification. This null hypothesis is rejected. The two-way ANOVA revealed a significant main effect on classification, $F(698)=3.42$, $p=.017$. The ANOVA test also indicated a significant interaction between race and classification, $F(571)=2.80$, $p=.040$. The White freshman class compared to the African American freshman class reported having a stronger preference for a developmental style of advising. Results are displayed in Tables 21 and 22 and Figure 6b below.

Table 22

Two-way Analysis of Variance based on Race and Classification for Advising Preferred

Source	df	MSE	F	P
Race (R)	1	376.91	1.85	.175
Classification (C)	3	698.39	3.43*	.017
R X C	3	571.53	2.80*	.040
error	365	203.90		

*p ≤ .05.

Figure 6

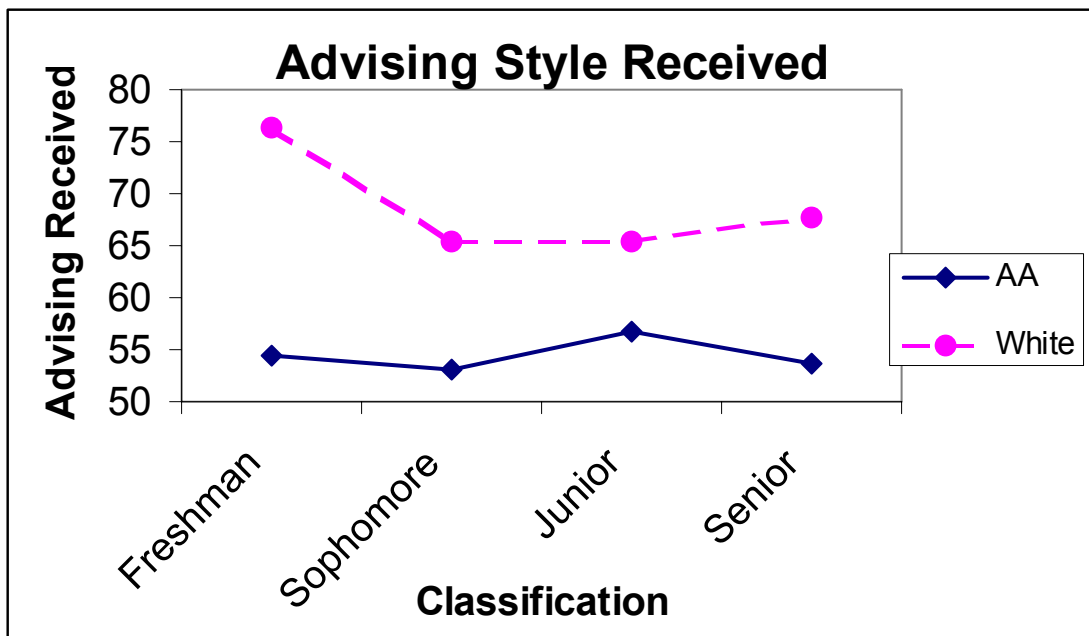


Figure 6a. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Figure 6 Continued

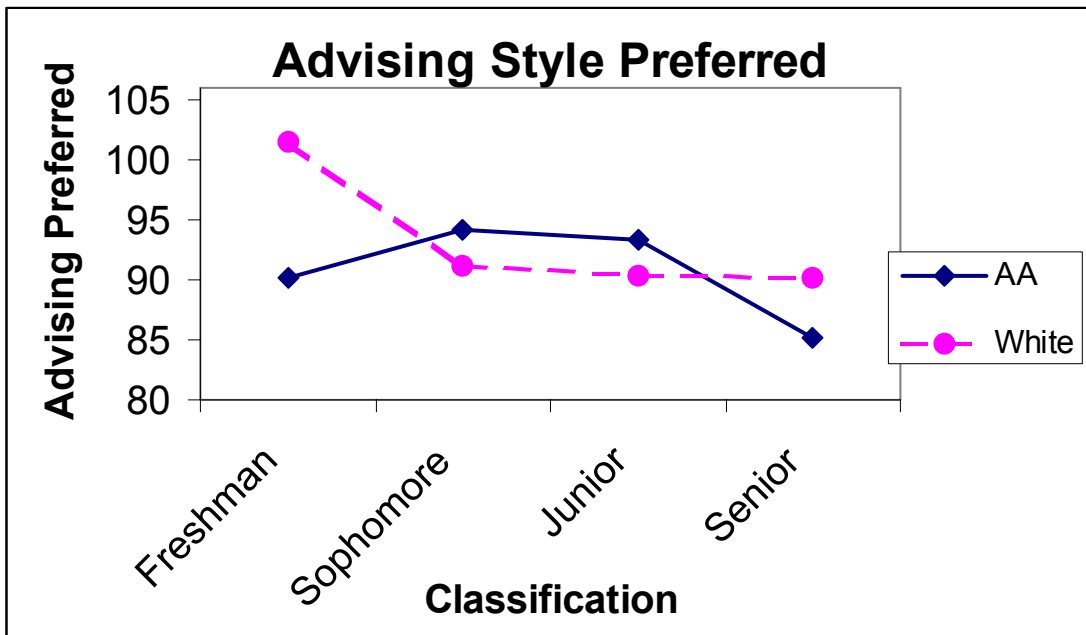


Figure 6b. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Grade Point Average

The null hypothesis states that there is no difference between the style of academic advising currently perceived by African American and White engineering students when considering GPA. Students were categorized by 1, 2, 3, and 4, where 1 = GPA between 1.0-1.9, 2 = GPA between 2.0-2.9, 3 = GPA between 3.0-3.9, and 4 = 4.0-higher. Descriptive statistics are displayed in Table 23.

Results of the analysis showed that the null hypothesis is rejected. Two-way ANOVA tested at a significance level of .05 indicated a significant main effect of race, $F(7,415)=21.45$, $p=.000$ and GPA, $F(4,838)=13.99$, $p=.000$. The ANOVA test also indicated a significant interaction between race and GPA, $F(2,002)=5.79$, $p=.003$. Results show that African Americans engineering students in the GPA categories of 1.0-1.9 and 2.0-2.9 reported receiving prescriptive advising, while the 3.0-3.9 category of African Americans reported receiving developmental advising (67.17). Results are displayed in Table 24. Means for the Whites data indicated that all White classes reported receiving developmental advising. Please note that one student had a GPA of 4.0, and that student was categorized in the 3.0 group. The student with the GPA of 4.0 did have an advising received mean score of 37, indicating a prescriptive advising received. Results are displayed in Tables 24 and 25 and Figure 7.

The second null hypothesis, which states that there is no difference between the style of academic advising that African American or White engineering students prefer based on GPA, not rejected. All students regardless of race and GPA prefer a developmental style of advising. Results are displayed in Tables 24 and 26 and Figure 8.

Table 23

Race and GPA Comparison

Academic Level	1	2	3	4	Total
African American	20	83	29	-	132
White	9	104	127	1	241
Total	29	187	156	1	373

Note. Numbers represent the number of students falling in these GPA categories. GPA is broken into 3 categories: 1=1.0-1.9, 2=2.0-2.9, 3=3.0-3.9, and 4=4.0

Table 24

Advising Received and GPA Mean Comparison

Race	African American	White
GPA		
1.0-1.9	32.30	62.44
2.0-2.9	55.05	64.03
3.0-3.9	67.17	69.15
4.0	---	37
Mean	54.27	66.56

Advising Preferred and GPA Mean Comparison

Race	African American	White
GPA		
1.0-1.9	93.65	91.22
2.0-2.9	89.11	90.86
3.0-3.9	90.59	90.85
4.0	---	97.00
Mean	90.12	91.39

Note. Numbers represent the means of advising received segmented by GPA categories. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Table 25

Two-way Analysis of Variance based on Race and GPA for Advising Received

Source	df	MSE	F	P
Race (R)	1	7414.65	21.45*	.000
GPA (G)	2	4837.82	13.99*	.000
R X G	2	2001.61	5.79*	.003
error	367	345.70		

* $p \leq .05$.

Figure 7

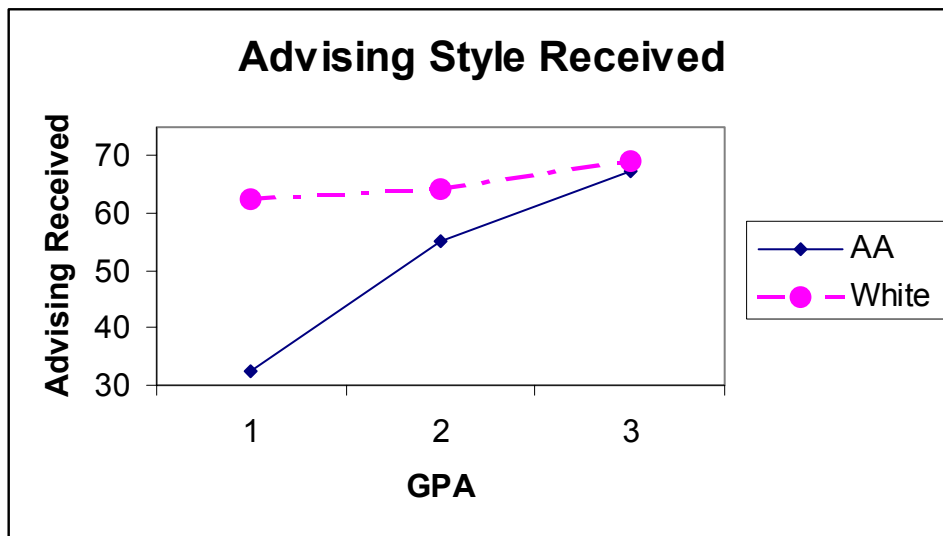


Figure 7. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114. Please note that the one person that was in the 4 group, was grouped with the 3 = 3.0-3.9 group.

Table 26

Two-way Analysis of Variance based on Race and GPA for Advising Preferred

Source	df	MSE	F	P
Race (R)	1	.60	.003	.957
GPA (G)	2	73.07	.350	.705
R X G	2	54.89	.263	.769
error	367	209.03		

Note. $p \geq .05$ meaning that the null hypothesis is not rejected. All students regardless of race and academic levels prefer a developmental advising style and do not differ in advising style preferred.

Figure 8

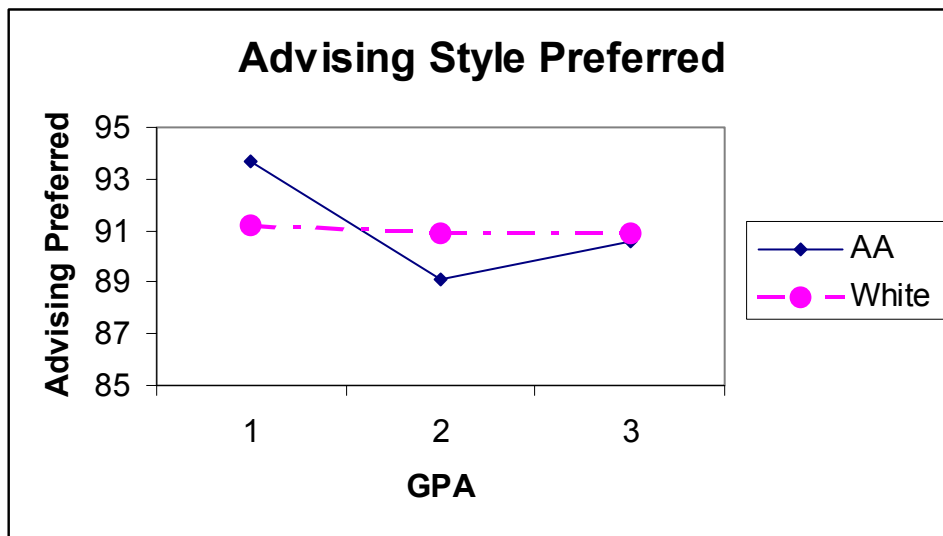


Figure 8. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114. Please note that the one person that was in the 4 group, was grouped with the 3 = 3.0-3.9 group.

Major

The null hypothesis that there is no difference between the style of academic advising currently perceived by African American and White engineering students when looking at a particular major is rejected. Test of significance was set at .05. Two-way ANOVA indicated a significant main effect of race, $F(10,938)=29.05$, $p=.000$. Results revealed that all majors (Computer, Electrical, General Eng., Industrial, and Mechanical) except for the category group "Others" reported receiving a prescriptive style of advising. "Others" had a mean score of 62.06 indicating a developmental style of advising received. The group "Others" is a combination of seven majors that had a low number of African Americans students enrolled in that particular major. Refer to Table 27. The Mechanical Engineering major is the only group that is borderline between prescriptive and developmental with a mean score of 56.90. The mean score for the White engineering students' data indicated that all majors reported receiving a developmental style of advising, with a total mean average of 66.56. Group results are displayed in Tables 27 and 28 and Figure 9.

The second null hypothesis that states that there is no difference between the style of academic advising that African American or White engineering students prefer based on major is also rejected. The two-way ANOVA revealed a significant interaction between race and major, $F(490)=2.40$, $p=.037$. The White students majoring in Computer engineering compared to the African American students majoring in Computer engineering reported a stronger preference for a developmental style of advising. The African Americans majoring in Industrial engineering reported a stronger preference for

developmental advising compared to their White counterparts. Results are displayed in Tables 27 and 29 and Figure 10.

Table 27

Engineering Major and Advising Received and Preferred Means by Race

Major	African American		White		N
	Received	Preferred	Received	Preferred	
Computer	49.07	80	66.86	91	51
Electrical	53.89	87.53	67.39	90.96	47
Gen. Engineer	52.20	92.40	62.50	92.19	66
Industrial	54.55	95.27	77.14	87.43	39
Mechanical	56.90	94.55	68.87	90	65
Others	62.06	86.71	62.35	92.15	105
Mean Average	54.27	90.12	66.56	90.89	

Note. Others majors group includes Aerospace and Ocean, Biological, Chemical, Civil, Science/Mechanical, Material Science, and Mining Engineering. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Table 28

Two-way Analysis of Variance based on Race and Major for Advising Received

Source	df	MSE	F	P
Race (R)	1	10938.65	29.05*	.000
Major (M)	5	412.52	1.10	.362
R X M	5	649.17	1.72	.128
error	361	376.48		

*p ≤ .05.

Figure 9

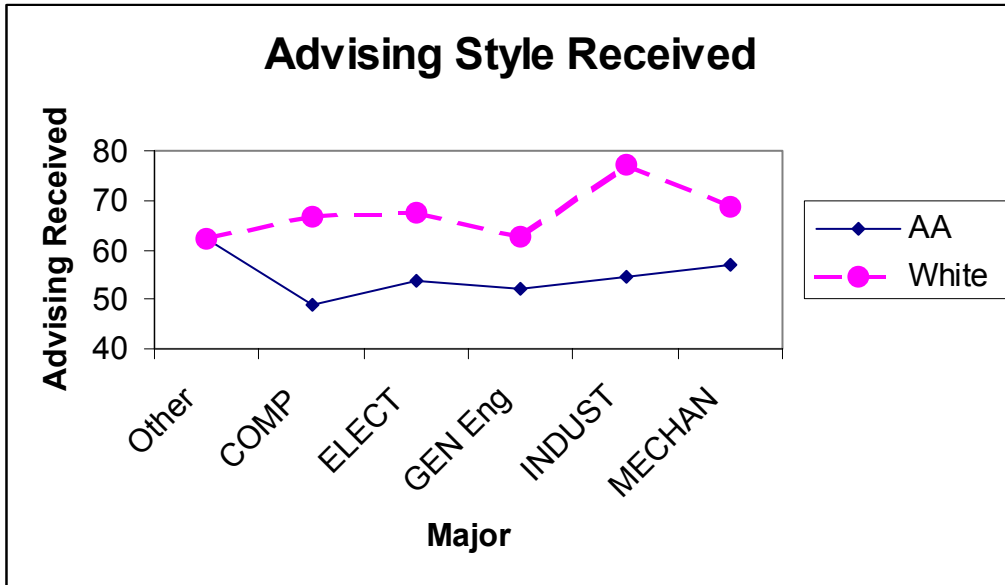


Figure 9. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Table 29

Two-way Analysis of Variance based on Race and Major for Advising Preferred

Source	df	MSE	F	P
Race (R)	1	99.00	.49	.487
Major (M)	5	299.95	1.47	.199
R X M	5	490.28	2.401*	.037
error	361	204.19		

*p ≤ .05.

Figure 10

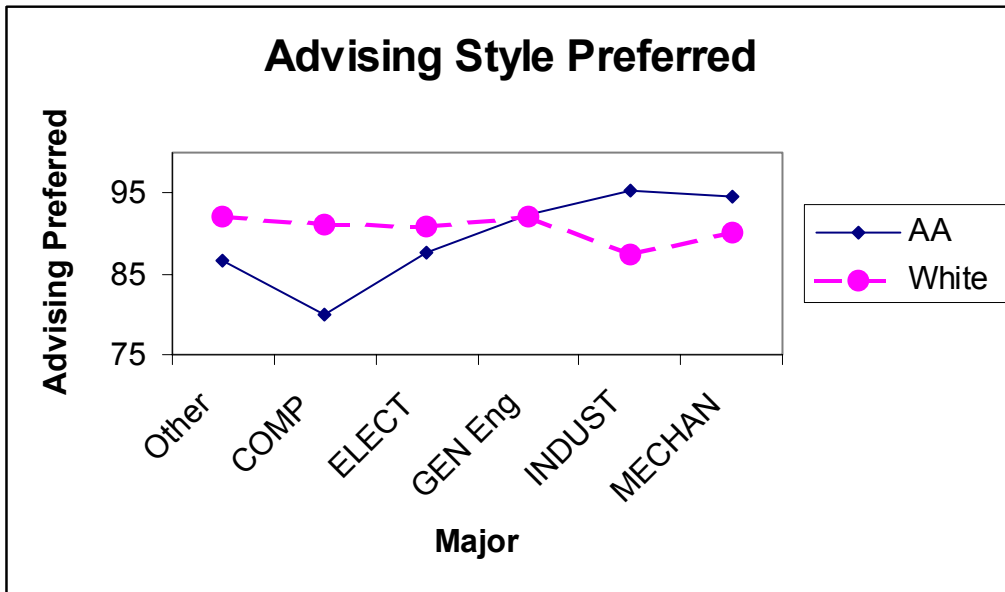


Figure 10. Prescriptive advising is a score between 14 - 56. Developmental advising is a score between 57 - 114.

Additional Data

In addition to the research questions, additional data was collected from the AAI to help investigate possible differences in particular styles (prescriptive or developmental) of advising. The following section will report the results on: (a) satisfaction; (b) where the majority of advising is received; (c) communication and relationship with advisor; (d) time spent with advisor; and (e) number of visits with advisor.

Satisfaction

Both groups of engineering students were asked to indicate their satisfaction towards academic advising in the College of Engineering. The AAI used a four-place Likert-type scale, choosing either strongly disagree, disagree, agree, or strongly agree.

The first questions asked if the student was satisfied in general with the academic advising they have received. When African American students were asked to respond to the statement "*I am satisfied in general with the academic advising I have received,*" 27.3% of participants "strongly disagree." Another 22.7% report that they "disagree," revealing that approximately 50% of the African American students are not satisfied with academic advising.

When White students were asked to respond to the same statement, 14.1% of the White Students "strongly disagreed," 18.3% "disagreed," 44% "agreed," and 23.2% "strongly agreed." Approximately 32% of the White students indicated that they are not satisfied with the academic advising. An Independent *t*-test was run to see whether African Americans and Whites differed on level of satisfaction with advising. Results of the analysis indicated that Whites have a statistically significant difference in the level of

satisfaction with advising when compared to the African American students; results are reported in Tables 30 and 31.

Table 30

I am Satisfied in General with the Academic Advising I have Received. Descriptive

Race	SD	Disagree	Agree	SA
African American	27.3	22.7	36.4	13.6
White	14.1	18.3	44.0	23.2

Note. Fifty percent of the African American students are not satisfied with the Academic advising they have received.

Table 31

Mean Comparison of Level of Satisfaction with Advising

Group	Mean	df	t	p-value
African American	2.36	260	-3.794	.000
White	2.78			

Note. Results of the *t*-test indicate that White engineering students have a higher level of satisfaction with advising, $t(260, 373) = -3.794$, $p = .000^*$.

The second question asked students to respond to the following statement: *"I have received accurate information about courses programs, and requirements through academic advising."* When African American students were asked whether they received accurate information, over 44% of the engineering students reported that they do not receive accurate information. Close to 56% of the African American engineering students "agree" or "strongly agree" that they are receiving accurate information. When White students were asked whether they received accurate information about courses, program, and requirements through academic advising, 73% of the White students either "agreed" or "strongly agreed" that they received accurate information. About 27% of the White

students either "disagreed" or "strongly disagreed" when asked whether they received accurate information regarding courses, programs, and requirements through academic advising. Results are reported in Tables 32 and 33.

Table 32

I have Received Accurate Information about Courses, Programs, and Requirements through Academic Advising. Descriptive

Race	SD	Disagree	Agree	SA
African American	20.5	24.2	38.6	16.7
White	8.3	17.4	46.1	27.8

Note. Forty-four percent of the African American engineering students feel that they have *not* received accurate information about courses, programs, and requirements through academic advising.

Table 33

Mean Comparison of Students receiving Accurate Information

Group	Mean	df	t	p-value
African American	2.52	247	-4.031	.000
White	2.93			

Note. Results of the *t*-test indicate that differences are significant between African American and Whites on this question, $t(247, 373) = -4.031$, $p = .000^*$.

Where the Majority of Advising is Received

All students were asked to indicate where they go for advising from a list of 10 possibilities in the inventory. Some of the choices included: "advised individually by assigned advisor," "advised individually by any available advisor at an advising center," "advised with a group of students," "advised by a peer (student) advisor," etc. Results indicated that 39.4% of the African American students received advising by assigned

advisor at an advising center. The second largest group of African American students received advisement by the Office of Minority Engineering Programs (OMEP) (14.4%), and the third largest group of students indicated being advised individually not through an advising center (13.6%). Chi Square test for independence indicated that a large portion of African American students seek advisement from OMEP, $\chi^2(8, N=373)=63.12, p=.000^*$. Results indicated that 42.7% of White students were being advised by an advisor assigned by the advising center. Another 24% of White students indicated that they had been advised individually, not through an advising center. Results are reported in Table 34.

Table 34

<i>Description of Advising</i>	AA(%)	Wht(%)
Advised individually by assigned advisor at an advising center	39.4	42.7
Advised individually by any available advisor at an advising center	5.3	2.9
Advised individually, not through an advising center	13.6	24.1
Advised with a group of students	4.5	.8
Advised by a peer (student) advisor	7.6	1.2
Advised in conjunction with a course in which I was enrolled	7.6	10.4
Advised by an individual at the Office of Minority Engineering Programs (OMEP)	14.4	0
Advised by an individual at the Center of Academic Enrichment and Excellence	0	0
Advised in a manner other than the alternatives described above	3.0	7.1
No advising received	4.5	10.8

Note. AA stands for African Americans; Wht stands for Whites. Numbers represent percentage (%) of respondents to the questions

Communication and Relationship with Advisor

Students were also asked to describe their communication with their assigned faculty academic advisor. Students indicated whether they "communicated well" with their faculty advisor, whether faculty advisor "understood" them, whether faculty advisor "did not understand" them, and whether they "have problems communicating" with their faculty academic advisor. Results from African American students indicated that 34.1% "communicated well" with their faculty advisor. Another 32.6% of the students reported

that their faculty advisor "understands" them. Close to 67% of African American students communicate well with their academic advisor or feel that their academic advisor understand them. Approximately 33.3% of the students indicated that their advisors "do not understand" them or "have problems communicating" with their advisor. Chi Square test for independence indicated that a larger portion of African American students than White students felt that their academic advisor does not understand them, $X^2(4, N=373)=12.61, p=.013^*$.

Approximately 47% of the White students stated they "communicate well" with their advisor, 22.4% indicated their advisor "understands" them, 9.5% stated their advisor "doesn't understand" them, and 20.3% stated "having problems communicating" with their advisor. Table 35 gives a more detailed description of engineering students interacting with their advisor.

Table 35

<i>Communication with Advisor</i>	African American (%)	White (%)
I communicate well with my faculty Academic Advisor	34.1	47.3
My faculty Academic Advisor understands me	32.6	22.4
My faculty Academic Advisor does not understand me	17.4	9.5
I have problems communicating with my faculty Advisor	15.9	20.3

Note. 17.4% of African Americans state that their faculty academic advisor does not understand them, compared to 9.5% with White. 20% of Whites indicate they have trouble communicating with their advisor, and 15.9% of African Americans have problems communicating with their advisor.

Students were also asked to report on their relationship with their academic advisor. Students either indicated whether they "enjoyed visiting" with their academic advisor, whether they "did not mind" visiting with their academic advisor, whether they "did not enjoy" visiting with assigned faculty advisor, and whether they "avoid" visiting with their assigned faculty academic advisor. Results of African American students

indicated 21.2% of the students "enjoyed" meeting with their advisor, and 50% of the students indicated that they "did not mind" meeting with their advisor. Ironically, 16.7% of the students "do not enjoy" visiting their assigned faculty academic advisor and another 12.1% of the students "avoid" their faculty academic advisor. Close to 30% of African American undergraduate engineering students either "do not enjoy" visiting or "avoid" visiting their faculty academic advisor. Chi Square test for independence did not show significance, $X^2(4, N=373)=6.79$, $p=.147$, but the standardized residual indicated that a large portion of African American students did not enjoy visiting their assigned faculty academic advisor.

White students were also asked to choose a statement that best describes their relationship with their advisor. Among the White students, the following results were 27.8% indicated they "enjoy" visiting with their advisor, 46.9% stated they "did not mind" visiting with their advisor, 9.9% stated "not enjoying" visiting with assigned advisor, and 14.9% stated that they "avoid" visiting with assigned faculty academic advisor. Close to 25% of White undergraduate engineering students either "do not enjoy" visiting or "avoid visiting their faculty academic advisor. Comparisons of African Americans and Whites relationships with their advisor are reported in Table 36.

Table 36

<i>Relationship with Advisor</i>	African American (%)	White (%)
I enjoy visiting with my advisor	21.2	27.8
I do not mind visiting with my faculty Academic Advisor	50	46.9
I do not enjoy visiting my assigned faculty Academic Advisor	16.7	9.9
I avoid visiting my assigned faculty Academic Advisor	12.1	14.9

Note. 16.7% of African Americans do not enjoy visiting with their faculty academic advisor, and 9.9% of Whites did not enjoy visiting with advisor.

Time Spent with Advisor

Students also reported how much time was spent in each advising session. Options presented were: less than 15 minutes, 15-30 minutes, 31-45 minutes, 45-60 minutes, or more than 1 hour. Results indicated that 44.7% of African American students spent less than 15 minutes per advising session. Over 50.8% of the African American students indicated they spent 15-30 minutes with their advisor. Only 4.5% of the African American students spent 31-45 minutes with their advisor, and none of the African American students spent more than 45 minutes with their faculty academic advisors. Results indicated that 56.7% of the White students spent less than 15 minutes in a session, 37.8% indicated sessions of 15-30 minutes, 4.6% indicated sessions of 46-60 minutes, and under 1% indicated more than an hour. Chi Square test for independence did not show significance, $X^2(5, N=373)=8.08$, $p=.152$, between time spent with advisor.

Table 37

<i>Time Per Session with Advisor</i>	<i>African American (%)</i>	<i>White (%)</i>
Less than 15 minutes	44.7	56.7
15-30 minutes	50.8	37.8
31-45 minutes	4.5	4.6
46-60 minutes	0	.4
More than 1 hour	0	.4

Note. Majority of students spend 30 minutes or less during an advising session.

Number of Visits with Advisor

Students were also asked how many visits they had with their faculty advisor over the course of an academic year. Visits ranged from 1 to 10 visits. The majority of the African American engineering students visited their faculty advisor either 3 or 4 times during the academic year. Approximately 57.5% of the African American students visited with their advisor either 3 or 4 times during the academic year. Only 9.1% of the

engineering students reported meeting with their advisor once, and 3% of students reported visiting with their advisor 10 times. More detailed results are reported in Table 40. Other notable findings were 10.6% of the African American students visited their faculty advisor 5 times and 7.6% visited 6 times. Twelve percent of the White engineering students indicated at least 1 visit a year, 18.8% indicated 2 visits a year, 30.7% indicated 3 visits a year, and 14.9% indicated 4 visits a year. Only 24% of the White sample indicated more than 5 visits a year. A *t*-test was used to compare the difference between the advising sessions per year, no significance was found $t(301.38, N=373)=1.50, p=.136$. Chi Square test for independence did reveal that a large portion of African American students visited with their advisor 4 times per year, and that a large portion of White students visit with their advisor 2 times per year, $X^2(10, N=373)=23.32, p=.010$. Results are presented in Table 38 below.

Table 38

<i>Advising Sessions Per Year</i>	<i>African American (%)</i>	<i>White (%)</i>
1	9.1	12.0
2	7.6	18.8
3	25.8	30.7
4	31.7	14.9
5	10.6	7.9
6	7.6	6.2
7	3.8	3.3
8	.8	2.1
9	0	.8
10	3.0	3.3

Summary of Major Results

Below is a summary of the results based on the major research questions presented in Chapter Three. First, what is the difference between the kind of advising engineering students currently perceive based on:

1. Race: The majority of African Americans reported receiving prescriptive advising and majority of Whites reported receiving a developmental style of advising.
2. Gender: The majority of African American males reported receiving prescriptive advising. The majority of African American females reported receiving developmental advising. The majority of White males and White females both reported receiving a developmental style of advising.
3. Classification: The different African Americans class standings reported receiving prescriptive advising and Whites reported receiving a developmental style of advising. The junior class for the African Americans is the only group that is borderline prescriptive/developmental advising with a mean score of 56.80.
4. GPA: African Americans in the GPA range of 1.0 - 1.9 and 2.0 - 2.9 reported receiving a prescriptive style of advising while African Americans in the GPA range of 3.0-3.9 reported receiving a developmental style of advising. All White students reported receiving a developmental style of advising regardless of the GPA range.
5. Major: Results revealed that all majors for African Americans (Computer, Electrical, General Eng., Industrial, and Mechanical) except for the category

group "Others" reported receiving a prescriptive style of advising. All White majors reported receiving a developmental style of advising.

Second, what is the preference for advising for engineering students based on race, gender classification, GPA, and major? A majority of engineering students regardless of race, gender, classification, GPA, or major prefer a developmental style of advising. African American females significantly prefer a more developmental style of advising than the other groups.

Chapter 4 presented the results of the study. Demographic information was reported on race, gender, classification, GPA and major of the students. Chi square tests for independence were used to test relations among these variables. The survey results were presented on the participants describing whether they were receiving prescriptive or developmental advising. Also, results were summarized describing what type of advising students preferred, prescriptive or developmental.