Using Data and Statistics to Support Academic Success Programs

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Academic Success Programs

- Academic Success Programs provide various types of support services to aid in overall student success.

- Examples:
  - First-Year Experience (FYE)
  - Learning Communities
  - TRIO Student Support Services

Sam Houston ELITE

- Sam Houston ELITE serves Hispanic and African American men to help promote higher retention and graduation rates.

- Mission: SH ELITE promotes the academic and civic engagement of African American and Hispanic men through various resources that specifically focus on academic, professional, and personal development, as well as leadership development and service engagement.

- Resources available to SH ELITE students:
  - Tutoring
  - Peer Mentoring
  - Small Group Meetings (topics include: study skills, career advising, public speaking, etc.)
  - Internship Opportunities

IR Supporting Academic Success Programs

- The reports provided by IR can be crucial to the continuation of support programs.
- Data can be helpful in pointing out areas of success, but data can also highlight areas that need improvement.
- IR staff work alongside the leaders of academic success programs to design ongoing studies to track student progress.

Designing SH ELITE's Tracking Study

- IR staff have been tracking SH ELITE's progress since Fall 2012.

- Program leaders were interested in comparing SH ELITE students to:
  - A control group
  - Minority male first-time freshmen
  - All male first-time freshmen

- Main points of interest included: # of hours attempted, # of hours completed, difference, SHSU GPA, and completion rate.
  - Difference = # of hours attempted - # of hours completed
  - Completion Rate = # of hours completed / # of hours attempted

Creating the Control Group

- The control group is established based on ranges of SAT scores.
- Compile a list of all Male FTF for a particular cohort, making sure to include a primary key, ethnicity, and SAT concordance score.
  - Build in an indicator to differentiate between ELITE students and Male FTF
  - Build in SAT ranges

ID	NAME	COHORT_PERIOD	GENDER	ETHNICITY	ELITE_IND	SAT_CONCORDANCE	SAT_RANGE
[redacted]		201780	M	White	Male FTF	1030	1000
		201780	M	Hispanic	SH ELITE	990	900
		201780	M	White	Male FTF	1060	1000
		201780	M	White	Male FTF	1420	1400
		201780	M	White	Male FTF	1110	1100
		201780	M	African American	Male FTF	940	900
		201780	M	Hispanic	Male FTF	950	900
		201780	M	Multiple Races	Male FTF	1000	1000
		201780	M	White	Male FTF	1140	1100
		201780	M	White	Male FTF	930	900
		201780	M	Hispanic	Male FTF	1100	1100
		201780	M	African American	Male FTF	1040	1000
		201780	M	White	Male FTF	1030	1000
		201780	M	Hispanic	Male FTF	1050	1000
		201780	M	Hispanic	SH ELITE	1090	1000
		201780	M	African American	Male FTF	1090	1000

Creating the Control Group

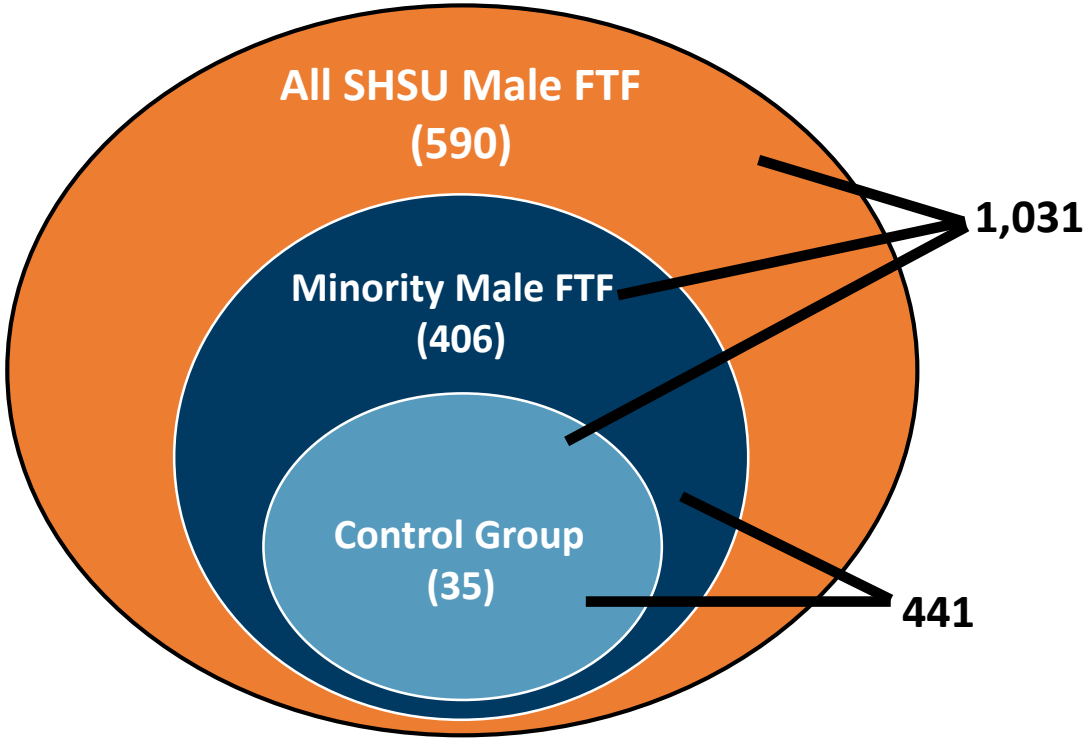
- Determine the number of SH ELITE students within each SAT range in order to randomly select that same number of students from the Male FTF population.

Count of ID	Co									
Row Labels	1000	1100	1200	1300	1400	1500	800	900	(blank)	Grand Total
Male FTF	363	290	111	34	14	1	11	174	33	1031
SH ELITE	14	6	4		1		1	8	1	35
Grand Total	**377**	**296**	**115**	**34**	**15**	**1**	**12**	**182**	**34**	**1066**

- With the use of SPSS syntax, select the correct number of students create a random sample from each SAT range to achieve a total of 35 students.

The Complete Cohort

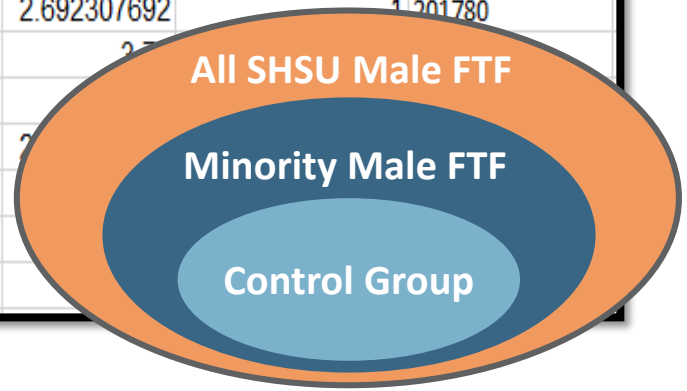
- It is important to remember that our cohort follows a hierarchy.



GROUP_IND	Count of ID	Accumulated Count of ID
SH ELITE	35	
CONTROL	35	35
Male_Minority_FTF	406	441
Male_FTF	590	1031
Grand Total	1066	

The Complete Cohort

ID	ETHNICITY	GROUP_IND	MALE_MINORITY_FTF_IND	MALE_FTF_IND	HOURS_ATTEMPTED	HOURS_COMPLETED	CREDITS_DIFFERENCE	GPA	COMPLETION_RATE	COHORT_PERIOD
	White	Male FTF	0	1	13	13	0	3.384615385	1	201780
	Hispanic	SH ELITE	0	0	13	13	0	2.461538462	1	201780
	White	Male FTF	0	1	15	6	9	1.166666667	0.4	201780
	White	Male FTF	0	1	12	12	0	3.75	1	201780
	Hispanic	Male_Minority_FTF	1	1	14	14	0	2.142857143	1	201780
	Hispanic	Male_Minority_FTF	1	1	12	12	0	3	1	201780
	African American	Male_Minority_FTF	1	1	25	22	3	2.909090909	0.88	201780
	African American	Male_Minority_FTF	1	1	25	25	0	2.68	1	201780
	African American	Male_Minority_FTF	1	1	25	19	6	2.363636364	0.76	201780
	White	Male FTF	0	1	13	10	3	2	0.769230769	201780
	Hispanic	Male_Minority_FTF	1	1	14	3	11	0.428571429	0.214285714	201780
	Hispanic	Male_Minority_FTF	1	1	12	0	12	0	0	201780
	White	Male FTF	0	1	13	13	0	3.769230769	1	201780
	Hispanic	Male_Minority_FTF	1	1	13	13	0	2.692307692	1	201780
	International	Male FTF	0	1	21	18	3			
	Hispanic	Male_Minority_FTF	1	1	12	12	0			
	African American	Male_Minority_FTF	1	1	12	9	3			
	Hispanic	Control	1	1	22	19	3			
	Hispanic	Male_Minority_FTF	1	1	14	0	14			
	Hispanic	Male_Minority_FTF	1	1	15	15	0			



SH ELITE vs. Control Group

- What are we testing?

  μ_1: The true mean difference of *hrs attempted - hrs completed* of SH ELITE

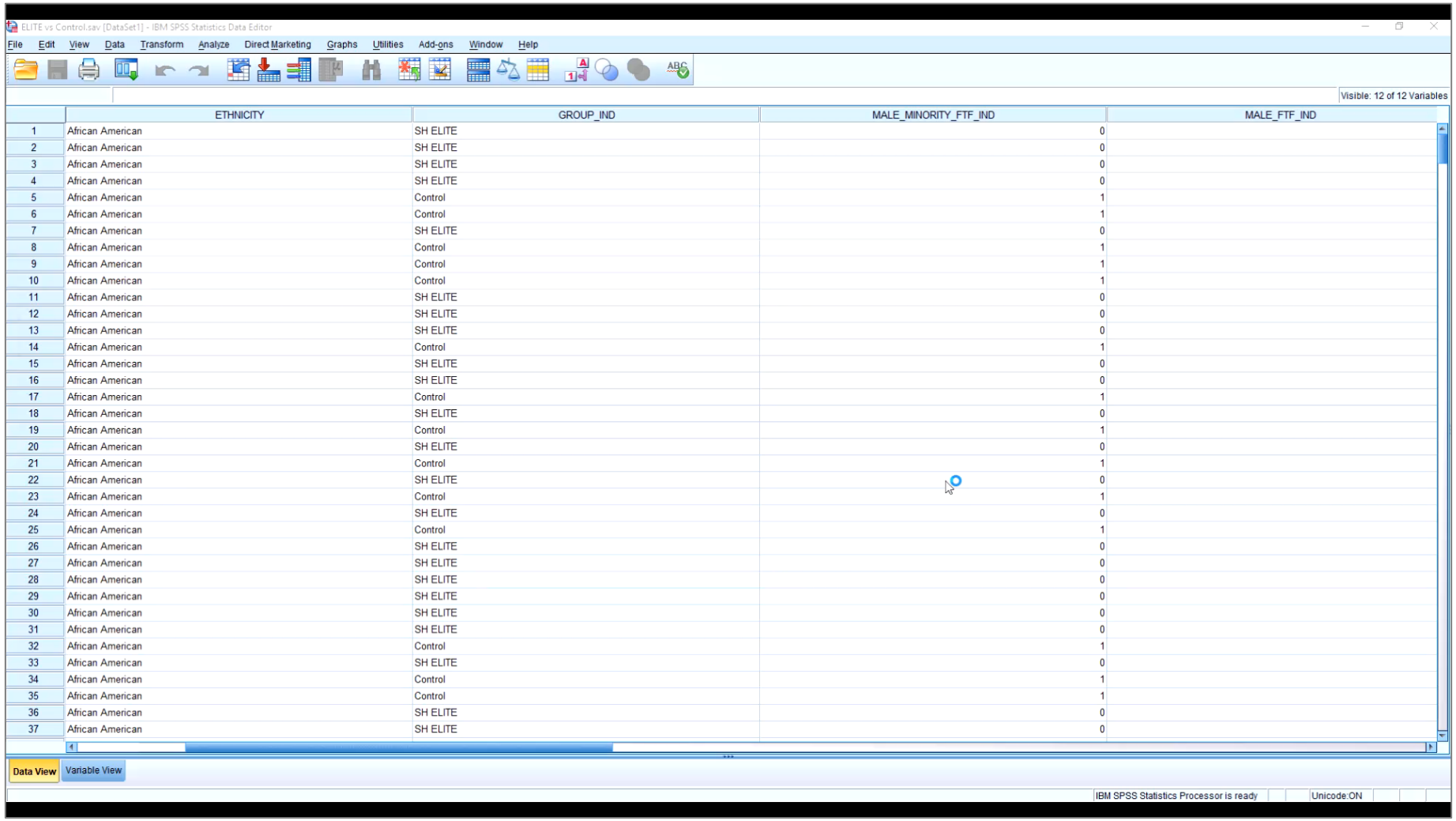
  μ_2: The true mean difference of *hrs attempted - hrs completed* of Control

  $H_0: \mu_1 = \mu_2$

  $H_1: \mu_1 < \mu_2$

- We can calculate the p-value of this test using an independent t-test or a one-way ANOVA.

SPSS Demo: SH ELITE vs. Control Group



	ETHNICITY	GROUP_IND	MALE_MINORITY_FTF_IND	MALE_FTF_IND
1	African American	SH ELITE	0	
2	African American	SH ELITE	0	
3	African American	SH ELITE	0	
4	African American	SH ELITE	0	
5	African American	Control	1	
6	African American	Control	1	
7	African American	SH ELITE	0	
8	African American	Control	1	
9	African American	Control	1	
10	African American	Control	1	
11	African American	SH ELITE	0	
12	African American	SH ELITE	0	
13	African American	SH ELITE	0	
14	African American	Control	1	
15	African American	SH ELITE	0	
16	African American	SH ELITE	0	
17	African American	Control	1	
18	African American	SH ELITE	0	
19	African American	Control	1	
20	African American	SH ELITE	0	
21	African American	Control	1	
22	African American	SH ELITE	0	
23	African American	Control	1	
24	African American	SH ELITE	0	
25	African American	Control	1	
26	African American	SH ELITE	0	
27	African American	SH ELITE	0	
28	African American	SH ELITE	0	
29	African American	SH ELITE	0	
30	African American	SH ELITE	0	
31	African American	SH ELITE	0	
32	African American	Control	1	
33	African American	SH ELITE	0	
34	African American	Control	1	
35	African American	Control	1	
36	African American	SH ELITE	0	
37	African American	SH ELITE	0	

SH ELITE vs. Minority Male FTF

- What are we testing?

  μ_1: The true mean GPA of SH ELITE

  μ_2: The true mean GPA of Minority Male FTF

  $H_0: \mu_1 = \mu_2$

  $H_1: \mu_1 > \mu_2$

- Issue:

GROUP_IND	Count of ID	Accumulated Count of ID
SH ELITE	35	
CONTROL	35	35
Male_Minority_FTF	406	441
Male_FTF	590	1031
Grand Total	**1066**	

Checking Assumptions

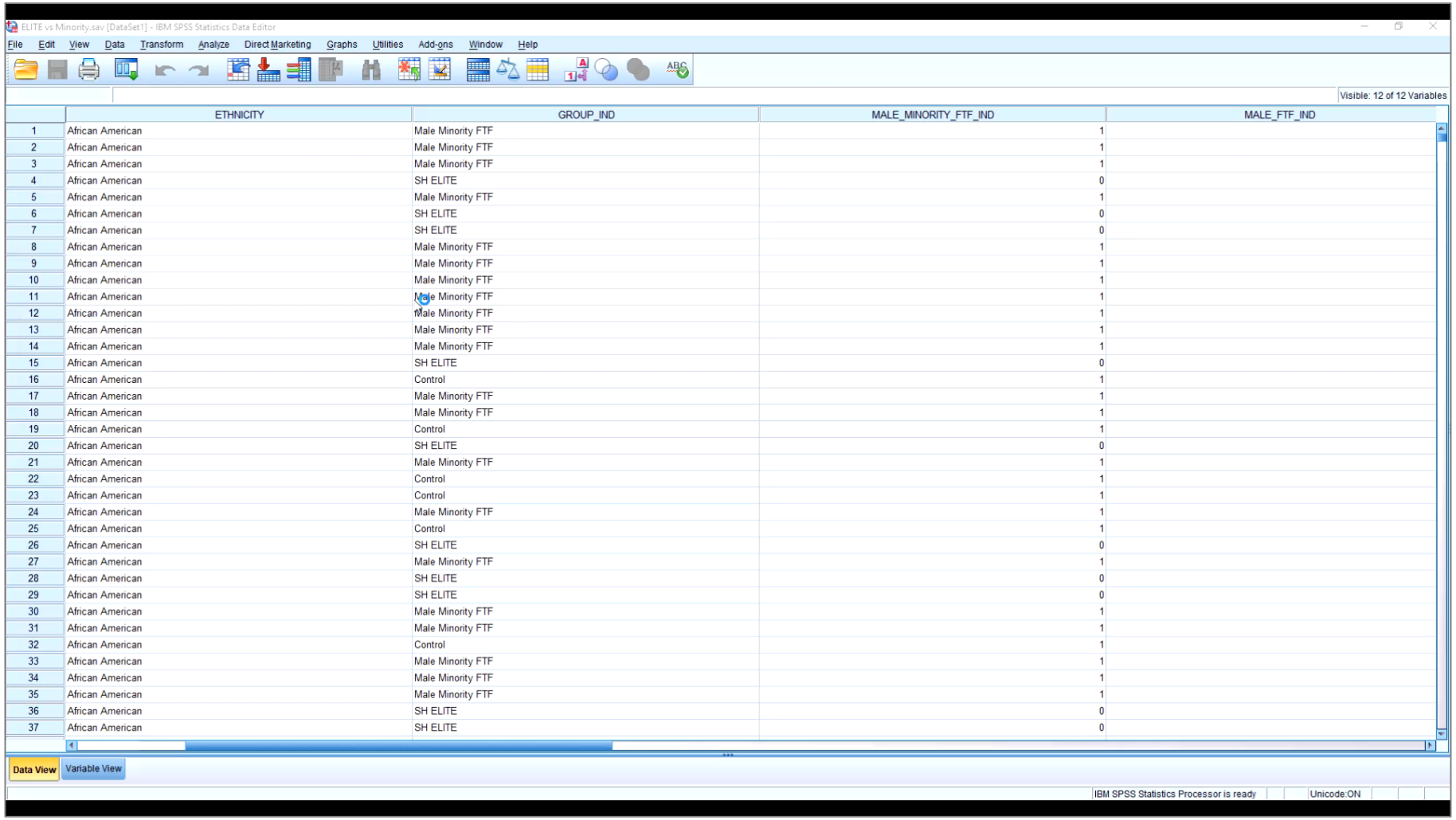
- Student's T-Test does not perform well when the assumption of equal population variances is violated.

COHORT_PERIOD		MALE_MINORITY_FTF_IND	N	Mean	Std. Deviation	Std. Error Mean
201780	HOURS_ATTEMPTED	0	35	14.0571	1.23533	.20881
		1	441	14.1927	6.45414	.30734
	HOURS_COMPLETED	0	35	13.2857	1.58247	.26749
		1	441	11.5465	7.11709	.33891
	CREDITS_DIFFERENCE	0	35	.7714	1.45695	.24627
		1	441	2.6463	3.85794	.18371
	GPA	0	35	3.0097	.70579	.11930
		1	441	2.2965	1.06065	.05051
	COMPLETION_RATE	0	35	.9474	.09944	.01681
		1	441	.8091	.27480	.01309

			Levene's Test for Equality of Variances	
COHORT_PERIOD			F	Sig.
201780	HOURS_ATTEMPTED	Equal variances assumed	.957	.328
		Equal variances not assumed		
	HOURS_COMPLETED	Equal variances assumed	4.782	.029
		Equal variances not assumed		
	CREDITS_DIFFERENCE	Equal variances assumed	15.113	.000
		Equal variances not assumed		
	GPA	Equal variances assumed	8.620	.003
		Equal variances not assumed		
	COMPLETION_RATE	Equal variances assumed	18.436	.000
		Equal variances not assumed		

- However, Welch's T-Test is robust against unequal sample size and unequal variance.

SPSS Demo: SH ELITE vs. Minority Male FTF



	ETHNICITY	GROUP_IND	MALE_MINORITY_FTF_IND	MALE_FTF_IND
1	African American	Male Minority FTF	1	
2	African American	Male Minority FTF	1	
3	African American	Male Minority FTF	1	
4	African American	SH ELITE	0	
5	African American	Male Minority FTF	1	
6	African American	SH ELITE	0	
7	African American	SH ELITE	0	
8	African American	Male Minority FTF	1	
9	African American	Male Minority FTF	1	
10	African American	Male Minority FTF	1	
11	African American	Male Minority FTF	1	
12	African American	Male Minority FTF	1	
13	African American	Male Minority FTF	1	
14	African American	Male Minority FTF	1	
15	African American	SH ELITE	0	
16	African American	Control	1	
17	African American	Male Minority FTF	1	
18	African American	Male Minority FTF	1	
19	African American	Control	1	
20	African American	SH ELITE	0	
21	African American	Male Minority FTF	1	
22	African American	Control	1	
23	African American	Control	1	
24	African American	Male Minority FTF	1	
25	African American	Control	1	
26	African American	SH ELITE	0	
27	African American	Male Minority FTF	1	
28	African American	SH ELITE	0	
29	African American	SH ELITE	0	
30	African American	Male Minority FTF	1	
31	African American	Male Minority FTF	1	
32	African American	Control	1	
33	African American	Male Minority FTF	1	
34	African American	Male Minority FTF	1	
35	African American	Male Minority FTF	1	
36	African American	SH ELITE	0	
37	African American	SH ELITE	0	

SH ELITE vs. All Male FTF

- What are we testing?

  μ_1: The true mean completion rate of SH ELITE

  μ_2: The true mean completion rate of all Male FTF

  $H_0: \mu_1 = \mu_2$
  $H_1: \mu_1 > \mu_2$

- Issue:

GROUP_IND	Count of ID	Accumulated Count of ID
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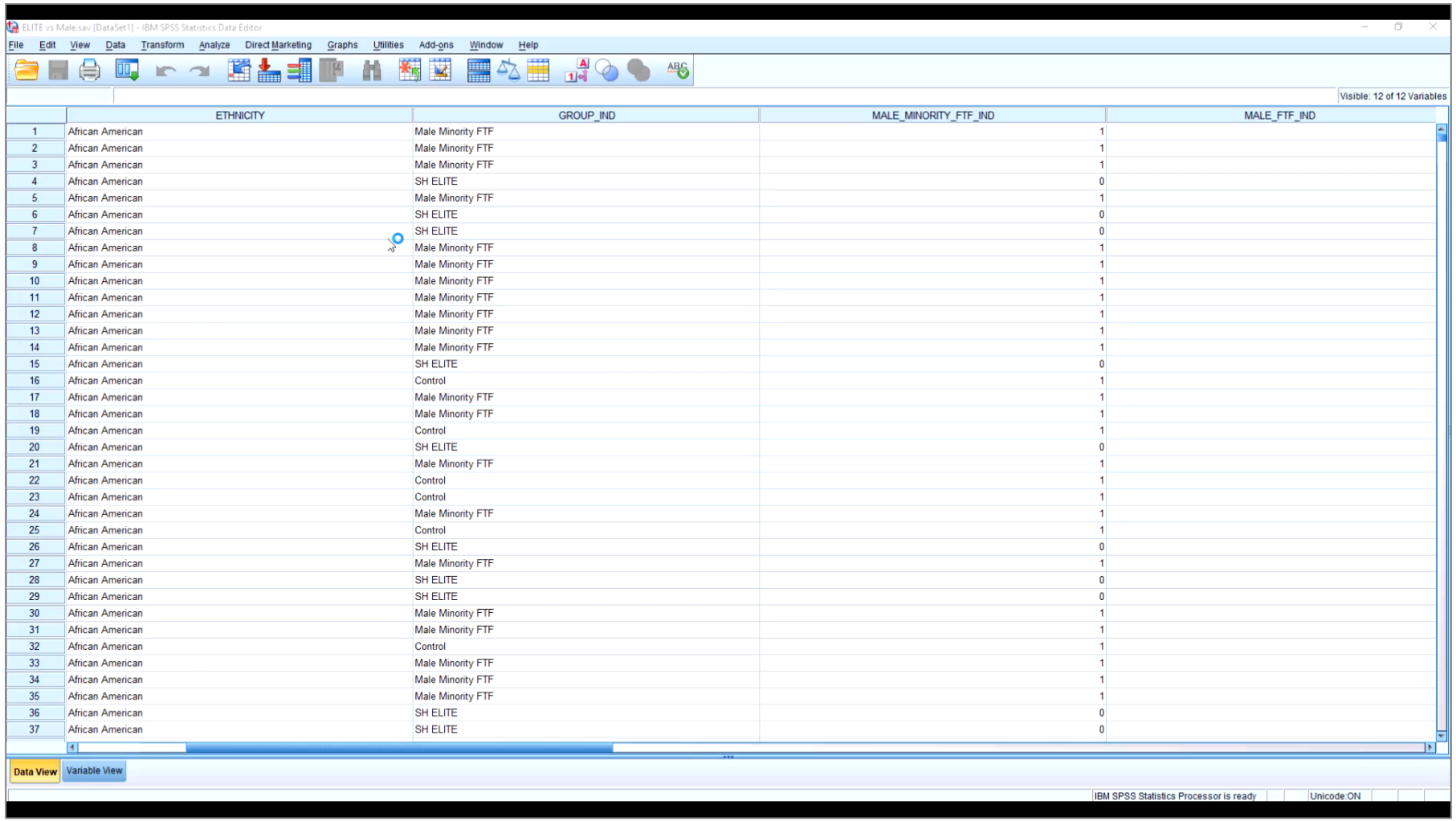
COHORT_PERIOD		MALE_FTF_IND	N	Mean	Std. Deviation	Std. Error Mean
201780	HOURS_ATTEMPTED	0	35	14.0571	1.23533	.20881
		1	1031	14.1532	5.08489	.15836
	HOURS_COMPLETED	0	35	13.2857	1.58247	.26749
		1	1031	11.5713	6.26429	.19509
	CREDITS_DIFFERENCE	0	35	.7714	1.45695	.24627
		1	1031	2.5820	4.01004	.12489
	GPA	0	35	3.0097	.70579	.11930
		1	1031	2.3812	1.10410	.03439
	COMPLETION_RATE	0	35	.9474	.09944	.01681
		1	1031	.8127	.28961	.00902

COHORT_PERIOD			Levene's Test for Equality of Variances	
			F	Sig.
201780	HOURS_ATTEMPTED	Equal variances assumed	1.077	.300
		Equal variances not assumed		
	HOURS_COMPLETED	Equal variances assumed	7.125	.008
		Equal variances not assumed		
	CREDITS_DIFFERENCE	Equal variances assumed	17.427	.000
		Equal variances not assumed		
	GPA	Equal variances assumed	11.394	.001
		Equal variances not assumed		
	COMPLETION_RATE	Equal variances assumed	20.136	.000
		Equal variances not assumed		

SPSS Demo: SH ELITE vs. All Male FTF



	ETHNICITY	GROUP_IND	MALE_MINORITY_FTF_IND	MALE_FTF_IND
1	African American	Male Minority FTF	1	
2	African American	Male Minority FTF	1	
3	African American	Male Minority FTF	1	
4	African American	SH ELITE	0	
5	African American	Male Minority FTF	1	
6	African American	SH ELITE	0	
7	African American	SH ELITE	0	
8	African American	Male Minority FTF	1	
9	African American	Male Minority FTF	1	
10	African American	Male Minority FTF	1	
11	African American	Male Minority FTF	1	
12	African American	Male Minority FTF	1	
13	African American	Male Minority FTF	1	
14	African American	Male Minority FTF	1	
15	African American	SH ELITE	0	
16	African American	Control	1	
17	African American	Male Minority FTF	1	
18	African American	Male Minority FTF	1	
19	African American	Control	1	
20	African American	SH ELITE	0	
21	African American	Male Minority FTF	1	
22	African American	Control	1	
23	African American	Control	1	
24	African American	Male Minority FTF	1	
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29	African American	SH ELITE	0	
30	African American	Male Minority FTF	1	
31	African American	Male Minority FTF	1	
32	African American	Control	1	
33	African American	Male Minority FTF	1	
34	African American	Male Minority FTF	1	
35	African American	Male Minority FTF	1	
36	African American	SH ELITE	0	
37	African American	SH ELITE	0	

Results: SH ELITE vs. Control Group

What did we test?

μ_1: The true mean difference of SH ELITE

μ_2: The true mean difference of Control

$H_0: \mu_1 = \mu_2$
$H_1: \mu_1 < \mu_2$

Fall 2017 SH ELITE vs SH ELITE Control Freshman Completion and GPA Analysis

Fall 2017 Cohort - SH ELITE vs SH ELITE Control

		SH ELITE Control				SH ELITE Students				P-Value
		N		Mean	Std. Deviation	N		Mean	Std. Deviation	
		Valid	Missing			Valid	Missing			
Hours Attempted	African American	10	-	14.80	3.77	11	-	13.82	1.33	0.2132
	Hispanic	25	-	14.00	2.35	22	-	14.18	1.22	0.3728
	All Ethnicities	35	-	14.23	2.79	35	-	14.06	1.24	0.3702
Hours Completed	African American	10	-	10.60	6.72	11	-	13.27	1.74	0.1086
	Hispanic	25	-	12.20	3.70	22	-	13.23	1.57	0.1164
	All Ethnicities	35	-	11.74	4.71	35	-	13.29	1.58	0.0352
Difference*	African American	10	-	4.20	5.07	11	-	0.55	1.21	0.0157
	Hispanic	25	-	1.80	3.01	22	-	0.95	1.62	0.1232
	All Ethnicities	35	-	2.49	3.80	35	-	0.77	1.46	0.0076
SHSU GPA	African American	10	-	1.93	1.28	11	-	2.88	0.79	0.0261
	Hispanic	25	-	2.57	1.03	22	-	3.03	0.67	0.0413
	All Ethnicities	35	-	2.39	1.13	35	-	3.01	0.71	0.0037
Completion Rate**	African American	10	-	0.70	0.36	11	-	0.96	0.09	0.0155
	Hispanic	25	-	0.87	0.23	22	-	0.94	0.11	0.1105
	All Ethnicities	35	-	0.82	0.28	35	-	0.95	0.10	0.0069

Results: SH ELITE vs. Minority Male FTF

What did we test?

μ_1: The true mean GPA of SH ELITE

μ_2: The true mean GPA of Minority Male FTF

$H_0: \mu_1 = \mu_2$
$H_1: \mu_1 > \mu_2$

Fall 2017 SH ELITE vs SHSU Minority Male First-Time Freshman and GPA Analysis

Fall 2017 Cohort - SH ELITE vs SHSU Minority Male First-Time Freshman

		SHSU Minority Male First-Time Freshman				SH ELITE Students				P-Value
		N		Mean	Std. Deviation	N		Mean	Std. Deviation	
		Valid	Missing			Valid	Missing			
Hours Attempted	African American	187	-	15.19	9.64	11	-	13.82	1.33	0.0464
	Hispanic	254	-	13.46	1.70	22	-	14.18	1.22	0.0077
	All Ethnicities	441	-	14.19	6.45	35	-	14.06	1.24	0.3577
Hours Completed	African American	187	-	12.12	9.87	11	-	13.27	1.74	0.1008
	Hispanic	254	-	11.12	4.00	22	-	13.23	1.57	0.0000
	All Ethnicities	441	-	11.55	7.12	35	-	13.29	1.58	0.0000
Difference*	African American	187	-	3.07	4.17	11	-	0.55	1.21	0.0000
	Hispanic	254	-	2.33	3.59	22	-	0.95	1.62	0.0009
	All Ethnicities	441	-	2.65	3.86	35	-	0.77	1.46	0.0000
SHSU GPA	African American	187	-	2.10	1.04	11	-	2.88	0.79	0.0044
	Hispanic	254	-	2.44	1.06	22	-	3.03	0.67	0.0004
	All Ethnicities	441	-	2.30	1.06	35	-	3.01	0.71	0.0000
Completion Rate**	African American	187	-	0.79	0.28	11	-	0.96	0.09	0.0000
	Hispanic	254	-	0.82	0.27	22	-	0.94	0.11	0.0001
	All Ethnicities	441	-	0.81	0.27	35	-	0.95	0.10	0.0000

Results: SH ELITE vs. All Male FTF

What did we test?

μ_1: The true mean completion rate of SH ELITE

μ_2: The true mean completion rate of all Male FTF

$H_0: \mu_1 = \mu_2$
$H_1: \mu_1 > \mu_2$

Fall 2017 SH ELITE vs SHSU Male First-Time Freshman and GPA Analysis

Fall 2017 Cohort - SH ELITE vs SHSU Male First-Time Freshman

		SHSU Male First-Time Freshman				SH ELITE Students				P-Value
		N		Mean	Std. Deviation	N		Mean	Std. Deviation	
		Valid	Missing			Valid	Missing			
Hours Attempted	African American	187	-	15.19	9.64	11	-	13.82	1.33	0.0464
	Hispanic	254	-	13.46	1.70	22	-	14.18	1.22	0.0077
	All Ethnicities	1,031	-	14.15	5.08	35	-	14.06	1.24	0.3574
Hours Completed	African American	187	-	12.12	9.87	11	-	13.27	1.74	0.1008
	Hispanic	254	-	11.12	4.00	22	-	13.23	1.57	0.0000
	All Ethnicities	1,031	-	11.57	6.26	35	-	13.29	1.58	0.0000
Difference*	African American	187	-	3.07	4.17	11	-	0.55	1.21	0.0000
	Hispanic	254	-	2.33	3.59	22	-	0.95	1.62	0.0009
	All Ethnicities	1,031	-	2.58	4.01	35	-	0.77	1.46	0.0000
SHSU GPA	African American	187	-	2.10	1.04	11	-	2.88	0.79	0.0044
	Hispanic	254	-	2.44	1.06	22	-	3.03	0.67	0.0004
	All Ethnicities	1,031	-	2.38	1.10	35	-	3.01	0.71	0.0000
Completion Rate**	African American	187	-	0.79	0.28	11	-	0.96	0.09	0.0000
	Hispanic	254	-	0.82	0.27	22	-	0.94	0.11	0.0001
	All Ethnicities	1,031	-	0.81	0.29	35	-	0.95	0.10	0.0000

Final Product

- Additional items sent to SH ELITE leadership:
  - Demographic information
    - Classification, first generation indicator, Pell grant recipient status, major
  - Retention rates
  - Graduation rates
  - Transfers
  - Program participation

Impact

- What impact does this have on program leaders?
  - Supports funding
  - Highlights areas that need improvement
  - Provides opportunities for program expansion
    - Evolved from a 1-Year to a 4-Year program
    - Possibility for a program for minority females

- What impact has this had on participants?
  - Higher retention and graduation rates
  - Increased GPAs
  - Student perception of increased skills (leadership, time management, etc.)

Questions?

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Office of Institutional Effectiveness

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