Ch2 Lab Results - Hypothesis Testing

```
*1. What conclusions are warranted about the life satisfaction scores of 4100 students re
lative to
*    UW students at large assuming researchers had no expectation about the results?

DATA LIST FREE / sat.
BEGIN DATA
20 17 19 15 19 18 14 21
END DATA.

DESCR /VARI = sat.
```

	N	Minimum	Maximum	Mean	Std. Deviation
sat	8	14.000	21.000	17.87500	2.416461
Valid N (listwise)	8				

```
*2. Use SPSS's TTEST command to perform the preceding analysis.

TTEST /TESTVALUE = 15 /VARI = sat.
```

	N	Mean	Std. Deviation	Std. Error Mean
sat	8	17.87500	2.416461	.854348

	Test Value = 15					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
sat	3.365	7	.012	2.875000	.85479	4.89521

```
*3. Perform an equivalent test using MANOVA and GLM.
*    Show correspondences to the TTEST results.

COMPUTE sat0 = sat-15.
MANOVA sat0 /PRINT = CELL.
```

	Mean	Std. Dev.	N	95 percent Conf. Interval	
For entire sample	2.875	2.416	8	.855	4.895

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	40.88	7	5.84		
CONSTANT	66.13	1	66.13	11.32	.012

```
GLM sat0 /PRINT = DESCR.
```

Dependent Variable: sat0

Mean	Std. Deviation	N
2.87500	2.416461	8

Dependent Variable: sat0

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.000[a]	0	.	.	.
Intercept	66.125	1	66.125	11.32	.012
Error	40.875	7	5.839		
Total	107.000	8			
Corrected Total	40.875	7			

a. R Squared = .000 (Adjusted R Squared = .000)

```
*4. What conclusion would be appropriate if prior research suggests that 4100 graduates
*    are more satisfied with their lives than other UW students?

*5. A comparison group of 8 general UW students completed the UTLS: MN=14.75, SD=4.367.
*    Determine whether the two groups differ significantly in life satisfaction.

*6. Copy and run the following commands to enter the data in SPSS.
*    Perform the analysis corresponding to that completed in #5.

DATA LIST FREE / grp sat.
BEGIN DATA
1 17 1 12 1 16 1 12 1 18 1 22 1 13 1 8
2 20 2 17 2 19 2 15 2 19 2 18 2 14 2 21
END DATA.

TTEST /GROUP = grp /VARI = sat.
```

	grp	N	Mean	Std. Deviation	Std. Error Mean
sat	1.000	8	14.75000	4.367085	1.543998
	2.000	8	17.87500	2.416461	.854348

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
sat	Equal variances assumed	3.007	.105	-1.771	14	.098	-3.125000
	Equal variances not assumed			-1.771	10.919	.104	-3.125000

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
sat	Equal variances assumed	1.764607	-6.909706	.659706
	Equal variances not assumed	1.764607	-7.012388	.762388

```
*7. Use GLM to perform same analysis and obtain descriptive statistics.
*    Perform the analysis by hand and compare to the SPSS output.

GLM sat BY grp /PRINT = DESCR.
```

Dependent Variable: sat

grp	Mean	Std. Deviation	N
1.000	14.75000	4.367085	8
2.000	17.87500	2.416461	8
Total	16.31250	3.772157	16

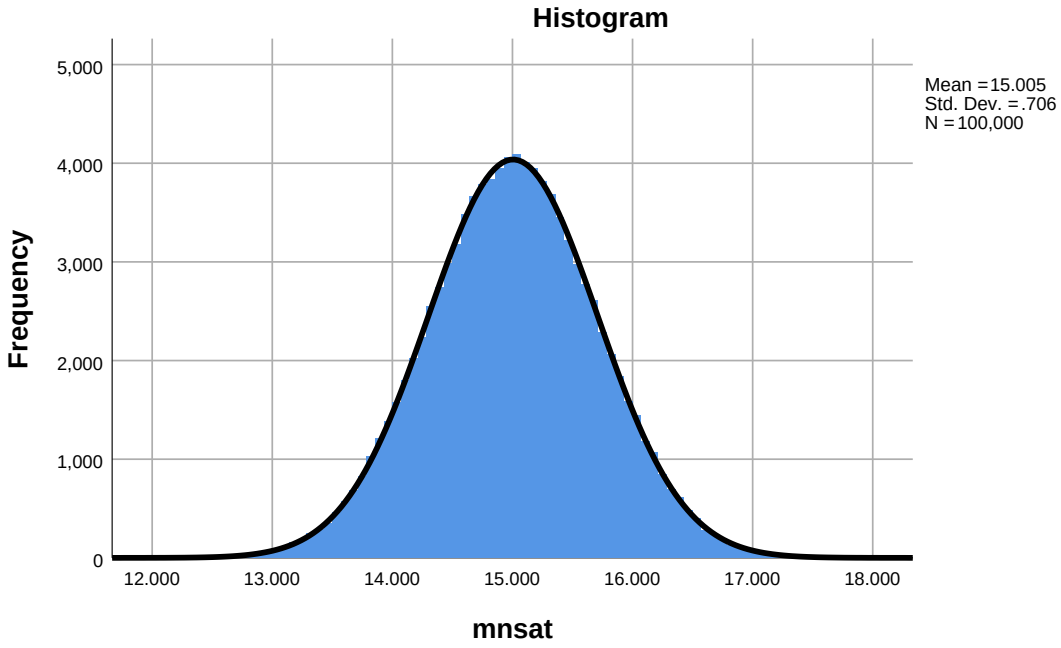
Dependent Variable: sat

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	39.063[a]	1	39.063	3.136	.098
Intercept	4257.563	1	4257.563	341.826	.000
grp	39.063	1	39.063	3.136	.098
Error	174.375	14	12.455		
Total	4471.000	16			
Corrected Total	213.438	15			

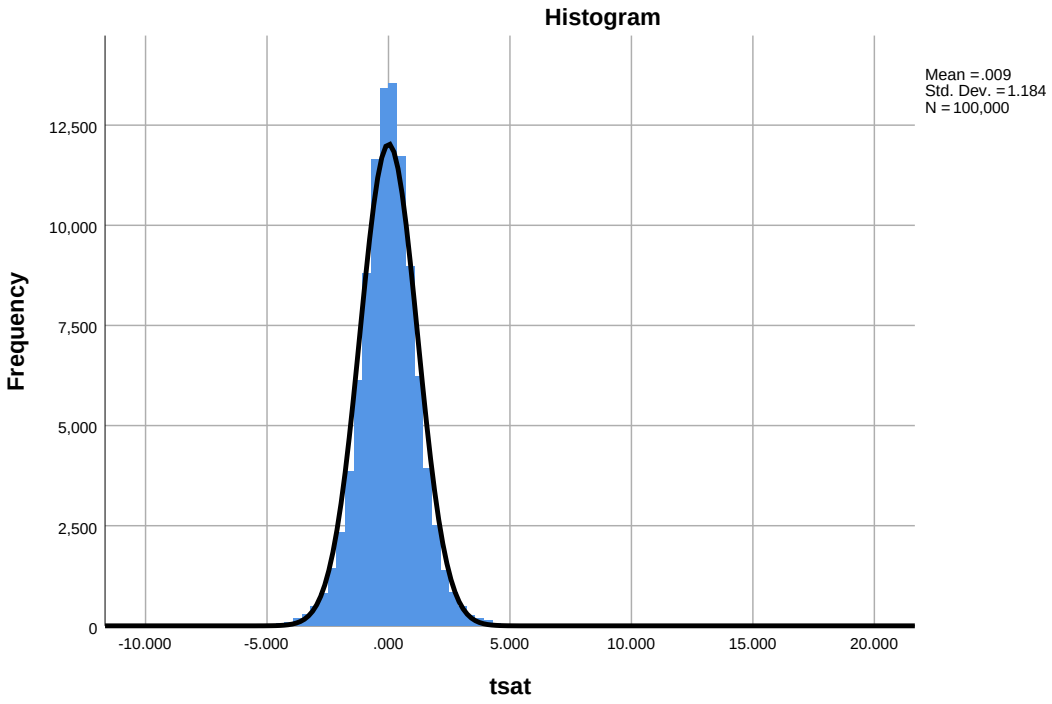
a. R Squared = .183 (Adjusted R Squared = .125)

```
MANOVA sat BY grp(1 2) /PRINT = CELL.

     FACTOR          CODE                Mean  Std. Dev.          N
  grp                  1               14.750      4.367          8
  grp                  2               17.875      2.416          8
For entire sample                      16.313      3.772         16

Source of Variation        SS      DF        MS         F  Sig of F
WITHIN CELLS           174.38      14     12.46
grp                     39.06       1     39.06      3.14      .098

(Model)                 39.06       1     39.06      3.14      .098
(Total)                213.44      15     14.23

R-Squared =           .183 Adjusted R-Squared =  .125
```

```
 SET SEED = 457102234.
INPUT PROGRAM.
LOOP s = 1 to 100000.
END CASE.
END LOOP.
END FILE.
END INPUT PROGRAM.
DO REPEAT y = s1 TO s8.
COMPUTE y = RV.NORM(15,2).
END REPEAT.
COMPUTE mnsat = MEAN(s1 TO s8).
COMPUTE sdsat = SD(s1 TO s8).

FREQ mnsat /FORM = NOTABLE /HIST NORM.
```



```
COMPUTE tsat = (mnsat-15)/(sdsat/SQRT(8)).
FREQ tsat /FORM = NOTABLE /HIST NORM.
```



```
*non-directionalt critical = 2.365, df = 8-1 = 7.
COMPUTE tsig = ABS(tsat) GE 2.365.
FREQ tsig.
```

tsig

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.000	95044	95.0	95.0	95.0
	1.000	4956	5.0	5.0	100.0
	Total	100000	100.0	100.0	

```
*direct t critical = 1.895.
COMPUTE tsig = tsat GE 1.895.
FREQ tsig.
```

tsig

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.000	94915	94.9	94.9	94.9
	1.000	5085	5.1	5.1	100.0
	Total	100000	100.0	100.0	

```
 *obs t 3.365 non-directional
COMPUTE prob = ABS(tsat) GE 3.365.
FREQ prob.
```

prob

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.000	98786	98.8	98.8	98.8
	1.000	1214	1.2	1.2	100.0
	Total	100000	100.0	100.0	

```
 *obs t 3.365 directional
COMPUTE prob = tsat GE 3.365.
FREQ prob.
```

prob

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.000	99383	99.4	99.4	99.4
	1.000	617	.6	.6	100.0
	Total	100000	100.0	100.0	

Statistics

prob		
N	Valid	100000
	Missing	0

```
 DATA LIST FREE / t.
BEGIN DATA
2.365 3.365
END DATA.

COMPUTE p = 1-CDF.T(t, 7).
LIST.
     t      p
 2.365   .025
 3.365   .006
```