Sample Test 2:
Answers

1. Health experts argue that the average caloric intact for adult males should be about 2,000 calories per day. Is there any evidence that the sample of male graduate students from GSU differ, on average, from this recommendation? Below is the daily caloric intake for a sample of GSU students.

2560, 3345, 5966, 1568, 3687, 2985, 2159, 2358, 4596, 4416

One-sample t-test

(No example of APA style is provided for the one-sample t-test; text rather than tabular presentation will be used.)

The sample of male graduate students have a caloric intake that does differ from the recommend 2,000 calories per day ($t = 3.24$, $df = 9$, $p < .05$). On average, the 10 males sampled eat about 3364.00 calories per day ($sd = 1332.47$) which is about 1364 calories greater than the recommend limit (95% CI = 410.81, 2317.19).

2. Do females in single-sex classes perform better than females in co-educational classes in high school biology? Below are end of course test scores in 9th grade biology for two classes, one taught with female-only and one with both males and females present.

Single-sex Class		Co-educational Class	
85	75	79	76
83	83	82	79
79	84	75	81
95	86	94	82
71	91	69	88
86	95	81	84
93	98	87	93

Independent samples t-test

Table 2: Results of t-tests and Descriptive Statistics for SAT Biology Test Performance by Class Type

Outcome	**Class**								
	Single-sex			**Co-educational**			**95% CI for Mean Difference**		
	M	**SD**	**n**	**M**	**SD**	**n**		**t**	**df**
Biology Test	**86.00**	**7.83**	**14**	**82.14**	**6.81**	**14**	**-1.85, 9.56**	**1.39**	**26**

*** $p < .05$.**

The independent samples t-test results indicate biology test scores are not statistically different at the .05 level of significance. It appears performance in biology is similar for females whether in a single-sex or co-educational class.

3. Self-determination theory is an explanation for motivation that contains three fundamental constructs: autonomy, relatedness, and competence. Briefly explained, autonomy refers to individual power and control over important decisions, relatedness is a want for interaction and social experience with others, and competence refers to one's ability to successfully interact with daily tasks and demands. Theory suggests these three variables should display positive associations. Below are data collected from a sample of

psychology students in a freshmen introductory course to psychology – do the three variables display positive associations?

student	autonomy	relatedness	competence
1	5	5	8
2	11	12	12
3	16	12	14
4	11	12	11
5	7	13	14
6	13	17	12
7	9	10	11
8	6	6	7
9	9	14	9
10	13	8	8
11	14	10	14
12	6	12	8
13	12	11	16
14	11	17	16
15	12	4	12
16	6	3	12
17	14	10	12
18	6	5	5
19	16	8	9
20	8	7	10

Pearson Correlation

Table 3. Correlations and Descriptive Statistics for Autonomy, Relatedness, and Competence

	1	**2**	**3**
1. Autonomy	**---**		
2. Relatedness	**.34**	**---**	
3. Competence	**.46***	**.49***	**---**
M	**10.25**	**9.80**	**11.00**
SD	**3.52**	**4.02**	**2.99**

***Note*. n = 20.**
*** p < .05.**

Competence and relatedness, and also competence and autonomy, display positive and statistically significant associations. The relationship between autonomy and relatedness, while positive, is not statistically significant at the .05 level. The correlational results partially support the theoretical predictions—each of the three relationships are positive, as anticipated, but one is not statistically significant, so chance as an explanation for this positive association cannot yet be eliminated as an explanation for the association.

4. Some college faculty believe that grade distributions should follow an approximate normal distribution. This is based upon the assumption that ability and effort will be normally distributed among college students. Sometimes faculty attempted to force a normal distribution in grades. Below are frequencies for grades in Calculus 1 at a local university for a large number of students. The grades provided contain only five categories (A, B, C, D, F), so a normal distribution would be impossible to model with only five categories. However, it is possible to determine whether these five categories provide frequencies that approximate a normal distribution. Percentages are presented that would approximate a normal distribution. Use these percentages to test whether the frequency of grades present appear to approximate a normal distribution.

Grade	Frequency	Percentage if Grades follow a Normal Distribution
A	93	6.5
B	156	25
C	112	37
D	63	25
F	33	6.5

Chi-square Goodness-of-fit

(No example of APA style is provided for the χ^2 goodness-of-fit test; text rather than tabular presentation will be used.)

Results of the χ^2 goodness-of-fit ($\chi^2 = 192.76$, $df = 4$, $p < .05$) indicate the grades assigned do not appear to follow a normal distribution. There appears to be more grades of A, B, and C, and fewer of grades D and F than would be expected in a normal distribution.

5. Some students fail the high school graduation test and are targeted for summer training. These individuals were within a few points of passing with their first testing attempt. Below are their scores on the high school graduation test before summer training and after summer training. Is there any evidence that the summer training session enhanced test scores for these students?

Student	Before Summer Training	After Summer Training
1	783	794
2	775	786
3	791	786
4	795	802
5	786	792
6	793	799
7	783	786
8	791	803
9	795	804
10	796	799
11	785	790

Paired-samples t-test

Table 5: Descriptive Statistics and t-test Results for Graduation Test Results by Training Status

	Before		After			95% CI for Mean			
Outcome	**M**	**SD**	**M**	**SD**	**n**	**Difference**	**r**	**t**	**df**
Test Scores	**788.45**	**6.59**	**794.64**	**7.09**	**11**	**-9.44, -2.92**	**.75**	**-4.22***	**10**

*** p < .05.**

Results of the test scores both before and after summer training suggests a statistically significant mean increase of about 6 points on the high school graduate test.

6. Some students fail the high school graduation test and are targeted for summer training. These individuals were within a few points of passing with their first testing attempt. Below are performance data on second attempts to pass the high school graduation test after first failing the test. Two groups are presented: those who received summer training and those who did not receive summer training. Is there any evidence that summer training altered the passing rate for those who went to summer training?

	Pass	Fail
Attended Summer Training	113	233
Did Not Attend Summer Training	234	596

χ^2 test-of-association

Table 6: Results of Chi-square Test and Descriptive Statistics for Test Outcome by Training Status

Performance	**Training Status**	
	Attended	**Did not Attend**
Fail	**233 (67.3%)**	**596 (71.8%)**
Pass	**113 (32.7%)**	**347 (28.2%)**

***Note*. Numbers in parentheses indicate column percentages.**
χ^2 =2.34, df = 1, p > .05

The χ^2 test-of-association indicates no statistically significant difference in passing rate between those who attended the summer training and those who did not attend the summer training. The passing rate was 32.7% for those who attended the summer training and 28.2% for those who did not attend the training – the similarity indicates little benefit results from summer training.