**Background and objectives**

The smokeintervention.xlsx dataset represents data from a fictitious study that explores the impact of two different interventions designed to help those quit smoking after a 10 day time period. Patients completed several scales and then were randomly assigned to one of two groups: Nicotine patch or nicotine patch plus motivational support. Higher scores on the anxiety and depression scales imply more anxiety and depressive symptoms.

The intent of this analysis is to have you use these data to demonstrate your ability to:

1) Identify the appropriate statistical tests to test differences in means;

2) Conduct analyses to test for statistical differences (recommend use of Intellectus Statistics (IS); and

3) Summarize findings as you would in a journal article or report using APA format.

**Assignment**

**Part 1: Describe the sample characteristics and baseline values, comparing the two groups’ characteristics.**

With any analysis, the first step is to examine your data, assessing the degree of missing data, the potential miscodes, and conducting a descriptive analysis. Then, a table is created to describe the sample characteristics. Since this is an intervention study with two groups, the characteristics of the two groups should be described separately, rather than report on the entire sample. The example table shell below gives you an illustration of how this might look. Calculate the descriptive statistics for sex, age, the baseline depression and anxiety scores, and the number of cigarettes smoked per day. Then describe the findings in the table (use APA formatting).

Table 1

Characteristics of clients at baseline (n=)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Nicotine Patch  n= | | Nicotine patch & motivational support  n= | |
|  |  | Mean | SD | Mean | SD |
| **Age (years)** |  |  |  |  |  |
| **Baseline Values**  Depression |  |  |  |  |  |
| Anxiety |  |  |  |  |  |
| Number cigarettes smokes/day |  |  |  |  |  |
| **Gender** |  | Frequency | % | Frequency | % |
| Female |  |  |  |  |  |
| Male |  |  |  |  |  |

Note. Data source: smokeintervention.xlsx.

**Part 2: Comparing two independent group means**

In an intervention it is always good to examine if the intervention groups are comparable at the start on the thing your intervention is targeting to change (in this case the number of cigarettes smoked).

For your write up follow the steps of hypothesis testing: state the null hypothesis for the comparison just stated, review assumptions for the statistical test (show evidence you explored if the assumptions were met), and consider if the hypothesis is directional or not. Consider if the distribution of cigarettes is approximately normal. If using Excel, you do not need to **statistically test** for homogeneity of variance but you should consider (calculate and ‘eye ball compare’) if the standard deviations of the groups being compared are similar (hint: know how SD relates to variation) so you can select the proper t-test condition to run. Write a few sentences describing your steps and the results of the testing, making sure that you note what group means are being compared and what the results would mean to someone who does not understand statistics. This summary should be in YOUR OWN words and not copied from IS. Include a copy of the IS raw output view or if using Excel the excel output. This video may be useful <http://www.youtube.com/watch?v=X14z9r8FUKY>

See the end of the assignment for examples of how to write up the results.

Steps in Hypothesis Testing

1. State the null and alternative hypothesis, determine if directional and if using two-tailed or one-tailed test
2. Decide what test statistic to use
3. Make sure the data meet the necessary assumptions for the test statistic chosen
4. Establish the level of significance (usually 0.05)
5. Compute the test statistic
6. Compare test statistic to critical value- decide to accept or reject the null hypothesis
7. Obtain p-value- determine statistical significance
8. Clearly state the conclusion in words using the statistics as evidence not the finding in of themselves. (e.g., so you found significant differences in the means -well this alone doesn’t tell anyone anything. Instead describe what the results mean by writing it in words what test you used, which group had what value, how the means differed, etc.)

**Part 3: Comparing means of a single group, pretest-posttest**

It may be too early to judge quitting, but do we see early results that overall regardless of any group assignment that our interventions appear to be helping (i.e, reducing the number smoked would be considered successful at this early time). For the entire sample (regardless of the intervention), test the hypothesis:

The number of cigarettes smoked will decrease over the 10 day period (i.e., compare Time 1 to Time 2).

Again, follow the steps of hypothesis testing, stating the null hypothesis, review assumptions for the statistical test, and consider if the hypothesis is directional or not. Make sure that you evaluate the assumptions for the statistical test, particularly the level of the measurement and the normality of the distribution (show evidence). Write a few sentences describing your steps and the results of the testing, making sure that you note what group means are being compared and what the results would mean to someone who does not understand statistics. This summary should be in YOUR OWN words and not copied from IS. See the end of the assignment for examples of how to write up the results. Include a copy of the IS raw output view or if using Excel the excel output.

Steps in Hypothesis Testing

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**Part 4: Comparing means of more than 2 groups**

Mental state may influence your success to reduce the number of cigarettes smoked. A variable has been created for you reflecting low, medium and high depression at baseline. Test the following hypothesis:

The number of cigarettes smoked at day 10 is statistically different for the three depression groups created from the baseline depression scores (low, medium, and high).

As with the t-tests, assumptions of the statistical tests must be considered. If using Excel, you do not need to test for homogeneity of variance but you should consider if the standard deviations of the 3 groups being compared are similar. Write a few sentences describing your steps and the results of the testing, making sure that you note what group means are being compared and what the results would mean to someone who does not understand statistics. This summary should be in YOUR OWN words and not copied from IS. Include a copy of the IS raw output view or if using Excel the excel output. If the ANOVA F test is significant, further post hoc testing would be needed to compare which means are statistically different (e.g., Group 1 vs 2? Group 1 vs 3? Group 2 vs. 3?). This video shows you how to do this in Excel <http://www.youtube.com/watch?v=tPGPV_XPw-o> but it is not required for this assignment (you need to indicate to your instructor what software you are using).

See the end of the assignment for examples of how to write up the results.

Steps in Hypothesis Testing

1. State the null and alternative hypothesis, determine if directional and if using two-tailed or one-tailed test
2. Decide what test statistic to use
3. Make sure the data meet the necessary assumptions for the test statistic chosen
4. Establish the level of significance (usually 0.05)
5. Compute the test statistic
6. Compare test statistic to critical value- decide to accept or reject the null hypothesis
7. Obtain p-value- determine statistical significance
8. Clearly state the conclusion in words using the statistics as evidence not the finding in of themselves. (e.g., so you found significant differences in the means -well this alone doesn’t tell anyone anything. Instead describe what the results mean by writing it in words what test you used, which group had what value, how the means differed, etc.)

Examples of how results may be written for .....

**Independent samples t-test** (from analysis of another database):

An independent samples t-test was conducted to compare self-esteem scores for males and female high school students. There was no significant difference in scores for males (M=34.1, SD=4.9) and females (M=33.2, SD=5.7); t=1.62, p=.11, two tailed.

**Paired samples t-test** (from analysis of another database):

A paired samples t-test was conducted to evaluate the impact of the weight loss intervention on women’s confidence in ability to lose weight. There was a statistically significant increase in confidence from baseline (M=55.2, SD=5.8) to three months after the intervention (M=68.5, SD= 5.0); t=5.39, P<.0005, one-tailed.

**One-way ANOVA** (from analysis of another database):

A one-way between-groups ANOVA was conducted to explore the impact of education (high school or less, some college, college degree) on levels of optimism, as measured by the Life Orientation Test. There was a statistically significant difference in at least two of the group means (F=4.6, p=.01). The mean scores of the “high school or less groups” was the lowest (M=21.4, SD=4.6); the means of the “some college group” was higher (M=23.1, SD=4.5). The means of the “college degree” were the highest of the three groups (M=23.4, SD=4.0). Further post hoc analyses would be needed to determine which groups were significantly different from each other.