**PSY-380 Introduction to Probability and Statistics**

**Project 3**

**Answer each question completely. Copy and Paste the SPSS output into the word document for the calculations portion of the problems, highlighting correct answers. (Please remember to answer the questions you must interpret the SPSS output).**

1. A researcher is interested to learn if there is a linear relationship between the hours in a week spent exercising and a person’s life satisfaction. The researchers collected the following data from a random sample, which included the number of hours spent exercising in a week and a ranking of life satisfaction from 1 to 10 ( 1 being the lowest and 10 the highest).

|  |  |  |
| --- | --- | --- |
| **Participant** | **Hours of Exercise** | **Life Satisfaction** |
| 1 | 3 | 1 |
| 2 | 14 | 2 |
| 3 | 14 | 4 |
| 4 | 14 | 4 |
| 5 | 3 | 10 |
| 6 | 5 | 5 |
| 7 | 10 | 3 |
| 8 | 11 | 4 |
| 9 | 8 | 8 |
| 10 | 7 | 4 |
| 11 | 6 | 9 |
| 12 | 11 | 5 |
| 13 | 6 | 4 |
| 14 | 11 | 10 |
| 15 | 8 | 4 |
| 16 | 15 | 7 |
| 17 | 8 | 4 |
| 18 | 8 | 5 |
| 19 | 10 | 4 |
| 20 | 5 | 4 |

1. Find the mean hours of exercise per week by the participants.
2. Find the variance and standard deviation of the hours of exercise per week by the participants.
3. Run a bivariate correlation to determine if there is a linear relationship between the hours of exercise per week and the life satisfaction. Report the results of the test statistic using correct APA formatting.
4. Run a linear regression on the data. Report the results, using correct APA formatting. Identify the amount of variation in the life satisfaction ranking that is due to the relationship between the hours of exercise per week and the life satisfaction (Hint: the R2 value)
5. Report a model of the linear relationship between the two variables using the regression line formula.
6. Insomnia has become an epidemic in the United States. Much research has been done in the development of new pharmaceuticals to aide those who suffer from insomnia. Alternatives to the pharmaceuticals are being sought by sufferers. A new relaxation technique has been tested to see if it is effective in treating the disorder. Sixty insomnia sufferers between the ages of 18 to 40 with no underlying health conditions volunteered to participate in a clinical trial. They were randomly assigned to either receive the relaxation treatment or a proven pharmaceutical treatment. Thirty were assigned to each group. The amount of time it took each of them to fall asleep was measured and recorded. The data is shown below. Run an independent samples *t*-test to determine if the relaxation treatment is more effective than the pharmaceutical treatment at a level of significance of 0.05. Report the test statistic using correct APA formatting and interpret the results.

|  |  |
| --- | --- |
| **Relaxation** | **Pharmaceutical** |
| 98 | 20 |
| 117 | 35 |
| 51 | 130 |
| 28 | 83 |
| 65 | 157 |
| 107 | 138 |
| 88 | 49 |
| 90 | 142 |
| 105 | 157 |
| 73 | 39 |
| 44 | 46 |
| 53 | 194 |
| 20 | 94 |
| 50 | 95 |
| 92 | 161 |
| 112 | 154 |
| 71 | 75 |
| 96 | 57 |
| 86 | 34 |
| 92 | 118 |
| 75 | 41 |
| 41 | 145 |
| 102 | 148 |
| 24 | 117 |
| 96 | 177 |
| 108 | 119 |
| 102 | 186 |
| 35 | 22 |
| 46 | 61 |
| 74 | 75 |

1. A researcher is interested to learn if the level of interaction a women in her 20s has with her mother influences her life satisfaction ratings. Below is a list of women who fit into each of four levels of interaction. Conduct a One-way ANOVA on the data to determine if there are differences between groups; does the level of interaction influence women’s ratings of life satisfaction? Report the results of the One-way ANOVA. If significance is found, run the appropriate post-hoc test and report between what levels the significant differences were found. Report the test statistic using correct APA formatting and interpret the results.

|  |  |  |  |
| --- | --- | --- | --- |
| **No Interaction** | **Low Interaction** | **Moderate Interaction** | **High Interaction** |
| 2 | 3 | 3 | 9 |
| 4 | 3 | 10 | 10 |
| 4 | 5 | 2 | 8 |
| 4 | 1 | 1 | 5 |
| 7 | 2 | 2 | 8 |
| 8 | 2 | 3 | 4 |
| 1 | 7 | 10 | 9 |
| 1 | 8 | 8 | 4 |
| 8 | 6 | 4 | 1 |
| 4 | 5 | 3 | 8 |

1. Are handedness and gender related? A researcher collected the following data in hopes of discovering if handedness and gender are independent (Ambidextrous individuals were excluded from the study). Use the Chi-Square test for independence to explore this at a level of significance of 0.05. Report the test statistic using correct APA formatting and interpret the results.

|  |  |  |
| --- | --- | --- |
|  | **Left-Handed** | **Right-Handed** |
| **Men** | 13 | 22 |
| **Women** | 27 | 18 |

1. A researcher is interested in studying the effect that the amount of fat in the diet and amount of exercise has on the mental acuity of middle-aged women. The researcher used three different treatment levels for the diet and two levels for the exercise. The results of the acuity test for the subjects in the different treatment levels are shown below.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Diet |  |  |
| Exercise | <30% fat | 30% - 60% fat | >60% fat |
| <60 minutes | 4 | 3 | 2 |
|  | 4 | 1 | 2 |
|  | 2 | 2 | 2 |
|  | 4 | 2 | 2 |
|  | 3 | 3 | 1 |
| 60 minutes | 6 | 8 | 5 |
| or more | 5 | 8 | 7 |
|  | 4 | 7 | 5 |
|  | 4 | 8 | 5 |
|  | 5 | 6 | 6 |

1. Perform a Two-way analysis of variance (ANOVA) and report the results using correct APA style; report whether significance was found for Factor A, Factor B, and/or an interaction between Factors A and B was found.
2. If the test statistic is significant, run a post hoc test to determine between what groups significance was found.
3. Report an effect size for all significant results.