**ASSIGNMENT QUESTIONS**

1. Please identify the appropriate research design for the studies described below. You may find it helpful to think about how participants would be grouped and how data would be collected from participants. In your answer, please be sure to include whether the study is:

* 1-way, 2-way, 3-way, or more….?
* 2x2 Factorial, or….?
* Between-subjects, within-subjects or mixed design?

1. A researcher is interested in determining whether or not parents’ education (high, medium, low) and participation in a community-based ‘Early Start’ program (participation vs. no participation) had a statistically significant effect on children’s IQ score at age 10.
2. A study is investigating the effectiveness of a self-management program on quality of life (QoL) in a cohort of older patients living with cancer. The participants are grouped according to treatment status (on active treatment vs. completed treatment) and disease spread (metastatic vs not metastatic), and were assigned to one of the following groups: cell phone app, educational video, weekly peer-led educational sessions.
3. A cohort of grade 12 students have been randomized into groups to receive different interventions (math support 30 minutes 1 day per week, math support 30 minutes 2 days per week, math support 30 minutes 3 days per week), as well as either no snack or free snacks provided during the math sessions. After 3 months, the math scores were compared with the math scores prior to the start of the program.
4. Identify the appropriate inferential statistic(s) for the following research questions. Please remember to think about assumptions for each question before choosing your answer. You might consider how a researcher would collect the data before you identify the levels of measurement for your variables.
5. A prospective cohort study with a group of expectant mothers receiving a daily new supplement vs a group not receiving the new supplement, to assess the potential link between this new supplement and the child’s height at age 6.
6. A dietitian is interested in identifying potential differences in perceived risk of coronary heart disease (1 = Low risk, 2 = Moderate risk, 3 = High risk) among participants receiving different types of special diet (paleo, keto, and Okinawa).
7. A cross-sectional study of 75 patients is investigating whether a link exists between dosage of abiraterone and bone mineral density (BMD) in men with prostate cancer. From the data, the team observed a somewhat straight line on the scatterplot; however, both variables appear to be skewed. The researchers decide to proceed with data analysis using Pearson’s *r*. Is this decision justified? Please explain.
8. Consider the follow table.

A researcher is trying to compare a number of assessment outcomes for frail patients who have social support versus those who do not. The outcomes measured are: functional performance score, nutritional assessment score, and length of stay.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | F | Sig | t | df | t-test for Equality of Means | | | 95% confidence Interval of the Difference | |
| Sig. (2-tailed) | Mean Differ | Std. Error Difference | Lower | Upper |
| Functional performance score | Equal variances assumed | .891 | .365 | .573 | 99 | .248 | .296074 | .337128 | .37932 | 1.56401 |
| Equal variances not assumed |  |  | .408 | 81.215 | .311 | .296074 | .337159 | .37964 | 1.87235 |
| Nutritional assessment score | Equal variances assumed | .996 | .031 | 2.373 | 99 | .006 | 2.01574 | 1.67858 | 1.03719 | 5.24676 |
| Equal variances not assumed |  |  | 2.104 | 82.375 | .017 | 2.00789 | 1.87312 | 1.00287 | 8.11790 |
| Length of stay | Equal variances assumed | 5.911 | .083 | 1.876 | 99 | .029 | 1.92318 | .862214 | 1.42363 | 2.76139 |
| Equal variances not assumed |  |  | 1.467 | 72.150 | .038 | 2.04176 | .908713 | 1.18665 | 2.98981 |

1. What is the sample size of this study?
2. What conclusion should the researcher make regarding functional performance? Please provide relevant numbers and clear explanation of your rationale.
3. What conclusion should the researcher make regarding nutritional assessment? Please, provide relevant numbers and clear explanation of your rationale
4. What conclusion should the researcher make regarding length of stay? Please provide relevant numbers and clear explanation of your rationale.
5. You are conducting a study to compare the efficacy of different nursing interventions (guided imagery and mindfulness, music therapy, standard care). Several different outcomes are assessed and analyzed independently. The statistical output is displayed below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Levene Statistic | df1 | df2 | Sig. |
| Anxiety | Based on Mean | 1.786 | 2 | 62 | .113 |
| Based on Median | .885 | 2 | 62 | .209 |
| Based on Median and with adjusted df | .859 | 2 | 58.271 | .209 |
| Based on trimmed mean | 1.411 | 2 | 62 | .087 |
| Subjective norm | Based on Mean | 1.594 | 2 | 62 | .037 |
| Based on Median | 1.637 | 2 | 62 | .156 |
| Based on Median and with adjusted df | 1.638 | 2 | 53.046 | .157 |
| Based on trimmed mean | 1.612 | 2 | 62 | .042 |
| Perceived behavioural control | Based on Mean | 2.049 | 2 | 62 | .256 |
| Based on Median | .873 | 2 | 62 | .273 |
| Based on Median and with adjusted df | .930 | 2 | 51.137 | .271 |
| Based on trimmed mean | 2.552 | 2 | 62 | .154 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Sum of Squares | df | Mean Square | F | Sig. |
| Anxiety score | Between Groups | 43.913 | 2 | 21.956 | 6.181 | .011 |
| Within Groups | 220.27 | 62 | 3.552 |  |  |
| Total |  | 64 |  |  |  |
| Subjective norm | Between Groups | 86.61 | 2 | 43.305 | 5.157 | .002 |
| Within Groups | 520.70 | 62 | 8.398 |  |  |
| Total |  | 64 |  |  |  |
| Perceived behaviour control | Between Groups | 32.86 | 2 | 16.430 | 0.886 | .670 |
| Within Groups | 1149.74 | 62 | 18.544 |  |  |
| Total |  | 64 |  |  |  |

1. What is the sample size of this study?
2. For the variable “anxiety score”, what would be your next course of action? Please provide clear explanation of your rationale.
3. For the variable “perceived behaviour control”, what would be your next course of action? Please provide clear explanation of your rationale.
4. For the variable “subjective norm”, what would be your next course of action? Please provide clear explanation of your rationale.
5. A study comparing length of stay (LOS) of patients on the surgical unit receiving standard care versus a novel intervention results in the following:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Group | N | Std. Deviation | Mean | Std. Error Mean |
| Length of Stay | New intervention X | 45 | 2.71716 | 20.5978 | 1.08732 |
| Standard care | 48 | 2.96335 | 27.2126 | 1.16227 |

1. Calculate the variance for each group
2. Calculate the effect size
3. A study is being conducted to investigate the efficacy of various forms of exercise training on retirees’ mobility confidence score (ranging from 0-20). A cohort of 60 participants have been randomly allocated to one of the following interventions. The participants’ confidence scores are provided below.
4. Please input the data into SPSS and compute the appropriate statistical test. Please write-up your results for publication in paragraph style. Please include all relevant variables and numbers in your results, do not include SPSS outputs.

|  |  |  |
| --- | --- | --- |
| **Confidence scores** | | |
| **Resistance training** | **Flexibility training** | **Yoga** |
| 18 | 11 | 8 |
| 12 | 9 | 4 |
| 17 | 7 | 9 |
| 9 | 16 | 7 |
| 20 | 14 | 10 |
| 17 | 8 | 14 |
| 11 | 8 | 17 |
| 9 | 7 | 15 |
| 11 | 11 | 8 |
| 16 | 10 | 16 |
| 15 | 10 | 8 |
| 15 | 9 | 6 |
| 13 | 14 | 5 |
| 14 | 8 | 5 |
| 13 | 6 | 15 |
| 10 | 15 | 9 |
| 19 | 11 | 6 |
| 9 | 5 | 6 |
| 11 | 13 | 8 |
| 17 | 10 | 17 |

1. The test scores of a class of Grade 12 students were collected.

|  |  |  |
| --- | --- | --- |
| **Student** | **Gender** | **Physics test score** |
| 1 | F | 81 |
| 2 | M | 59 |
| 3 | F | 73 |
| 4 | M | 69 |
| 5 | M | 59 |
| 6 | F | 90 |
| 7 | F | 68 |
| 8 | F | 83 |
| 9 | F | 51 |
| 10 | M | 72 |
| 11 | F | 70 |
| 12 | M | 69 |
| 13 | M | 84 |
| 14 | M | 60 |
| 15 | F | 99 |
| 16 | F | 71 |
| 17 | M | 80 |
| 18 | F | 60 |
| 19 | M | 76 |
| 20 | F | 83 |
| 21 | M | 89 |
| 22 | F | 57 |
| 23 | M | 80 |
| 24 | F | 69 |
| 25 | M | 78 |
| 26 | F | 81 |
| 27 | F | 78 |
| 28 | M | 70 |
| 29 | M | 84 |
| 30 | M | 69 |

Please compute the appropriate statistical test. Report only your write-up for publication in paragraph style. Please include all relevant information in your results, but do not include any tables/plots.

1. Provide the most appropriate descriptive statistics for gender and physics scores.
2. How does gender influence physics score?
3. A collection of 20 oil paintings were being ranked by an art master and their student. The art master would like to know the concordance between their own ranking and the student’s ranking. (In other words, they are interested in finding out if there is any relationship between the two rankings). Please compute the appropriate statistical test. Be sure to include your rationale for the type of statistical test chosen.

|  |  |  |
| --- | --- | --- |
| **Painting number** | **Master’s ranking** | **Student’s ranking** |
| 1 | 10 | 3 |
| 2 | 3 | 10 |
| 3 | 6 | 8 |
| 4 | 7 | 2 |
| 5 | 12 | 15 |
| 6 | 1 | 18 |
| 7 | 15 | 14 |
| 8 | 2 | 1 |
| 9 | 8 | 19 |
| 10 | 17 | 9 |
| 11 | 9 | 5 |
| 12 | 4 | 20 |
| 13 | 20 | 16 |
| 14 | 13 | 11 |
| 15 | 11 | 17 |
| 16 | 19 | 4 |
| 17 | 14 | 7 |
| 18 | 5 | 13 |
| 19 | 16 | 6 |
| 20 | 18 | 12 |