



MSc Applied Social & Health Psychology
M7X01449 - Applied Research, Ethics & Analysis

**Assessment component 5: Practical in-class skills assessment 2: Data input and analysis
 (10%) –MODEL ANSWER**

Task One: Estimating required sample size. (5 marks)

Read the study information below and then answer the questions.

Objective: to compare the effectiveness of a healthy eating intervention in improving self-reported intention to eat more healthily in people with a clinical diagnosis of obesity.

Design: a randomised controlled trial in which clinically obese individuals between the ages of 18 and 40 years old are randomly allocated to either a daily motivational text-messaging intervention over a six-week period, or to attend a weekly “healthy eating” support group.

Main outcome measure for determining sample size: self-reported intention to eat healthily (rated on mean scores to a validated intentions to eat healthily questionnaire, scale range 0-30).

Sample size question: How many participants are needed in order to have an 80% power of detecting a clinically significant difference in intentions to eat healthily?

The clinicians involved in this research project consider a difference in intentions score of 7 scale points between the two groups at the 5% level of significance as being a clinically significant difference. Based on previous literature, the researchers are expecting the standard deviation of intention to eat healthily in those attending the “healthy eating” support group to be 15.47.

1. In the space below, state the formula that should be used to calculate sample size in Altman’s nomogram for the above study (1 mark).

$$\text{Independent samples t-test} = \frac{\delta}{\sigma}$$

2. Using the correct formula for Altman’s Nomogram, calculate the standardised difference for the above study and use Altman’s nomogram to estimate the required sample size – show your workings below (2 marks).

$\delta = 7$ scale points and $\sigma = 15.47$ intention to eat healthily standard deviation. Therefore, $7/15.47 = 0.45$. On Altman’s Nomogram, the line connecting a standardized difference of 0.45 and a power of 80% cuts the sample axis on the 0.05 alpha level at approximately 150. $150 \text{ divide by the number of groups } (2) = 150/2 = 75$.

3. Write out your Power Statement below (2 marks).

“Seventy-five participants would be required in each group to have an 80% chance of detecting a clinically important difference in means of 7 scale points (SD=15.47) at the 5% level of significance using the Independent-samples t-test.”

Task Two: Data screening, analysis, and effect size (5 marks).

1. Using the SPSS datasheet titled “Screening datasheet” from the above (hypothetical) study, screen the data for errors and outliers and provide details on all of the errors and outliers below (1 mark).

Errors =

Participant ID 218 had an age of 334 years – Apart from being exceptionally high, based on the study information above; this randomised control trial was only conducted on participants aged between 18-40 years. Therefore, this age must be an error and was changed to 99 Missing data prior to examining for outliers.

Participant ID 360 had an intention to eat healthily score of 2237.

Based on the study information provided above, the self-reported intention to eat healthy was rated on a validated intention to eat healthy questionnaire, with a scale range from 0-30. Therefore, the above score must be an error as it fall outside of this range and was consequently changed to 99 Missing data prior to examining for outliers.

Outliers =

Following inspection of the histogram, stem and leaf plot, Q-Q plots, and boxplot of the data, participant ID 311 was highlighted as an outlier with an intention to eat healthy score of 2. Although this score is within the scale range of the questionnaire (0-30), it has fallen well below the scores from all other participants, and is therefore considered as an outlier for this particular piece of research and should be removed from the data.

2. Using the SPSS datasheet titled “Analysis datasheet” (which has already been screened and cleaned), identify and carry out the appropriate analysis.
 - a. In the space below state the appropriate analysis that should be conducted and state whether there is a statistically significant difference between the two groups on the main outcome measure. Report the inferentials appropriately and interpret the results as you would for a report (2 marks).

Statistical Analysis = Independent samples t-test.

The results from an independent samples t-test on intention to eat healthy between the daily motivational text-messaging group and the weekly support group revealed a statistically significant difference $t(347) = -8.08, p < 0.0001$, with those in the text-messaging group reporting significantly lower intentions to eat healthy ($M=20.56$; $SD=5.71$) compared to the weekly support group ($M=24.56$; $SD=3.92$). However, based on the outcome from Levene’s test, the assumption of equality of variances for the current data was violated; therefore, the reported values have been obtained from the equal variances not assumed row in SPSS.

- b. Is the difference in scores considered clinically significant? Justify your answer and include and interpret the appropriate effect size statistic below (2 marks).

The difference in scores between the two groups would not be considered clinically significant because the magnitude of the difference in the means: 4.00, 95%, is below what the researchers considered as clinically significant (i.e., 7 scale points). However, there were narrow confidence intervals CI: 3.03 to 4.97 and a large effect size – Eta squared = 0.14.

Calculations for Eta Squared:

$$\frac{8.06^2}{8.06^2 + (197+194 - 2)} =$$

$$\frac{64.0636}{64.9636 + 389} =$$

$$\frac{64.9636}{453.9636} = \mathbf{0.14}$$

Or if using the t value from the equal variances not assumed row (given that the assumption of equality of variances was violated in the Levene's test), this value of 8.08 would still lead to the calculation continuing to show an effect size of 0.14.

Please keep in mind the Learning Outcomes for this module when you are planning your work. The Learning Outcomes of specific relevance to this assignment are in bold.

Learning Outcomes:

1. Demonstrate a critical appreciation of ethical issues associated with qualitative and quantitative applied research designs.
2. **Demonstrate strong data inputting and data screening skills using appropriate software.**
3. **Recognise and identify appropriate analysis techniques and interpret and report data appropriately.**
4. Understand the distinction between quantitative and qualitative approaches and be familiar with a range of data collection and analytical techniques.
5. **Present their work appropriately, within ethical and research frameworks, and with an understanding of requirements of critical thinking.**