

Sc Applied Psychology

ECAS7001 - Applied Research Design and Analysis

Practical Skills Assessment 2

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Task One = 10/10

Task Two = 3/10

Task Three = 3/10

Total = 16/30 = 53% - A decent attempt but further revision of the processes involved in conducting and interpreting normality and inferential analyses required.

In this 120-minute practical skills assessment you will be required to do the following tasks with the information and data sets provided.

You must save a copy of your SPSS input datasheet and must also save evidence of each step through one SPSS output file and one SPSS syntax file.

You must also save a word-version of this Question sheet with your answers to the questions.

At the end of the assessment, you MUST email the following to kate.williams@uwtsd.ac.uk:

- One final SPSS input dataset (with all processes completed) for Task Two (Screening)
- One SPSS Output file with all processes for Tasks Two AND Three
- One Syntax data file
- This Question sheet with answers to the questions completed.

Familiarise yourself with the variables and study design using the information provided.

Then, using the SPSS datasheets, information on study design, and measures provided on Moodle, you are required to use the provided materials (Altman's Nomogram and Summary of key formulas on Moodle) and SPSS in order to demonstrate your ability to carry out the following tasks.

A total of 30 marks can be achieved on this assessment – the number of marks associated with each question is documented below.

Task One: Estimating required sample size (10 marks)

Read the information below about an applied research study and answer the questions.

Smoking cessation Intervention Study:

Study Objective: to compare the effectiveness of a tailored smoking cessation intervention in improving self-reported intention to quit smoking in young people aged 16-18.

Study Design: a randomised controlled **between-subjects** trial in which young people aged 16-18 are randomly allocated to two groups: either they receive a daily motivational text-messaging intervention over a six-week period alongside the standard treatment of attending a weekly "stop smoking" support group, or they only receive the standard treatment.

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

To conduct this study, the researchers wish to establish how many participants are needed in order to have an **80% power** of detecting a clinically significant difference in intentions to quit smoking.

The clinicians involved in this research project consider a difference in intentions score of **4 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 quit smoking in those receiving the additional daily motivational text-messaging intervention to be **17.88**.

Sample size Questions:

1. In the space below, state the formula that should be used to calculate sample size in Altman's nomogram for the above study (2 marks).

Independent samples t-test

δ

σ

2. Using the correct formula for Altman's Nomogram, calculate the standardised difference for the above study and then use Altman's nomogram to estimate the required sample size – show your workings below (4 marks).

$\delta = 4$ scale points and $\sigma = 17.88$ intention to quit smoking standard deviation.
Therefore, $4/17.88 = 0.22$.

On Altman's Nomogram, the line connecting a standardized difference of 0.22 and a power of 80% cuts the sample axis on the 0.05 alpha level at approximately 400. 400 divided by the number of groups (2) = $400/2 = 200$

Commented [KW1]: Correct - 2 marks

Commented [KW2]: Correct - 4 marks

3. Write out your Power Statement below (4 marks).

"200 participants would be required in each group (total of 400) to have an 80% chance of detecting a clinically significant difference in means of 4 scale points (SD=17.88) at the 5% level of significance using the Independent-samples t-test."

Commented [KW3]: Correct - 4 marks.

Just a formatting point to note: need to write out values when presented at the start of a sentence - i.e., Two-hundred.

Task Two: Data screening and cleaning (10 marks).

Using the SPSS datasheet available on Moodle and information on study design and measures provided, you are required to use SPSS to demonstrate your ability to carry out the following tasks.

Using the SPSS datasheet titled "**Screening datasheet**" from the above (hypothetical) study you should:

1. Screen the data for any errors within the **categorical variables** data, correct those errors in the SPSS input to "99" and write in the space below details of those errors (1 mark).

Errors: Participant ID 328 had a gender score of 222 – gender could only be classed between one and four in this study.

Commented [KW4]: Correct - 1 mark

2. Screen the data for any errors within the **continuous variables** data, correct those errors in the SPSS input to "99" and write in the space below details of those errors (1 mark).

Errors: Participant ID 130 had an age of 119

Apart from being exceptionally high, based on the study information above, this randomised control trial was only conducted on participants aged between 16-18 years.

Therefore, this age must be an error and was changed to 99 Missing data.

Participant ID 259 had an intention to quit smoking score of 320

Based on the study information provided above, the self-reported intention to quit smoking was rated on a validated intentions to quit smoking questionnaire, with a scale range from 0-30. Therefore, the above score must be an error as it falls outside of this range and was consequently, changed to 99 Missing data.

Commented [KW5]: Correct - 1 mark

3. Run descriptives on both the categorical and continuous data variables to check for any missing data and write in the space below the **ID number** of the participant(s) and the **variable(s)** in which there is missing data (2 marks).

Commented [KW6]: 0.5 mark - only the already established errors have been noted here as missing data. There were also eight other pieces of missing data within the Intentions to quit smoking variable - IDs: 20, 57, 99, 132, 160, 253, 307, 388. These should have been accounted for in the output and documented here.

From the output, in terms of categorical descriptives, there is one missing data for the gender variable for participant ID 328.

From the output, in terms of continuous descriptives, there is one missing data for the age variable for participant ID 130. There is also one missing data for the intentions to quit smoking score at time two. One of these came from an error [ID 259].

4. Run the correct analysis for assessing the normality of the intentions data and provide a brief interpretation of the output (4 marks).

In total, the normality analysis for the intentions to quit smoking data was conducted on 400 participants. The 5% trimmed mean (23.06) was similar to the overall mean (23.83), suggesting that extreme scores were not having much of an influence on the data. The skewness value of 18.024 while the kurtosis value was 345.636. The results of the Kolmogorov-Smirnov and Shapiro-Wilk Test of normality are both significant, suggesting a violation of the assumption of normality. This is confirmed by the histogram, which shows the majority of scores at the higher end of the scale. It is also confirmed by the Normal Q-Q plot, which shows some values deviating away from the expected value, thereby not forming a straight line. The Detrended Normal Q-Q Plot also shows one value deviating away from the straight line.

Commented [KW7]: 0.5 mark - while the overarching account for some aspects are correct, it is not clear how this interpretation is established from the output, given that it shows the error data in the intentions score remaining as part of the normality analysis. The specific values reported here are also incorrect and some key pieces of information are missing. Also, the normality checks only needed to be conducted on the intentions data and not on all the variables included in the input.

Commented [KW8]: 391 (because there were 9 pieces of missing data)

Commented [KW9]: 23.04 and 23.07

Commented [KW10]: 0.257 and -0.366 - then needed to explain that these were close to 0, suggesting good symmetry of the distribution of the data. However, the negative Kurtosis value indicates data in the extremes (Platykurtic).

5. Check for any outliers in the data and write in the space below the ID number(s) and the specific measure(s) in which those participants are highlighted as outliers (2 marks).

ID 259
ID130

Commented [KW11]: 0 marks - there was only one outlier for the intentions variable - ID: 146 with a score of 8.

Task Three: Analysis and effect size (10 marks)

Using the study information and SPSS datasheet on Moodle titled “**Analysis datasheet**” (which has already been screened and cleaned), you should do the following:

1. Run the correct **descriptive** analyses on the data in SPSS and in the space below write out the interpretation of the output as you would see in a Psychology report (4 marks).

From the output, we can see for the categorical descriptives there are 200 participants in each of the two groups (50% in each). There are 119 males (29.8%), 187 females (46.9%), 67 other (16.8%), and 26 (6.5%) who would prefer not to say. There is also now one missing data for the gender variable (.3%). In terms of marital status, 115 participants are single (28.7%), 182 are either

Commented [KW12]: 3 marks - Descriptive analyses on the demographic data is correct but also needed descriptives for the intentions data - i.e., Three-hundred and ninety-one participants had completed intention scores, which ranged from 16 to 30. The mean on this scale was 23.11, with a standard deviation of 3.73

married or living with a partner (45.5%), 70 are separated or divorced (17.5%), and 33 are widowed (8.3%). From the output, we can see for the continuous descriptives that 399 participants have provided information on their age. Participants' ages range from 16 to 18, with the mean age of the sample being 17.08 and a standard deviation of .82

2. Run the correct **inferential** analyses on the data in SPSS and in the space below write out the interpretation of the output, including effect size, as you would see in a Psychology report (4 marks).

The results from an independent samples t-test on intention to quit smoking between the Daily motivational text-messaging intervention group and the standard treatment group revealed a statistically significant difference $t(59.925)$

Commented [KW13]: 0 marks - unfortunately, the value presented here is not correct and the output suggests the incorrect analysis was conducted (a one-sample t-test rather than an independent samples t-test). Further information should have also been provided to fully explain the interpretation of this analysis:

The results from an independent samples t-test on intentions between the text-messaging intervention group and the standard treatment group revealed a statistically significant difference $t(340.963) = 19.30, p < 0.001$, with those in the text messaging intervention group reporting significantly higher intentions ($M = 25.73; SD = 3.13$) compared to the standard treatment group ($M = 20.51; SD = 2.12$), with a very large effect size (Cohen's d point estimate = 1.95). However, based on the outcome from Levene's test for equality of variances, 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.

3. In the space below state whether the difference in scores is considered **clinically** significant? Justify your answer based on the study information provided (2 marks).

Commented [KW14]: 0 marks - nothing provided. This should have read that the data were considered clinically significant.

Along with the statistically significant difference in the magnitude of the difference in the means (mean difference = 5.22, 95%), with narrow confidence intervals CI: 4.688 – 5.752, and a very large effect size, the current data would also be considered as clinically significant. This is due to the researchers on this project considering a difference in intentions score of 4 scale points between the two groups at the 5% level of significance as being a clinically significant difference. As mentioned above, the mean difference in this data was 5.22, thereby falling 1.22 scale points above what the researchers would accept as a clinically significant effect.