Introduction to Quantitative Research

Formative assignment MT 2024

MSc Education

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The aims of the formative assignment are

1. To support your learning
2. To provide feedback on your write-up following academic conventions in social sciences
3. To provide feedback on your presentation of statistical procedures and findings

It is not marked

The aims of the course are (from welcome to Oxford)

1. To set a solid base of understanding for increased statistical literacy,
2. To enhance understanding of central statistical concepts and their application
3. To enhance the ability to select, carry out and interpret the results of appropriate statistical tests for answering a range of research questions,
4. To enhance skills to create informative graphical representations and tables for presenting findings, and explaining these in text

Guidance

You are asked to write about the methods in a way that provides evidence that you understand:

* basic assumptions (e.g., variables and their scaletypes, normality, dependent and independent variables, etc.),
* how you can calculate descriptive and inferential statistical measures based on raw or summary data (e.g., by hand, calculator or in excel)
* how to report findings (e.g., in table or graph)

Write about the statistical findings clearly and concisely. Include hand-calculations, tables and figures that illustrate key results.

Please use conventions such as numbering tables and figures and using these to refer the reader to the appropriate object in the text, e.g. ‘Figure 1 shows that …’.

Include key software outputs (not all!) in the Appendix.

Tables

* Include table number (1, 2, 3…) and title. The title should be self-explanatory
* Collate information from SPSS outputs and include these in tables your create
* Include notes as necessary

Table 1. Descriptive statistics of *memorization*

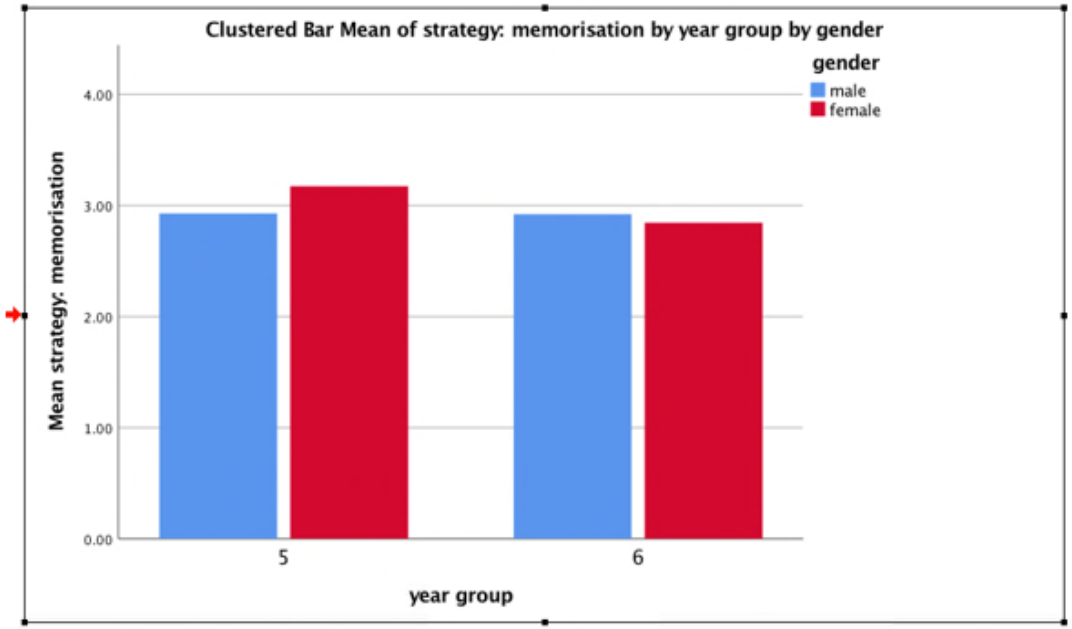
	All (n=334)			Grade 5 (n=119)			Grade 6 (n=215)		
Controls	Mean	n	(SD)	Mean	n	(SD)	Mean	n	(SD)
Male	2.92	153	(0.63)	2.93	67	(0.61)	2.92	86	(0.66)
Female	2.94	181	(0.61)	3.17	52	(0.67)	2.84	129	(0.57)
Total	2.93	334	(0.62)	3.04	119	(0.64)	2.88	215	(0.61)

Notes. Table shows mean values of the *memorization* variable for different subgroups, respective standard deviations (SD) and the number of observations in each category (n). No missing values are reported in the sample.

Figures and graphs

* Include figure number (1, 2, 3…) and title. The title should be self-explanatory
* Collate information from SPSS outputs and include these in figures / graphs. Some SPSS figures can be ok in the text, but you might need to edit these a bit.
* Include legends (explanation of how to read figure) as necessary

Figure·1.2·Clustered·bar·graph·of·means·of·memorization·by·year·group·and·gender¶



“Hand-calculations”

* In Excel, but program the equations yourself
* By hand, don’t worry about minor rounding errors
* In text, possibly using equation editors
* In R-syntax

In order to calculate the *t*-value by hand, it was first necessary to calculate the pooled variance estimate using the two groups’ sample sizes and standard deviation values (Field, 2017):¶

$$s_p^2 = \frac{(n1-1)s_1^2+(n2-1)s_2^2}{n1+n2-2} = \frac{(120-1)0.74^2+(218-1)0.70^2}{120+218-2} = \frac{119x0.5476+217x0.49}{336}$$¶

$$s_p^2 = \frac{65.1644+106.33}{336} = \frac{171.4944}{336} = 0.5104$$¶

Appendix 2¶

a hand-calculation of the t-test

Formula for independent samples t-test.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$\bar{x}_1 = 2.3417$

$\bar{x}_2 = 2.1093$

$\Rightarrow \bar{x}_1 - \bar{x}_2 = 0.2324$

$n_1 = 120$ $n_2 = 218$

$s_1 = 0.73649$ $s_2 = 0.69609$

nglish (United States)

Guidance (… continued)

Refer to statistical literature (name, year and page), and include your statistics book(s) in the reference list.

“An ordinal scale is assigned to variables that, like nominal variables, have categories, but unlike nominal variables, have a naturally occurring order (Agresti, 2010, p. 67). Also, the ordinal data inform us how things occurred, but also in order to which they occurred (Field 2017, p. 12). Based on these definitions, it can be concluded that the ‘year group’ variable was measured on an ordinal scale. This conclusion is reached because the year group 5 has a naturally lower order than the year group 6, meaning that participants in the year group 5 are younger than those in the year group 6.”

References

Agresti, A. (2010). *Analysis of ordinal categorical data*. New York: John Wiley and Sons.

Field, A. (2017). *Discovering statistics using SPSS*. London, England: Routledge.

Submission and timing

* All assignments are individually written and signed off. DO NOT include your candidate-ID.

* For RDM and CDE-students, submit an electronic version to Lars Malmberg (lars-erik.malmberg@education.ox.ac.uk) or Benjamin Hart (benjamin.hart@education.o.ac.uk) by Thursday week 6, with feedback in weeks 7-8.

* For non-assessed MSc Education students (CIE, HE, DSC) wanting to continue to the assessed Intermediate Quantitative Methods course, submit an electronic version to Mike Ma (youchouan.ma@education.ox.ac.uk) by Thursday week 6, with feedback in weeks 7-8. Students who wish to continue in the Intermediate Quantitative Methods course in HT 2025, are required to submit a formative assignment.

Timing and feedback

* Let us know if you struggle or need more time.

* We have discretion to individualize feedback and provide options to redo any sections.

* It is not possible to communicate about the formative assignment after the summative assignment has been released.

Happy number crunching and write-up ☺

Lars, Benjamin and Mike