



HBC203
Statistics and Data Analysis for the
Social and Behavioural Sciences

Tutor-Marked Assignment 02
July 2021 Presentation

HBC203

TMA02

This tutor-marked assignment (TMA) is worth 25% of the final mark for HBC203 Statistics and Data Analysis for the Social and Behavioural Sciences.

You are to include the following particulars in your submission: Course Code, Title of the TMA, SUSS PI No., Your Name, and Submission Date.

Please upload this assignment to Turnitin by Wednesday, 20 October 2021, 11:55pm. Resubmissions are allowed before this cut-off time.

It is strongly recommended that you make an early submission to check the originality report and, if necessary, make amendments to your document for resubmission. Note that the Turnitin report is usually generated immediately after the first submission, however, subsequent reports may take up to one day to generate. Do note that Turnitin will not accept any further submissions **AFTER** the cut-off time. There is a 12-hour grace period after the cut-off time, which is not an extended deadline but solely meant for solving any technical problems that you may encounter while attempting to make a submission before the cut-off time. Please email Canvas Support immediately (with relevant screenshots and your TMA attached) and follow up with Canvas Support first thing in the morning to ensure that the problem is resolved before the grace period is over.

One late submission is allowed only if no prior submissions were made before the cut-off time. Do note that the Canvas system will automatically deduct penalty marks for every day that your assignment is late. With this automatic deduction, there will be no need to request for extensions from your tutor because your tutor does not have the mandate to over-ride the Canvas system settings. You will need to form your own judgement as to how many marks you are willing to forego for each extra day that you gain to work on your assignment.

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Backup your TMA at all times. Once you have uploaded your TMA (in Word document format only), retain the Turnitin digital receipt as evidence of a successful submission. View your submission to ensure that the entire document has been uploaded successfully.

Plagiarism and Collusion

The assignment is to be completed on your own. You may discuss the TMA with your course-mates; however, the assignment must be written independently. Do not share your notes, draft or final TMA with anyone before the marked TMAs are returned to you.

Avoid plagiarism by giving yourself sufficient time to research and understand the material so that you can write up your assignment in your own words. Quotations should be used sparingly. Simply citing the source of 'copied' chunks of text does not excuse it from plagiarism. Do ensure that any paraphrasing is done appropriately, even if you use text from your own work that you have submitted as part of another assignment for the same or another course.

The University takes a very serious view of plagiarism (passing off someone else's ideas as your own, or recycling of contents from your own earlier marked TMA from the same course or another course) and collusion (submitting an assignment which is the same or very similar to another student's). Both are very serious academic offences. Please refer to the Student Handbook on the penalties of plagiarism or collusion. You are strongly advised to submit your TMA early, check the plagiarism report yourself, and if needed revise and resubmit your TMA before the submission deadline.

Total: 100 marks**Question 1 (27 marks)**

May, a restaurant owner, wants to know if there is a difference in how much consumers like three brands of rice, CrescentMoon, Noble Umbrella, and Silver Phoenix. She recruited 27 participants and randomly assigned them to taste a dish made with CrescentMoon rice ($n = 9$), Noble Umbrella rice ($n = 9$), or Silver Phoenix rice ($n = 9$). The three dishes were cooked in exactly the same way except for the brand of rice used. The participants then reported how much they liked the dish, from 1 (*not at all*) to 7 (*very much*). The ratings for all the participants are presented in the table below.

CrescentMoon	Noble Umbrella	Silver Phoenix
4	5	5
4	4	5
2	5	6
4	4	5
6	3	6
3	5	7
4	3	6
4	6	6
3	4	4

Note. Both the study and the data are hypothetical. For the purposes of this exercise, we are using a small sample size. However, in the “real world”, a much larger sample with more observations would be recommended for reliable results.

- Identify the predictor variable. State the number of conditions and identify what the conditions are. Identify the outcome variable. (4 marks)
- Assume that the scale of measurement for the ratings is interval. Based on the study design, identify the most appropriate parametric statistical test to conduct. Discuss why this is the most appropriate parametric test by providing two reasons in the context of this study. (3 marks)
- State the null hypothesis (H_0) and the alternative hypothesis (H_1). (2 marks)
- Enter the data into jamovi. Add informative labels to your variables. Change the measure type to match the scale of measurement of the variable. For this question, assume that the ratings are interval scale of measurement. Show the jamovi spreadsheet by taking a screenshot of the spreadsheet (i.e., what you see when you click the DATA tab) and pasting it in your answer. Make sure you capture the variables in your screenshot. (3 marks)
- Assuming all the assumptions of the statistical test you identified in (b) are met and there are no concerns about small sample size, analyse the data by conducting the statistical test using jamovi. Where necessary, conduct post-hoc analyses. Paste the output in your answer. Remember to include output for the descriptives (means and standard deviations), results from the inferential test(s), the confidence interval(s), and the effect size. (5 marks)
- Discuss and report the results in APA format. (10 marks)

Question 2 (6 marks)

June wants to know whether people can tell if they are eating real meat or meat substitutes, such as lab-grown meat and plant-based meat. She recruited 300 people and had them taste three dishes, one made with lab-grown meat, another with plant-based meat, and a final one with real meat. The three dishes were cooked in exactly the same way except for the type of meat used. The participants then reported which one they thought contained real meat (participants could only choose one option). The data from the study are presented in the table below:

Number of Participants Who Said The Dish Contained Real Meat		
Dish with Lab-Grown Meat	Dish with Plant-Based Meat	Dish with Real Meat
80	70	150

Note. Both the study and the data are hypothetical.

- Identify the most appropriate statistical test to conduct if June wants to find out whether people can tell they are eating real meat or meat substitutes. Discuss why this is the most appropriate parametric test by providing two reasons in the context of this study. (3 marks)
- Using hand calculations, analyse the data by conducting the statistical test identified in (a). Examine the results of your data analysis and determine if people can tell they are eating real meat or meat substitutes. Explain your answer with reference to the p value and the alpha level. Use an alpha level of .05. (3 marks)

Question 3 (13 marks)

June thinks that the ability of people to tell if a dish contained real meat or meat substitute depends on whether they are regular meat eaters. She went back to the 300 participants and asked them how frequently they ate meat. She categorised those who ate meat at least 4 times a week as “Regular Meat Eaters”. Those who ate meat fewer than 4 times a week were categorised as “Non-Regular Meat Eaters”.

	Number of Participants Who Said The Dish Contained Real Meat		
	Dish with Lab-Grown Meat	Dish with Plant-Based Meat	Dish with Real Meat
Regular Meat Eaters	50	50	130
Non-Regular Meat Eaters	30	20	20

Note. Both the study and the data are hypothetical.

a. Identify the most appropriate statistical test to conduct if June wants to find out whether the ability of people to tell if a dish contained real meat depends on whether they are regular meat eaters. Discuss why this is the most appropriate parametric test by providing two reasons in the context of this study. (3 marks)

b. Using hand calculations, analyse the data by conducting the statistical test identified in (a). Interpret the results of your data analysis and determine whether the ability of people to tell if a dish contained real meat depends on whether they are regular meat eaters. Explain your answer with reference to the p value and the alpha level. Use an alpha level of .05. If the ability of people to tell if a dish contained real meat depends on whether they are regular meat eaters, show how regular meat eaters and non-regular meat eaters differ in their ability to identify the dish with real meat. (10 marks)

Question 4 (30 marks)

The CEO of a call centre wants to find out if conscientiousness predicts the number of calls an employee answers. He randomly selected 10 employees and had them respond to the Big Five conscientiousness scale. Higher scores on the conscientiousness scale indicate higher levels of conscientiousness. He then calculated the average number of calls each employee answered per day. The data from his study is presented in the table below.

Conscientiousness Score	Average Number of Calls Answered Per Day
2	50
5	60
4	58
3	57
2	58
3	70
5	65
1	45
2	53
2	51

- Identify the predictor variable and the outcome variable. (2 marks)
- Assume that the scale of measurement for conscientiousness score is interval. Based on this information and the study design, identify the most appropriate parametric statistical test to conduct. Discuss why this is the most appropriate parametric test by providing two reasons in the context of this study. (3 marks)
- State the null hypothesis (H_0) and the alternative hypothesis (H_1). (2 marks)
- Enter the data into jamovi. Add informative labels to your variables. Change the measure type to match the scale of measurement of the variable. For this question, assume that the conscientiousness scores are interval scale of measurement. Show the jamovi spreadsheet by taking a screenshot of the spreadsheet (i.e., what you see when you click the DATA tab) and pasting it in your answer. Make sure you capture the variables in your screenshot. (3 marks)
- Assuming all the assumptions of the statistical test you identified in (b) are met and there are no concerns about small sample size, analyse the data by conducting the statistical test using jamovi. Paste the output in your answer. Remember to include the output for the descriptives (means and standard deviations), results from the inferential test, the confidence interval, and the effect size. (4 marks)
- Interpret the results of your data analysis and determine if conscientiousness predicts the average number of calls answered per day. Explain your answer with reference to the p value and the alpha level. Use an alpha level of .05. (2 marks)
- Discuss and report the results in APA format. (10 marks)
- Using the linear regression equation, predict the expected number of calls answered per day if a person's conscientiousness score is 3. (2 marks)

i. The director administered the conscientiousness scale to five people who applied for a position in the company. The applicants' conscientiousness scores are shown in the table below. Identify the applicant(s) the director should choose for an interview if he only wants to interview people who are predicted to answer at least 56 calls a day. (2 marks)

Applicant	Conscientiousness Score
1	4
2	2
3	4
4	3
5	5

Question 5 (24 marks)

A sociologist wants to know if the amount of time women spent on household chores changed over a year, from May 2019 to May 2020. She had 10 women estimate the amount of time they spent on household chores per day (in minutes) in May 2019, November 2019, and May 2020. The data from the study are presented in the table below.

Woman	May 2019	Nov 2019	May 2020
1	72	54	106
2	42	54	112
3	78	53	115
4	76	83	110
5	51	38	118
6	51	41	137
7	65	71	95
8	60	47	78
9	84	101	127
10	86	61	135

Note. This problem scenario is based on an existing study (see the write-up in The Straits Times [here](#)) but the data presented here are hypothetical. For the purposes of this exercise, we are using a small sample size. However, in the “real world”, a much larger sample with more observations would be recommended for reliable results.

- Identify the predictor variable. State the number of conditions and identify what the conditions are. Identify the outcome variable. (4 marks)
- Based on the study design, identify the most appropriate parametric statistical test to conduct. Discuss why this is the most appropriate parametric test by providing two reasons in the context of this study. (3 marks)
- State the null hypothesis (H_0) and the alternative hypothesis (H_1). (2 marks)
- Enter the data into jamovi. Add informative labels to your variables. Change the measure type to match the scale of measurement of the variable. For this question, assume that the ratings are interval scale of measurement. Show the jamovi spreadsheet by taking a screenshot of the spreadsheet (i.e., what you see when you click the DATA tab) and pasting it in your answer. Make sure you capture the variables in your screenshot. (3 marks)
- Assuming all the assumptions of the statistical test you identified in (b) are met and there are no concerns about small sample size, analyse the data by conducting the statistical test using jamovi. Where necessary, conduct post-hoc analyses. Paste the output in your answer. Remember to include the output for descriptives (means and standard deviations), results from the inferential test(s), and the effect size. (4 marks)
- Interpret the results of your data analysis and determine whether the amount of time women spent on household chores changed over a year, from May 2019 to May 2020. If it has, then examine the results to determine which time points differ from which other time point(s). Explain your answer with reference to the p values and the alpha level. Use an alpha level of .05. (8 marks)

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