

Thinking About Data - Questions - Ricky

2025-05-03

Question 1

ASSIGNMENT CASE

Australian Neuroplasticity and Learning Efficiency Study

Sleep quality and cognitive function play a vital role in overall well-being and productivity. This study examines these factors in adults aged 20-35 across Australia, including individuals from various occupational backgrounds and lifestyles. It explores how sleep patterns, lifestyle habits, and daily routines influence learning efficiency and cognitive adaptability.

Data Collection Process

The study used stratified random sampling to capture participants from diverse occupations and lifestyles. Recruitment was conducted through university mailing lists, workplace wellness programs, and social media, resulting in a final sample of 300 individuals selected after screening.

Data Sources:

- Wearable device tracking: All participants used wrist-based trackers to measure sleep duration, sleep consistency, and physical activity levels.
- Self-reported surveys: Participants completed structured questionnaires on diet, caffeine intake, screen time, stress, and social interactions.
- Cognitive performance tests: Standardised assessments measured memory, reaction time, and logical reasoning over three months.

Question 2

Test whether gender is independent of nap frequency

Question 3

Test whether participants who use melatonin supplements have significantly longer average sleep durations than those who don't.

Question 4

Test whether average sleep duration vary significantly across different genders.

Question 5

Test if screen time before bed can be used to predict average sleep duration among office workers. • Fit to a suitable model and show all key steps. • Assess the strength of the predictive power of the model. • Plot the residuals. What do they suggest about the model?

Question 6

Which of your results surprised you and why? What would you test if you had more time and interest?

Only create a question and explain the solution method in words.

Question 7

Formatting Guidelines

This is not a question but a guideline to remind you of the submission requirements for earning 4 marks.

For your assignment, follow these formatting guidelines to ensure clarity and completeness:

Content Requirements:

Include the full text of each question and its corresponding number. Provide your statistical analysis, including all relevant R code, output (results), and solutions. Offer brief yet clear explanations of each step: what you did, why you did it, and what the results mean. Avoid lengthy explanations; focus on clarity and relevance.

Formatting and Presentation:

Use RMarkdown: Incorporate RMarkdown effectively, including code chunks, Markdown for descriptive text, proper headings, and numbering.

Professional Appearance: Ensure your report is well-organized, easy to read, and visually professional. Number each question and clearly present them in the document.

Submission Instructions:

Prepare with RMarkdown: Create your report using RMarkdown.

Knit to Word: Knit your RMarkdown file into a Word document (Mac users can knit to PDF directly).

Convert to PDF: Save the Word document as a PDF.

Submit Your PDF: Upload the PDF to the submission link in vUWS under Assignment > Submit Your Assignment by the due date.

Only one person from each group should submit.