

Midterm quiz - Results

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Attempt 1 of 1

Written Oct 14, 2024 2:47 PM - Oct 14, 2024 4:47 PM

Attempt Score 34.5 / 35

Overall Grade (Highest Attempt) 34.5 / 35

Question 1

1.5 / 2 points

First, what is probability? Or define probability. Second, given this particular wheel of fortune, what is the chance you would get a slice of the wheel that says "\$X" with some number for X? If you cannot see the image below, click the link to see image of wheel I want you to use



- Probability measures the likelihood of occurrence of an event.
- Values range from 0-1.
- $P(A) = \frac{\text{no. of favorable outcomes for A}}{\text{Total number of possible outcomes in sample space}}$ .

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- "Bankrupt" slices (4 of them)
- "Lose a Turn" slice (1 of them)
- "Free Play" slice (1 of them)
- "Wild00" slice (1 of them)
- "One million" slice (1 of them)

Total slices = 26

chance you would get a slice of the wheel that says "\$X" with some number for X  
= 1 - P(not getting those slices)  
= 1 - (8/26)  
= 0.6923

The correct answer is not displayed for Written Response type questions.

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Feedback

There are 24 slices in total, and not 26.

## Question 2

8 / 8 points

*"We explored if communication mode (social dialog vs. monolog) and persona (virtual human as building vs. building manager) affected the number of times respondents chose to comply with the pro-environmental requests. While the effect of communication mode had  $F(1, 196) = 3.33, p = .07$ , the communication mode by persona interaction had  $F(1, 196) = 4.88, p = .03$ ." What specific statistical test was run? What is the F value for each test reported? If df (degrees of freedom) =  $N - 2$  in this case, what is the sample size (or N)? What is the p-value (or significance) for the main effect reported and for the interaction? Are they statistically significant? If it is, what allows us to say that it is statistically significant; if its not, why not?*

Statistical test run: 2-way ANOVA

F-Values:

- main effect of communication mode:  $F(1, 196) = 3.33$
- interaction effect b/w communication and persona:  $F(1, 196) = 4.88$

Sample Size (N) = Degree of freedom + 2 =  $196 + 2 = 198$

p-values:

- main effect of communication mode:  $p = 0.07$
- interaction effect b/w communication mode and persona:  $p = 0.03$

Statistical Significance:

Assuming conventional alpha level = 0.05

- main effect of communication mode: not significant as greater than or equal to alpha
- interaction effect: significant as less than or equal alpha

Interpretation:

- Statistical Significance: p-value  $\leq 0.05$  indicates results are unlikely due to chance.
- Interaction Effect: p-value = 0.03 -> statistically significant interaction b/w communication mode and persona, influencing eco-friendly compliance.
- Main Effect: communication mode alone is not significant, suggesting it has a weak impact on compliance

The correct answer is not displayed for Written Response type questions.

## Question 3

5 / 5 points

You want to test to see if your score on the driver's test is significantly different than the average. The score is 119 and the average is 100 with standard deviation of 10. You run a z-test with two-tailed  $p = .05$ . Recall what we learned about z-scores and the normal curve and, state "yes" or "no" as to whether this test score of 119 would be statistically significantly different from the population mean (of 100). So, then, would we reject the null hypothesis (or not); if we did reject the null hypothesis, how likely are we to be wrong if we did reject the null hypothesis (compared to the cutoff Z score for significance, are we really close, somewhat close, or quite far away)? Do we need a sampling distribution to have run this statistical test; and why (or why not)?

$$Z = (X - \text{population mean}) / \text{s.d} = (119 - 100) / 10 = 1.9$$

Two-tailed test at  $p = 0.05$ :

The critical z-scores for a two-tailed test with  $\alpha = 0.05$  are approximately  $\pm 1.96$

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Statistically significant: No

Null Hypothesis: Not Rejected since  $Z < 1.96$  as there is no significant diff b/w test score and population mean.

If rejecting Null Hypothesis: Somewhat close to critical z-score (cutoff) -> moderate risk of error (Type 1 error)

Sampling Distribution: No

- Since we doing a single score comparison to known population mean and s.d.

In general: Yes

- It is necessary to understand variability of sample mean relative to population mean
- to determine significance of z-score

The correct answer is not displayed for Written Response type questions.

#### Question 4

13 / 13 points

These results were reported: people who abstained from social media in a given day liked more posts the next day than those who used social media in that given day,  $r(N = 45) = .38$ ,  $p = .01$ .

(a) From the text above, identify which test was run, the sample size, the value of the test statistic, the effect size, and the significance (include with significance interpretation of that number)

(b) Was this the correct test to use? Why or why not? If not, what specific test should they have used and why (make sure to explain all aspects of why that specific test should be chosen)?

(c) If people were randomly assigned to use social media or not, what kind of study is this: correlational or experimental? Why?

(d) If so, and a significant result was also found, would we be able to claim that abstinence from (or use of) social media caused an effect on liking posts the next day? Why or why not?

(e) What if instead people CHOSE if they wanted to abstain for that day or not: in that case, what kind of study is this: correlational or experimental? Why?

(f) If so, would we be able to claim that abstinence from (or use of) social media caused an effect on liking posts the next day? Why or why not?

a) Test Run: Pearson correlation

Sample size (N) = 45

Test Statistic (r) = 0.38

Effect size: 0.38 (for correlations as r itself is the effect size)

significance (p) = 0.01

- moderate positive correlation b/w abstaining social media and liking more posts next day
- considering a conventional alpha of 0.05, since p-value is less than alpha therefore statistically significant

b) Not a correct test to use.

Appropriate to use: independent samples t-test

- 2 distinct groups being compared
- outcome variable (number of likes) is continuous
- looking at differences b/w group means, not a relationship between 2 continuous variables

c) Experimental

- study designed manipulates independent variable (social media use) and observes effect on dependent variable (no. of posts liked)
- allows for causal inferences

d) Claiming Causality: Yes, if a significant result was found.

- abstinence from social media caused an effect on liking posts the next day
- random assignment helps to control for confounding variables

e) Correlational study

- we cannot control for potential confounding variables or self-selection bias w/o random assignment
- this limits the ability to make causal inferences.

f) No

- participants self-select their social media use
- there may be confounding variables that influence both their choice and their subsequent behavior (e.g., personality traits, prior social media habits)

The correct answer is not displayed for Written Response type questions.

#### Question 5

7 / 7 points

A researcher is hired as a consultant to a company planning to open a coffee house for college students. The company wants to know if their customers will drink different amounts of coffee if the coffee house is decorated in a Paris motif or in a San Francisco motif. To test this, the researcher sets up two similar rooms, but with the two different motifs. She then arranges to have six students each spend an afternoon, first in the Paris room and then the SF room, while being allowed to drink all the coffee they like. The amount each participant drinks in each room is shown below:

Participant	Paris (# cups)	SF (# cups)
A	8.5	6.5
B	4.3	4.6
C	2.0	1.2
D	7.8	5.8
E	7.0	5.7
F	9.1	5.1

- a) What kind of test should the researcher run? Why?
- b) What is the name of this design? Why might the researcher conduct the experiment this way, rather than having separate groups of people visit each kinds of coffee houses? What would be the name of that design; And what statistical test would you do for it?
- c) What is a potential draw-back to the way in which the researcher conducted the experiment? Give an example.

- a) Paired samples t-test
- Same participants are tested in both conditions (Paris & SF Motif)
  - dependent variable (num of cups of coffee consumed) is continuous
- b) Within subjects design
- requires fewer participants - more efficient and cost effective
  - each person acts as their own control, reducing error variance due to individual differences

If researcher had used separate groups for each condition,

- name of design: between-subjects design
- test: independent samples t-test

- c) Order Effects
- example: participants may drink less coffee in the second room they visit (SF) because they're already caffeinated from the first room (Paris)
- to control order effects -> counterbalance - have half the participants visit Paris first and half visit SF first

The correct answer is not displayed for Written Response type questions.

Done