HW1: Case Study and Data Collection (Homework)

INSTRUCTOR
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Due Date: THU, JAN 15, 2026 11:59 PM EST

REQUEST EXTENSION

Current Score: – / 22 POINTS | 0.0 %

Scoring and Assignment Information

QUESTION	1	2	3	4
POINTS	– / 4	– / 7	– / 2	– / 9

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

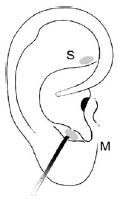
Your last submission is used for your score.

1. **[– / 4 Points]** DETAILS MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

DiezStat4 1.1.001.

A migraine is a particularly painful type of headache, which patients sometimes wish to treat with acupuncture. To determine whether acupuncture relieves migraine pain, researchers conducted a randomized controlled study where 94 females diagnosed with migraine headaches were randomly assigned to one of two groups: treatment or control. 47 patients in the treatment group received acupuncture that is specifically designed to treat migraines. 47 patients in the control group received placebo acupuncture (needle insertion at non-acupoint locations). 24 hours after patients received acupuncture, they were asked if they were pain free. Results are summarized in the contingency table below.

		Pain Free		
		Yes	**No**	**Total**
Group	**Treatment**	11	36	47
	Control	2	45	47
	Total	13	81	94



(a) What percent of patients in the treatment group were pain free 24 hours after receiving acupuncture? (Round your answer to two decimal places.)

[ ] %

(b) What percent were pain free in the control group? (Round your answer to two decimal places.)

[ ] %

(c) In which group did a higher percent of patients become pain free 24 hours after receiving acupuncture?

- ○ control group
- ○ treatment group

(d) Your findings so far might suggest that acupuncture is an effective treatment for migraines for all people who suffer from migraines. However this is not the only possible conclusion that can be drawn based on your findings so far. What is one other possible explanation for the observed difference between the percentages of patients that are pain free 24 hours after receiving acupuncture in the two groups?

This answer has not been graded yet.

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2. **[– / 7 Points]** DETAILS MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

DiezStat4 1.2.003.

Researchers collected data to examine the relationship between air pollutants and preterm births in Southern California. During the study, air pollution levels were measured by air quality monitoring stations. Specifically, levels of carbon monoxide were recorded in parts per million, nitrogen dioxide and ozone in parts per hundred million, and coarse particulate matter (PM_{10}) in $\mu g / m^3$. Length of gestation data were collected on 143,196 births between the years 1989 and 1993, and air pollution exposure during gestation was calculated for each birth. The analysis suggested that increased ambient PM_{10} and, to a lesser degree, CO concentrations may be associated with the occurrence of preterm births.†

(a) Identify the main research question of the study.

- ○ Is there an association between the levels of carbon monoxide, nitrogen dioxide, ozone, and coarse particulate matter in Southern California?
- ○ What is the average length of gestation in Southern California?
- ○ What are the average evels of carbon monoxide, nitrogen dioxide, ozone, and coarse particulate matter in Southern California?
- ○ Is there an association between air pollution exposure and preterm births in Southern California?
- ○ Are levels of carbon monoxide, nitrogen dioxide, ozone, and coarse particulate matter in Southern California too high?

(b) Who are the subjects in this study?

- ○ The subjects are air pollution levels in Southern California between 1989 and 1993.
- ○ The subjects are adults without childern in Southern California between 1989 and 1993.
- ○ The subjects are parents of childern born in Southern California between 1989 and 1993.
- ○ The subjects are births in Southern California between 1989 and 1993.
- ○ The subjects are all adults in Southern California between 1989 and 1993.

How many are included?

(c) What are the variables in the study?

(i) Identify the continuous numerical variables in this study. (Select all that apply.)

- ☐ ozone
- ☐ coarse particulate matter
- ☐ length of gestation
- ☐ carbon monoxide
- ☐ age of parent
- ☐ nitrogen dioxide
- ☐ There are no continuous numerical variables.

(ii) Identify the discrete numerical variables in this study. (Select all that apply.)

- ☐ ozone
- ☐ coarse particulate matter
- ☐ length of gestation
- ☐ carbon monoxide
- ☐ age of parent
- ☐ nitrogen dioxide
- ☐ There are no discrete numerical variables.

(iii) Identify the nominal categorical variables in this study. (Select all that apply.)

- ☐ ozone
- ☐ coarse particulate matter
- ☐ length of gestation
- ☐ carbon monoxide
- ☐ age of parent
- ☐ nitrogen dioxide
- ☐ There are no nominal categorical variables.

(iv) Identify the ordinal categorical variables in this study. (Select all that apply.)

- ☐ ozone
- ☐ coarse particulate matter
- ☐ length of gestation
- ☐ carbon monoxide
- ☐ age of parent
- ☐ nitrogen dioxide
- ☐ There are no ordinal categorical variables.

†

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3. **[– / 2 Points]** DETAILS MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

DiezStat4 1.2.008.

Researchers studying the effect of antibiotic treatment for acute sinusitis compared to symptomatic treatments. Study participants either received either a 10-day course of an antibiotic (treatment) or a placebo similar in appearance and taste (control). At the end of the 10-day period, patients were asked if they experienced improvement in symptoms.

What is the explanatory variable in this study?

- ○ antibiotics or placebo
- ○ symptoms of acute sinusitis

What is the response variable in this study?

- ○ antibiotics or placebo
- ○ symptoms of acute sinusitis

†

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4. **[– / 9 Points]** DETAILS MY NOTES ASK YOUR TEACHER

DiezStat4 1.2.010.

A survey was conducted to study the smoking habits of UK residents. Below is a data matrix displaying a portion of the data collected in this survey. Note that "£" stands for British Pounds Sterling, "cig" stands for cigarettes, and "N/A" refers to a missing component of the data.

	sex	age	marital	grossIncome	smoke	amtWeekends	amtWeekdays
1	Female	42	Single	Under £2,600	Yes	12 cig/day	12 cig/day
2	Male	44	Single	£10,400 to £15,600	No	N/A	N/A
3	Male	53	Married	Above £36,400	Yes	6 cig/day	6 cig/day
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1691	Male	40	Single	£2,600 to £5,200	Yes	8 cig/day	8 cig/day

(a) What does each row of the data matrix represent?

- ○ The participant's rank, by amount he/she smokes
- ○ The number of smokers in a region
- ○ The total number of participants in the survey
- ○ The participant's rank, by income
- ○ A participant in the survey

(b) How many participants were included in the survey?

[ ] participants

(c) Indicate whether each variable in the study is numerical or categorical. If numerical, identify as continuous or discrete. If categorical, indicate if the variable is ordinal.

Variable	Type
gender	---Select---
age	---Select---
marital	---Select---
grossIncome	---Select---
smoke	---Select---
amtWeekends	---Select---
amtWeekdays	---Select---

†

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