HW1

I pledge my honor that I have abided by the Stevens Honor System.
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Problem 1

A recent study at Britain's Oxford and Exeter Universities explored whether a woman's diet before conception affects the gender of her child. Researchers studied the eating habits of 740 women during their first-time pregnancies and found that higher caloric intake prior to conception can significantly increase the chances of having a son while more restricted diets are more likely to produce daughters. They found that high potassium diets (eating bananas) and calcium rich diets (cereal and milk) were associated with having a baby boy. Researchers concluded that eating a bowl of cereal for breakfast can increase the chances of a male birth. "Of women eating cereals daily, 59 percent had boys, compared with only 43 percent who bore boys in the group eating less than a bowlful per week."

1. Identify the population and sample of the study.
   Ans: **Population**: All Women before conception ; **Sample**: 740 women during their first-time pregnancies.
2. What is the variable of the study?
   Ans: **Independent Variable**: Diet of the women. **Dependent Variable:** Gender of the child.
3. Determine whether the data for this study are qualitative or quantitative.
   Ans: Quantitative.

Problem 2:

Researchers at the Ohio State University and Zeppelin University Friedrichshafen, in Germany, recently conducted a study regarding the elderly and negative news coverage. The researchers presented 276 subjects with several stories (with photos) about either old or young people. Participants were presented with one of two versions of each story. In one version the main character was painted in a positive light and in the other the same character was described negatively. After the participants finished reading their self-esteem was measured. The study found that older readers were more inclined to read the negative stories about you. In addition, they found that the more negative stories older people read about younger individuals, the higher their self-esteem tended to be. This could explain the prominence of negative media coverage on networks with an older audience such as Fox News and MSNBC.

1. Identify the population and sample of the study.

2. What is the variable of the study?
3. Determine whether the data for this study are qualitative or quantitative.

Answer:

1. **Popluation**: All elderly individuals who consume news media. **Sample**: 276 subjects who were presented with various stories about old or young people.
2. **Independent Variable**: Media presented; **Dependent Variable**: Self esteem of the elderly reader.
3. Qualitative.

Problem 3:

Identify the sampling method used in each of the following study.

1. The FDA chooses 15 hospitals around the country at random. Every doctor in the chosen hospitals is asked to participate in the study.
2. Every 4th dorm room is selected for a survey regarding study hours and campus security.
3. A state politician wants to gauge public opinion in his area before deciding to run for reelection. For the study, 200 registered voters are chosen at random from each county in his district.
4. In order to complete a psychology project, you pass out surveys to the first 25 people you find in the student union.

Answer:

1. Random Sampling
2. Systematic Sampling
3. Cluster Sampling
4. Convenience Sampling

Problem 4:

“Does taking 80 mg of aspirin each morning reduce the risk of heart attacks in African-American women over the age of 50?”

If the results of this study showed that aspirin did indeed reduce the risk of heart attacks in this population, would you be justified in recommending that your 52-year-old uncle begin taking aspirin daily? Does your answer change based on the ethnicity of your uncle? Explain.

Answer: Recommending daily aspirin use for my 52-year-old uncle wouldn't be appropriate, regardless of his ethnicity. The study's findings are specific to African-American women over 50, and can't be applied to other groups, including men or people of different ethnicities.

In statistics, we can only extend results to populations similar to those studied. Since my uncle - a man in his early 50s - differs significantly from the study participants, we can't assume aspirin would affect him similarly. The study's conclusions are limited to African-American women, and it would be incorrect to apply them broadly to men or other ethnic groups without targeted research on those populations.

Problem 5:

Find a study of interest on the internet. (Note: Though it may be tempting to choose a very short article, if the article is too short, it might not contain all of the necessary elements.)

Once you have found a study of interest, answer the following questions.

1. What is the title of the article? What is the link to the article?
2. Who conducted the study, when and where?
3. What question(s) does the study seek to answer?
4. Identify the population and sample in the study.
5. Identify the variable(s) being studied.
6. Describe how the sample was chosen.
7. What is the sampling method? Is there any potential bias in the sampling method? Explain your answer.
8. What is the result(s) (conclusion) of the study?
9. Do you feel comfortable believing the result(s) of the study based on your analysis? Explain your answer

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Answer

1. **Title:** "Comparative efficacy and tolerability of 15 antipsychotic drugs in schizophrenia: a multiple-treatments meta-analysis". **Link:** DOI: 10.1016/S0140-6736(13)60733-3
2. Authors: Prof Stefan Leucht MD, Andrea Cipriani, Loukia Spineli etc. **Conducted** at (Department of Psychiatry and Psychotherapy, Technische Universität München, Germany), (Department of Medicine and Public Health, Section of Psychiatry, University of Verona, Verona, Italy), and (Department of Hygiene and Epidemiology, University of Ioannina School of Medicine, Ioannina, Greece) correspondingly.
3. The **question** the study sought to answer is which antipsychotic drug should be preferred for the treatment of schizophrenia. Their **aim** in this meta analysis was to integrate the available evidence to create hierarchies of the comparative efficacy, risk of all-cause discontinuation, and major side-eff ects of antipsychotic drugs.
4. **Popluation**: All studies that sought to treat schizophrenia. **Sample**: 212 suitable trials reported between October, 1955, and September, 2012.

5. **Independent Variable:** Anti-Psyschotic Medication. **Dependent Variables:** Efficacy, Risk, Side-Effects.
6. The sample was chosen using "Bayesian-Framework: A multiple-treatments meta-analysis (with both direct and indirect comparisons) of randomised controlled trials. The samples were found in Cochrane Schizophrenia Group's specialised register, Medline, Embase, the Cochrane Central Register of Controlled Trials, and ClinicalTrials.gov for reports published up to Sept 1, 2012. Only Blinded, randomised controlled trials of patients with schizophrenia or related disorders were eligible, however, trials done in patients with predominant negative symptoms, concomitant medical illness, or treatment resistance, and those done in stable patients were excluded."
7. The sampling method was Bayesian-Framework: A multiple-treatments meta-analysis. There is selection bias in the sampling method as there is a inclusion/exclusion criteria. The exclusion of trials done in patients with predominant negative symptoms, concomitant medical illness, or treatment resistance, and those done in stable patients limits the generalizability of the results to the broader population of schizophrenia patients. The source of the data is a potential bias as they search through specfic data bases.
8. "Through 212 sutible trials, with data for 43049 patients, all drugs were significantly more effective than placebo, and clozapine was significantly more effective than all the other drugs. After clozapine, amisulpride, olanzapine, and risperidone were significantly more effective than the other drugs apart from paliperidone and zotepine."
9. Yes I do, as the research methodology demonstrates robust features of a strong meta-analysis, notably the incorporation of Bayesian analysis and randomized controlled trials (RCTs), which typically enhance reliability by reducing bias. Nevertheless, certain aspects of the study, such as its exclusion criteria and the selection of studies particular databases, may constrain the broader applicability of the results.

Problem 6:

The students in two fourth grade classes were clocked for the time to the nearest second required to run completely around the school's playground:

Times for Class 1	**58, 48, 53, 61, 67, 72, 59, 74, 62, 58, 47, 62, 65, 47, 50, 53, 48, 55, 49, 57, 50, 53, 51, 56, 52, 55**
Times for Class 2	65, 70, 78, 49, 58, 71, 74, 56, 53, 67, 68, 55, 59, 67, 51, 79, 45, 55, 54, 63, 62, 57, 61, 59

1. Sketch a central stem and plot the leaves for Class 1 on the right and Class 2 on theleft of the stem.
2. Which class had the better performance? Explain by referring to the stem and leaf plot

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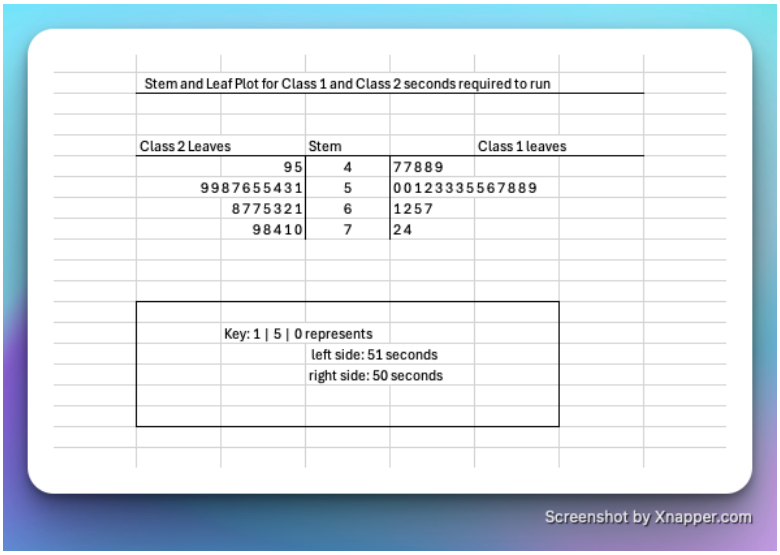
Answer:

1. 

2. The stem and leaf plot reveals distinct performance patterns between the two classes. Class 1 exhibited greater consistency, with the majority of times concentrated in the 50-60 second range, suggesting a steady, mid-level performance. In comparison, Class 2 displayed more diverse results, spanning from the mid-40s to the upper 70s. While Class 2 achieved some superior individual times in the 70-second range, they also recorded more instances of lower times. This wider distribution in Class 2's results contrasts with the more clustered outcomes of Class 1. The data implies that Class 1's performance was more uniform and reliably above average, whereas Class 2 showed both exceptional highs and notable lows. Ultimately, Class 1's consistent results, centralized data, indicate a stronger overall performance, despite Class 2's occasional standout times, Class 2 has a wider spread with more extreme values on both ends.