

Homework Assignment 2

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Statistics

Problem 1

A credit card company collects data on 10,000 users. The data contained two variables: an indicator of the customer status, i.e., current ($def = 0$) or in default ($def = 1$) and a measure of their loan balance relative to income, i.e., low ($bal = 1$), medium ($bal = 2$) and high ($bal = 3$). The data is in the following table:

		def	
bal	0	1	
1	8,940	64	
2	651	136	
3	76	133	

1. Compute the estimated marginal distribution of customer status
2. What is the conditional distribution of bal , given $def = 1$?
3. Make a prediction for the status of a customer with a high balance.

Problem 2

In a recent episode of Mythbusters, Jamie and Adam (the show's hosts) wanted to determine whether women are better multitaskers than men. To test this theory, they had 10 men and 10 women perform a set of tasks that required multitasking in order to have sufficient time to complete all of the tasks. They use a scoring system that produces scores between 0 and 100.

The women ended up with an average of 72 with a standard deviation of 5, while the men averaged 64 with a standard deviation of 9. In the show, The Mythbusters concluded that this 8 point difference confirms the myth that women are better multitaskers. Based on the results from the experiment, do you agree with their conclusion? Why?

Problem 3

During a recent breakout of the flu, 850 out of 6,224 people diagnosed with the virus presented severe symptoms. During the same flu season, an experimental anti-virus drug was being tested. The drug was given to 238 people with the flu and only 6 of them developed severe symptoms. Based only on this information, can you conclude, for sure, that the drug is a success?

Now, it turns out that the people who received this drug were all MBA students. Can you infer any causal connection between the drug and the lack of severe symptoms? What are some potential confounding variables that may influence whether someone develops severe symptoms or not?

Problem 4

In 1960, census results indicated that the age at which American men first married had a mean of 23.3 years. It is widely suspected that young people today are waiting longer to get married. We want to find out if the mean age at first marriage has increased during the past 50 years. We plan to test our hypothesis by selecting a random sample of 40 men who married for the first time last year. The men in our sample married at an average age of 24.2 years, with a standard deviation of 5.3 years.

1. Based on a 99% confidence interval, what do you conclude?