SMDM Classroom Exercises

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1. Case Problem-National Health Care Association(Descriptive Statistics)

The National Health Care Association is concerned about the shortage of nurses the health care profession is projecting for the future. To learn the current degree of job satisfaction among nurses, the association has sponsored a study of hospital nurses throughout the country. As part of this study, a sample of 50 nurses was asked to indicate their degree of satisfaction in their work, their pay and their opportunities for promotion. Each of the three aspects of satisfaction was measured on a scale from 0 to 100, with larger values indicating higher degrees of satisfaction. The data collected also showed the type of hospital employing the nurses. The types of hospitals were private (P), Veterans Administration (VA) and University (U). The complete data set is on the file named "Health".

Managerial Report:

Use methods of descriptive statistics to summarize the data. Present the summaries that will be beneficial in communicating the results to others. Discuss your findings. Specifically, comment on the following questions.

1. On the basis of the entire data set and the three job satisfaction variables, what aspect of the job is most satisfying for the nurses? What appears to be the least satisfying? In what area(s), if any, do you feel improvements should be made? Discuss
2. On the basis of descriptive measures of variability, what measure of job satisfaction appears to generate the greatest difference of opinion among the nurses? Explain
3. What can be learned about the types of hospitals? Does any particular type of hospital seem to have better levels of job satisfaction than the other types? Do your results suggest any recommendations for learning about and/or improving job satisfaction? Discuss
4. What additional descriptive statistics and insights can you use to learn about and possibly improve job satisfaction?

(This case problem is due to Anderson, Sweeney, and Williams for Classroom Discussion)

2. Case Problem-CardioGood Fitness(Descriptive Statistics)

(Business Statistics-A First Course 7e Levine ,Szabat, Stephan, Viswanathan)

The market research team at AdRight is assigned the task to identify the profile of the typical customer for each treadmill product offered by CardioGood Fitness. The market research team decides to investigate whether there are differences across the product lines with respect to customer characteristics. The team decides to collect data on individuals who purchased a treadmill at a CardioGood Fitness retail store during the prior three months. The data are stored in the CardioGoodFitness.xls file. The team identifies the following customer variables to study: product purchased, TM195, TM498, or TM798; gender; age, in years; education, in years; relationship status, single or partnered; annual household income ($); average number of times

the customer plans to use the treadmill each week; average number of miles the customer expects to walk/run each week; and self-rated fitness on an 1-to-5 ordinal scale, where 1 is poor shape and 5 is excellent shape.

I. Compute descriptive statistics to create a customer profile for each CardioGood Fitness treadmill product line.
II. Write a report to be presented to the management of CardioGood Fitness, detailing your findings.

3. Of the cars on a used car lot, 70% have air conditioning (AC) and 40% have a CD player (CD). 20% of the cars have both. What is the probability that a car has a CD player, given that it has AC ?

4. Association of Attributes

Of 37 men and 33 women, 36 are teetotalers (completely abstain from alcoholic beverages). Nine of the women are non-smokers and 18 of the men smoke but do not drink. 13 of the men and seven of the women drink but do not smoke. How many, both drink and smoke? What is the associated probability?

5. Nuclear Power Plant

A nuclear power company is deciding whether to build a nuclear power plant at Diablo Canyon or at Roy Rogers City. The cost of building the power plant is $10million at Diablo and $20 million at Roy Rogers City. If the company builds at Diablo, however, and an earthquake occurs at Diablo during the next five years, construction will be terminated and the company will lose $10 million (and will still have to build a power plant at Roy Rogers City). Without further expert information the company believes that there is a 20% chance that an earthquake will occur at Diablo during the next five years. For $1 million, a geologist can be hired to analyze the fault structure at Diablo Canyon. She will predict either that an earthquake will occur or that an earthquake will not occur. The geologist's past record indicates that she will predict an earthquake on 95% of the occasions for which an earthquake will occur and no earthquake on 90% of the occasions for which an earthquake will not occur. Should the power company hire the geologist?

(This Problem is due to Winston and Albright-Business Analytics)

6. Problem for Normal Distribution

The mean weight of a morning breakfast cereal pack is 0.295 kg with a standard deviation of 0.025 kg. The random variable weight of the pack follows a normal distribution.

a) What is the probability that the pack weighs less than 0.280 kg?
b) What is the probability that the pack weighs more than 0.350 kg?
c) What is the probability that the pack weighs between 0.260 kg to 0.340 kg?