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 09/11/09

 MONT 106-N

 Problem Set 1

1. (a) One year of data is not enough evidence to support the claim that Minnesotans are more law-abiding than Michiganders. The fact that Detroit is a bustling major city with a higher population than most cities in Minnesota puts Michigan at a disadvantage. In 2001, Michigan’s population was over 10 million[[1]](#footnote-2) while Minnesota’s population at that time was a little below 5 million[[2]](#footnote-3). With this data, it is impressive to see a population almost double in size having only 500 more crimes in a single year.

(b) Between 1991 and 2001, many factors could have attributed to the lowering of the crime rates. For example, more police officers could have been hired in order to enforce laws and keep threats of crime at ease. Furthermore, legislature could have changed powers and could have established stronger policies in law enforcement. Also, even though the FBI reported that overall crime rates had decreased, major crimes such as murder and car theft rose in rates[[3]](#footnote-4). The fact that the U.S. became more law-abiding seemed to only affect smaller criminal acts.

 4. (a) The men and women and age groups were studied differently so that confounding factors would be eliminated. Men and women have different body types that change with age. In order to find the best results, the participants would have to be placed in groups of same eligibility and physical attributes.

(b) The smokers who had recently stopped smoking did not have enough time for their bodies to withdraw from the side-effects of smoking. The body was taken off a substance that it had gotten used to and did not know how to handle it. On the other hand, those who continually smoked had bodies that were used to the constant nicotine. The body was comfortable with the consistent environment it was in. It is still healthier not to smoke, even if a person has already started.

5. Zinc sulfate should not be given to treat the disease. In the double-blind experiment, no results showed that the zinc sulfate worked. The doctors may have held a bias opinion when examining the participants when they knew who was being treated; they may have been finding results that were not actually there.

6. Because the subjects did not improve during the first half of the experiment, they assumed that they were not being treated. During the second half, they must have figured that they were receiving the proper treatment and therefore had psychological encouragement for the drug to work.

7. (a) This is an observational study because the investigators did not conduct an experiment, they just filtered cervical cancer rates based on age, education, and marital status.

(b) The investigators adjusted for age because women’s bodies change as they get older it would be a confounding factor if they were all placed in the same group. The women were separated by education in order to distinguish who would have had more knowledge of the effects of oral contraceptives and who may not have been aware. They were also distinguished by marital status because female hormones are different when one is single and when one is married or in a relationship.

(c) Women would also differ depending on their sexual activity. Women who are more sexually active come in contact with areas susceptible to cervical cancer more than those who do not have sex very often.

(d) The conclusions were justified by the data however because it was only an observational study, it would be wise to conduct a double-blind controlled experiment to further test the theory.

8. The statistics do not prove that burglars go to work when other people are on vacation. The association of the two factors does not prove causation; it merely states that they coexist.

9. (a) False: The experiments did not confirm the results of the observational studies. The experiments showed that the diet supplement led to an increased death rate.

(b) True: People who eat lots of fruits and vegetables may be more concerned about their lifestyle and may exercise more or stay on a balanced, nutritional diet.

(c) True: The same confounding factor applies to the experiment. The experiment should have also been separated by people who exercise regularly in order to eliminate that confounding factor.

10. (a) This was an observational study because no experiment was set up in which mothers were observed either controlling or not controlling their children, leading to more or less body fat.

(b) The study found an association between the two factors but there are many confounding factors not considered: the child may not have a father, have a controlling father, be an only child, etc.

(c) If a mother’s controlling behavior led to a child eating more and having more body fat, it would explain the association. The cause of body fat comes from excess eating and lack of exercise. A controlling mother may cause a child to become stressed and resort to food as a form of relaxation. This would explain the connection between body fat and a controlling mother.

(d)A gene that causes obesity would not explain the association. A child with the “obesity gene” would become obese whether or not the mother was controlling, therefore eliminating that factor.

(e) The data does not prove the *Chronicle*’s advice because the observational is not enough evidence. There are too many confounding factors that could have skewed the results that were not accounted for or countered.

11. (a) The treatment group is the ones who are participating in the boot camp. The control group is the ones who are remaining at the prison.

(b) The spokesman’s comparison is based on an observational study. The prisoners who went to the boot camp volunteered. This means that they wanted to attend the camp and wanted to do well so that they would be released sooner.

(c) The data does not show that the boot camp worked. The prisoners who went meant to do well in the program in order to influence a speedy release. A more accurate test would to put both prisoners who do and do not want to go at the boot camp. This would test whether those not motivated would be affected at all by the boot camp.

12. An overall percentage is not determined by the combined totals of the two wards. For example, a baseball player may have a higher batting average than another player every year for five years. However overall, the other player may have a greater total average.

1. areaConnect. <http://www.areaconnect.com/population.htm?s=MI> 9 Sept 2009. [↑](#footnote-ref-2)
2. Minnesota Dept. of Administration <http://www.demography.state.mn.us/resource.html?Id=1705> 9 Sept 2009. [↑](#footnote-ref-3)
3. Free Library [http://www.thefreelibrary.com/Eugene+sees+less+crime+in+2001,+FBI+says.(Crime)(Report:+Nationwide,...-a087874056](http://www.thefreelibrary.com/Eugene%2Bsees%2Bless%2Bcrime%2Bin%2B2001%2C%2BFBI%2Bsays.%28Crime%29%28Report%3A%2BNationwide%2C...-a087874056) 9 Sept 2009. [↑](#footnote-ref-4)