

1]

- a) <http://www.mdch.state.mi.us/PHA/OSR/CHI/POP/HP01CO1.htm>  
<http://www.demography.state.mn.us/resource.html?Id=1705>

In order to accurately compare the crime rates between these two states the information must be quantified in terms of percent of the total population. Therefore the statement that there are more total crimes in Michigan is misleading as it neglects to mention the total number of people. In 2001 there were approximately 10,006,266 people in Michigan compared to about 4,972,294 in Minnesota. Once these crime rate figures are computed it becomes evident that Michigan as a whole is more law-abiding than Minnesota. In 2001, the Minnesota crime rate was  $3,584 / 4,972,294$  or .07% while in Michigan the crime rate was  $4,082 / 10,006,266$  or .04%.

- b) [http://www.npg.org/facts/us\\_historical\\_pops.htm](http://www.npg.org/facts/us_historical_pops.htm)  
<http://www.govspot.com/ask/population.htm>

In 1991 the estimated United States national population was about 252,127,402 while in 2008 it stood at approximately 285,669,915 people. I agree that the U.S. became more law-abiding over the time period from 1991 to 2001, however the investigator is right for the wrong reasons. The crime rate is lower in 2001 not because there are less total crimes, but rather because when you divide the total crimes by the total number of people there is a crime rate of .011% in 1991 compared to .007% in 2001. Also, it is not necessarily true that the time between 1991 and 2001 was greater

4]

a) They studied men and women and different age groups separately in order to minimize confounding. The age and gender of the individuals involved in the experiment could play a factor in their overall health. In order to focus on just the repercussions of smoking as they pertain to health, it is necessary to differentiate between these groups.

b) The conclusions drawn from the experiment are slightly skewed, because there may have been confounding effects which impacted both the group the people were in and their results. The individuals who had stopped smoking may have done so because of already present health concerns.

5]

Zinc sulfate should not be prescribed to treat idiopathic hypoguesia, because the results of the first randomized controlled experiment are invalid due to the doctors' knowledge of who was in both the control and treatment group. In order to eliminate the possibility of bias or tampering, it is essential to conduct a double-blind study. After the second trial which was double-blind, the true untampered results emerged and showed that zinc sulfate has no effect thus it should not be used.

6]

In the first half of the experiment groups only two groups had taken zinc, while two groups had been exposed to the placebo. Since two groups had not taken the zinc it was therefore unable to experience its effects. In the second half of the experiment all but one of the groups were using the zinc and were therefore more likely to improve. Another possibility is that although the individuals were not told which group they were in, since they knew the layout of the different groups they could still experience a placebo effect. By knowing that they only had a 50% chance of taking the actual zinc in the first half of the experiment they could be less convinced that the treatment would effect their

condition. On the contrary, since they knew that three out of the four groups took the zinc in the second half they could have experienced a therapeutic effect.

7] [http://www.essortment.com/all/whatis cervical\\_rirt.htm](http://www.essortment.com/all/whatis cervical_rirt.htm)

a) It is an observational study, because the decision of whether or not to use oral contraceptives is left to the participants' discretion.

b) Age, education, and marital status are adjusted for in order to minimize confounding. Certain age groups may be at a greater risk than others while those who are more educated may be able to protect themselves against the perils of cervical cancer. Also Marital status may influence their amount of sexual activity, tendency to use the contraceptives and likelihood of contracting cervical cancer.

c) Women using the pill differed from non-users in that the majority of those who are using the pill are doing so because they are sexually active and do not want to get pregnant. Since cervical cancer, unlike other types of cancer, is spread by the human papilloma virus through sexual activity those who use the pill tend to be more sexually active and thus more prone to contracting cervical cancer. Sexual activity is a confounding factor that could sway the results in opposition to the contraceptive.

d) No, the conclusions of the study were not justified by the data. In this observational data there were confounding factors that tainted the results, resulting in misleading data. In order to properly conduct this experiment it should be set-up as a randomized controlled experiment.

8] <http://www.timeanddate.com/holidays/us/memorial-day>

In order to properly analyze this question it is necessary to calculate the time interval between Memorial day and Labor day. Memorial day takes place on May 25<sup>th</sup> while Labor day is on September 7<sup>th</sup>. This period is slightly over 3 months or approximately  $\frac{1}{4}$  of the year. Considering that  $\frac{1}{4}$  is 25% and that is the exact amount of burglaries that happened over this interval, disproves the statement that when other people go on vacation, burglars go to work.

9]

a) False, the experiments actually disproved the claims of the observational studies. While the observational studies contended that an intake of five or more servings of fruits and vegetables would lead to lower death rates of colon and lung cancer, the controlled experiment produced contradicting results.

b) True, the people who eat five fruits and vegetables daily likely tend to live overall healthier lives. This healthier lifestyle would influence their tendency to join the treatment group and effect their death rate for both types of cancer.

c) False, the experiments took this into account and conducted a randomized controlled experiment that negated the effects of confounding. Since they subjects were randomly selected to be in either the treatment or control group, their lifestyles did not impact the results. In other words, the people who live healthy lifestyles were randomly dispersed throughout the two groups.

10]

a) This is an observational study because they could not control which fat kids had controlling mothers, so they could not assign particular individuals to the treatment and control groups. The results are being deduced simply from observing the relationship between fat kids and their mothers.

b) Yes, this observational study demonstrates an association, or tangible link, between the child's body fat content and the extent to which the mother is controlling. This is evidenced by the statement that those with a higher body fat content tended to have more controlling mothers. However, association and causation are two entirely different phenomena. While the two are associated it does not mean that one thing causes the other.

c) Yes, this is evidence of an association between the mother's behavior and her child's eating

habits. Association merely means that the two are linked, which is the case here.

d) No, while the genes may effect the child's weight it is in no way related to the controlling parent. The gene could be expressed for both the group with and without controlling mothers.

e) Since the parents are controlling they may limit the children to eating only certain types of food. If these foods happen to be unhealthy ones then they would naturally cause the children to gain weight. On the contrary, if the children were forced to eat only really healthy and nutritional foods, then they may end up eating more unhealthy and junk food to compensate for their controlling mothers. This may be a way for the children to free themselves from the restrictions of their mothers.

f) No the data does not support the he claim that the controlling mothers result in fat kids. While there is an association present between controlling mothers and fat kids, there are also many confounding factors that may skew the results of this observational study. The controlling mothers themselves do not cause their children to be overweight.

11]

a) The treatment group consists of the ex-prisoners who voluntarily enlisted in the “boot camp.” Conversely, the control group contains those prisoners who elected not to join the “boot camp.”

b) It is an observational study, because they are unable to control who has gone to prison and who joins the “boot camp.” This study involves no manipulation, and the two distinct groups are merely watched in order to reach a conclusion.

c) Due to the voluntary admission and the fact that it is an observational study and not a controlled experiment, the boot camp is not necessarily the factor that led to lower re-imprisonment rates. Those who completed the boot camp have a lower tendency to be re-imprisoned, however there is a confounder present. Those who joined the “boot camp” are more willing to change their lifestyle and start anew, causing them to join and not return to prison.

12] False.

Example:

City ward #	1		2		1 & 2	
	Democrats	Republicans	Democrats	Republicans	Democrats	Republicans
voted	2100	1520	1500	4900	3600	6420
registered	5000	4000	3000	10000	8000	14000
% registered who vote	42.00%	38.00%	50.00%	49.00%	45.00%	45.86%

While there is a higher percentage of registered Democrats who vote in each city ward, the total percentage of those registered who vote is greater for Republicans than it is for Democrats.