

Name: _____

Date: _____

Quiz 9 – A

1. A computer animation company is charged with discriminatorily paying its female employees too little. It produces an accurate statistic that shows the average of female pay is equal to the average of male pay. Explain how discrimination could still be going on, using proper statistical terminology. Assume that the company has two types of employees: well paid executives and poorly paid animators. You may make up numbers in an example scenario to illustrate your answer.
2. For elite athletes, the sporting equipment that they can make their performance record-beating or second place. But if a regular person competed against an elite athlete, the equipment wouldn't matter in the slightest. Explain what is going on, using proper statistical vocabulary.
3. Canada has, in the past, used a points-system for immigration, wherein immigrants earn points for being high-skilled, having family already in Canada, and so forth. The highest point earners are admitted. Explain why it will APPEAR like there is a correlation between family size and being low-skilled. Then name the statistical fallacy.
4. You're considering going into computer programming as a profession. You talk to a family friend who's a computer programmer who says, "It's great! I switch companies every couple of years and earn a salary bump every time." Explain the statistical fallacy that might be going on.

5. Your teacher gives the class a weekly spelling quiz, then announces who got the best score. While there are three students who regularly have the best score, it's very rare that anyone has the best score two weeks in a row. Your teacher says that it must be that the best scorer gets complacent, but you know that's not the best explanation. Say what's happening!

6. People who keep returning to acupuncture report that it is amazing effective at relieving their aches and pains. Explain what is going on, using proper statistical vocabulary.

Quiz 9 – A – answer key

1. There could be a Simpson's paradox going on, if, for example, the women were likelier to work as executives.

	Men	Women
Executives	10 men Avg. pay \$100,000	10 women Avg. pay \$80,000
Animators	50 men Avg. pay \$40,000	10 women Avg. pay \$30,000

2. This is a within group/between group issue. Within the group of elite athletes, the only sources of variability are minute differences in training and equipment because they are all operating at their physical limits. However, compared to regular people, the main source of the variability is physical fitness.
3. This is an example of Berkson's fallacy. The low-skilled, no-family immigrants are excluded from the data set being analyzed. Because of this, only low-skilled immigrants with family connections are considered, making it appear that all low-skilled immigrants have families. Similarly, immigrants without family connections are only included in the data set if they are high-skilled, making it appear that all immigrants without family connections are high-skilled.
4. This could be a survivor bias issue. Your family friend might be the rare person who thrives on that kind of instability. Other programmers might not be able to land a new job and quit the profession.
5. This is likely regression to the mean. Being the best speller in a week requires both skill and luck (English spelling is often quite random). The top three students are all very good spellers, but they trade the top spot because of getting a lucky guess or two right.
6. This is self-selection bias. The people who are willing to keep going back to acupuncture are the people who find that it works for them.