

Name: _____

**PHIL/PSYC 2100 Critical Thinking
HW 4**

I. Statistical Reasoning

1. You are reading a report on the results of a survey. It was found that 30% of the respondents are happy with President Obama's handling of the oil spill. Based on this result, it was concluded that around 30% of all Americans are happy with President Obama's handling of the oil spill. Being the critical thinker that you are, you scan the report for other details that indicate how reliable this statistical inference is. For each of the following pairs of additional information that you may encounter in the report, indicate which one of the pair gives the strongest support for this claim, assuming all other things being equal (you can assume a 95% confidence level):
 - a. the sample size is 100 / the sample size is 1000
 - b. the margin of error is 3% / the margin of error is 5%
 - c. the sample size is 100 / the margin of error is 5%
 - d. the respondents were 200000 / the respondents were 1000
randomly picked Texans randomly picked Americans

2. You want to know whether or not RPI students support a sustainability fee: a student fee to support sustainability efforts at RPI. You ask a group of 100 randomly selected RPI students, and of these 100 students, 60 students say they support the fee. Now determine whether the following statements are true or false:
 - a. There is a 95% chance or more that exactly 60% of all RPI students support the sustainability fee.
 - b. There is a 95% chance or more that at least 60% of all RPI students support the sustainability fee.
 - c. There is a 95% chance or more that between 50% and 70% of all RPI students support the sustainability fee.
 - d. There is a 95% chance or more that more than 50% of all RPI students support the sustainability fee.

3. To find out what the local community thought about their recent development proposals, city officials put together a questionnaire, handed this to people in the local mall, and asked them to submit the completed form in a big box at the exit. Describe/explain 4 ways in which the reliability of the results of this survey was negatively affected by this method.

4. Critically evaluate the following passages:

- a. Minorities economically disadvantaged? I don't believe a word of it! Two of my friends are black, and they are quite well off.

- b. Drug abuse among professional players is a serious and widespread problem. Just last week three players from a single team admitted that they had used cocaine.

- c. A majority of Ohio citizens consider the problem of air pollution critical. According to a survey taken in Cleveland, more than half the respondents identified air pollution as the most pressing of seven environmental issues and as having either "great" or "very great" importance.

- d. "You're not taking a course from Professor Harris, are you? I know at least three people who say he's terrible. All three flunked his course, as a matter of fact.

II Ask Marilyn

1. The following letter appeared in the recent April 22, 2007 column of “Ask Marilyn”, in which people ask questions to Marilyn vos Savant, the person with the highest ever recorded IQ:

I read that half of the children 14 and under who die in car crashes are not buckled, boosted or otherwise restrained. Doesn't this mean that half of the children are appropriately secured? If so, wouldn't this also mean that the chances of a child surviving a crash are 50-50, restrained or not?

- Scott Stochak, Burlingame, Ca.

a. Taking his second question literally, Scott would seem to be suggesting that the chances of a child surviving a car crash are 50-50, restrained or not. Can that be inferred from the given information? Why or why not?

b. Presumably, Scott wasn't so much suggesting that the chances of survival are 50-50, but rather that the chances of survival, whatever they are, are the same for children who are restrained as for those who are not. In short, Scott was suggesting that it doesn't help to wear a seatbelt. Can that be inferred from the given information? Why or why not?

2. If you were Marilyn, how would you answer the following letter?

Dear Marilyn,

I noticed that you recommended to Tom that he should make his children wear a seatbelt. However, I asked a large number of children 14 and under about their seat belt use, and found that a full 100% of all those who admitted not to use seat belts on a regular basis have never died in a car crash. How do you explain that?

- Confused in Texas

III. Causal Reasoning

1. For each of the following arguments, indicate whether we may be dealing with reverse causation, common cause, coincidence, or any combination thereof. Explain your answer where needed.
 - a. I once had an older lady come to me, and I discovered a bad growth in her eye. When I saw her a week later, however, the growth was completely gone. When I asked her what she had done, she told me that she had prayed every day for it to go away.
 - *Eye doctor arguing that there really is something to faith healing*
(and you think I made this one up: ha!)
 - b. You want me to go to the hospital to visit your friend? No way! Look, many people die when they are in hospitals, so being in a hospital obviously causes death.
 - c. Have you noticed how yellow the Doerr's lawn has gotten? They started fertilizing it, too, I understand. Must be cheap fertilizer, to make it turn yellow like that!
 - d. Statistics show that people who are older when they become sexually active don't experiment with drugs. That to me is a very good reason to keep youngsters from having sex.
 - e. Research demonstrates that people who eat fish are smarter. I'm going to increase my intake.
 - f. What explains all the violence in society today? TV. Just look at all the violence they show these days.
 - g. "... and let's not underestimate the importance of that home field advantage, Dan"

"That's right, Dave Six of the last seven teams who had the home field advantage went on to win the championship"

IV. Critical Analysis of Studies suggesting a Causal Claim

Critically analyze and evaluate the passages on the following pages. Other than using your common sense, you could ask yourself the questions below. If you want, you can answer all these, but note that they are really just general guidelines: some questions apply better to certain passages than others and, most importantly, for some passages there are criticisms that go beyond this specific list of questions. So don't think that answering all and only these questions automatically amounts to a good critical analysis and evaluation!

- What is the causal claim made in the passage? What is the target population, i.e. about who or what and what kinds of conditions is this claim supposed to generalize to? If the target is not explicitly mentioned, point this out, but also try and indicate what you yourself would consider to be a reasonable target.
- What is the nature of the groups being compared? How were these groups created? Are they representative of the target population? Why or why not? Did the researchers try to do a controlled experiment? If so, do you feel they did a good job controlling the experiment, i.e. making sure the control and experimental groups were as similar as possible? Were the subjects 'blind'? Were the researchers 'blind'? If not, point out differences between the groups that you feel are important with regard to the intended causal claim. Also, are there any issues of self-selection or self-reporting?
- What were the differences found between the groups? Are group sizes and percentages provided, and just looking at those numbers, are the differences statistically significant? How meaningful is this quantitative result, i.e. how appropriate is it to use quantitative statistics in this case?
- If any correlation is found, do you feel it is because of the causation as suggested? What other factors could explain any differences found? Could we be dealing with reverse causation? Common cause? Indirect causation? Coincidence?
- In the end, how well do you find the causal claim suggested is supported by the evidence provided? Very well? Somewhat well? Not well at all? If you aren't convinced, is it because of the evidence itself, or because of the (often second-hand) report of the experiment? That is, did the write-up omit important pieces of information, or was it unclear anywhere, and if so what would you like to know about the experiment itself? If you feel there is a problem with the experiment itself, how would you try and fix it, and what data would you be looking at?

Stop Slouching! Good posture boosts self-esteem

When you were growing up, your mother probably told you to sit up straight, because good posture helps you look confident and make a good impression. And now it turns out that sitting up straight can also improve how you feel about yourself, according to a study in the October 2009 issue of the *European Journal of Social Psychology*. Researchers asked college students to rate themselves on how good they would be as job candidates and employees. Those told to sit up straight with their chests out gave themselves higher ratings than those instructed to slouch while filling out the rating form. Once again, Mom was right.

Research at the University of Pennsylvania and the Children's Hospital of Philadelphia indicates that children who sleep in a dimly lighted room until age two may be up to five times more likely to develop myopia (nearsightedness) when they grow up. The researchers asked the parents of children who had been patients at the researchers' eye clinic to recall the lighting conditions in the children's bedroom from birth to age two. Of a total of 172 children who slept in darkness, 10 percent were nearsighted. Of a total of 232 who slept with a night light, 34 percent were nearsighted. Of a total of 75 who slept with a lamp on, 55 percent were nearsighted. The lead ophthalmologist, Dr. Graham E. Quinn, said that, "just as the body needs rest, this suggests that the eyes need a period of darkness".

- Adapted from an article by Associated Press

In a fifty-seven-month study, involving over 11,000 male physicians, 104 of those who took aspirin had heart attacks, as compared with 189 heart attacks in those who took only a sugar pill. This means ordinary aspirin reduced the heart attack risk for healthy men by 47 percent.

- Adapted from an article in the Los Angeles Times

The Carolina Abecedarian Project selected participants thought to be at risk for producing mildly retarded children. These families were on all welfare, and most were headed by a single mother, who had scored well below average on a standardized IQ test (obtaining IQs of 70 to 85). The project began when the participating children were 6 to 12 weeks old, and continued for the next 5 years. Half of the participants were randomly assigned to take part in a special day-care program designed to promote intellectual development. The program ran from 7:15 to 5:15 for 5 days a week for 50 weeks each year until the child entered school. The other children received the same dietary supplements, social services, and pediatric care, but did not attend day-care. Over the next 21 years, the two groups were given IQ tests and tests of academic achievement. The day-care program participants began to outperform their counterparts on IQ tests starting at 18 months and maintained this IQ advantage through the age of 21. They also outperformed the others in all areas of academic achievement from the third year of school onward.

- Adapted from Developmental Psychology, 6th ed., David Schaffer

No Booze? You May Lose: Why Drinkers Earn More Money than Nondrinkers

Drinkers earn 10 to 14 percent more money at their jobs than nondrinkers and men who drink socially, visiting a bar at least once a month, bring home an additional 7 percent in pay, according to a new Reason Foundation report by economists Bethany Peters, Ph.D., and Edward Stringham, Ph.D.

"Social drinking builds social capital," said Stringham, an economics professor at San Jose State University. "Social drinkers are networking, building relationships, and adding contacts to their Blackberries that result in bigger paychecks."

The study finds that men who drink earn 10 percent more than abstainers and women drinkers earn 14 percent more than nondrinkers. However, unlike men, who get an additional income boost from drinking in bars, women who frequent bars at least once per month do not show higher earnings than women who do not visit bars.

The study, published in the latest edition of the *Journal of Labor Research*, suggests that the growing wave of anti-alcohol legislation at state and local levels will have harmful effects on local economies and individual finances. Efforts to impose massive tax increases on alcohol, to restrict alcohol sales through zoning laws, and prohibit alcohol advertisements have all been stepped up in recent years.

"We're quick to ban beer at sports stadiums and festivals. The legal blood alcohol level is dropping everywhere, and we're barraged with overhyped warnings about binge and underage drinking," Stringham said. "Instead of fear mongering we should step back and acknowledge the proven health and economic benefits that come with the responsible use of alcohol."

Published by the Reason Foundation, September 14, 2006. The Reason Foundation is a non-profit think tank dedicated to advancing free minds and free markets. For more information, visit www.reason.org

