

AP Statistics Summer Assignment

Part 1: Due July 15th

Choose one of the articles and answer the questions that follow, typed in complete sentences. If you have questions or issues, send me an email at dunlap@appublicschools.com. Responses should be submitted to the Google Classroom page under the appropriate assignment.

Option 1

<http://mobile.nytimes.com/blogs/well/2016/06/17/for-u-s-parents-a-troubling-happiness-gap/?referer=http://www.apa.org/>

1. What is the parental happiness gap? How has it been studied?
2. What factors did the researchers investigate with regards to the happiness gap? How did be results relate to their initial hypotheses?
3. What is an indirect benefit? Give an example of an indirect benefit that exists in your life.
4. The article discusses parental anxiety and worry about a child's future. Do you see this type of anxiety and stress in your life or the lives of your friends? How does this personal experience impact your thoughts on the validity of this article?
5. Do you trust the findings in this article? What about the information presented makes you trust or mistrust the experiments and their results?

Option 2

https://www.washingtonpost.com/national/health-science/is-that-a-psychological-condition-or-just-faulty-research/2016/06/17/4116088c-3245-11e6-95c0-2a6873031302_story.html

1. What is ego depletion?
2. Give at least two examples from research to support the theory of ego depletion and one example against the theory. Briefly describe how each example helps or hurts the theory.
3. What is a file drawer problem? Describe it
in general and provide a new example in your own life.
4. What part of the scientific research process is being left out to cause many problems in the eyes of researchers? What is one effort that could be made to fix the problem?
5. What are some factors that could lead to a false result in an experiment or a study?

Part 2: Due August 1st

As with the first assignment, choose one of the two articles and answer the questions. Both articles explore the idea of medical screening, along with its benefits and drawbacks. The articles discuss issues that will factor into our probability unit but also get into some of the ethics of medical screening and the interaction between the statistics point of view and the point of view of an individual person who is getting screened for a given disease. Just like with the first set of articles, do your best to answer the questions thoroughly and accurately, but don't stress if some of the concepts are not crystal clear -- that is what class will be for! Continue to enjoy your vacations!

Option 1: Theranos Is Wrong: We Don't Need More Blood Tests

<http://fivethirtyeight.com/features/theranos-is-wrong-we-dont-need-more-blood-tests/>

1. The philosophy behind Theranos' business is summarized by the article as "Finding a disease as early as possible would lead to fewer deaths than finding it late." The article then goes on to try to refute that, starting with the example of prostate cancer screening. Give a brief explanation of why screening for prostate cancer may not be an effective prevention step.
2. What factors go into the quality and effectiveness of a screening test?
3. The diagram in the middle of the article illustrates a very important concept in probability. What point is the diagram trying to illustrate about testing for rare diseases?
4. Explain the difference between the following two statements.

Statement 1: If you are a smoker, there is a 25% chance that you will develop lung cancer.

Statement 2: If you have lung cancer, there is a 25% chance that you are a smoker.

5. What is overdiagnosis? What did Ioannidis discover about deadly disease screening and how does this relate to overdiagnosis?

Option 2: The Case Against Early Cancer Detection

<http://fivethirtyeight.com/features/the-case-against-early-cancer-detection/>

1. Give a brief summary of the pattern in thyroid cancer diagnosis and death rates in South Korea. Use the second graph to help support your description.
2. What is papillary thyroid cancer? What does it have to do with the diagnosis issue in South Korea?
3. What is overdiagnosis? What are some consequences of it?
4. The article goes into detail on what it calls the relentless progression model of cancer, followed by a breakdown of cancers into different categories based on their likelihood of spreading. Which type of cancers are we truly trying to scan for and detect sooner?

There are some visuals depicting the effectiveness of screening using mammograms and also PSA for prostate cancer. These charts, along with the majority of this article itself, start to address a very important issue in probability that we will learn about during the year. It leads to mistakes with statements like the ones below.

5. Explain the difference between the following two statements.

Statement 1: If you are a smoker, there is a 25% chance that you will develop lung cancer.

Statement 2: If you have lung cancer, there is a 25% chance that you are a smoker.

Part 3: Due September 1

Option 1

<http://noblestatman.com/uploads/6/6/7/3/66731677/cockpit.flaw.averages.pdf>

1. What problem did the Air Force have in the 1940s?
2. What were the possible explanations for the problem identified in question 1?
3. How was the size of the cockpit decided upon?
4. What did Daniels learn from his research at Harvard?
5. What was the take home message about the pilots and their relation to the cockpits? Give an example of how this idea applies to a different area of life (school, work, sports, etc.).

Option 2

<http://noblestatman.com/uploads/6/6/7/3/66731677/cell.phone.separation.anxiety.pdf>

1. What was this study investigating?
2. What were the independent and dependent variables in the study?
3. How did the researchers carry out the study?
4. Why did the researchers withhold the true purpose of the study?
5. What do you think it means to have a "significant increase" in anxiety? How would you determine what would qualify as significant?