**AP Statistics Second Term Project: Response Bias**

**The Project:** You and your partner (or you by yourself) will design and conduct an experiment to investigate the effects of response bias in surveys. You may choose the topic for your surveys, but you must design your experiment so that it can answer at least one of the following questions:

* Can the wording of a question create response bias?
* Do the characteristics of the interviewer create response bias?
* Does anonymity change the responses to sensitive questions?
* Does manipulating the answer choices change the response?

**Proposal (20 points):**

* The proposal is due: Monday, November 25. Late work will be penalized 20% per day, even if you are absent-if you are absent you need to get work dropped off or you could email a file, scan or photo of your work!
* The proposal will be worth 20% of the grade, so don’t treat it casually.
* If the proposal isn’t approved the first time, you will need to resubmit it for a reduced grade. You must attach the original proposal to any resubmissions.

In your proposal, you should:

* Describe your topic and state which type of bias you are investigating
* Describe how you will obtain your subjects (minimum sample size is 50). This must be practical!! Your population does not need to be from Nipmuc nor should you interrupt any classes (without teacher permission).
* Describe what your questions will be and how they will be asked, including how you will incorporate the principles of a good experiment and avoid potentially confounding variables. You should also indicate what your hypotheses are (what you assume will happen).
* Plan out how you will display/analyze your results.
* Convince me that you have a good design!

**Poster (80 points):**

* The poster is due: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Late work will be penalized 20% per day, even if you are absent (see guidelines in proposal).
* The key to a good statistical poster is communication and organization. Make sure all components of the poster are focused on answering the question of interest.
* The poster should be standard sized and not on foam board. Make sure the poster is light enough to be hung on the wall.

The poster should include:

* Title (in the form of a question).
* Introduction. In the introduction you should discuss what question you are trying to answer, why you chose this topic, and what your hypotheses are.
* Data Collection. In this section you will describe how you obtained your data. Be specific.
* Graphs and Summary Statistics. Make sure the graphs are well labeled, easy to compare, and help answer the question of interest.
* Discussion and Conclusions. In this section, you will state your conclusions. You should also discuss any errors you made, what you could do to improve the study next time, and any other comments based on your own critical reflection on the project.
* Live action pictures of your data collection in progress.

**Presentation:** Each pair (or individual) will be required to give a 5 minute oral presentation to the class. Both members need to participate equally and should be prepared to answer questions.

**Examples of Successful Projects:**

“Cartoons”

1. “Do you watch cartoons?” (90% yes)

2. “Do you *still* watch cartoons?” (60% yes)

“Milk vs. Orange Juice”

1. “Which do you prefer, milk or orange juice, as a breakfast drink?” (milk: 14%)

2. “Milk contains high levels of vitamin D and calcium. Do you prefer milk or orange juice as a breakfast drink?” (milk: 64%)

“Cheating”

1. “Do you cheat in class?” (anonymous: 47% would)

2. “Do you cheat in class?” (not anonymous: 15% would)

“Make-Up”

 (all questions asked to males)

1. “Do you find females who wear makeup attractive?” (wearing makeup: 75% yes)

2. “Do you find females who wear makeup attractive?” (without wearing makeup: 30% yes)

“Time Online”

1. “On average, how many hours do you spend online each week: 0-5, 6-10, 11-16, 17-25, 26- 35, or more?”

2. “On average, how many hours do you spend online each week: 0-5, 6-10, 11-16, or more?”

For this question, the students anticipated that subjects would be embarrassed to put “more”. In the first question, 50% answered over 17 hours, but in the second question, 0% did.

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ AP Stats Block\_\_\_\_\_\_\_\_\_\_\_

**Proposal Rubric:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Response Bias Project** | **5 = Complete** | **4 = Substantial** | **3 = Developing** | **2 = Minimal** |
| **Intro** | * Describes the context of the research
* Has a clearly stated question of interest
* States type of bias testing
* Provides a hypothesis about the answer to the question of interest
* Question of interest is of appropriate difficulty
 | * Introduces the context of the research and has a specific question of interest
* States type of bias testing
* Suggests hypothesis OR has appropriate difficulty
 | * Introduces the context of the research and has a specific question of interest OR has question of interest and a hypothesis
 | * Briefly describes the context of the research
 |
| **Data Collection** | * Method of data collection is clearly described
 | * Method of data collection is clearly described
* Some effort is made to incorporate principles of good data collection
 | * Method of data collection is described
* Some effort is made to incorporate principles of good data collection
 | * Some evidence of how data collection will be done
 |
| **Plan of Graphs& Summary Statistics** | * Appropriate graphs will be included (to help answer the question of interest)
* Graphs will be easy to compare
* Appropriate summary statistics will be included
 | * Appropriate graphs are discussed (to help answer the question of interest)
* Appropriate summary statistics will be included
 | * Graphs and summary statistics are discussed
 | * Graphs or summary statistics are not discussed
 |
| **Principles of Experimental Design** | * All three principles of a good experiment have been well thought and justified, including how you will avoid any potentially confounding variables.
 | * Two of the principles are adequately addressed.
 | * Only one principle is adequately addressed.
 | * None of the design principles are adequately addressed.
 |

**Total Possible Points = 20 POINTS EARNED PROPOSAL:\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Late deduction (-20% per day or 16 points)=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\*\*PASSED IN A RUBRIC (+2 points extra credit)=­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ AP Stats Block\_\_\_\_\_\_\_\_\_\_\_

**Poster/Presentation Rubric:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **16 = Complete** | **12 = Substantial** | **8 = Developing** | **4 = Minimal** |
| **Intro** | * Describes the context of the research
* Has a clearly stated question of interest
* Provides a hypothesis about the answer to the question of interest
* Question of interest is of appropriate difficulty
 | * Introduces the context of the research and has a specific question of interest
* Suggests hypothesis OR has appropriate difficulty
 | * Introduces the context of the research and has a specific question of interest OR has question of interest and a hypothesis
 | * Briefly describes the context of the research
 |
| **Data Collection** | * Method of data collection is clearly described
* Includes appropriate randomization
* Describes efforts to reduce bias, variability, confounding
* Quantity of data collected is appropriate
 | * Method of data collection is clearly described
* Some effort is made to incorporate principles of good data collection
* Quantity of data is appropriate
 | * Method of data collection is described
* Some effort is made to incorporate principles of good data collection
 | * Some evidence of data collection
 |
| **Graphs and Summary Statistics** | * Appropriate graphs are included (to help answer the question of interest)
* Graphs are neat, clearly labeled, and easy to compare
* Appropriate summary statistics are included
* Summary statistics are discussed and correctly interpreted
 | * Appropriate graphs are included (to help answer the question of interest)
* Graphs are neat, clearly labeled, and easy to compare
* Appropriate summary statistics are included
 | * Graphs and summary statistics are included
 | * Graphs or summary statistics are not included
 |
| **Conclusions** | * Uses the results of the study to correctly answer question of interest
* Discusses what inferences are appropriate based on study design
* Shows good evidence of critical reflection (discusses possible errors, shortcomings, limitations, alternate explanations, etc.)
 | * Makes a correct conclusion
* Discusses what inferences are appropriate
* Shows some evidence of critical reflection
 | * Makes a partially correct conclusion
* Shows some evidence of critical reflection
 | * Makes a conclusion
 |
| **Poster, Presentation,& Communi-cation** | * Clear, holistic understanding of the project
* Poster is well organized, neat and easy to read
* Poster included pictures of data collection in progress and is visually appealing
* Oral presentation is well organized
 | * Clear, holistic understanding of the project
* Poster is unorganized, lacks pictures, or isn’t visually appealing or oral presentation is not organized
 | * Poster and oral presentation are not well done or communication is poor
 | * Communication and organization are very poor
 |

**Total Points Possible=80 POINTS EARNED POSTER/PRESENTATION:\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Late deduction (-20% per day or 16 points)=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\*\*PASSED IN A RUBRIC (+2 points extra credit)=\_\_\_\_\_\_\_\_\_\_\_\_\_**

**OVERALL GRADE (OUT OF 100 POSSIBLE POINTS=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**