

Turn-in your

Unit 1–Personal Project Check – FRQ

Agenda

- 1. Learn about the Response Bias Project.**
- 2. Start Preparation for the Ch. 4 Test which is Wednesday.**

AP Statistics --- Response Bias Project

Overview: Working in your team, you will design and conduct an experiment to investigate the effects of response bias in surveys. You may choose the topic for your survey, but you must design your experiment so that it can answer 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 providing extra information affect the responses?
- ❖ Does manipulating the answer choices or order of choices affect the response?
- ❖ Can revealing other peoples' answers to a question create response bias?

You will prepare two versions of your survey to test the form of response bias you select.

Introduction


Our goal was to find whether or not providing additional information creates response bias. We asked 50 random people if they would eat a hamburger shown in a picture. But 25 of them were also provided the unhealthy nutrition facts along with the picture. In attempt to randomize the sample and avoid potential confounding variables, we sampled every third person walking into the Tucson mall food court. Our hypothesis is that more people will respond "No" when the unhealthy nutrition facts are shown.

Would You Eat This Hamburger?

Nick Gikerson
Reed Curtis
Period 6

Data Collection

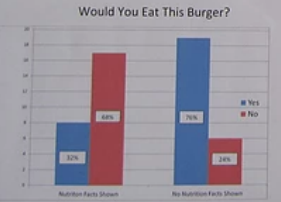
To collect our data, we decided to survey people going into the Food Court at the Tucson Mall. Both of us (Nick and Reed) would ask the question, "Would you eat this hamburger?" to every 3rd person entering the food court. We collected our results on different dates and times in an attempt to randomize the sample as much as possible. We collected 20 results on 11/19, 15 results on 12/7 and 15 more results on 12/8. We chose to survey at the Tucson Mall Food Court to try to avoid confounding variables. For example, if a person has recently eaten and are full, they may answer with "No" regardless of the nutrition facts being shown, answering at the Food Court helps alleviate this problem because they are most likely there to eat. The Food Court also has a wide variety of food choices which attracts people of many different tastes.



Conclusion

The results show that our hypothesis was correct. When the nutrition facts were shown, more people responded "No" to eating the burger than when they were not shown. It should be noted that people who responded "Yes" can certainly find additional information our team did not provide. One of our goals was to find if additional information could affect their response and going to show that our hypothesis was correct. Our data shows that 32% of our sample would eat the burger when nutrition facts were shown. 36% said "Yes" when no nutrition facts were shown. There is a greater percentage of people who responded "No" with the nutrition facts shown. This shows that additional information does affect responses.

Would You Eat This Burger?



Condition	Yes	No
No Nutrition Facts Shown	32%	68%
With Nutrition Facts Shown	36%	64%

Nutrition Facts

Calories – 1020
Carbs – 42g
Fat – 50 g
Protein – 42g
Sugar – 10g

	Yes	No	Total
Nutrition Facts	8	17	25
No Nutrition Facts	19	6	25
Total	27	23	50

Are People More Likely To Admit to Texting and Driving if Asked Anonymously?

Introduction

We are trying to find out if anonymity changes the response to the question, "do you text and drive?" We chose this because many students text and drive and because its a touching subject many people lie in their responses. We also a got some concern about people who might not admit to texting and driving when asked anonymously.

Data Collection

We sampled a total of 52 CDO students during 4th/5th passing period by standing on opposite sides of the main staircase. We then asked every 5th passer by if they drove, if yes, we proceeded to ask if they text and drive. We asked 13 face to face and 13 anonymously (using slips of paper with said question and plastic bag holders). To reduce confounding we each asked 13 anonymous & 13 face to face.

Graphs & Summary Statistics

conclusions

According to our survey, people are more likely to admit to texting & driving if they answer anonymously. We can infer many students text and drive but do not admit it when asked face to face only if answered "yes" they text and drive and 6 said "no" but when asked anonymously, 11 responded "yes" and 9 said "no".

Do you cry?

INTRODUCTION

Our question was: Do characteristics of the surveyor increase the effect of response bias? We will ask boys at our school an emotional question, and see if they tend to respond differently if the question is asked guy to guy versus guy to girl. Considering Tommy is a rge, masculine guy, and Hannah is a rge, masculine guy, we thought that the way we look and act would be effective in reducing a response bias. Since women are generally more sensitive, men tend to be more emotionally expressive with them. Therefore, if a girl asks a boy a sensitive question, rather than a boy asking a boy, he will be more likely to answer truthfully, or just tell the girl what he wants to hear.

DATA

Number of males asked 30. Percent who asked

Response	Hannah Ask	Tommy Ask
Yes	20	4
No	10	26

METHOD

To collect our data, one of us stood at the lower parking lot entrance and the other stood at the upper parking lot entrance and asked every fourth male that entered. Once we both surveyed 15 boys, we switched parking lots and repeated the process, accumulating a sample size of 60 teenage, CDO males. Hannah greeted the boys with a friendly smile and asked the question in a sweet and sensitive tone. Tommy approached the guys in a serious and straight forward manner, and he asked the question in a tough sounding tone.

CONCLUSION

After we collected and analyzed all of our data, we found that when Tommy asked, only 4 out of the 30 guys say yes to crying in a movie. When Hannah was the surveyor, 20 out of the 30 guys said yes. This leads us to the conclusion that the characteristics of the surveyor do have an effect on the people being asked the question and increase response bias. Based on the study design, we can infer that boys are more open with their emotions when speaking with girls versus when they are speaking with boys. Some limitations of our design is that the population we surveyed was all boys from our school, therefore they had a high chance of knowing either Tommy or Hannah and were all in the same age group.

ARE YOU AFRAID OF THE DARK?

Introduction

Our topic is asking people if they are afraid of the dark. We will be testing if the wording of a question can create response bias. To test this one person will ask 30 randomly selected adults the question: "Do you still have the childish fear of the dark?" while the other person will ask another 30 randomly selected adults: "Do you have a fear of the dark?" We want to see if the way we word the question has any effect on the response.

We predict that less people will be willing to admit to a fear of the dark to the question that labels the fear as "childish". We think this because in today's culture, things that are labeled as childish are more likely to be embarrassing to some people.

Data Collection

To obtain the 60 people for our sample we will go to the Torjan Mall and each of us will stand at a different exit. Then we will ask every third adult leaving the respective question. By asking every third person we can eliminate any bias that would cause and truly have a randomized sample.

Cara will stand at one exit and alternating between questions, ask every third person: "Do you have a fear of the dark?" or "Do you still have the childish fear of the dark?" and record the responses until she has asked 30 people. At the same time, Jessica will stand at a different exit and alternating between questions, ask every third person: "Do you have a fear of the dark?" or "Do you still have the childish fear of the dark?" and record the responses until she has asked 30 people. To avoid any biases we will not let anyone see how previous people have responded to the question nor will we give any clues to the data we will compare numbers to see which question got more "yes" and "no". If someone chooses to not participate then we will skip them and just ask the next third person.

Graph

Results!

This graph shows the results of our experiment. It clearly shows how when people were asked if they had a "childish" fear of the dark they were more likely to say no. For the "fear of the dark" question, 30 out of the 30 (or about 37%) adults asked were willing to admit to a fear, but when it came to the "childish fear of the dark" question only 10 out of the 30 (or about 17%) adults asked were willing to admit to a.

Conclusion

From this study we can conclude that for this setting, the wording of a question can indeed create response bias. According to our results, considerably less people were willing to admit to having a fear of the dark if about 20% bias. Based off of this study we could infer that how you word a question can affect the way someone will answer. Although this may not always be the case, a possible error that may have occurred during our experiment is that a lot of people refused to stop to answer our questions, so that could have affected the results. Also, in the 60 people we asked a majority of them happened to be men so they might have not wanted to talk the truth if they really did have a fear. This bias could have affected our results.

DO YOU EVEN LIFT BRO?

Introduction

The question I tried to answer in my project was "can revealing other people's answers to a question create a response bias?" I chose this question because I was interested in finding out if that showing others people's answers to a survey question would make them more inclined to answer the truth about the question, or tend to lean more towards the more popular answers. The question I chose to ask was "How many days per week do you work out," and see if I could get some sort of response bias by revealing other people's answers while asking. My hypothesis was that if I showed a subject a chart with the most numbers of tallies in the columns of 6 and 7 days per week the average number of days would be higher than asking the same question and showing the subjects a chart with the most number of tallies in the columns of 2 and 3 days per week.

Data Collection

I obtained my data by standing in front of the gym with a sign board and 2 charts. One chart had a lot of tallies in the columns for 6 and 7 days per week and the other chart had a lot of tallies in the columns of 2 and 3 days. I surveyed a total of 53 subjects. I figured a sign to decide which question I would start with and to avoid confounding I would alternate which sign board I would show for each person and I asked every third person that walked into the gym to take the survey. Also I surveyed 17 people at 9 in the morning, 17 people at 3 in the afternoon and 17 people at 8 at night because I thought that maybe people who go to the gym in the morning on average go to the gym more often than people who go at night.

Conclusion

After finishing the project I concluded that my hypothesis was not correct. I predicted that the subjects asked the question and then shown a chart with a majority of the tallies in the high numbers like 6 and 7 would be higher than the low day tally group that answered the question and were shown a chart with a majority of tallies on the columns of the lower days like 2 and 3. The higher day tally group was higher than the low day tally group but just barely. The average number of days at the gym for the higher day chart group was 4.7 and the average number of day for the lower day chart group was 4.24 so I did not think these stats were significant enough to conclude that my hypothesis was correct. Some errors I made were maybe I should have gone to a busier gym because it took me a while asking every third person and getting a total of 53 people. And for next time maybe a good topic would be to see who's more honest about how many times they go to the gym, boys or girls? Because I feel like guys are more inclined to lie than girls are.

Number of Days Per Week

1	2	3	4	5	6	7

Number of Days Per Week

1	2	3	4	5	6	7

Group 1

Group 2

Average # of Days Per Week

Group	Average # of Days Per Week
Group 1	4.24
Group 2	4.7

Subject Groups

Is A Picture worth 1000 words?

Introduction

After some time of think what I should do with my project I decided to answer the question, "Does showing someone a picture while asking them a question as opposed to just asking them create response bias?" I decided to ask the question, "Should the government increase funds on welfare for the poor?" I chose this because I felt as if that was a pretty solid yes or no question and that most people would know what welfare is. My hypothesis was that if you show the subject a picture while asking them the question, it will create response bias, depending on what the picture you selected.

Data Collection

At first I thought a sample size of 50 subjects would be just right but then I realized that that was not going to be a big enough to draw any conclusions from. So, I decided to do a sample size of 100 so I could get 50 seeing the picture and the other 50 not seeing the picture. Secondly, I needed to choose a location to do my sampling at and I chose the Tucson mall. I chose this mall because I figured as one of the more populated malls meaning that there is going to be a variety of people here and it's kind of in between all the other malls which gives it a better flow of people. To randomize it I decided to ask every four people instead of asking every single person that I saw, then for the picture and not showing the picture I decided to rotate one and the other. So, every other person would see the picture.

Does Showing a picture Create Response Bias?

Conclusion

After performing this experiment first hand and examining the data I can safely conclude that showing some type of support for your question will really skew your answers depending on what the question is. My data supports this because there was an obvious increase of people saying yes when they saw the picture and a decrease of people saying no. I did make some errors with the picture because at some times I would show the picture but not describe it or I would show it and, in my opinion, over describe it. But I'm pretty sure you can tell what the picture was just by looking at it, so maybe next time I'll come up with one thing to say about it and keep it that way to keep consistency but I don't think that was a big thing. Another way I could improve this is by maybe increasing the sample size even more just to get a better estimate on the population or maybe I just have to pick a different location next time, but other than that I think my results turned out well despite my errors. So, is a picture worth 1000 words?

Data summary

From this data we see, on average more than half the people total said yes then no. In total 66 out of 100 people answered yes, while 37 of those people answered yes when they were seeing the picture. Without the picture it seemed as if people were sympathetic and said yes 58% of the time or in other words 29 people. With the picture 74% of people said yes. If we look at the percentages it was a 28% increase from without the picture to with the picture. 34 of the 100 people answered no while seeing the picture. Without the picture 42% of people answered no, which was 21 people. Looking at the picture 26% or 13 people said no. As for the no's it was a 38% decrease. So, the picture did create response bias because it made more people say yes, maybe it was because of the sad picture.

TABLE

	Yes	No	Total
Without Picture	29	21	50
With picture	37	13	50
Total	66	34	100

Asking the Same thing but while showing the picture.

Asking whether we should increase funds on welfare without picture.

TABLE

	Yes	No	Total
Without Picture	29	21	50
With picture	37	13	50
Total	66	34	100

I. Proposal (20%) Due: Friday, November 1st, by 2:40 pm

Using the form attached, your group must submit a completed project proposal form that outlines your survey question and the details of your experimental design. **NOTE: Do not start your project until your proposal has been approved!!**

Don't ask other teachers for class lists. Many teachers will not want their classes interrupted. Therefore, think twice about doing a cluster sample that requires you to sample everyone in a cluster if your clusters are classrooms.

II. Data collection (10%) Due: On or before Friday, November 15 by 2:40 pm

Turn in your raw data in spreadsheet format to me, both a paper copy and electronically, with the names of participating subjects and the values of the variables recorded.

III. Poster (60%) Due: One day before your Presentation

Your poster should include:

- Title (in the form of a question)
- Everyone's name should be on the front of the poster.
- At least one live-action pictures of your data collection in progress with at least one (willing) participant.

Your poster should include the following sections (clearly labeled).

- ❖ **Introduction:** What form of response bias were you investigating? Why did you select the topic you did for this project? What results did you expect?
- ❖ **Study design:** Describe how you conducted your experiment and why you chose the design that you did. Note: This section should be very similar to your proposal.
- ❖ **Data analysis:** Present the data using appropriate tables and graphs. Be sure to label the tables and graphs clearly. Give appropriate numerical summaries of the data.
- ❖ **Conclusions:** Are your results statistically significant? Include a graph of the simulation that addresses this issue. What conclusions can be drawn from your experiment? Be specific.
- ❖ **Reflections:** What problems did you encounter during your project and how did you resolve them? How might your research be extended?

The poster should completely summarize your project, yet be simple enough to be understood by a 9th grader who has no statistics experience. Your poster should be visually appealing.

IV. Presentation (10%) On or before Tuesday, Nov. 26th (Sign up ahead of time)

Your group will give a 5-minute poster presentation to Mr. Cedarlund, outside of class. Be sure to address all five sections of your written report: introduction, study design, data analysis, conclusions, and reflections. And make sure that all members of your group contribute roughly equally to the presentation. *No PowerPoints, etc.*

Data ethics: It is important to behave in an ethical manner when doing statistical research.

- Be sure to maintain anonymity and confidentiality of all subjects' responses.
- Remember that people have a right to refuse participation in your research.
- Never alter or fabricate data!

Any violation of data ethics will result in a failing grade on the project!

Note: All work is due when stated above, even if someone in your group is absent. Late work will incur a substantial grade penalty (minimum of a one letter grade deduction).

**Spend about 10 minutes
discussing possible ideas.**

Preparation for the Ch. 4 Test

Can we trust the results to a study or an experiment we hear about ?

The answer depends
on.....•

how the data
were produced. •

If asked to describe a
"Completely Randomized Design",

do not incorporate a Random Block Design
or Matched Pairs design unless prompted.

It's ok to use a diagram as long as all of the
information is included. •

≡ HW packet due Wed
must write your total

40

• 10 assignments
at 4

Review Assignment #1

(will be turned in with rest of Assignments)

Strive for 5:

1. p70.... do Concepts 1,2,3
2. p.76.... do Multiple Choice 1-10
and check all answers