Biases and Improper Sampling

October 26, 2026

NOTE: There are several things that can be wrong with any one of these. Something not listed either means I was focusing on something else or just didn't think about it. There is a good deal of creativity in the answers students proffer in class.

1. A researcher is interested in CofC student's views of gay marriage and gay adoption. The researcher decides to do in-person group interview by contacting a randomly chosen sample from the student population. Before the interview formally began the researcher made the off-hand comment that they were part of the LGBT+ community loud enough that most of the students in the sample heard.

   Response bias as people are more likely to lie to the researcher to avoid the social awkwardness. Conservative students hiding their views on campus is considered a common occurrence nowadays. Fun fact: it's estimated that CofC has 2 conservative students for every 3 liberal students. Where I was previously had a 1:9 ratio (they prided themselves on their liberal political traditions so attracted those types).

2. A researcher is interested in all Iowa State Univeristy student's views of the Trump tax cuts. A sample was obtained from the ISU's School of Business's records of undergraduate and graduate students in their programs and the question was phrased as such:

   > "On a scale of 1 to 5, with 1 being strongly disagree and 5 being strongly agree how would you rate the following: The Trump tarriffs will boost the American economy and make up for the loss of tax revenue."

   Undercoverage as the only people the researchers contacted was in the school of business who may have distinct views of the tax cuts compared to, say, music majors.

3. A researcher is interested in the use of opioids in the student population at CofC. The researcher is afraid that few people contacted will participate so the researcher sends out a bulk email to the entire student population saying that an anonymous discussion will be held discussing the use of student use of opioids in the past 30 days. The email invited anyone who would like to participate to come to the meeting.

   Response and Non-response bais. Who is going to show up? Probably people with very strong opinions who want to share. Who's not going to show up? Probably people doing opiods.

4. A researcher is interested in the views of CofC students on regards to a restructuring of the tuition rates. The researcher contacts the gym and gains permission to set-up a booth at the entrance to the gym. At the booth the researcher will ask a series of questions relating to tuition and at the end of the interview all participants will be given a free water bottle regardless of their responses.

   Convenience sample, they set up a booth at the entrance to the gym. It's easy for them (the researchers) but the only people who could take the interview would be people going to the gym. NOTE: The waterbottle was a bit of a red herring. Incentivizing people to take a survey is not a bad thing. That is how we try to overcome response and non-response bias. If the onlly people who answer are those with strong opinions we end up losing the very large swath of the student body. We aren't interested in opinionated students' views...we are interested in all students' views. This is why things like "and you'll be entered to win an amazon gift card" exist.

5. A researcher is interested in the student bodies views of safety on campus, particularly of a students perceptions of their ability to walk around campus at night safely. The researcher happens to teach a course in sociology and sends an email to their class with a link to an anonymous response poll[1] for the students to fill out. If the students fill out the poll they are given a small amount of extra credit. The course taught is a general educational requirement that any student, regardless of their major, could reasonably be expected to take.

   Convenience sampling again. Very easy to send out that poll but the responses will only be students in their class. This could be a problem for several reasons (the students give answers to please the researcher, the students are aware of the researchers work and "know" the actual safety levels, etc...) Note that convenience sampling often leads to undercoverage.

6. A researcher is interested in the sexual health of the students at CofC. A random sample of students is collected from the provost's records and an in-person interview is had. Some questions are fairly standard such as "What do you believe the approximate pregnancy prevention rate for a condom is?" but a few questions become very personal. Some students refused to answer these very personal questions because it made them feel uncomfortable. At the end of the study, there was no discussion of the questions certain students refused to answer.

   Non-response and response bias. Students with a more conservative or traditional background might refuse to answer certain questions that more liberal/children of the sexual revolution would be more comfortable talking about. This would skew those questions towards a more liberal bent.

7. CofC is interested in heroin usage among it's student body. To select students the college on 10 separate days randomly grabbed students from inside the library to question.

   Do heroin users go to the library? This and other odd questions come up in statistics class. The problem is (possibly) under coverage. Only students who use the library will be included which could miss a lot of people who's opinions/experiences we would be interested in.

[1] Anonymous in the sense the researcher won't know which student gave what answer, but they will know who filled out the poll.

8. CofC is interested in heroin usage among it's student body. The college randomly selected students within the dining hall and asked them loudly at the table if the student had shot up with heroin in the last two weeks.

   Response bias because people will lie if they do do herion. Could also be non-response in that some people will refuse to answer the question.

9. CofC is interested in heroin usage among it's student body. They randomly select 100 students from a master list of students. The students received the email asking: "In the last two weeks, that is 14 days not exclusively business days, have you or have you not at some point in that time frame consumed a derived substance or product (or a synthetic of) the floral organism *Papaver somniferum* such as but not limited opiate narcotics which are broadly schedule 2 or 1 drugs according to the US Drug Enforcement Agency in cooperation with the Food and Drug Administration as established by Congress in Comprehensive Drug Abuse Prevention and Control Act of 1970?"

   Wording of question. It took four lines to say "heroin" as a student pointed out. THis definition might be hyper accurate and technically correct but it's to the point where few people wouldn't have to reread the sentence at least once. Ideally we write questions that are simple enough to read. Don't assume your subjects are stupid (almost always leads to some critical mistake in human experiments) but don't assume they're well versed in the Comprehensive Drug Abuse Prevention and COntrol Act of 1970.

10. CofC is interested in heroin usage among it's student body. Being a vigilante professor I find one student buying heroin. To learn who else is a "druggy" I follow student to a party and then surveyed with the students I found shooting up.

    Snowball sampling. One student led me to the next batch of students I sampled. This leads to a lack of independence between the observations. Presumably if two people are shooting up together at a party they are friends (or at least acquaintances) which may (or may not) have similar drug usage habits and opinions.

11. CofC is interested in heroin usage among it's student body. Taking it upon myself to investigate this I discreetly ask the three students who sit in front of my desk in STA 209 if they have shot up with heroin in the last two weeks.

    Response bias (lying), Non-response bias (refusing to answer), convenience sampling (they sit immediately in front of my desk), undercoverage (have to be in my class). This is a poor sample in every direction.