Forming A Research Question

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Announcements

Office Hours

- From now on, office hours will be held in Gilman 134 on Wednesdays from 11 AM to 12 PM.

Activity From Last Class

- Use "#" to create headers.
- Use one asterisk around a statement to *italicize*.
- Use two asterisks around a statement to **bold**.
- Use dashes to create an unordered list, like this one. Use numbers to create an ordered list.
- To link a phrase, put brackets around the phrase you want linked, followed by the URL in parentheses.
- To create a block of R code, use the "`" sign 3 times, then write {r, } where options follow the comma in the brackets
  - Add "eval=FALSE" if you do not want the output, only code, to display
  - Add "echo=FALSE" if you do not want the code, only output, to display
- Use the "Markdown Quick Reference" help page if you ever forget something.

What Is A Research Question and Why Is It So Important?

A research question is:

- A question to which your analysis seeks to provide an answer
- A statement of the interest to be addressed in the analysis
- The uncertainty that you seek to resolve

The most important part of any data analysis is the research question. It guides the entire process, along with almost every decision an analyst will make.

When and Where Is A Research Question Created?

A research question can be conjured and created almost anywhere, such as

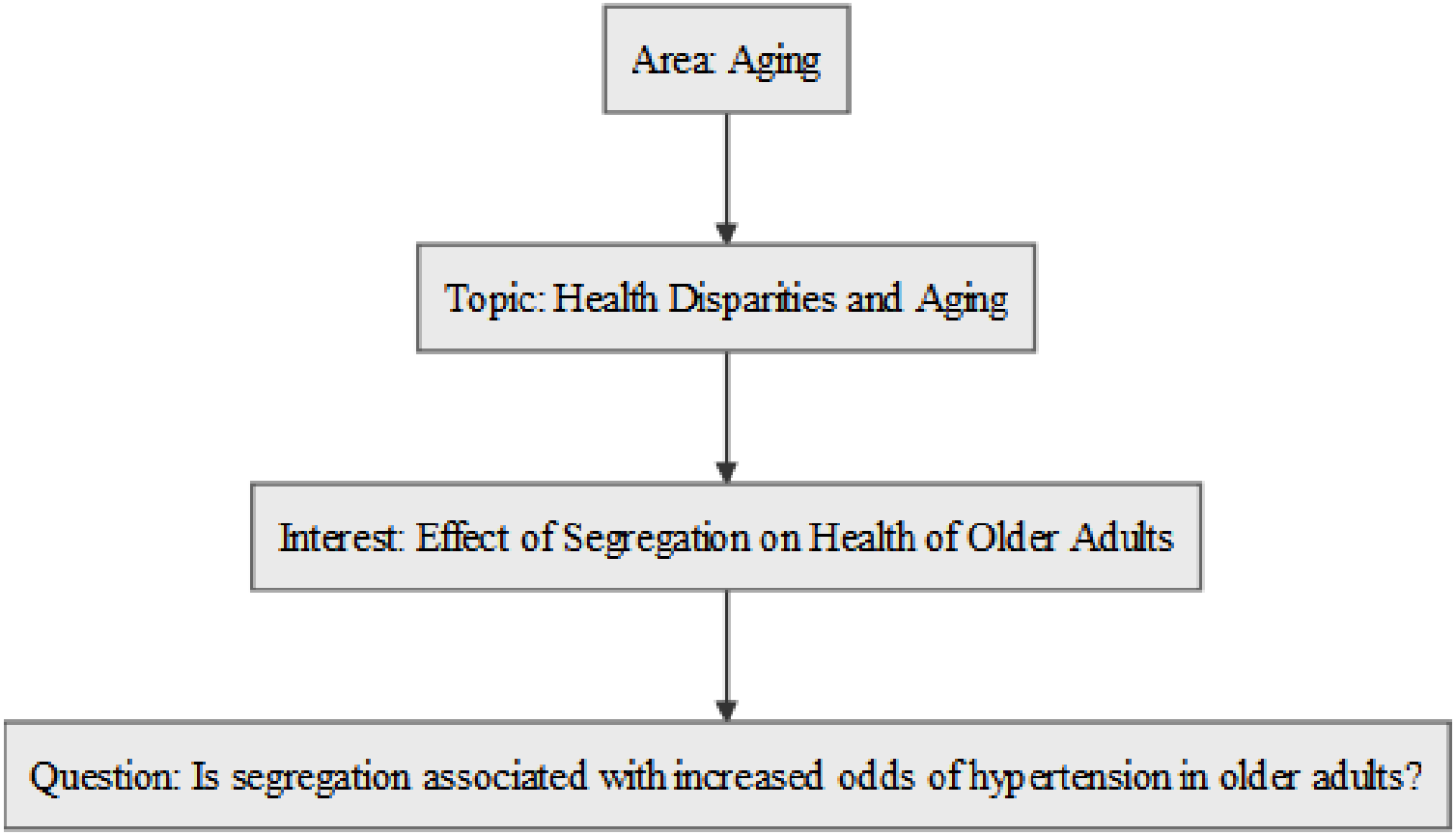
- Conferences
- Meetings
- Classrooms
- At home

They can also be created at diferent times, such as when you

- Talk to your mentor
- Review existing literature
- Work on current research

However, there is one common time that all research questions should be created: **before the analysis begins**.

How Do We Create A Research Question?



How Do We Create A Research Question? My Opinion

We become knowledgeable about our focus. As we become knowledgeable, we learn about things that have not been studied and we figure out what interests us. Based on these two things, and usually after performing literature reviews, we create a research idea, which is then refined to a research question.

FINER Criteria

The FINER Criteria[1] is only one criteria for creating research questions. The acronym "FINER" stands for:

- Feasible
- Interesting
- Novel
- Ethical
- Relevant

[1] Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. Designing clinical research. 3rd ed. Lippincott Williams and Wilkins; 2007.

PICO Criteria

Another criteria for research questions, more commonly used in clinical settings, is the PICO Criteria[2], where "PICO" stands for:

- Population of interest
- Intervention
- Control
- Outcome

[2]Straus SE, Richardson WS Glasziou P, Haynes RB. RB. Evidence based medicine: How to practice and teach EBM. 3rd ed. Elsevier Churchill Livingstone; 2005.

Discussion Time

Which criteria do you prefer? Why?

Do you think either criteria captures all necessary parts of a research question? If not, what are they missing?

Think about it and talk about it with your classmates. Be prepared to share.

My Answer

I prefer the FINER criteria but it still misses a couple things:

- Simplicity and clarity
- Testability
- Potential impact

Example

We explored whether the nexus of race, poverty, and neighborhood racial composition and poverty concentration illuminates the race disparities in diabetes. Specifically, we examined (1) whether diabetes prevalence increases in predominantly Black neighborhoods compared with predominantly White neighborhoods, (2) whether diabetes prevalence is higher in poor neighborhoods than in nonpoor neighborhoods, and (3) whether the impact of neighborhood racial composition and poverty concentration on the risk of diabetes varies by race.

Work with your group to assess this research question based on the FINER criteria and other things you have learned about research questions. Record the group's comments on a sheet of paper.

Things to Think About

- Is it feasible to answer this question? Do you have the time, resources, and ability?
- Is it an interesting question, at least to your peers?
- Is the question original?
- Is it ethical to test the question?
- Is the research question relevant to the scientific community?
- Have you indicated who the question pertains to?
- Have you stated the outcome of interest?
- What are the long-term implications of answering this question?
- Can many people understand it or only those who have the same interest as you?
- Can it expand to other research?

Your Research Question

Take the rest of class to think about your own research question for your data analysis project. Write out a draft of your question and share with the rest of your table. Offer constructive feedback to others on their questions.

Next Class: Collecting and Processing Data

- We're finally going to play with some data!
- We will be spending 2 weeks on this area.
- I will be adding resources on research data to Blackboard so please check frequently.