Formulating research questions

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By the end of this topic students will understand

- How to use a codebook to connect measured items to research question topics
- How to formulate a testable hypothesis
- How to review literture to refine their research question

Answer these questions in the HackMD collab notes. Then when prompted, share with your neighbor.

1. What are the characteristics of a good research question
2. What is the one essential piece you need to review before you can formulate a research question?

1. Define a topic area

- Nice and broad

  Ex: Vaping in adolescents.

2. Choose measures

- You can't conduct research on data you don't have.
- When using a secondary data source, this is where the codebook is used.

  Ex: Age of respondent, how often they vape in a week, family structure (two parent household?), parental education, parental smoking status...

3. Draft a few Research Questions

What specific questions are you interested in trying to answer about your topics?

- One of the simplest research questions that can be asked is whether two measures are associated.
- Must be written as a testable hypothesis **(can you answer yes or no to the question?)**
- Good RQ's are made up by asking how does 1 explanatory variable affect 1 response variable.
  - You can always build up but you have to start with 2.
- Must connect directly with your chosen measures.
  - Can you clearly identify what your independent and dependent variables are?
- Read your question out loud. Does it make sense?

  Ex: Do teens who vape have parents that smoke?

A note about the `explanatory` vs `response` variable terminology:

Depending on your field of study, these terms may be called different things. Statisticians tend to say *covariate* and *outcome*. Public health and the Social Sciences tend to use Independent variable (IV) and dependent variable (DV). Regardless of the word you use... the explanatory variable tries to **explain** the response variable.

Explanatory	Response
X	Y
independent variable	dependent variable
covariate	outcome

Write an example of a research question.

4. Conduct a literature review

Literature reviews help you identify gaps in the current literature regarding your research topic, and refine your research question.

What is a literature review?

- Examination of the body of work that has been written about your topic
  - In this context, it is a VERB (but it can also be a NOUN)
- Why do I need to do it?
  - To understand the state of knowledge on your topic
  - You must do this because others have researched something along the same lines as what you are interested in
  - So you will be able to learn what methodologies, theories, or models others have applied to your research question
- It will help you ask your question better
- To refine (narrow, expand, focus, modify) your own research question
- To contribute to your area with something new, which is science!
- It is the way you always introduce your topic, which you will be writing
  - Helps you create your argument as to why this is important
- It helps you interpret what you results are (later)
  - It gives you the context to evaluate your results

Primary source literature

- Journal articles reporting study results – a researcher did a literature review, had data, analyzed it, and wrote up results in context.
- This is what you will be doing later, in poster form.

Secondary source literature

- Textbooks, handbooks, review papers, theoretical articles, magazines and newspapers (you CANNOT use these as a source for your paper)
- What are some problems with secondary source literature?
  - Can describe or interpret results incorrectly
  - Can leave out important details

How can you tell if it a primary source?

- It has a title, abstract, introduction, method (with participants), results, discussion, and reference list.

What do "participants" look like for research in your field?

A few tips for your literature search

- Try to use articles that are published within the last 5-10 years
- Read the abstract, if sounds similar to your topic, read the participants, methods, and discussion at a glance then decide if you should keep or not
- As you read the literature, there should be an exchange between your research question and what you are learning.
- The articles you are reading about should inform you about the association you are interested in testing.
  - Allows us to see what we KNOW and what we DO NOT KNOW
- Give special attention to the "future research" sections of the articles that you read.
- Try to find a few articles that are looking specifically what you are looking at in terms of the association between your two specific topics.
  - This will tell you what we already know and the "future research" in the discussions and conclusions sections will tell you questions that need more research.
  - If you can look at an association that has recently been identified as "area for future research" we have hit the jackpot in terms of topics.
- How to read a journal article is available on the course website under Articles

5. Refine your research question

- Based on your literature review some of your draft questions may already be answered, or you noticed that your question is a still too vague.
- Revisions are a part of research.

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