

Today's topics:

- **Research questions and experiment design**
- **Research papers: Overview**

Background preparation:

- *Kaplan (2016), Ch 2 and Appendix (review)*

0. Today's objectives

After today's class, you should be able to:

- State a big-picture research question
- State a measurable research question that addresses the big-picture research question
- Discuss factors that are important to consider when designing or evaluating an experiment
- Describe the structure (subparts) of a quantitative research project and identify them in an article

1. Structure of a quantitative research project

Group discussion

- What did you learn in middle school or high school about the “steps of the scientific method”?

1. Structure of a quantitative research project

- My middle school taught something like this

Steps of the scientific method:

1. State the **question**
2. Form a **hypothesis**
3. List your **materials**
4. State your **methods**
5. Give your **results**
6. State your **conclusions**

- Which are part of the **design** of an **experiment**?

1. Structure of a quantitative research project

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- } *experiment design*
- *from experiment*

1. Structure of a quantitative research project

The research question | What we want to know

- **Big-picture** research question
 - Connection to big ideas — “Why do we care?”

1. Structure of a quantitative research project

The research question | What we want to know

- **Big-picture** research question
 - Connection to big ideas — “Why do we care?”
- **Measurable** research question
 - What the researcher is going to **do** in the study
 - **Quantitative**: Is A **bigger than** B? Does Y **increase with** X?
 - Addresses some aspect of the big-picture research question
- Where might researchers find big-picture RQs?

1. Structure of a quantitative research project

The experiment design | What we do

- These aspects follow from the research questions:
 - Design of the **experiment** (“materials”+“methods”)
 - **Materials** (stimuli, etc.)
 - **Participants** — what characteristics matter?
 - **Task** — what will participants do?
- Work backward from these to state a specific...
 - **Hypothesis** — what quantities do you predict to be the same or different, and why?

1. Structure of a quantitative research project

Reporting and interpreting results | What we find

- What did the experiment **find**?
 - **Report** and/or **summarize** data
 - Draw **inferences** (generalizations) from data
 - Use **statistics** and **data tables** or **data graphics**
- End with **discussion** and **conclusions**: How do the results **answer** the research questions?
 - Was the hypothesis confirmed?
 - What big-picture implications does this have?

2. Big-picture research questions

Group discussion

- The **myth** used as the title of Ch 2 is:
“A dialect is a collection of mistakes”
- What is the overall **big-picture research question** addressed by the case studies in sec 2.3?
 - Österberg (1961)
 - Yiakoumetti (2006)
 - Taylor (1989)
- How closely are the myth and the big-picture research question related? Why do you think this is?

2. Big-picture research questions

- Sec 2.3 title:

“What is the best way to teach the standard dialect to speakers of a non-standard dialect?”
- More specifically (see Kaplan 2016: 21):

Does giving students **explicit instruction** in the differences between their dialect and the standard dialect **improve their ability** to use the standard dialect?

3. Measurable research questions

Quick discussion

- By our criteria, does this quotation from Yiakoumetti's research article represent a **measurable research question**?

"The aim of the study is to investigate the relationship between native speech in a regional dialect and learned knowledge of a standard educational variety." (Yiakoumetti 2006: 295)

3. Measurable research questions

- **Measurable** research question
 - What the researcher is going to **do** in the study
 - **Quantitative:** Is A **bigger than** B? Does Y **increase with** X?
 - **Addresses some aspect of the big-picture research question**
- Can we state a measurable research question for any of the case studies discussed in sec 2.3?

4. Experiment design

Discussion

- What are some of the factors that Kaplan identifies in sec A.3 that help us evaluate whether a study is well-designed or has trustworthy results?

The topics in her discussion:

- Subject selection
- Task design
- Data analysis
- Publication bias and replication

4. Experiment design

Participants

- Are they representative of the groups of people we want to know about?
- Many study participants in linguistics or psychology are university undergraduates...
 - WEIRD! = from Western, educated, industrialized, rich, and democratic societies (Henrich et al. 2010)
 - typically aged 18-24 or so

Henrich, J., Heine, S., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences* 33(2-3): 61-83.

4. Experiment design

Task design (see PQ #1 from 08. 29)

- Is the experimental task really similar to what we want to study?
 - Is it likely to affect different groups of participants differently?
 - Does observing participants change the data?
- What potential confounding factors can we identify?
 - Can we reduce or eliminate them, or at least include them explicitly in our analysis?

4. Experiment design

Data analysis

- How is the data to be coded? Is the coding protocol explicit? Is it reliable across coders? (Can we avoid coder bias?)
- Should outliers be excluded from analysis? If so, how can they be safely (objectively) identified?
- Appropriateness of statistical analysis: the right test; not too many tests ('fishing')

4. Experiment design

Problems in replication and underreporting of null results

- More exciting to publish a non-null result than a null result
- More exciting to publish a new study than a replication
- So it might be the case that various effects are not as robust as the literature makes it seem

5. Scientific research articles: Overview

Show of hands

- Have you read a scientific research article before?
- How confident do you feel about reading scientific research articles?

5. Scientific research articles: Overview

- What information is in the bibliographic citation for a journal article?

Yiakoumetti, Androula. 2006. A bidialectal programme for the learning of Standard Modern Greek in Cyprus.
Applied Linguistics 27 (2): 295–317.

- Links:
 - [This article](#) (via UNC Libraries)
 - *Journal of Applied Linguistics* [web site](#)

5. Scientific research articles: Overview

- What is a **peer-reviewed** journal?
 - How does peer-review work?
 - What are the goals of the peer-review process?
- Is *Journal of Applied Linguistics* peer-reviewed?

5. Scientific research articles: Overview

- What are the typical sections in a scientific article?

How do these relate to the “steps of the scientific method”?

5. Scientific research articles: Overview

- What are the typical sections in a scientific article?

How do these relate to the “steps of the scientific method”?

- Abstract
- Introduction / Background / Previous Studies
- Experiment n (repeat as needed)
 - Methodology: Participants, materials, etc.
 - Results and Discussion
- General Discussion / Conclusion / Implications

6. For next time

- Prep questions for Friday's class include
 - Topic preferences survey for case-study presentations
 - A research article to check out