I'm John R. Starr

Hi!

You can usually find me here:

FWS Instructor

(Psycho) linguist

Person?

What I think about a lot:

Wtf is language???

How do we process language???

Are our brains like manual cars???

How do we read???

What I think about a lot:

Wtf is language???

Are our brains like manual cars???

How do we process language???

How do we read???
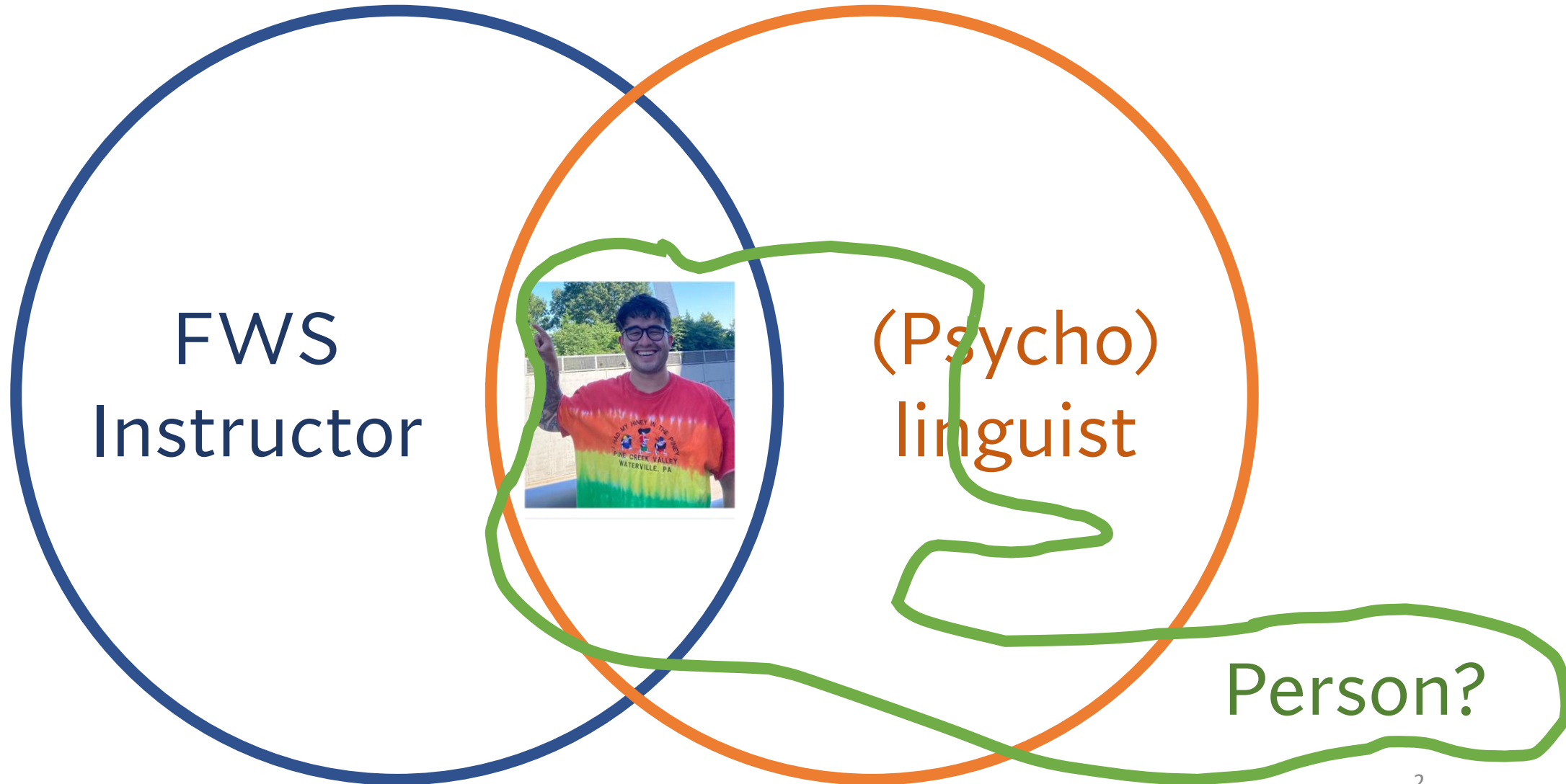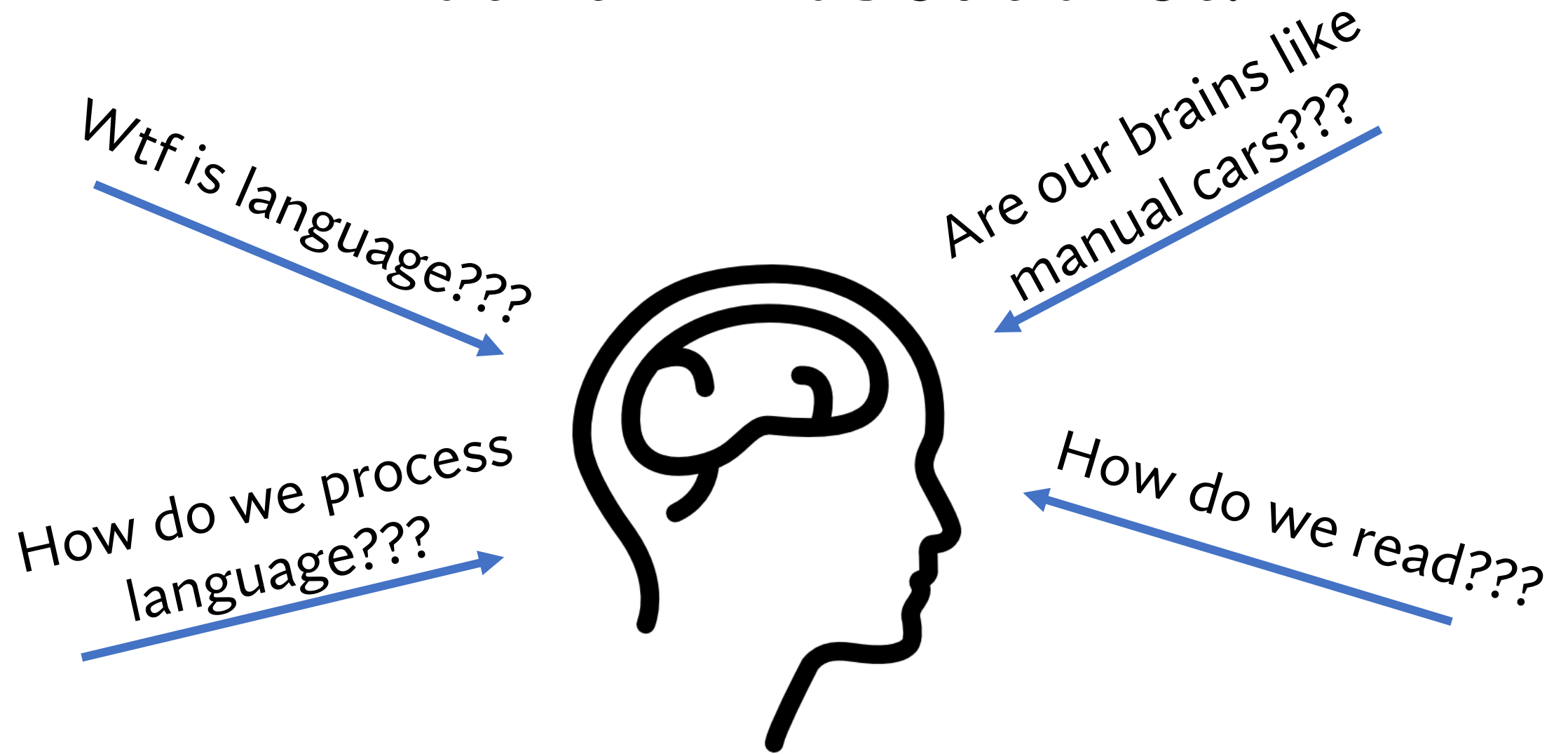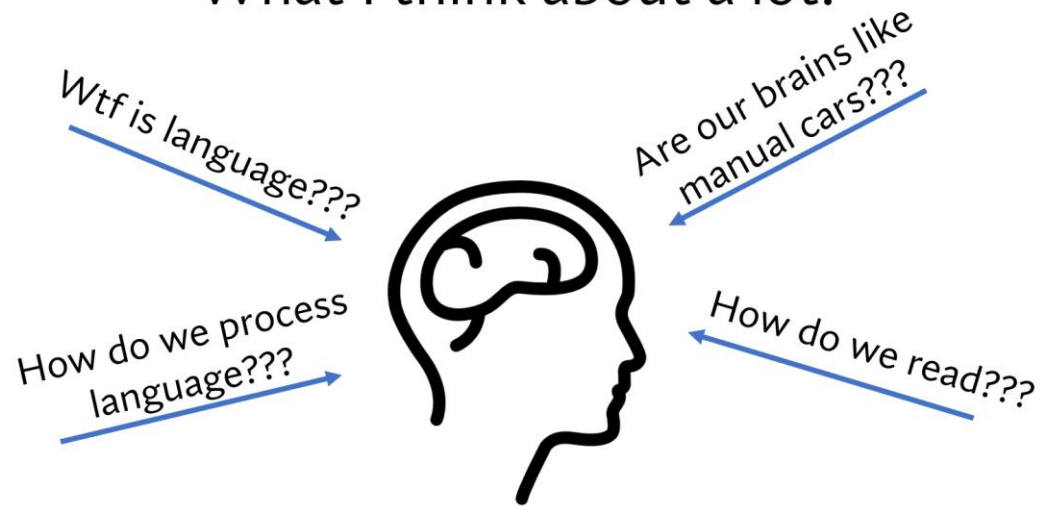
… but focusing on representations of sound (broadly defined)!

I spend a lot of time developing experiments for:

Ask me questions anytime!

Humans

… and how they inform each other

Language models (LMs)

Your First (?) Experiment

John R. Starr
LING 1100

We'll focus on the <u>what</u>'s:

1. <u>What</u> is the purpose of experimenting?

2. <u>What</u> kinds of experiments are there?

3. <u>What</u> are the steps of an experiment?

4. <u>What</u>'s next?

1. What is the purpose of experimenting?

But how do we bridge this gap of understanding?

Understanding the world (and all that within its domain)

But how do we bridge this gap of understanding?
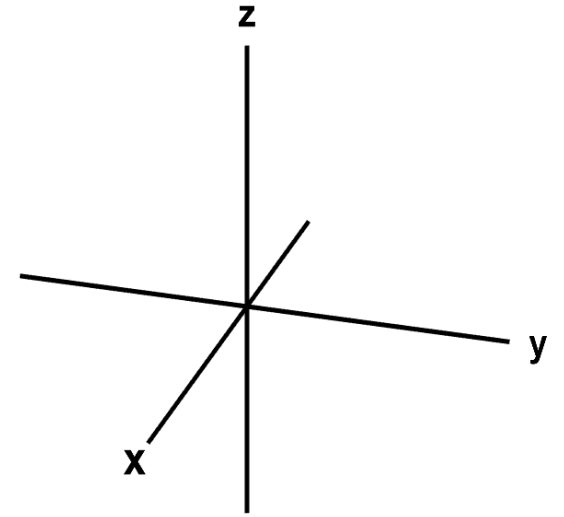
Sometimes, we're good with sources!

But other times, we need to collect data to answer our questions!

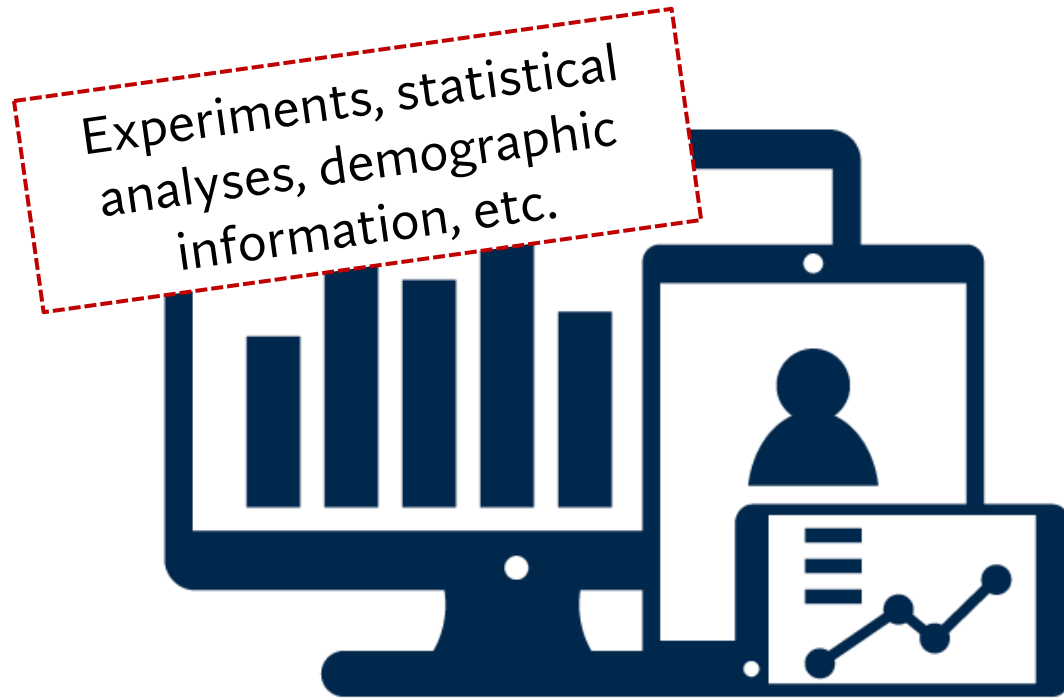# 2. What kinds of experiments are there?

Axes* of experimentation

1. Quantitative or qualitative (or both?)

2. Exploratory or confirmatory (or both??)

3. Naturalistic or laboratory (probably not both??)

*Well, *a few* of them – this is certainly not all of them. These are the ones that matter most to you right now.

1. Quantitative or qualitative?

Experiments, statistical analyses, demographic information, etc.
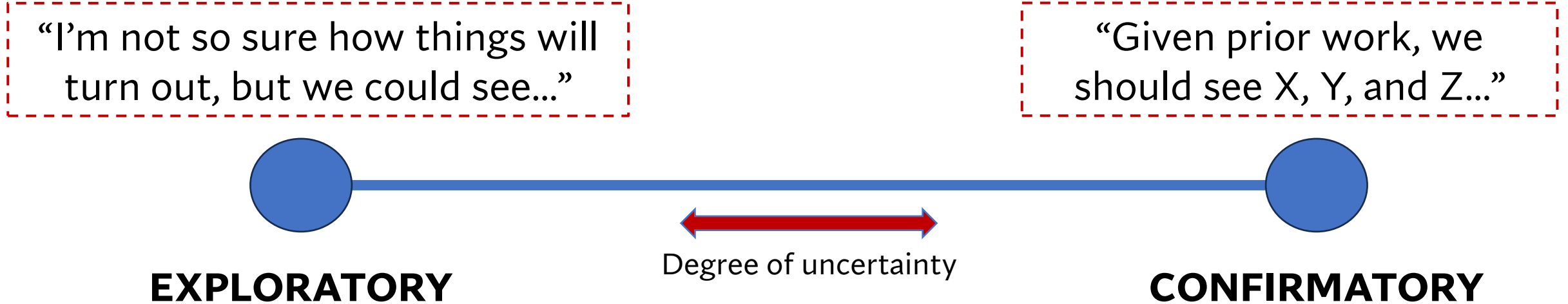
Case studies, interviews, observations, etc.

QUANTITATIVE work mostly focuses on numbers (or countable statistics)!

QUALITATIVE work mostly focuses on non-numerical information!

2. Exploratory or confirmatory?

"I'm not so sure how things will turn out, but we could see…"

"Given prior work, we should see X, Y, and Z…"

EXPLORATORY

Degree of uncertainty

CONFIRMATORY

3. Naturalistic or laboratory?

Haha yeah!

Fr...

Corpus investigations, observation, media, etc.
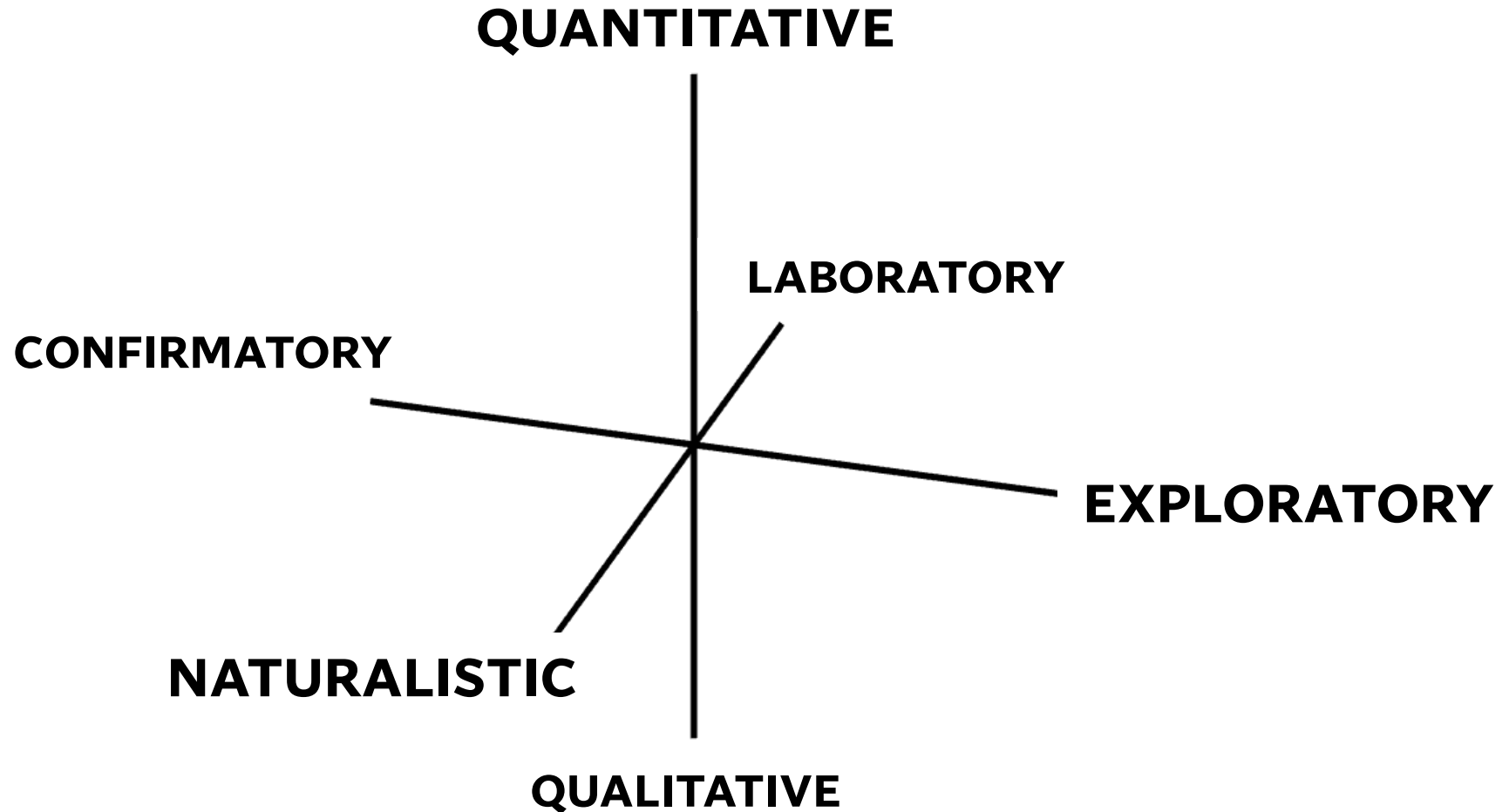
Designed studies
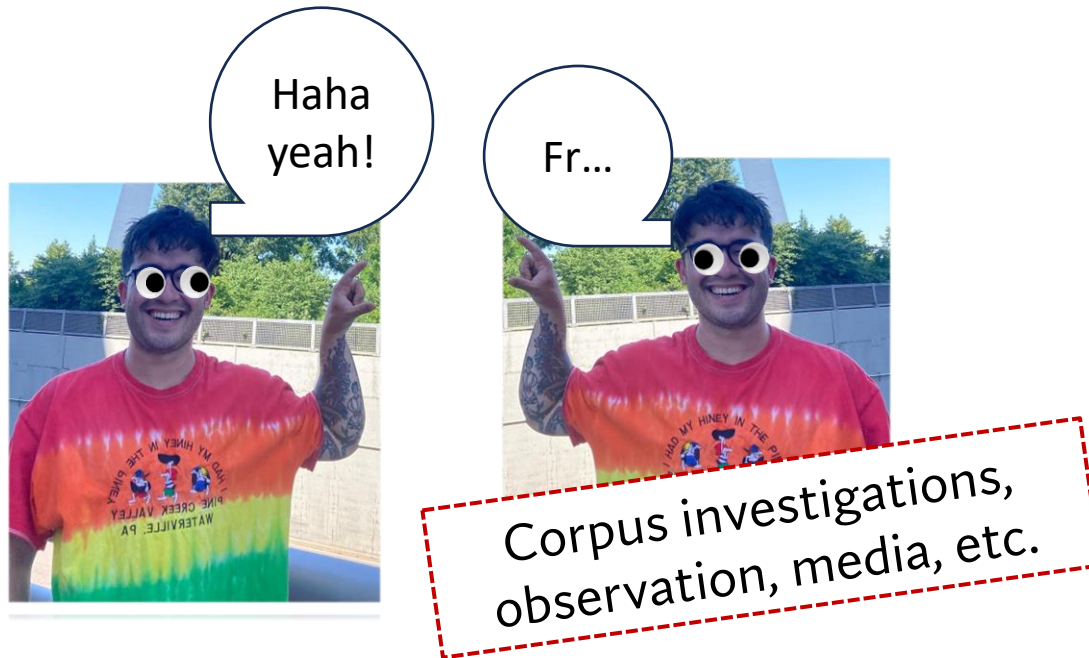
NATURALISTIC approaches collect data from the wild!

LABORATORY approaches collect data from a controlled setting!

Your experiment is always multi-dimensional…

3. What are the steps of an experiment?

… but first, take the next five minutes:

https://farm.pcibex.net/p/dPxkVB/

Basic steps

1. Develop a research question (RQ)

2. Design/use a paradigm that addresses the RQ

3. Run the damn ~~football~~ thing!

4. Analyze the results

Basic steps

1. **Develop a research question (RQ)**

2. Design/use a paradigm that addresses the RQ

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4. Analyze the results

What is a research question (RQ)?

- RQs should be <u>concise</u> and <u>informed</u>
  - <u>Concise</u>: the scope of the question should neither be too broad nor too narrow
    - Bad RQ: "How can we solve world peace?"
    - Good RQ: "How does economic status affect perception of personal and national safety in Southern Alabama?"
  - <u>Informed</u>: the question should derive (in part) from some prior work, though it does not necessarily need to *extend* that work
    - Bad RQ: "How do unicorns fly?"
    - Good RQ: "How do authors write about unicorn flight in children's literature?

Sorry for the ugly slide!

What do RQs do?

- RQs should ask how an <u>independent variable</u>...

How does syntactic complexity...

- ...affects a *dependent variable*

... modulate *saccade distance*?

Sample RQs:

QUANTITATIVE or QUALITATIVE?

1. Do we read puns slower than non-puns, as suggested by prior work?

EXPLORATORY or CONFIRMATORY?

2. Do we enjoy reading puns over non-puns?

3. Are reading times of puns and enjoyment of puns positively correlated?

NATURALISTIC or LABORATORY?

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2. **Design/use a paradigm that addresses the RQ**

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Some common experimental paradigms:

- Rating tasks using either Likert scales [(1-5), (1-7)] or a slider:

Elara

How cold is Elara?

Very warm ○ ○ ○ ○ ○ Very cold

OR

Very warm ⸺⸺⸺◯⸺⸺⸺ Very cold

Some more common experimental paradigms:

- Short answer:

How do you think Elara is feeling?

Elara

Even more common experimental paradigms:

- Fill-in-the-blank:

Elara

Right now, Elara feels very _____.

… but also, you can make your own paradigm!

Make some stimuli

- How and what your stimuli look like is dependent on the experimental paradigm! Regardless, you'll need to:
  - Decide what factors that you're going to look at
  - Control (where possible) for other factors that could bias your results

- This part takes a while… but it's absolutely crucial!
  - No stimuli → no experiment!

I cannot stress this enough:

Double- and triple-check that your experimental paradigm and stimuli will *directly* provide results that address your research question(s)!!!

Things your experiment should have (1):

- Instructions
  - Clarity on what the task is (*but don't give away what you're looking at*)
    - You can discuss what the task is for *after* people have completed the experiment
  - Payment if possible.
    - If not possible, I usually mention "Payment will be provided by the love and gratitude of the researcher"
  - ***Consent!!!***
  - Collection of non-identifying demographic information (when necessary)

progress

Consent & payment come first!

Welcome! Thank you so much for your participation.

This experiment is part of a Cornell University scientific research project. You will be asked to read sentences one word at a time. After you have finished reading a sentence, you will report how much you enjoyable that sentence was to read.

The results of the research may be presented at scientific meetings or published in scientific journals.

There are no foreseeable risks or discomforts associated with participating in this project. Your participation in this research is voluntary. You may decline to answer any or all of the following questions. You may decline further participation at any time without adverse consequences. No personal or identifying information about you will be collected. The only information we will have, in addition to your responses, is the time at which you completed the survey.

Compensation is approximately $0/hr. This experiment is intended to take approximately 3-5 minutes to complete.

I consent.

Instructions should 1) be clear, 2) minimize biases, and 3) inform the overall structure of the study.

progress

In this experiment, you will read sentences one word at a time.

Please press your spacebar to move on to the next word.

At the end of each sentence, you will have a brief question about how enjoyable the sentence was to read. Please answer this question to the best of your ability according to the sentence that you have just read. There is no right answer.

We have provided two practice trials for you.

Continue to practice trials

Things your experiment should have (2):

- A few practice trials:

progress

Not enjoyable 1 2 3 4 5 Very enjoyable
○ ○ ○ ○ ○

The participant needs to "warm up" to what you're asking them to do.

Things your experiment should have (3):

- Some gratitude:

progress

Thank you for participating in this experiment!

You may now exit out of this tab.

They just helped you out! Appreciate them!

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… remember me?

… and me?

Sample RQs:

1. Do we read puns slower than non-puns, as suggested by prior work?

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NATURALISTIC or LABORATORY?

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John, check the results!*

*And embarrass yourself (potentially).

4. What's next?

It's your turn now!

1. Proposing a project (or some project ideas) based off of some broad research questions that we will whittle down **[Tuesday, 10/31]**

2. Developing an outline that considers the information that you'll need to gather **[Thursday, 11/02]**

3. Actually researching and designing **[In-class work]**

Thank you!

Acknowledgements
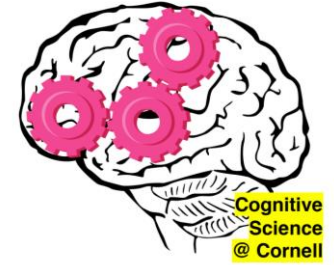
Marten
van Schijndel

Draga
Zec

Helena
Aparicio