

# Part II:

# Things we need to control for the sake of science

Aix Summer School on Prosody

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DEPARTMENT OF LINGUISTICS

Science is driven by your 'why'

Maybe we don't wanna know why  
every time...

"It's just a phase,"  
they said.

"He'll grow out of  
it," they said.

"He's just being a  
kid," they said.

som**ee**cards  
user card



Let's meet your study team.

# Design exercise

Pick a study topic as a team:

- Toddlers' sensitivity to preschool teachers' prosody
- Recognition of sexual orientation in teenagers
- Cross-linguistic/cultural study of emotion recognition in aging adults

1. State your core research question of your team's study.

E.g.,

*“This study tests whether the recognition of the speaker's sexual orientation develops with age or if it is driven by individual sensitivity to the variation in sexual orientation.”*

## 2. Participants

### Graf Estas & Hurley (2013): infants

- Aged 16;5 – 18;3
- 28 (Expt 1), 26 (Expt 2), & 28 (Expt 3) infants
- English as L1, less than 25 hrs/wk exposure to L2
- Born full term, no history of chronic ear infection
- Typically developing vision

### Ito et al. (2014): school-age children

- Aged (1) 6-11, and (2) 18 and above
- 55 (6&7yrs), 41 (8&9yrs), 25 (10&11yrs), 33 (18 and above)
- Monolingual AE speakers
- Normal or corrected-to-normal vision
- No history of hearing loss

Age, sex, gender, SES, linguistic background, medical history, IQ, etc.

## 2. Participants

### Demenescu et al. (2015): Lifespan

- 3 age groups: 18-35yrs, 36-55yrs, older than 55yrs
- Handedness
- Behavioral data
- Brain volume

TABLE 1: Demographics and neuropsychology.

	Young adults (18–35 yrs; n = 21)	Middle-aged adults (36–55 yrs; n = 19)	Older adults (>55 yrs; n = 15)
Age	26.62 (3.48)	47.26 (4.86)	61.33 (5.75)
Females (%)	52	53	40
Right-handed (%)	100	96	100
Years of education	17.29 (1.79)	14.68 (3.45)	11.53 (2.72)*
BDI <sup>1</sup>	1.14 (1.88)	2.56 (2.64)	3.20 (2.76)*
PANAS <sup>2</sup>	19.17 (6.63)	13.47 (5.36)	17.27 (10.03)
Movies <sup>3</sup> rating	3.5 (0.55)	3.77 (0.83)	3.26 (0.56)
TBV <sup>3</sup>	1.60 (0.17)	1.53 (0.13)	1.47 (0.09)*

Notes. <sup>1</sup>Beck Depression Inventory; <sup>2</sup>Positive Affect and Negative Affect Scale (global score); <sup>3</sup>total Brain Volume; yrs = years of age. Means (standard deviations) or percentages (%) are presented. Stars (\*) indicate significant difference between groups ( $p < 0.05$ ).



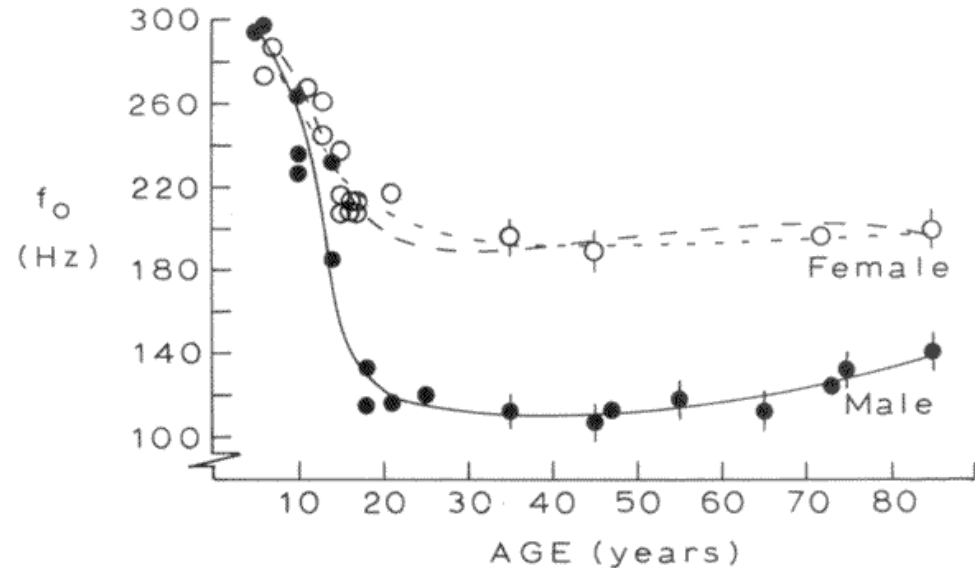
# Participant characterization for Kiwa's imaginary study

e.g.,

teenagers

Age 13 (or 10) to 19

Sex balanced



<http://languagelog.ldc.upenn.edu/nll/?p=5908>

Questionnaire:

SES, language background, self-report of sexual orientation, family structure, religious background

# Who are your participants?

- Discuss who you should recruit as participants of your hypothetical study?
- What info should be collected from the participants?
- Any practical constraints?

### **3. Pick your experimental tasks**

e.g., Teenagers' production & gender recognition

Production: video message elicitation task



Gender recognition: voice & picture judgment

# Kiwa's imaginary study task 1

## Voice response elicitation task

View the video clip and record a response

<https://www.youtube.com/watch?v=VLW6M7-CjZc>

<https://www.youtube.com/watch?v=rv7E08KB9k8>

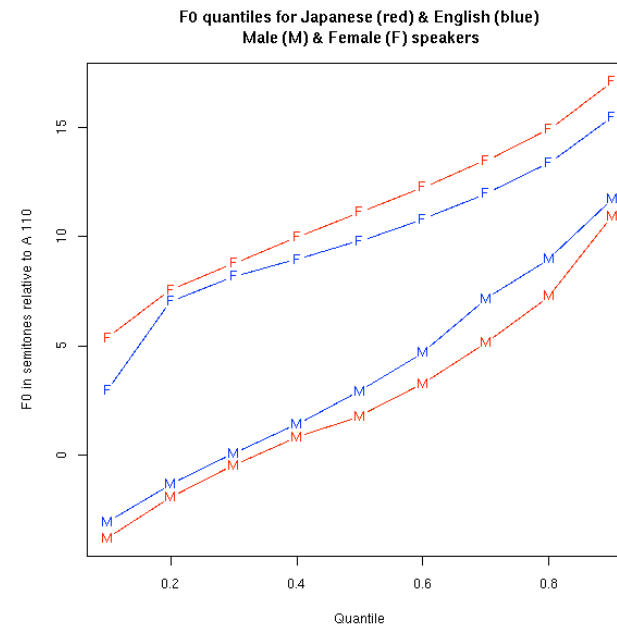
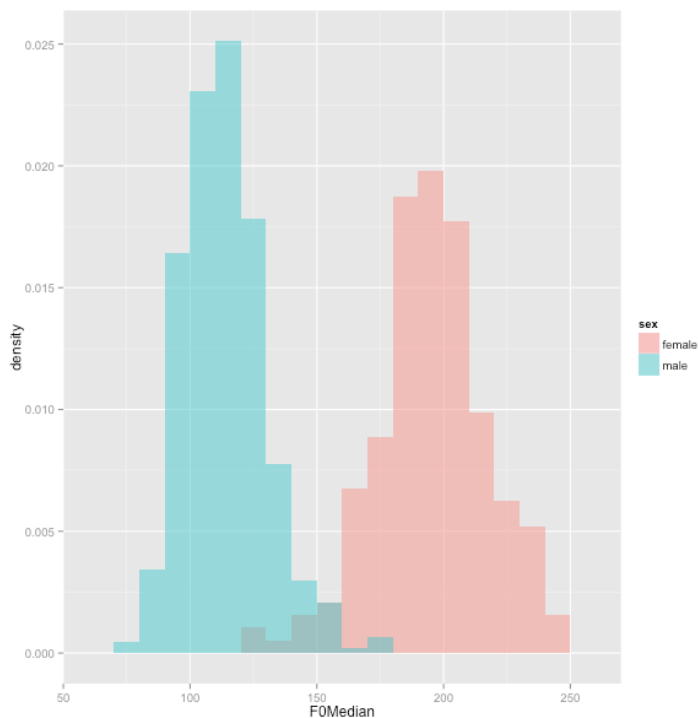
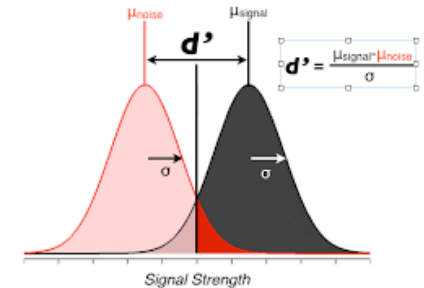
<http://www.youtube.com/watch?v=RGuxlBfitVU>

“Please give a voice message to the youtuber after each video.”

# What would I measure?

Production data:

Would teenagers' F0 range shift according to who they are talking to?



<http://languagelog.ldc.upenn.edu/nll/?p=5908>

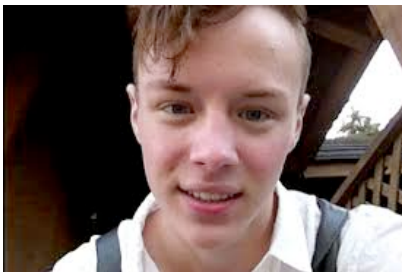
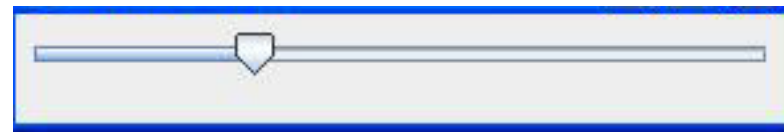
# Kiwa's imaginary study task 2

## Picture / Voice judgment task



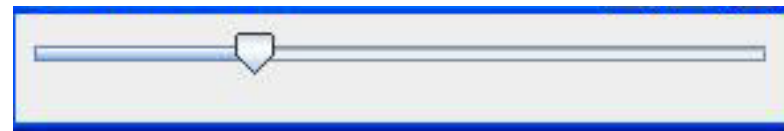
Male

Female



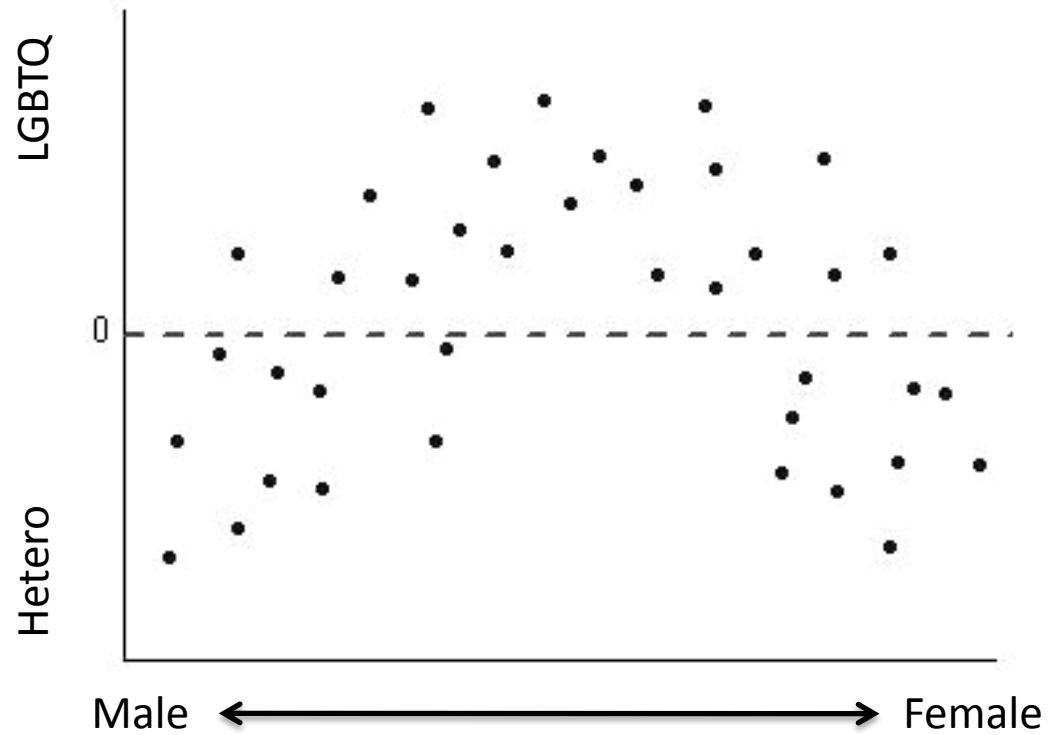
Hetero

LGBTQ



# What would I measure?

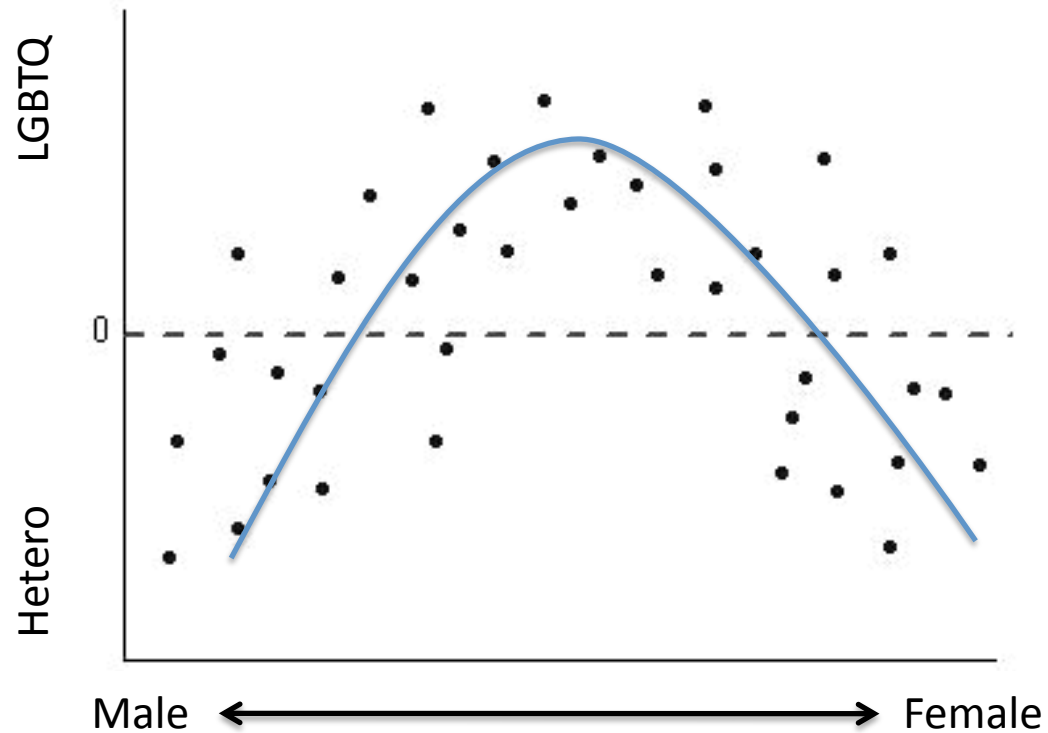
## Judgment data



# What would I measure?

Judgment data

Quadratic  
correlation?

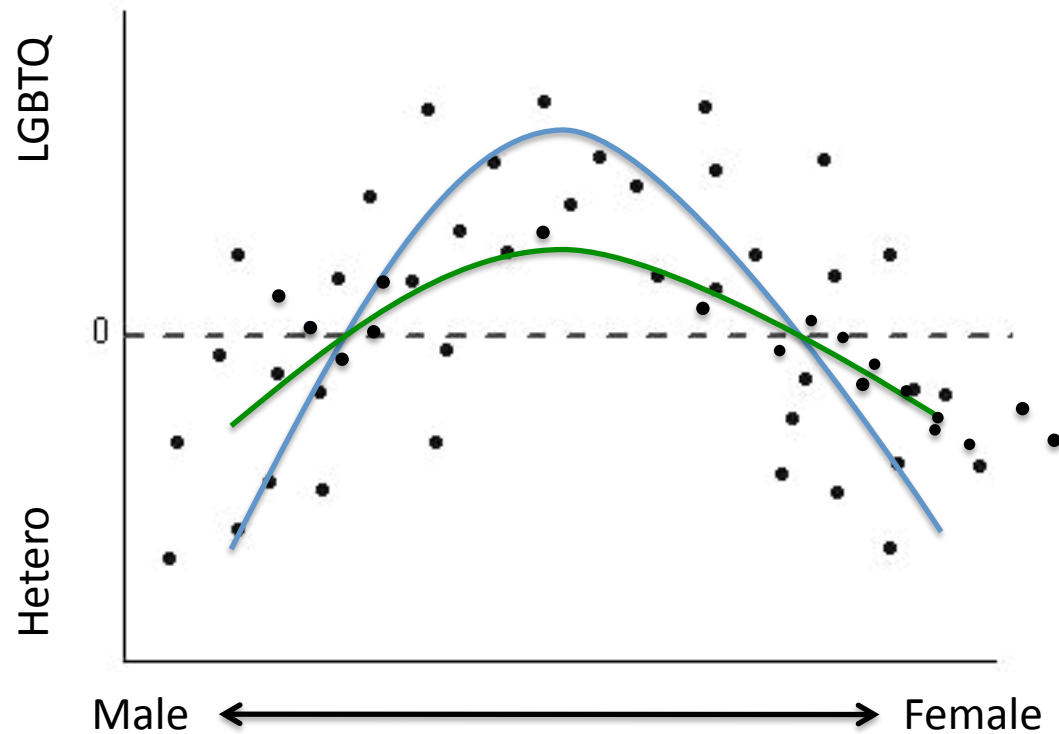




# What would I measure?

Judgment data

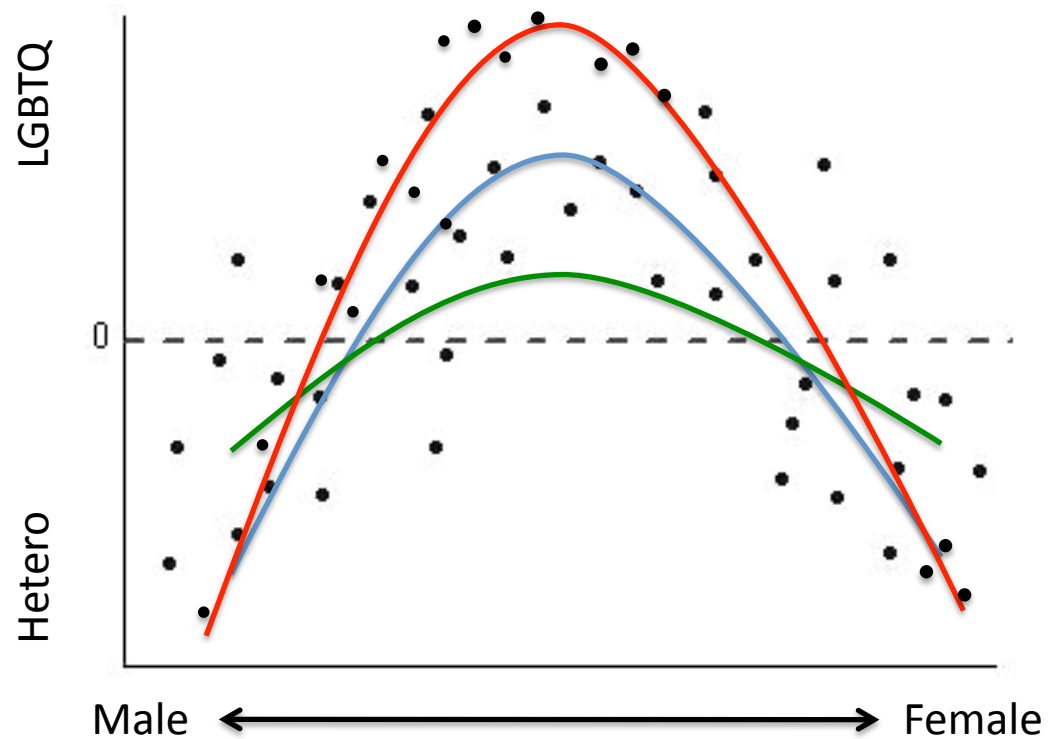
Quadratic  
correlation?



# What would I measure?

Judgment data

Quadratic  
correlation?



# Age or individual difference?

If I can argue that:

- SD along hetero-LGBTQ scale can be an indicator of the individual's sensitivity to sexual orientation
- SD along male-female scale indicates the individual's sensitivity to sex distinction.

$SD_{hl} \sim \text{age} * SD_{sex} + (1 | \text{subj}) + (1 + \text{age} * SD_{sex} | \text{item})$

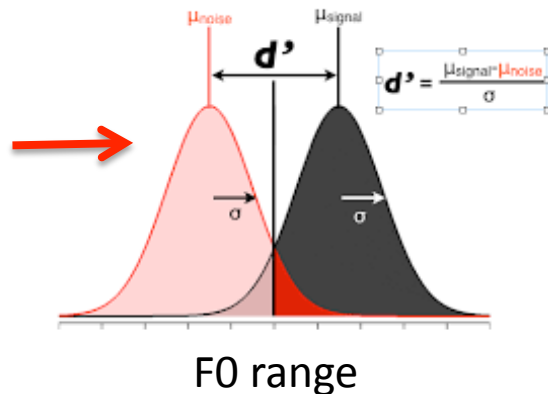
Alternative DV?:

Quadratic coefficient ('a' in  $y = ax^2 + bx + c$ )

# Production and Perception

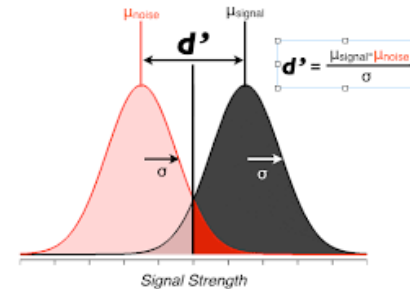
Do teenagers shift their F0 ranges according to their perception of the sexual orientation of the addressee?

D-prime  $\sim$  age \* SDhl + (1 | subj) + (1 + age \* intercept | item)

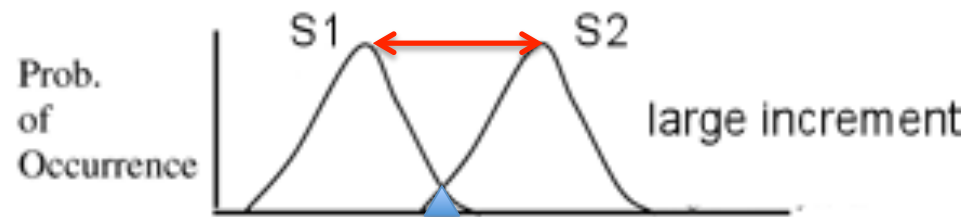


# Alternative dep var

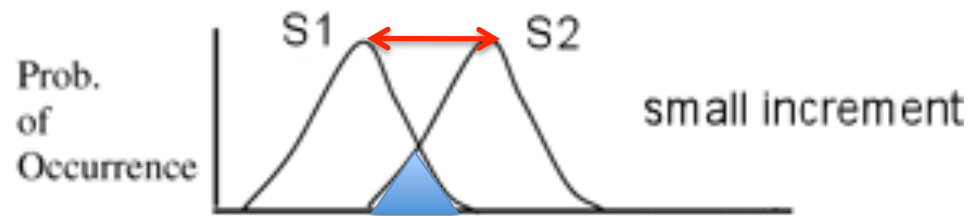
**D-prime / (misses + false alarms)**



Larger mean difference, less overlap



Smaller mean difference, more overlap



## 3. Dependent Measure

For your team's study, discuss 2-3 possible dependent measures of the effect under investigation.

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For your team's study, discuss 2-3 possible dependent measures of the effect under investigation.

Once the dependent measures are determined, try to come up with hypotheses and predictions.

# 1-page proposal

- Research question
- Participants
- Tasks
- Measures
- Predictions