

# ENTRAINMENT IN THE SUPREME COURT

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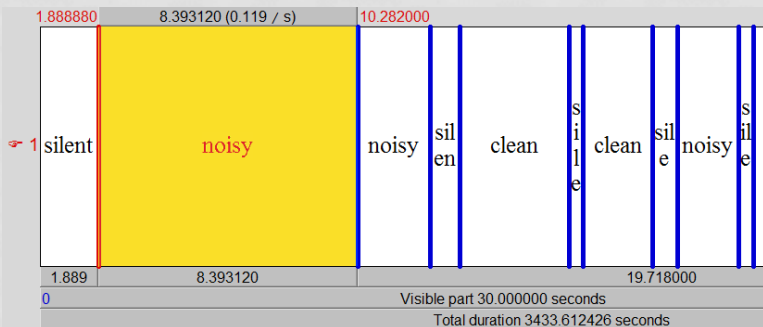
# OUTLINE

- Overview
- Entrainment
- Supreme Court Corpus
- Mechanical Turk
- Methods
- Results

# OVERVIEW



Supreme Court corpus



Text grid

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```

Results file

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# ENTRAINMENT

- Definition
- Dialogue success and quality
- Types of entrainment
- Examples

# ENTRAINMENT

- **Definition**

- Phenomenon of people becoming similar to each other in conversation

- Dialogue success and quality
- Types of entrainment
- Examples

# ENTRAINMENT

- Definition
- **Dialogue success and quality**
  - Reitter & Moore, 2007
  - Nenkova et al., 2008
  - Levitan et al., 2011
- Types of entrainment
- Examples

# ENTRAINMENT

- Definition
- Dialogue success and quality
- **Types of entrainment**
  - Lexical
  - Acoustic/prosodic
- Examples



# ENTRAINMENT

- Definition
- Dialogue success and quality
- Types of entrainment
- **Examples**

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# SUPREME COURT CORPUS

## PROS:

- Over 50 years of oral arguments
- 9000 hours of audio
- 2001 – transcribed, speaker id, word aligned (OYEZ project)
- Knowledge of outcome



# SUPREME COURT CORPUS

## CONS:

- Noise
- Alignment issues



# SUPREME COURT CORPUS

## Questions:

- Do justices entrain more to lawyers that they eventually side with?
- Does entrainment depend on other factors like justice gender, ideology, or investment in the case?
- Do more successful lawyers entrain more?

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# AMAZON MECHANICAL TURK (AMT)

- Marketplace for work that requires human intelligence

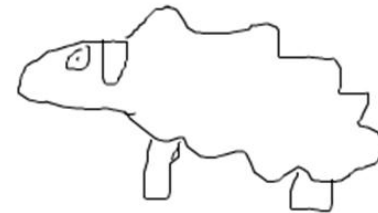
# AMAZON MECHANICAL TURK (AMT)

- Marketplace for work that requires human intelligence
- **Terminology**
  - HIT
  - Requester, Turker
  - Reward



# AMAZON MECHANICAL TURK (AMT)

- Marketplace for work that requires human intelligence
- Terminology
- **Creative uses**
  - [thesheepmarket.com](http://thesheepmarket.com)
  - Facebook



# AMAZON MECHANICAL TURK (AMT)

- Marketplace for work that requires human intelligence
- Terminology
- Creative uses
- **Research uses**
  - Social variables
  - Clarification questions
  - WordsEye annotations

# AMAZON MECHANICAL TURK (AMT)

## PROS:

- On demand workforce
- Cost effective
- Speed

## CONS:

- Quality control
- Virtual sweatshop?

# AMAZON MECHANICAL TURK (AMT)

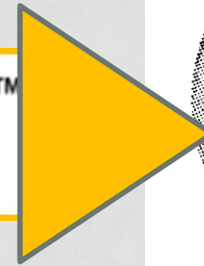
## **Quality Control**

- US only
- 90% acceptance rate
- Qualification exam
- Gold standard questions

# AMAZON MECHANICAL TURK (AMT)



**amazon mechanical turk™**  
Artificial Artificial Intelligence



# SAMPLE HIT

identify noisy IPUs  
(inter-pausal units)

## Does this sound contain noise?

Please listen to each sound and tell us if it contains noise. Noise can be papers ruffling, a click, a cough

### EXAMPLES



\*papers ruffling



\*coughing

**Note: two or more people speaking at the same time is NOT considered noise.**



\*2 people talking - NOT noise

**If you are playing something over and over again to decide if it contains noise, it probably is insignificant noise**



\*insignificant noise - NOT noise

Most of the sounds will not contain noise. However, if you are in doubt as to whether or not a sound contains noise, you are uncertain about your answer.

Please listen to each sound carefully and answer as well as you can. Some of the sounds have already

1.   Yes noise  No noise  Not sure

2.   Yes noise  No noise  Not sure

3.   Yes noise  No noise  Not sure

4.   Yes noise  No noise  Not sure

5.   Yes noise  No noise  Not sure

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# METHODS

- HIT preparation
- Getting results



# METHODS

- **HIT preparation**
  - Amazon CLT (Command Line Tools)
  - Python scripts
  - CGI (Common Gateway Interface)
- Getting results

# METHODS

- HIT preparation
- **Getting results**
  - Python scripts
  - Text grids
  - Praat scripts

# METHODS

- Getting results (cont)
  - Extracted intensity from all sessions
  - Calculated intensity at beginnings and ends of turns
  - Preliminary analysis using R

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# RESULTS

- Smaller intensity differences between lawyers and justices than between justices and lawyers  
( $t=-7.92$ ,  $df=17622$ ,  $p=2.57e-15$ ,  $mean\_lawyer=3.59$ ,  $mean\_justice=3.94$ )

- Dominance

- No significant difference in entrainment between male and female lawyers  
( $t=1.29$ ,  $df=2205.1$ ,  $p=0.20$ ,  $mean\_male=3.61$ ,  $mean\_female=3.50$ )

# RESULTS

- Differences between justices and petitioners are significantly smaller when the justice sides with the petitioner!

( $t=-2.14$ ,  $df=294.86$ ,  $p=0.03$ ,  $mean\_petitioner=3.71$ ,  $mean\_respondent=4.18$ )

- However, differences between justices and respondents are also significantly smaller (when the petitioner wins the case)

( $t=-2.53$ ,  $df=217.9$ ,  $p=0.01$ ,  $mean\_petitioner=3.68$ ,  $mean\_respondent=4.26$ )

# FUTURE WORK

- AMT – continue with more sessions
  - Build classifier
- Extract more features
  - Pitch
  - Speaking rate
  - Voice quality
- Look for evidence of multi-party entrainment
- Look for association between entrainment and case outcome

THANK YOU!