

# Prosodic Features of Stance Acts

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# Project

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- ATAROS
  - Automatic Tagging and Recognition of Stance
  - Collaboration with phoneticians, computational linguists, signal-processing engineers
    - Hosted at the University of Washington
  - Seeks automatically-extractable acoustic cues to stance
    - Also Marvel god of video games →



# Terms

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- Stance
  - Speaker's attitudes, opinions, feelings, judgments about topic of discussion (Biber et al. 1999; Conrad & Biber 2000)
    - Related: evaluation, attitude, sentiment, subjectivity
  - Stance-taking
    - Activity of expressing stance (Haddington 2004)
- Stance act
  - Speech act involving stance-taking

# Prosodic Cues to Stance

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- Pitch, intensity increase with stance strength
- Positive stances: longer stressed vowel duration (~slower speaking rate)
  - cf. Freeman (2015), Freeman (2016) LSA talk
- Some **stance types** distinguished by combinations of prosodic measures
  - cf. Freeman et al. (2015)

# ATAROS Corpus

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- High-quality audio
- 34 dyads from Pacific Northwest
  - Strangers matched by age group
- 5 collaborative tasks
  - Frequent changes in stance
- Transcribed, time-aligned to audio
- Annotated for stance strength, polarity, type
- Available to other researchers

# Tasks

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	Neutral first-mentions	Increasing involvement
Store items	Map	<div style="border: 1px solid black; padding: 5px;">Inventory</div> Survival
Budget items	Category	<div style="border: 1px solid black; padding: 5px;">Budget</div>

# Inventory Task

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- Scenario: You're co-managers of a new superstore in charge of arranging inventory
- Decide together where to place each target item on a felt wall map
- Low involvement, weak opinions, agreement

# Inventory Task

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- W- We should-
- So, fridge-
- We should- make a- a- a decision where beverages should go, anyway. So, it doesn't-
- Yeah.
- I don't think it's a big... huge decision to s-
- We could do b- beverages like here.
- Sure.
- Maybe.
- Perfect.





# Budget Task

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- Scenario: You're on the county budget committee, and it's time to make cuts
- Decide together which expenses to cut from each department
- High involvement, stronger opinions, more persuasion, reasoning, negotiation, personal experience as support

# Budget Task

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- {breath} Alright. .. Wh- Poetry books .. or cooking classes?
- No, if you're gonna leave in football, we need poetry.
- Oh we're not g- Oh - oh, I'm willing to take out - {breath}
- Oh, football equipment?
- Yeah.
- Oh.
- So if we take out the juice machines and football, we've done it.
- Okay.



# Transcription & Annotation

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- Manual orthographic transcription in Praat (Boersma & Weenink 2013)
- Forced-alignment w/ P2FA (Yuan & Liberman 2008)
- Manual stance annotation
  - 2-3 annotators identify, label “stancey” expressions via content analysis (modified from Freeman 2014)
  - Stance Strength (none, weak, moderate, strong)
  - Stance Polarity (positive, negative, neither/neutral)
  - **Stance Act Type**

# Stance Act Types

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- Offering opinion
- Soliciting opinion
- Convincing/reasoning
- Agreement
- Disagreement
- Reluctance to accept
- Softening/hedging
- Rapport-building
- Encouragement
- Backchannels
- Strong intonation
- Unclear
- None

Stance Act Type		Example
a	Agreement	“I agree, absolutely”
at	Agree w/ rapport	“Yeah, now we’ve got it!”
r	Reluctance to accept	“Well, ... maybe”
f	Softening/hedging	“I don’t know, that’s just me”
b	Backchannels	“Mm-hm”
i	Strong intonation	e.g. incredulous, mocking; may be hard to categorize

# Hypothesis & Measures

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- Measurable cues to stance type are present in the acoustic signal
  - Same words, different messages...
- Automatically-extracted measures:
  - Pitch, intensity at vowel midpoint & every decile
    - Z-score normalized within speaker
  - Vowel duration
    - Z-score normalized within speaker & vowel quality

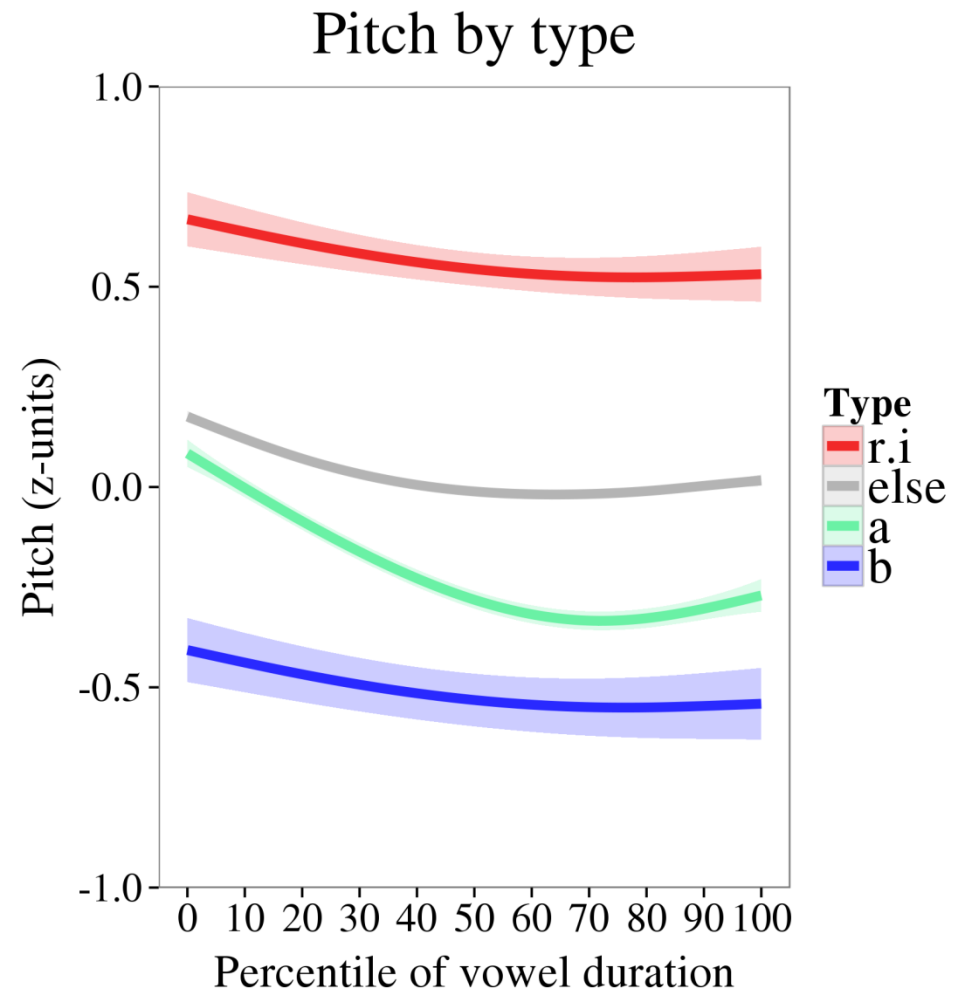
# Data Set

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- 20 dyads
  - Dyads: 7 FF, 3 MM, 10 mixed-sex
  - Speakers: 24 F, 16 M (half under age 35)
- Inventory & Budget task data combined
- 32,000 stressed vowels from content words

# Pitch Contours by Type

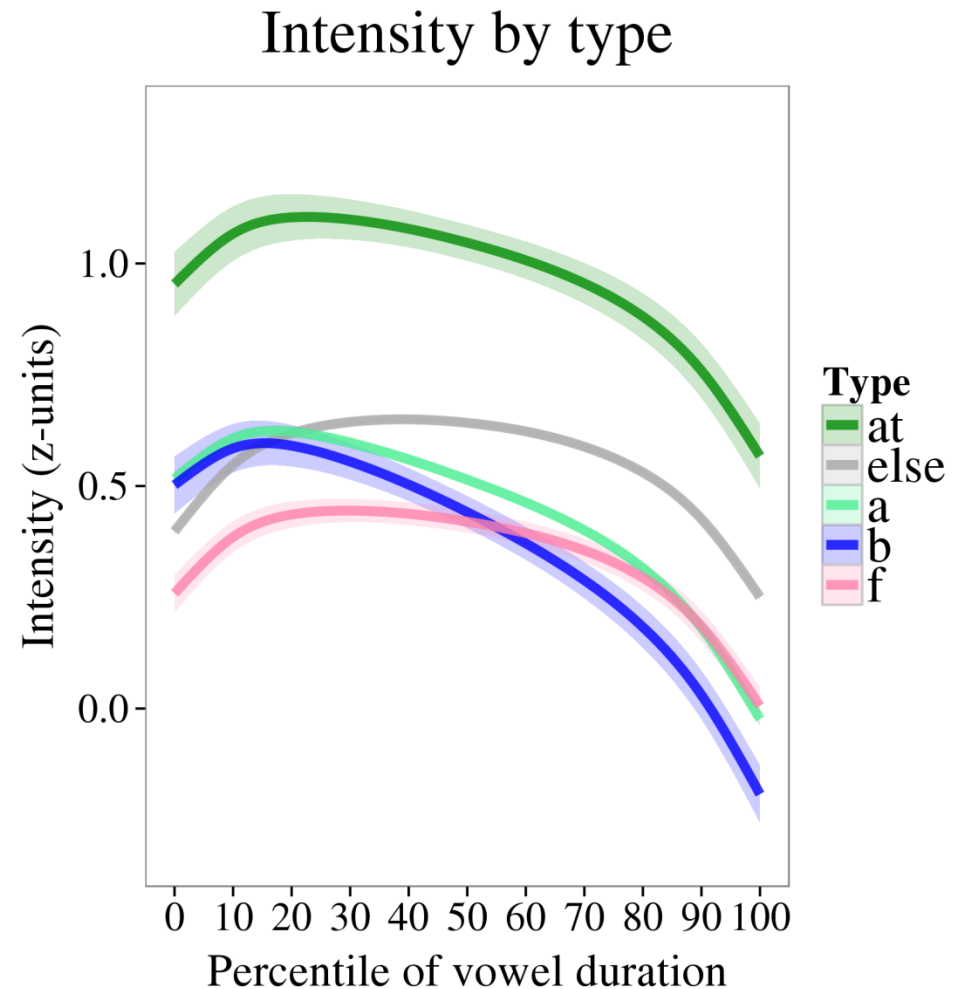
- Clusters:
  - Reluctance, strong intonation (r, i) high
  - Agreement (a) mod-low dipping
  - Backchannels (b) low





# Intensity Contours by Type

- Clusters:
  - Rapport-building agreement (at) very high
  - Agreement (a) dropping
  - Backchannels (b) low dropping
  - Softening (f) low



Act Type	Pitch	Intensity	Duration
r; i	reluctance; intonation	very high	long
at	agreement w/ rapport	very high	very long
a	agreement	low-dipping dropping	long
b	backchannel	very low	low-dropping long
f	softening / hedging	low	

# Conclusion

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- Measurable cues to stance type are present in the acoustic signal
  - Prosodic features on stressed-content vowels
  - Stance act types distinguished by combination of prosodic measures
- Future work
  - Prosodic contours/tunes over acts
  - Social variables
    - Age, gender, familiarity, power, rapport...

# References

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# Thanks

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