

How Meaningful These Intonational Contours Are!

Byron Ahn • Nanette Veilleux • Bethany Sturman • Alejna Brugos • Sunwoo Jeong • Stefanie Shattuck-Hufnagel

1. Introduction

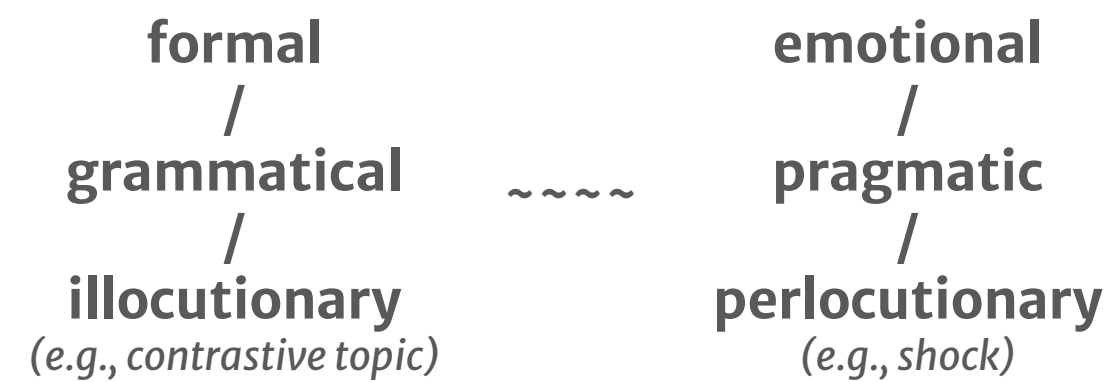
English exclamatives' syntactic forms

- a. Salvador is very successful!
- b. How very successful Salvador is!
- c. Has Salvador been successful!
- d. The success Salvador has had!

→ ...*intonational forms?*

2a. Background: Intonation?

Suprasegmentals (e.g., f0, intensity, duration) that convey **'post-lexical' meanings**



Analysis may require some human annotation (e.g., ToBI, PoLaR)

2b. Background: Exclamatives!

Rett & Sturman (2021) on mainstream US English exclamatives:

[[mirativity]] ↔ **L+H***
(syntactic/semantic core) ↔ *(prosodic core)*

Other acoustic features: iconically enhance exclamative meaning

3. Research Goals

Primary Goal:

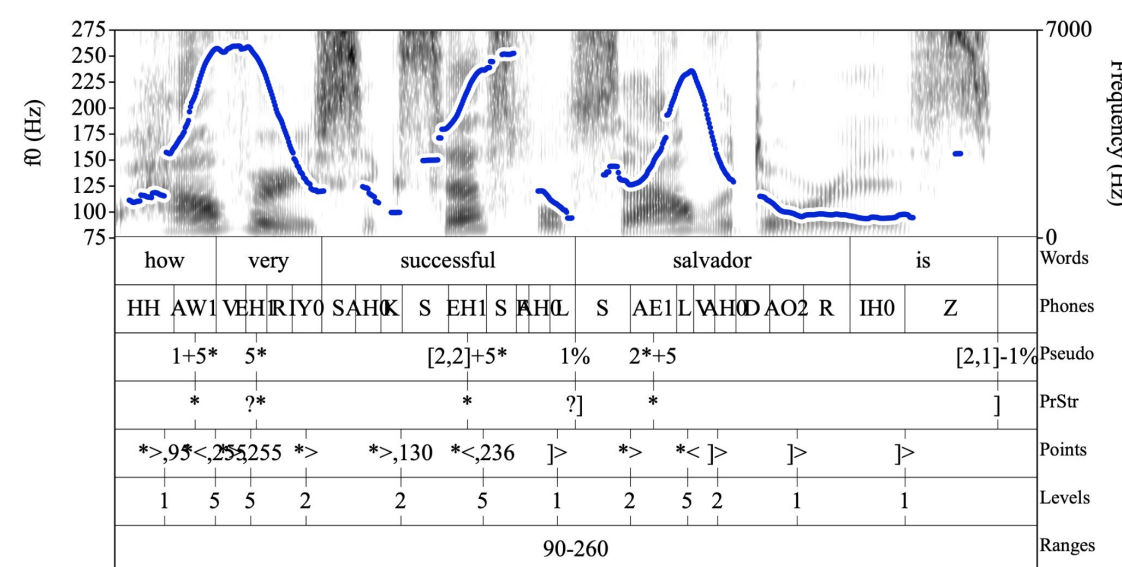
Model of which aspects of intonation signal an utterance's status as exclamative

Secondary Goal:

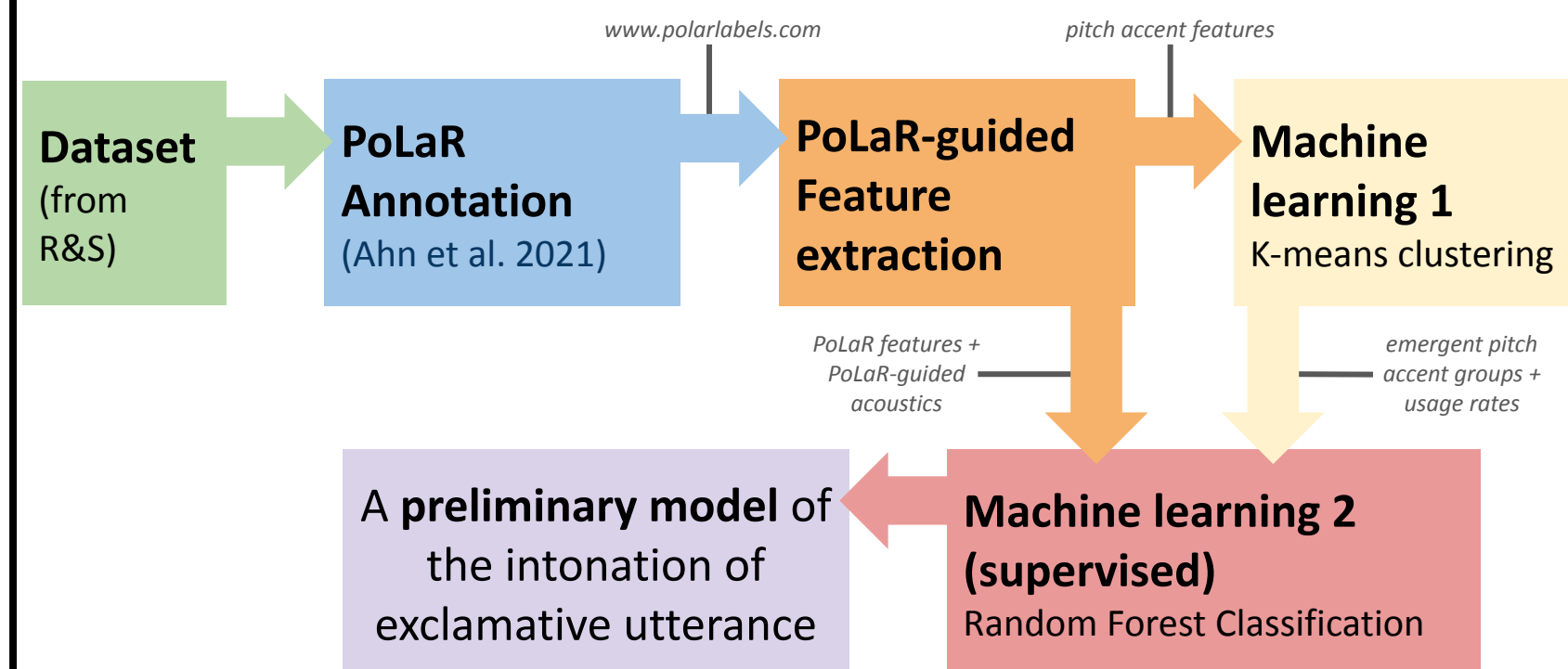
Proof of concept for future work on intonational meaning

Central Question

Is there an intonational core to English exclamatives?



4. Methods



5. Results

- Clustering analysis finds 3 groups of pitch accents, differentiated by slope (between_SS / total_SS = 81.1 %)
 - **Cluster K2 looks like L+H***
- Classification analysis distinguishes exclamatives (Estimated Error Rate: 14.08%)
 - **Usage of K2 very important**
 - *Many of R&S' other findings are replicated too*

6. Conclusions / Future Work

- Results **support R&S' findings** based on phonological labels
 - **Using non-phonological labels + analysis**
- **Proof of concept:** emergent cluster categories potentially standing in for phonological labels
 - Methodology for new domains / languages / varieties **beyond current model of MUSE phonology**

Selected References:

- Beckman & Hirschberg. 1994. The ToBI annotation conventions.
- Ahn et al. 2021. PoLaR Annotation Guidelines (version 1.0). Available at <https://osf.io/usbx5>.
- Rett & Sturman. 2021. Prosodically marked mirativity. In Proceedings of WCCFL 37.

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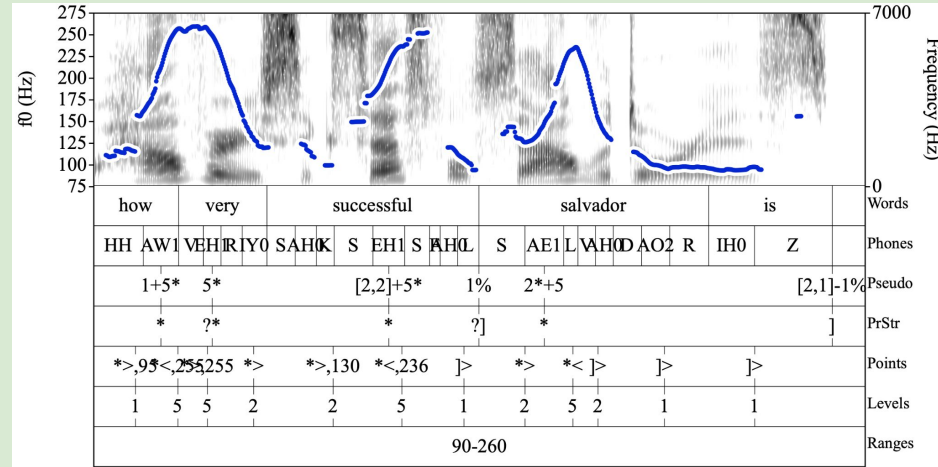
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Exclamatives forms

- Exclamative meanings in English map onto a variety of syntactic forms:
 - (Wow,) Salvador is very successful!
 - (Wow,) how very successful Salvador is!
 - (Wow,) has Salvador been successful!
 - (Wow,) the success Salvador has had!

- An example how they map onto intonation:



Varied syntactic forms of exclamatives have a common core, but...

Is there a common intonational core to exclamatives?

Background - Exclamative Intonation

Previous work by Rett & Sturman (2021) on mainstream US English exclamatives

e.g., ***What big teeth you have!***

- Empirical findings:

Categorical Measures

L+H* pitch accents

Continuous Measures

Extra high pitch accent peaks
Increased rhythmicity

- Analysis:

[[mirativity]]
(*syntactic/semantic core*)



L+H*
(*prosodic core*)

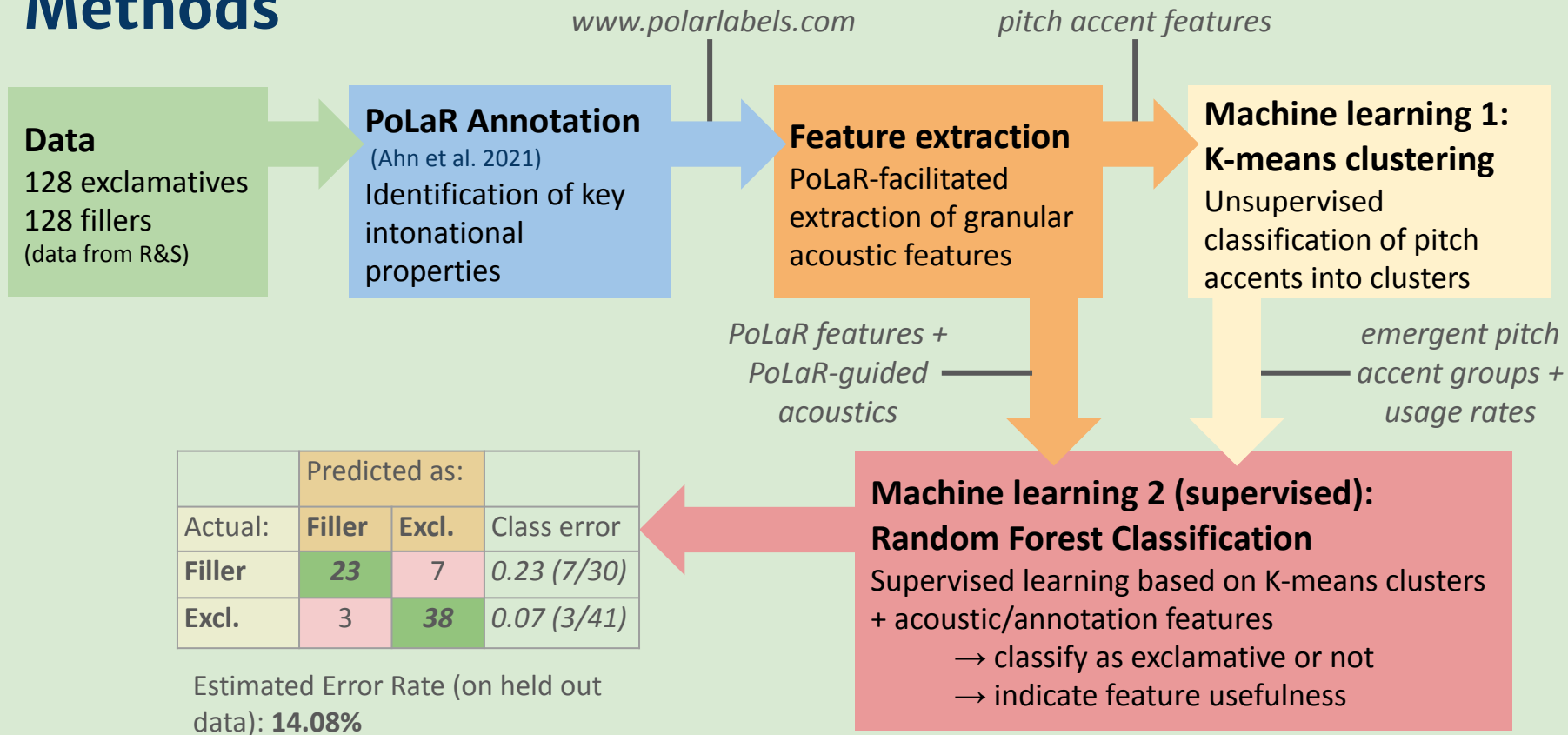
Other intonational characteristics: iconically enhance exclamative meaning

Our Research Goals

- Can we verify this analysis **with a different methodology?**
- Primary Goal:
 - Model which aspects of intonation have predictive power to classify utterances as exclamative**
 - Using more intonational details in the model (*e.g., those lost in categorical annotations like ToBI*)
 - Transcribing intonation with PoLaR (*uniform across languages, facilitating cross-linguistic comparison**)
- Secondary Goal: *Verify PoLaR + data mining methods to investigate semantic/pragmatic categories*
 - Proof of concept for future work on intonational meaning**

* cf. R&S's "future work" section

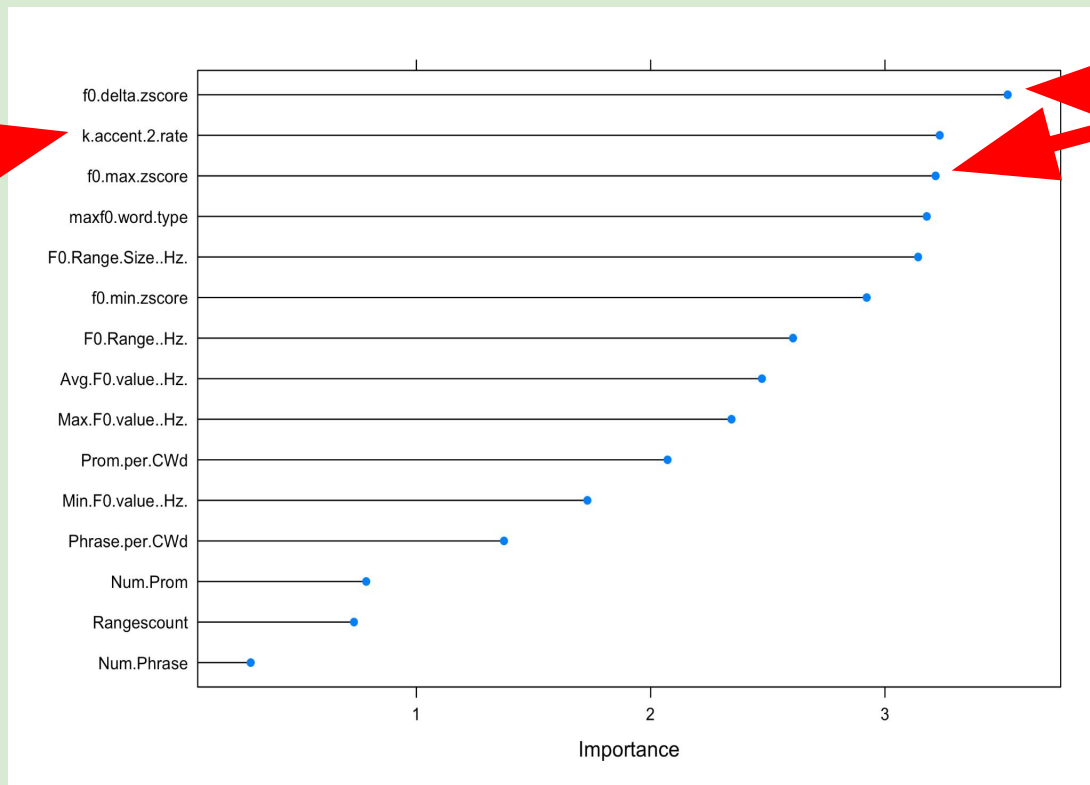
Methods



Goals: Met

- Can we verify R&S' analysis **with a different methodology?**
→ *YES! Using non-phonological labels + analysis*
- Primary Goal:
Model which aspects of intonation have predictive power to classify utterances as exclamative
→ *Achieved!*
- Secondary Goal:
Proof of concept for future work on intonational meaning

Relative Importance of Features in Random Forest Classification



rapid rise
pitch accent
(K2) usage in
an utterance

cf. R&S' L+H
finding*

f0 range
information

*cf. R&S' extra
high pitch accent
peaks*

Goals: Met

- Can we verify R&S' analysis **with a different methodology?**
→ *YES! Using non-phonological labels + analysis*
- Primary Goal:
Model which aspects of intonation have predictive power to classify utterances as exclamative
- Secondary Goal:
Proof of concept for future work on intonational meaning
→ *Achieved!*

Discussion & Conclusions

- **Proof of concept:** Emergent cluster categories potentially standing in for phonological labels
- **Advantages for this methodology include:**
 - PoLaR's low barrier to entry
 - PoLaR's **usability in new domains / languages / varieties beyond current model of MUSE phonology**
 - Replicability of machine learning analyses

Coming Soon...

- A complete analysis of this entire dataset
- PoLaR-based analysis tools (***PoLaR Basic Extraction and Analysis in R***)
- More work on meaning and intonation (*NSF-supported grant work*)

Thank you!