Phonetics and Phonology of Overlong Vowels in East Frisian Low German

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Ternary Vowel Length Contrast

- Ternary or three-level vowel length refers to a typologically rare three-way phonological distinction between **short**, **long** and **overlong** vowels;

a. σ	b. σ	c. σ
μ	$\mu \quad \mu$	$\mu \quad \mu \quad \mu$
p á l	p áa l	p áaa l

Shilluk (Nilo-Saharan) data borrowed from Remijsen et al. 2019

- Analyses & Debates

Binary vowel-length contrasts	Ternary vowel-length contrasts
Phonological contrasts between **short** vs. **long**	Phonological contrasts between **short**, **long** and **overlong**
Phonetic vowel overlength arises from extra dimension	Few works provide phonetic evidence
(e.g., Kohler 2001, Odden 2011, Prehn 2012)	(e.g., Remijsen and Gilley 2008, Remijsen et al. 2019)

Language Profile: Low German

- Low German (or Low Saxon, Continental West Germanic) is spoken mainly in Northern Germany and the northeastern part of the Netherlands.
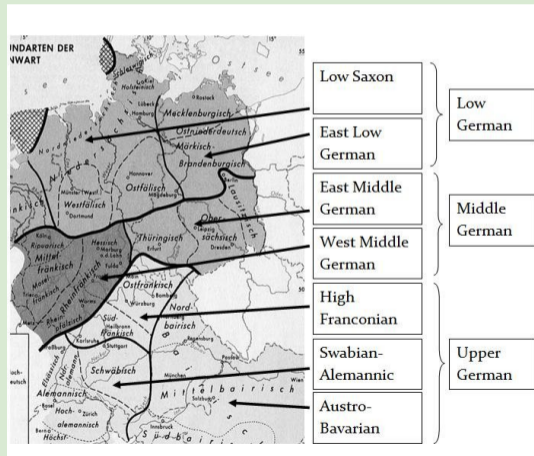
Main dialect groups of German languages (Adam 1989)

Ternary Vowel Length Contrast in Low German (LG)

- Low German is one of the few languages in the world that is described as having a ternary contrast between **short**, **long** and **overlong** vowels in stressed syllables.

| SHORT	LONG	OVERLONG
[zɪt] 'sit-1.SG.PRES'	[ziːt] 'side-SG.NOM'	[ziːːd̥] 'silk-SG.NOM'
[gɪs] 'guess-1.SG.PRES'	[riːs] 'rice-SG.NOM'	[riːːz̥] 'giant-SG.NOM'
[stɪk] 'pencil-SG.NOM'	[steːk] 'pierce-1.SG.PRES'	[steːːg̥] 'jetty-PL.NOM'

Low German near minimal triples, adapted from Prehn (2012)

- This contrast occurs not only with respect to vowel DURATION, but also in vowel QUALITY.

  - Short vowels are **lax** (produced more central)

  - Long and overlong vowels are typically **tense** (produced more peripheral)

(Kohler and Tödter 1984; Kohler et al. 1986; Kohler 2001)

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Ternary Vowel Length Contrast in Low German (LG)

- Some researchers also report an observation of contrastive TONAL CONTOUR distinguishing between **long** and **overlong** vowels
    - **Short** vowels do not show any accompaniment of tone.
    - **Long** vowels are accompanied by a dragging tone, i.e., an **early** peak is observed
    - **Overlong** vowels co-occur with a pushing tone, i.e., a **delayed** peak is observed

Long vs. overlong vowels with contrastive tonal contours from Prehn 2007
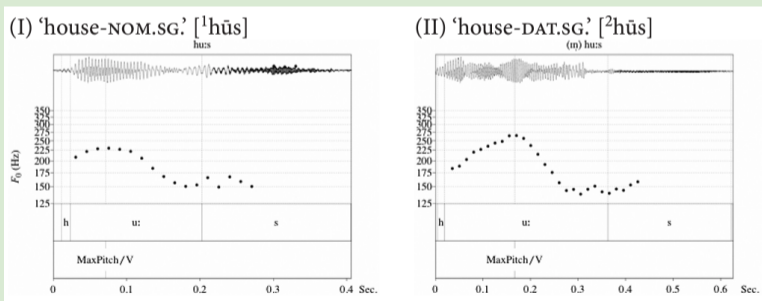
Ternary Vowel Length Contrast in Low German (LG)

- Some researchers also report a presence of contrastive TONAL CONTOUR distinguishing between **long** and **overlong** vowels

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    - **Long** vowels are accompanied by a dragging tone, i.e., an **early** peak is observed

    - **Overlong** vowels co-occur with a pushing tone, i.e., a **delayed** peak is observed

        (e.g., Höder 2003, Ternes 2006, Prehn 2007)

- Another group of scholars disagree with this contrastive tonal pattern

    - The dragging tone is NOT observed

    - Duration difference between short and long comes from vowel quality (lax vs. tense, both short in this matter)

    - Overlong vowels are the real long vowels.

        (e.g., Kohler 2001)

Origins of Ternarity in Low German (LG)

- Most researchers generally accept the assumption that long and overlong vowel contrast came into being due to **apocope**, **final-devoicing** and **compensatory lengthening (CL)** from post-Middle Low German (MLG) to Low German (LG)

MLG	[ziːdə]
apocope	[ziːd∅]
final devoicing	[ziːt]
CL	[ziːːt]
modern LG	[ziːːt]

  - [ziːːt] 'silk-SG.NOM' < MLG *side*; [steːːk] 'jetty-PL.NOM' < MLG *stege*.

- General assumption: No ternary contrast in words with non-final stress (e.g., [ˈweɪkən] vs. [ˈweɪɡən])

Origins of Ternarity in Low German (LG)

- A number of researchers generally accept the assumption that long and overlong vowel contrast came into being due to **apocope**, **final devoicing** and **compensatory lengthening (CL)** from post-Middle Low German (MLG) to Low German (LG)

MLG	[ziːdə]	[ziːtə]	‖
apocope	[ziːd◌̸]	[ziːt◌̸]	
final devoicing	[ziːt]	×	
CL	[ziːːt]	×	
modern LG	[ziːːt]	[ziːt]	⇓

- Whether final devoicing is complete in apocopated words is still under debate.
    - ✔ General assumption: Final devoicing is complete for Low German.

      (Lücht 2016)

    - ✘ There possibly exists difference between word-final lenis ("voiced") and fortis ("voiceless") consonants. (Prehn 2012)

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Research Questions

Research Questions

RQ 1: [Vowel Duration] Is there a vowel duration contrast between **long** and **overlong** in East Frisian LG? Is it restricted to synchronic monosyllabic words because of compensatory lengthening, or are there also oppositions in disyllabic words?

H_0: A vowel (with same vowel quality) duration contrast is only observed in **monosyllabic** words because they undergo compensatory lengthening, while disyllabic words do not.

(influenced by Kohbrok 1901, Bremer 1929, von Essen 1957, etc)

H_α: A vowel (with same vowel quality) duration contrast can be observed in **both** monosyllabic and disyllabic words in Low German.

(influenced by Feyer 1939)

Research Questions

RQ 2: [Tonal Contour] Does East Frisian LG have tonal contour contrast along with the vowel duration, if there is any?

H_0: A tonal contrast is not observed between words with long and overlong vowels;

(influenced by Kohler 2001)

H_α: Such a tonal contrast is observed between words with long and overlong vowels.

(influenced by Prehn 2012, etc)

Research Questions

RQ 3: [Word-final Consonant Voicing] Does East Frisian LG have final devoicing, as that in Standard (High) German? Are there any differences in the voicing realization of word-final obstruents?

H$_0$: So-called 'voiced' and 'voiceless' word-final obstruents have **identical** realizations.

(influenced by general assumption)

H$_\alpha$: **Distinction** between 'voiced' and 'voiceless' word-final obstruents exists.

(influenced by Prehn 2012)

- Final devoicing does not exist at all.
- Final devoicing has occurred incompletely.

Methodology

Speech Data: Speakers

- 10 East Frisian Low German speakers from Leer district are recruited in this study (5 are female speakers);

- All of them are Low/High German bilingual speakers; all declared Low German as their first language, while High German is acquired at school.

SPEAKER INDEX	GENDER	AGE	SPEAKER INDEX	GENDER	AGE
1	F	63	6	M	67
2	M	76	7	F	53
3	F	NA	8	M	67
4	F	72	9	M	50
5	F	65	10	M	63

Demographic information of these 10 speakers', data collected by Köhnlein and Prehn in 2021

Speech Data: Sentence Collection

- Each speaker will say ten sentences for each target word with three treatments:
    - FOCUS: focal vs. prefocal vs. postfocal
    - POSITION: final vs. non-final
    - SENTENCE TYPE: interrogative vs. declarative

High German ⟶ **Low German**

[focal, final]

Ist das die **Seite**? - Ja, das ist die **Seite**.

Ist dat de **Siet**? - Ja, dat ist de **Siet**.

[focal, non-final]

Ist das die **Seite** gewesen? - Ja, das ist die **Seite** gewesen.

Ist dat de **Siet** weerst? - Ja, dat ist de **Siet** weerst.

[pre-focal, non-final]

Ist die Seite **blau**? - Nein, die Seite ist **grün**.

Ist de Siet **blau**? - Nee, de Siet ist **gröön**.

[post-focal, final]

Ist **das hier** die Seite? - Nein, **das da drüben** ist die Seite.

Ist dat hier de Siet? - Nee, **dat da arten** ist de Siet.

Ist **das hier** die Seite gewesen?

Ist **dat hier** Siet weerst?

[post-focal, non-final]

    - Nein, **das da drüben** ist die Seite gewesen.

    - Nee, **dat da arten** ist de Siet weest.

Speech Data: Target Words

	LONG	OVERLONG
Monosyllabic	[ʁiːs] <Ries> 'rice-SG.NOM' [ziːt] <Siet> 'side-SG.NOM' [ʃwiːn] <Swien> 'pig-SG.NOM'	[ʁiːːz̥] <Ries> 'giant-SG.NOM' [ziːːd̥] <Siet> 'silk-SG.NOM' [ʃwiːːn] <Swien> 'silk-PL.NOM'
Disyllabic	[laːtən] <laten> 'let-INF' [ʁiːtən] <rieten> 'tear-INF' [weːɪkən] <Weken> 'week-PL.NOM'	[laːːdən] <laden> 'load-INF' [ʁiːːdən] <Rieden> 'ride-PL.NOM' [weːːɪgən] <wegen> 'weigh-INF'

- Preliminary results show vowel quality does not vary between **long** and **overlong** vowels.


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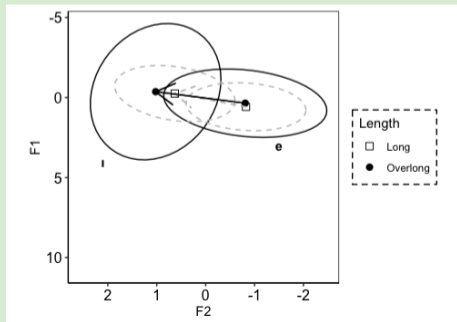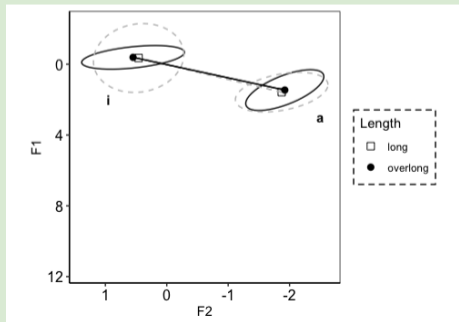
Results

Phonetic Analysis: Vowel Duration

- In both monosyllabic and disyllabic words (first syllable), the overlong nuclei are significantly longer than the long ones, across all **ten** speakers.

- These differences do not change their significance status with respect to FOCUS (Focus vs. Postfocus vs. Prefocus).
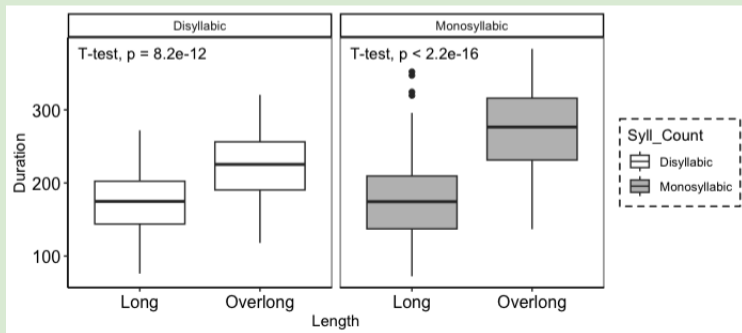
Phonetic Analysis: Vowel Duration

- The significant difference is also found between words with diphthongs ([weːɪkən] vs. [weːːɪɡən]).

- These differences do not change their significance status with respect to vowel height (/i/ vs. /a/).
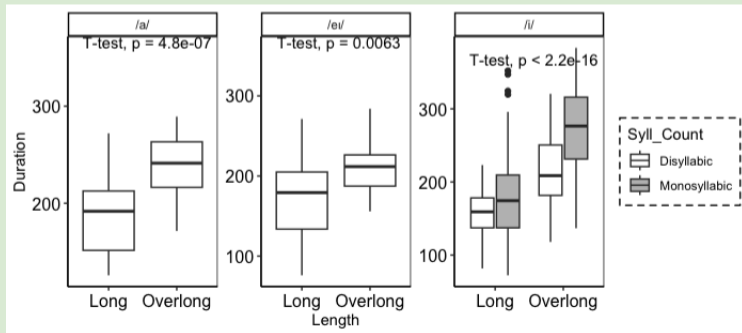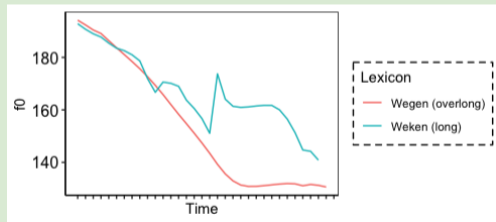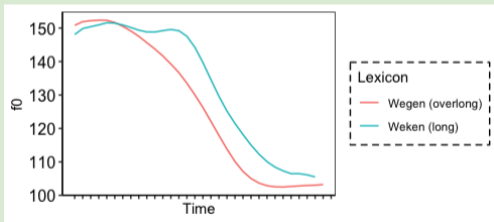
Phonetic Analysis: Tonal Contours

- So far, only data with certain treatment levels are studied: FOCUS = focal; POSITION = non-final; SENTENCE TYPE = declarative.

- From phonetic realizations, it seems that **long** vowels tend to have a **level** tone, and **overlong** vowels have a **falling** tone (monosyllabic, speaker 7 in the left figure).

- However, this tendency is not guaranteed. In some data, we do not find this contour contrast (monosyllabic, speaker 3 in the right figure).
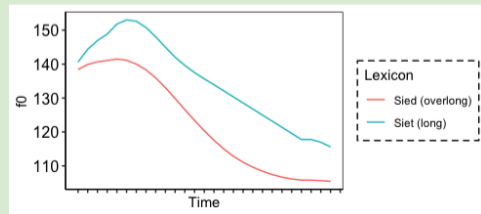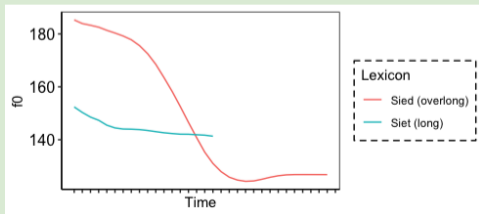
Phonetic Analysis: Tonal Contours

- Same observation is shown also in **disyllabic** words (presence in speaker 6 left figure; absence in speaker 5 right figure).

Phonetic Analysis: Tonal Contours

- The contour contrast (**level** vs. **falling**) is not consistent across 10 speakers in both mono- and disyllabic words.

- No speakers show contour contrast before **sonorant** coda.

speakers	[ʁiːs] vs. [ʁiːːz̥]	[ziːt] vs. [ziːːd̥]	[ʃwiːn] vs. [ʃwiːːn]
1	×	×	
2	×		
3		×	
4			
5			
6			
7	×		
8			
9	×	×	× represents presence of contrast
10	×		10 speakers' realization of monosyllabic words

Phonetic Analysis: Tonal Contours

- The contour contrast (**level** vs. **falling**) is not consistent across 10 speakers in both mono- and disyllabic words.

speakers	[laːtən] vs. [laːːdən]	[ʁiːtən] vs. [ʁiːːdən]	[weːɪkən] vs. [weːːɪɡən]
1		×	
2			
3		×	×
4		×	
5			
6			×
7			
8			×
9	×	×	×
10	×	×	×

× represents presence of contrast; 10 speakers' realization of disyllabic words
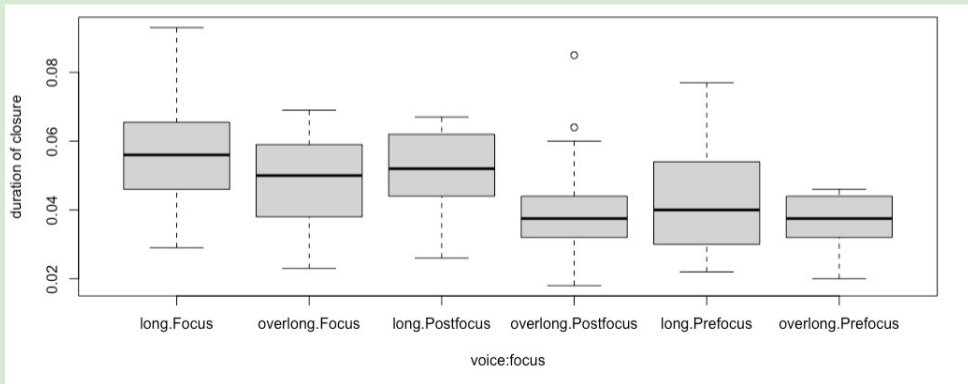
Phonetic Analysis: Obstruent Codas

- For stop sounds (/t/ vs. /d/)
  - We studied the duration of **closure**; burst and aspiration are not studied, because some speakers do not phonetically realize them in certain contexts.

- For fricative sounds (/s/ vs. /z/)
  - <u>Devoiced</u>: when less than one-third of the frication interval showed periodic structure in acoustic signals;
  - <u>Partially devoiced</u>: when more than one-third but less than half of the frication interval showed periodic structure in acoustic signals;
  - <u>Voiced</u>: when more than half of the frication interval showed periodic structure in acoustic signals;

 (three-way categorical distinction from Jesus & Shadle 2003)

Phonetic Analysis: Obstruent Codas

- **Stops** in coda position of monosyllabic words (e.g., [ziːt] vs. [ziːːd̥]) always tend to show longer closure after long vowels in all FOCUS treatment levels: Vːt̥ > Vːːd̥
    - Long.Focus vs. Overlong.Focus: *t=1.7192, p=0.0945*
    - Long.Postfocus vs. Overlong.Postfocus: *t=2.2392, p=0.03249*
    - Long.Prefocus vs. Overlong.Prefocus: *t=0.88252, p=0.3951*

Phonetic Analysis: Obstruent Codas

- **Fricatives** in coda position of monosyllabic words (e.g., [ʁiːs] vs. [ʁiːz̥])
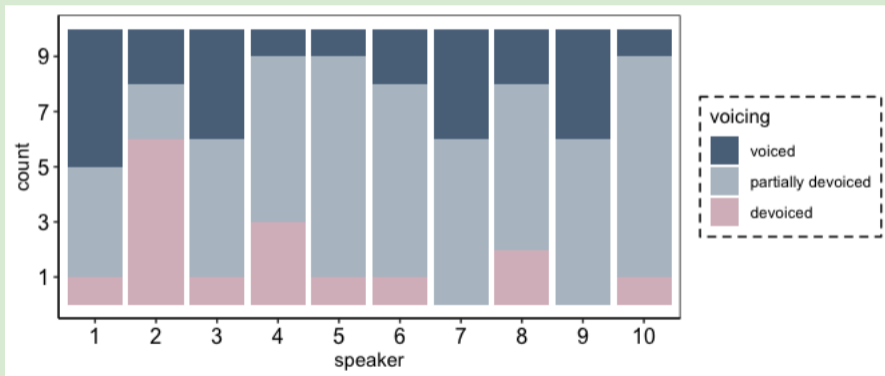
Back to Research Questions...

Answers to Research Questions

RQ 1: [Vowel Duration] Is there a vowel duration contrast between **long** and **overlong** in East Frisian LG? Is it restricted to synchronic monosyllabic words because of compensatory lengthening, or are there also oppositions in disyllabic words?

   H_α: A vowel (with same vowel quality) duration contrast can be observed in **both** monosyllabic and disyllabic words in East Frisian LG.

Answers to the Questions

RQ 2: [Tonal Contour] Does East Frisian LG have tonal contour contrast along with the vowel duration, if there is any?

H_α: Such a tonal contrast is observed between words with long and overlong vowels, but **not consistently**.

☞ Possibly an ongoing change.

Answers to the Questions

RQ 3: [Word-final Consonant Voicing] Does East Frisian LG have final devoicing, as that in Standard (High) German? Are there any differences in the voicing realization of word-final obstruents?

H$_\alpha$: **Distinction** between 'voiced' and 'voiceless' word-final obstruents exists.

(influenced by Prehn 2012)

- Final devoicing has occurred incompletely.

Discussion

Discussion

- **Vowel Duration**: Since vowel duration contrast (long vs. overlong) is found in both synchronic mono- and disyllabic words, it is reasonable to argue that apocope, final devoicing and CL are not end of story of ternarity in, at least, East Frisian LG.
    - Final devoicing only exists in obstruents, but not in sonorants.
    - Disyllabic words do not undergo apocope.

- **Tonal Contour**: Unlike some other languages showing contrastive tonal contour (West Germanic: Franconian; North Germanic: varieties of Norwegian, Swedish, etc), tonal contour in East Frisian LG is not consistent, thus not categorical.

(refer to Köhnlein (2018) for detailed examples of other Germanic languages)

Discussion

- **Word-final Consonant Voicing**: Final-devoicing in East Frisian LG seems **incomplete**, indicating 'voiced' word-final obstruents are distinct from 'voiceless' ones.

- This incomplete final devoicing might be seen as trigger of ternary length (cf. <feed> vs. <feet> in English), namely
  - short (lax) vs. long/overlong (tense) depends on vowel quality
  - long vs. overlong possibily depends on word-final obstruent voicing

- On the other hand, the contrast between long and overlong vowel duration also presents in sonorant-final words, as in [ʃwiːn] vs. [ʃwiːːn] and [bɛːm] 'leg-SG.NOM' vs. [bɛːːm] 'legs-PL.NOM'

(leg/legs example borrowed from Remmers 1997)

Discussion

- In monosyllabic words, coda following overlong nucleus on the surface level might be the onset of the next syllable underlyingly. The vowel is overlengthened because of being an nucleus of an open syllable.
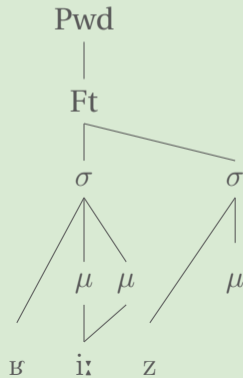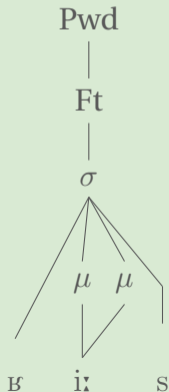
(Influenced by Köhnlein 2016)

Discussion

- This analysis is also valid for words with word-final sonorants:
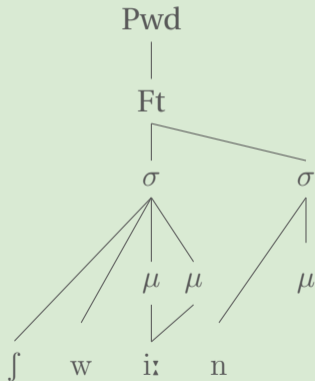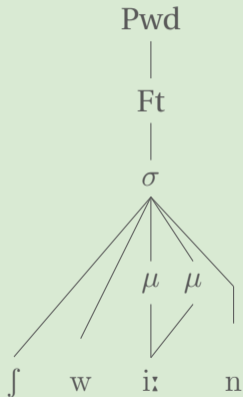
Future Work

Future Work

- Our future work lies in basically three directions:
  - Tonal contour prototypical patterns under other treatment level combinations;
  - Phonetic motivation of tonal contour contrast;
  - Diachronic process of ternarity formation.

References

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Thank you for your attention!!!

I want to say thank you to everyone in the **department** who has ever spent their time listening to my "blablabla" about the project, to my two advocates, **Björn and Becca**, for their warm and kind words when I feel down throughout this year, to everyone in **phonies** for their constructive feedback, to Dr. **Cynthia** Clopper, my committee member, for her feedback on phonetic analysis, Phuong and Ian, my labmates in OSU Phonology Lab for their detailed suggestions, and to **YOU** as long as you are here.