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A Metrical Analysis of Ternary Vowel Quantity in East Frisian Low German

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GOAL OF PRESENT STUDY

- To examine the phonetic and phonological properties of the contrast between long and overlong vowels in East Frisian Low German (LG)

short	long	Overlong
[zit] “sit.1SG.PRES”	[zi:t] “side.SG.NOM”	[zi:t:] “silk.SG.NOM”
[gis] “guess.1SG.PRES”	[bi:s] “rice.SG.NOM”	[bi:s:] “giant.SG.NOM”
[ʃtik] “pencil.SG.NOM”	[ʃte:k] “pierce.1SG.PRES”	[ʃte:k:] “jetty.PL.NOM”

Table I: Low German Minimal Triplets adapted from Prehn (2012:2)

RESEARCH QUESTIONS

- Phonetic correlates:** is the contrast merely durational or accompanied by other correlates, as sometimes suggested (but never shown with acoustic data) in previous literature (f0 as per Lucht 2013 for East Frisian LG; voicing distinctions as per Prehn 2012 for other LG dialects)?
- Representations:** What is the best way to phonologically analyze the distinction between long and overlong vowels in East Frisian LG?
- Our claim: contrast between **monosyllabic moraic trochee vs. disyllabic uneven trochee** (e.g., Morén-Duolljá 2013 for Swedish, Köhnlein 2011, 2016 for Franconian, Iosad (2016) for Danish, Morrison 2019 for Scottish Gaelic, Prince 1980 for Estonian)

BACKGROUND

TERNARY VOWEL LENGTH

- Typologically rare phenomenon: most languages have one or two vowel length categories
- Some languages, such as Shilluk (Remijsen et al. 2019), Dinka (Remijsen 2014), or Estonian (Lehiste 1965) exhibit an additional “overlong” category

DEBATES ON PHONOLOGICAL ANALYSIS

- Binary analysis:** ternary contrast arising from binary length (i.e., short vs. long) plus something else (our take here for LG, see below for details)
- Ternary analysis:** ternary contrast arising from ternary length (short vs. long vs. overlong)

COMMONLY ASSUMED ORIGINS OF OVERLENGTH

Predecessor Forms	/zi:də/	/zi:tə/
Apocope	[zi:d]	[zi:t]
Lengthening	[zi:d]	×
Final devoicing	[zi:d̥]	×
Modern Forms	[zi:t]	[zi:t]

Table II: Vowel Lengthening from Middle LG to modern LG

METHODOLOGY

- 10 East Frisian LG speakers from Leer district
- All participants = Low and High German bilinguals
- Male (5 speakers; mean: 64.6, SD: 9.45); Female (5 speakers; mean: 63.25, SD: 7.85)

- Data consists of monosyllabic pairs (roughly /bi:s/ vs. /bi:z/; /zi:t/ vs. /zi:d/; /ʃvi:n/ vs. /ʃvi:m/) and disyllabic pairs (roughly /la:tŋ/ vs. /la:dŋ/; /bi:tŋ/ vs. /bi:dŋ/; /we:ikŋ/ vs. /we:igŋ/)
- Target words situated in carrier sentences with different prosodic contexts: FOCUS (focus, prefocus, postfocus); POSITION (non-final, final); SENTENCE-TYPE (interrogative, declarative)

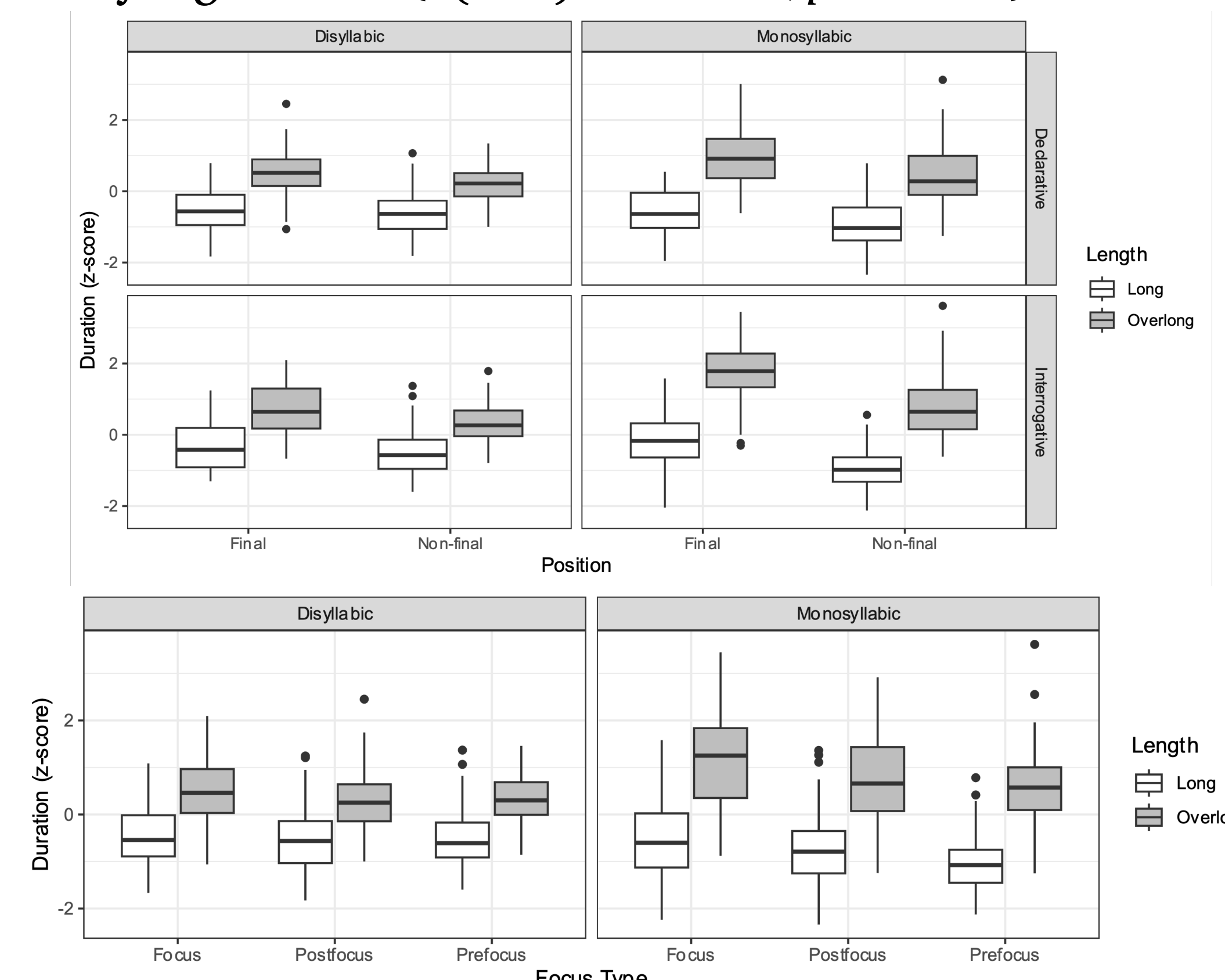
Prosodic Context	High German	Low German
Focused, final, interrogative	Ist das die Seite ? “Is that the side?” /ɪst das di: zaitə/ /ɪst das di: zaitə/	Ist dat de Siet ? “Is that the side?” /ɪst dat de: zɪt/ /ɪst dat de: zɪt/
Prefocus, non-final, declarative	Die Seite ist grün. “The side is green.” /di: zaitə ɪst grʏ:n/ /di: zaitə ɪst grʏ:n/	De Siet ist gröön. “The side is green.” /de: zɪt ɪst grøœm/ /de: zɪt ɪst grøœm/

Table III: Target words in carrier sentence examples.

RESULTS LONG VS. OVERLONG

VOWEL DURATION

- Linear Mixed Effect Model (LMM) conducted (VOWEL QUALITY × VOWEL LENGTH × POSITION × FOCUS × ST × SYLLABLE COUNT)
- Only VOWEL LENGTH significant; overlong vowels longer than long vowels ($t(1032) = 5.063, p < 0.001$)
- Interaction between SYLLABLE COUNT and VOWEL LENGTH was statistically significant ($t(992) = 2.609, p < 0.01$)



VOWEL QUALITY

- Similar LLM was conducted without SYLLABLE COUNT
- No significant differences in vowel quality

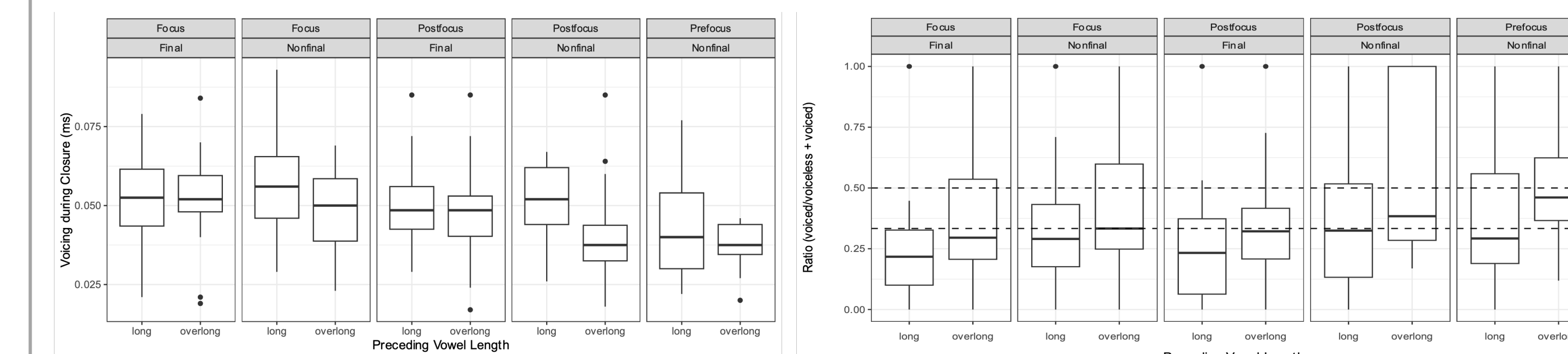
TONAL PATTERNS (f0)

- Tendency in declaratives: falling tones for overlong vowels, sometimes level tone for long vowels, but no stable contrast (ask if interested)

FINAL DEVOICING

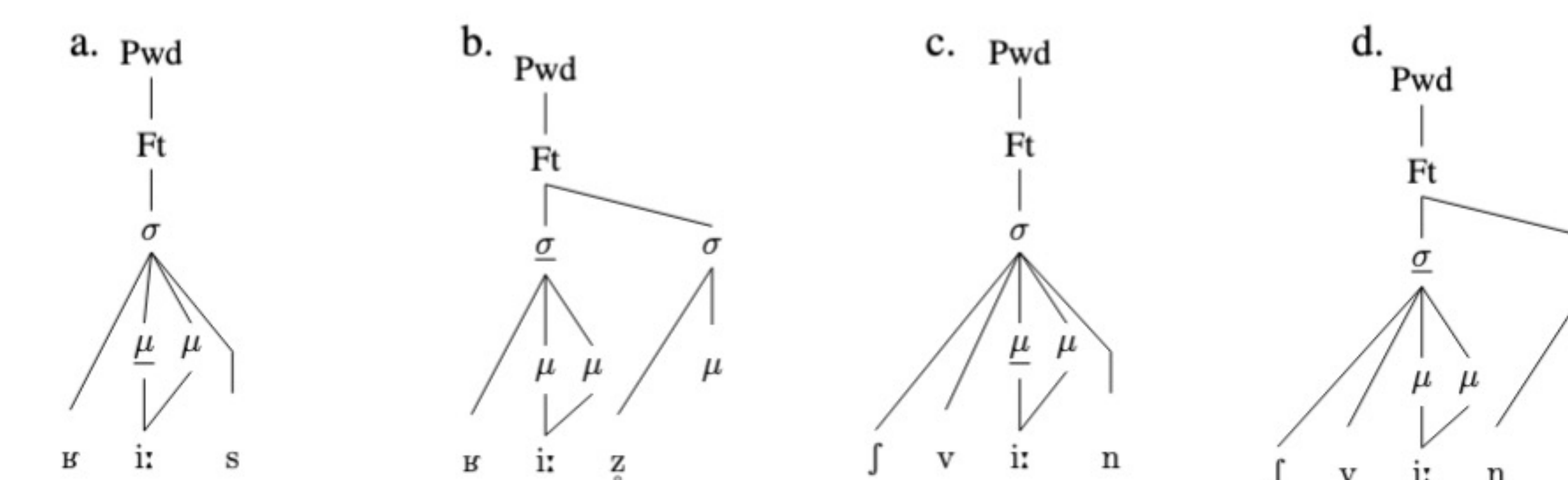
- Voicing status of obstruents judged based on periodicity observed in the closure of stops and duration of fricatives; fricatives classified: voiceless, partially voiceless, and voiced (Jesus & Shadle 2003)

- Stops: non-final focus ($t(31) = 1.7192, p = 0.0455 *$) and non-final postfocus ($t(31) = 2.2392, p = 0.0325 *$)
- Fricatives: final focus context, 82.4% of fricatives following long vowels are realized as voiceless, with no fully voiced codas observed, except for one outlier
- Fricatives following overlong vowels show a different distribution, with 55.6% being devoiced and 27.8% being fully voiced



ANALYSIS

REPRESENTATIONS



- Long vowels:** bimoraic, monosyllabic trochee, final consonant = coda
- Head** (underlined for illustration) = first μ; **Dependent** = second μ
- Overlong vowels:** disyllabic, uneven trochee, final consonant = onset
- Head** (underlined) = first σ, including both μ; **Dependent** = second σ (can be empty-headed)

CORRELATES OF OVERLENGTH

- Duration:** Durational boost when a mora is a foot head or dominated by a foot head (*head domain*, cf. Köhnlein 2011, 2016)
- Both moras in stressed syllable dominated by the syllabic foot head = double boost → phonetic overlength derived from foot structure
- Final obstruents:** onset of empty-headed syllable → incomplete final devoicing; no equivalent for sonorants, which do not devoice

CONCLUSION

- Analysis underscores role of metrical foot for analysis of syllable-internal prosodic oppositions (e.g., Köhnlein & Cameron 2024)
- Captures multiple correlates with the same machinery (*here*: duration, voicing)
- Earlier analyses either assume either **three length degrees** (e.g., Chapman 1993), derive overlength directly from **underlying final-consonant voicing** (Prehn 2012) or assume that the language is **tonal** (e.g., Höder 2010)
- Ternary length analysis misses role of incomplete final devoicing
- Voicing analysis cannot account for pre-sonorant contrast – [ʃvi:n] vs. [ʃvi:n]
- Tonal analysis problematic – f0 never been shown as stable correlate