

RESEARCH ARTICLE

Cut off and drown the last syllables: Utterance-final weakening in Pite Saami

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Abstract

UTTERANCE-FINAL WEAKENING refers to a prosodic feature found at the right periphery of some clauses in Pite Saami. This paper provides the most thorough general description of this prosodic phenomenon to date. The dataset used comes from an annotated corpus of spontaneous speech collected during the last 60 years. The phonetic-acoustic correlates are a complete devoicing of all segments in the final syllables of the affected clause, although creaky or breathy voice may also be present. Typically only one syllable is affected, but sometimes multiple syllables are affected. No syntactic units appear to correlate with this, and the weakening phase can even cross word boundaries. The phenomenon marginally correlates with gender, dialect, and age, with the speech of older speakers tending to feature it more frequently and with a longer prosodic scope. Similar utterance-final weakening phenomena are likely found in other languages, especially those in surrounding areas.

Keywords: utterance-final weakening; Pite Saami; prosody; sociolinguistic variance; devoicing

1. Introduction

The main title of this paper is borrowed from a quote by Johannes Schefferus from the 1674 English translation of his treatise *Lapponia* (Schefferus 1674:79), in which he writes (capitalization and italics from the original):

Now the *Laplanders* have a peculiar way of pronouncing words [...] they do also quite cut off and drown the last Syllables, especially of Nouns.

It is not entirely certain what Schefferus is referring to since he provides no examples or further explanation. However, it seems entirely plausible that he had noticed a subtle but common prosodic feature observable still today in spoken Pite Saami and which I refer to as UTTERANCE-FINAL WEAKENING (abbreviated here as UFW).¹ Specifically,

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this is a phonetic weakening of the terminus of an intonational phrase with a prosodic scope spanning one or more syllables. This paper is intended to provide a linguistically informed description of this phenomenon, not only to supplement previous descriptions of the Pite Saami language, but also because UFW is likely an areal phenomenon that has received little or no treatment for other languages in the area.

Despite the rather extensive linguistics literature on Pite Saami,² this phenomenon has only been treated in Wilbur (2014:36), and that treatment is brief and quite superficial; this paper aims to close that gap. However, beyond Pite Saami, UFW is also of particular interest because remarkably similar phenomena seem to exist in other languages and dialects of northern Fennoscandia (from both the Uralic and the Indo-European language families; see Section 7), such that it is a valid candidate for consideration as an areal feature, yet descriptions about similar phenomena are generally lacking in the respective literature as well. Despite the promising comparative work this scenario presents, the current paper will restrict itself to describing UFW in Pite Saami because the author is particularly familiar with Pite Saami, because the potential prosodic scope of UFW seems especially long in Pite Saami (compared impressionistically to other languages in the area), and, last but not least, because the article-length format is a good medium to present a thorough case study for a single language's instantiation of UFW, with the hope that other, comparative investigations will follow in the future.

Pite Saami (Uralic, Sweden, ISO 639-3 code: sje, Glottocode: pite1240) is a critically endangered Uralic language spoken nowadays by a handful of individuals originating from the areas around the municipality of Arjeplog in Swedish Lapland and adjacent areas in Norway. The language and its speakers have been living in close contact with North Germanic cultures and languages for more than a century and speakers have been more or less bilingual in Pite Saami and the local Swedish dialect (known as *arjeplogsmål*) for several generations (Valijärvi & Wilbur 2011). The spoken-language data used for this study stems from eight recordings collected in various language documentation projects by the author between 2008 and 2015, from older archived recordings (one from 1958, two from 1976), and from two interviews in news reports published by *Sameradion* (part of Swedish public radio) in 2016 and in 2019.

With the above as a backdrop, this paper explores phonetic and grammatical aspects of UFW in Pite Saami. After describing the data and methodology used for the study in Section 1.1, I present the acoustic and articulatory correlates in Section 2. Then I deal with prosodic scope and syntactic tendencies in Sections 3 and 4, respectively. In Section 5, the possibility that UFW might have pragmatic or discourse-level functions is outlined briefly, while potential sociolinguistic factors are discussed in Section 6. I discuss the potential existence of UFW in other languages and dialects, especially in (northern) Fennoscandia, in Section 7 before concluding the paper in Section 8.

1.1 Dataset and methodology

To investigate UFW in Pite Saami, 13 spontaneous speech recordings featuring 11 different Pite Saami native speakers were chosen as a sample dataset. The natural flow of speech in these recordings was divided into utterance units roughly corresponding to sentences and/or intonational units,³ using the software ELAN

(Sloetjes & Wittenburg 2008) to create and manage annotations. The utterances were then transcribed manually by the author and with the assistance of native speakers using the current Pite Saami orthography (Steggo et al. 2019). For each token, annotations for lemma, word class, relevant morphological values, and an English gloss were added automatically using natural language processing (more specifically, this runs a Python script applying a finite state transducer and constraint grammar, following the method outlined in Gerstenberger et al. 2017); any remaining ambiguities were manually resolved by the author whenever possible. In total, the recordings are 3 h 31 m 17 s long and include the speech of 11 different speakers with UFW (five females and six males) recorded in the years 1958, 1976, 2008, 2009, 2010, 2013, 2015, 2016, and 2019.⁴ These recordings consist of 2368 utterances by Pite Saami native speakers; 228 of those utterances contain instances of UFW. All utterances were considered when looking at the sociolinguistic variables presented in Section 6. A subset of 182 instances of UFW were investigated concerning prosodic and syntactic aspects of UFW covered in Sections 3 and 4 (46 instances were removed from the dataset: in 34 cases because no reliable transcription was available, in seven cases because the utterances were predominantly in Swedish,⁵ and in five cases because the extant transcription was insufficient for an unambiguous analysis). The set of data points extracted from these 182 instances of UFW and used for the analyses in this investigation is available as a JSON file via doi: [10.23659/re-523](https://doi.org/10.23659/re-523).

In addition to just marking the presence of an instance of UFW, each instance was coded for the number of affected syllables, the word class or classes affected, the length of the following pause, and whether the following utterance was produced by the same or a different speaker. To calculate a syllable count, the number of syllables that contain at least one segment that is clearly affected by UFW was counted; typically, but not exclusively, this was a vowel. The duration of the following pause was extracted from the ELAN transcription file using a Python (Python Software Foundation 2020) script that measured the gap between the end of the UFW utterance and the onset of the immediately following utterance. The same Python script was used to determine whether the same speaker or a different speaker produced the immediately following utterance. Information about the gender, dialect, and age for each speaker was extracted from metadata about the speakers.

Statistical tests were performed on extracts from the dataset and are discussed in the respective sections. The package SciPy (Virtanen et al. 2020) in Python (Python Software Foundation 2020) was used for the chi-squared tests on the syllable count data in Section 3 and the word class data in Section 4. Some core functions of R (R Core Team 2024) as well as the packages *lme4* (Bates et al. 2015) and *boot* (Davison & Hinkley 1997) were used to analyse the sociolinguistic data presented throughout Section 6.

2. Acoustic and articulatory correlates

Utterance-final weakening is most typically realized as devoicing or whispering; creaky voice or breathy voice may also coincide partly, particularly during the onset of the weakening phase. In this, any segments – both consonants and

vowels – which are underlyingly voiced are realized without any vibrations of the vocal cords; this of course contributes to the decrease in energy and a drop in intensity. In addition, any perceivable pitch essentially disappears, and so does the F0 formant; other formants, however, may still be evident, although weaker. Any devoicing is naturally only discernible when the affected segment is underlyingly voiced. Since only sonorants and the labiodental fricative /v/ are voiced in Pite Saami (in fact, /v/ is often realized as a labiodental approximant [ʋ], and thus also a sonorant) (Wilbur 2014:37–58), vowels provide the most common and reliable way to identify instances of UFW because they occur regularly and frequently and are otherwise always voiced. Note that the Pite Saami sonorants /m n ɲ ŋ l r j/ can also be devoiced as [ṁ ṇ ṅ ṅ̥ l̥ r̥ j̥] when preceding a preaspirated plosive or affricate phoneme (indeed, this is how PREASPIRATION is realized in Pite Saami (Wilbur 2014:38)); however, these voiceless sonorant allophones only coincide coincidentally with the devoiced segments resulting from UFW.

Three instances of utterances featuring UFW are glossed in examples (1), (2), and (3); these are also visualized in Figures 1, 2, and 3, respectively. The figures show the corresponding wave forms, intensity traces, pitch traces, spectrograms, and segmentations for the three examples. In the figures, the annotation tiers contain a rough phonetic transcription, a phonemic transcription, and the orthographic representation, from top to bottom. In the examples, the syllables hosting the instance of UFW are represented via boldface in the orthographic representation, while in the figures, the host syllables are inside the red box in the phonetic transcription. The example in (1) shows a common instance of UFW with a single, whispered syllable. In (2), the onset of UFW features creaky voice which then transitions to voicelessness; here, the creaky phase only affects the lateral approximant onset of the antepenultimate UFW syllable. In (3), breathy voice spans the entire antepenultimate UFW syllable and extends into the penultimate syllable.

- (1) påskå bajjel gujd verrtij-in bäbb**ma-t**
Easter.GEN.SG over definitely must-1DU.PST feed-INF
 ‘Over Easter we definitely have to feed (them).’ [UFW-150]
- (2) att dä mijá nybidtjár-in danne da-n **Lábbási-n**
that then 1PL.NOM settler-ESS there DEM.DIST-INE.SG Lábbás-INE.SG
 ‘So that we (became) settlers there at Lábbás.’ [UFW-169]
- (3) ja judi-jme vulus dálve-ied**nami-jda**
and move-1PL.PST down winter-land-ILL.PL
 ‘And we moved down to the winter lands.’ [UFW-133]

The UFW phases in the utterances in (2) and (3) each span three syllables. As discussed in more detail in Section 3 below, most instances of UFW in the dataset

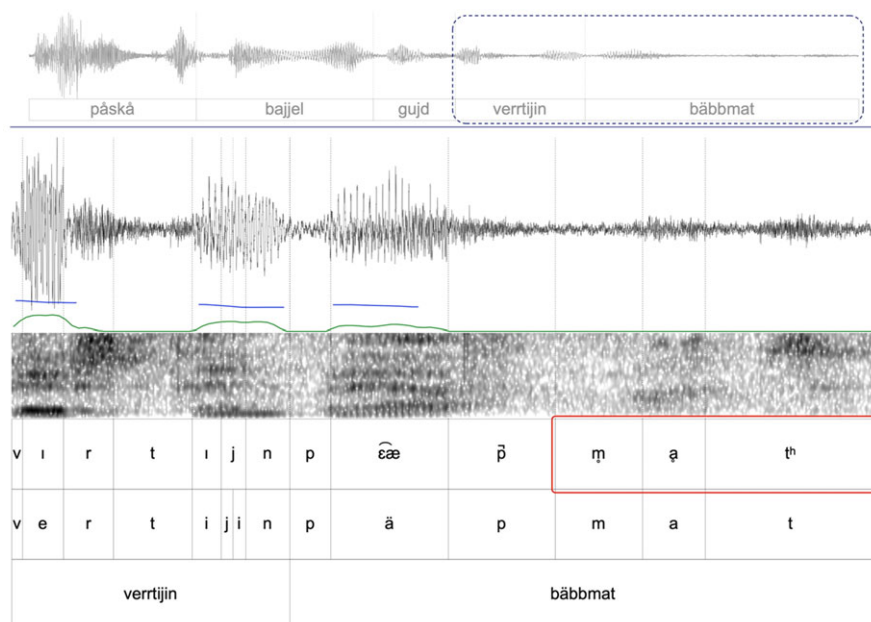


Figure 1. A waveform, intensity trace (green), pitch trace (blue) and spectrogram for the final six syllables of the utterance in example (1) are shown below the blue horizontal bar; the top tier presents a rough phonetic transcription and is aligned with the visual representations of the acoustic signal, while the middle tier shows a phonemic representation and the bottom tier has the orthographic forms of the word forms; the syllables hosting UFW are inside the red box in the top tier. A wave form of the entire carrier utterance is shown above the blue horizontal bar, with the highlighted final six syllables in the light blue dashed box.

only affect a single syllable; these two examples were chosen to illustrate the phenomenon here because the weakening is particularly obvious due to its duration.

In the course of my own linguistics fieldwork, I have consulted native speakers about UFW, and they are all generally unaware of its existence before I point it out to them. However, after I call attention to it, they all perceive it clearly. This indicates that UFW is not produced consciously.

3. Prosodic scope

To understand UFW, it is useful to look at the scope of prosody which UFW may be realized within. In other words, identifying a kind of ‘UFW-bearing-unit’ is important because this can provide evidence for where UFW may occur and whether prosodic units (or even syntactic units) play a relevant role. Note that utterances hosting UFW always correspond to a general fall in intensity⁶ and a fall in or complete loss of pitch as an utterance reaches its resolution; such drops in intensity and pitch can also occur without hosting UFW.⁷

Instances of UFW in the data were only tagged as such when minimally an utterance’s ultimate vowel is audibly affected by UFW (mainly by devoicing, but also by creak or breathiness). Because the onset of UFW is not instant but gradual (at a

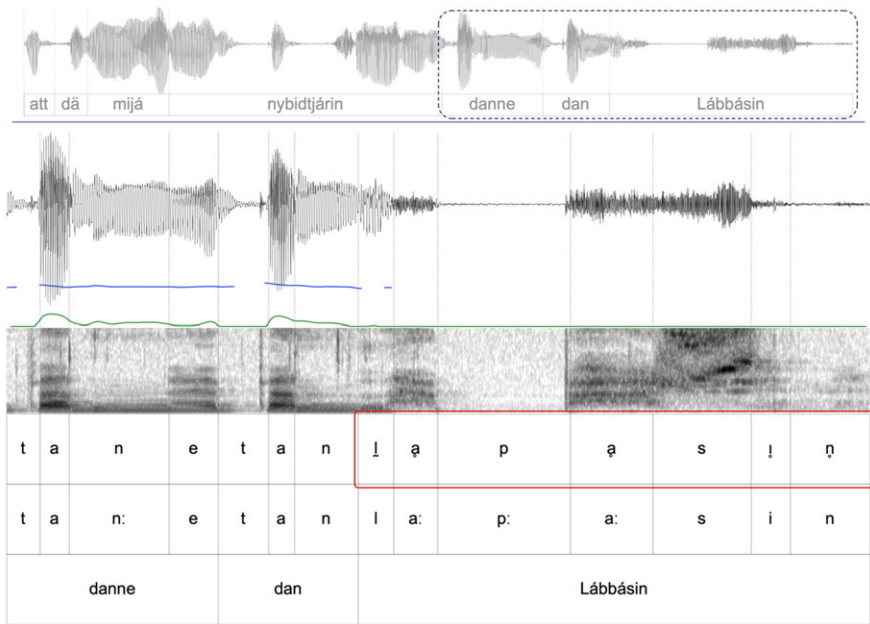


Figure 2. A waveform, intensity trace (green), pitch trace (blue) and spectrogram for the final six syllables of the utterance in example (2) are shown below the blue horizontal bar; the top tier presents a rough phonetic transcription and is aligned with the visual representations of the acoustic signal, while the middle tier shows a phonemic representation and the bottom tier has the orthographic forms of the word forms; the syllables hosting UFW are inside the red box in the top tier. A wave form of the entire carrier utterance is shown above the blue horizontal bar, with the highlighted final six syllables in the light blue dashed box.

millisecond scale) and thus impossible to pinpoint exactly, it is more easily identifiable using the devoicing of vowels – which otherwise are always voiced in Pite Saami – as a proxy (see also Section 2 on voiced segments). The examples in the figures at the end of the previous section illustrate this nicely. In Figure 2, the transition from modal voice to weakening occurs between the words *dan* and *Lábbásin*, where the final /n/ in *dan* is fully voiced, the /l/ in *Lábbásin* begins to lose strength and is pronounced with creak [ɺ], and from the following vowel /a:/ onwards, all segments are voiceless: [apʌsɪŋ]. In Figure (3), the final three syllables - *namijda* host this instance of UFW; here, the entire antepenultimate syllable /na/ and the penultimate syllable's onset /m/ are produced with breathy voice as [n̥am̥]; starting with the latter syllable's vowel /i/, the rest of the utterance is fully devoiced: [i̥j̥t̥ḁ]. With these examples in mind, one indirect way to measure the prosodic length of UFW is to count the number of syllables that contain at least one segment that is clearly affected. In other words, syllable count can be used as a proxy for UFW length. Note, however, that the initial or left UFW border does not necessarily align with a syllable boundary; the final or right border always does, but this is because it is always at the end of an utterance, which is also the end of a syllable.

Table 1 presents the frequency of UFW instances in the data as categorized by the number of affected syllables in absolute and relative numbers. UFW affecting a

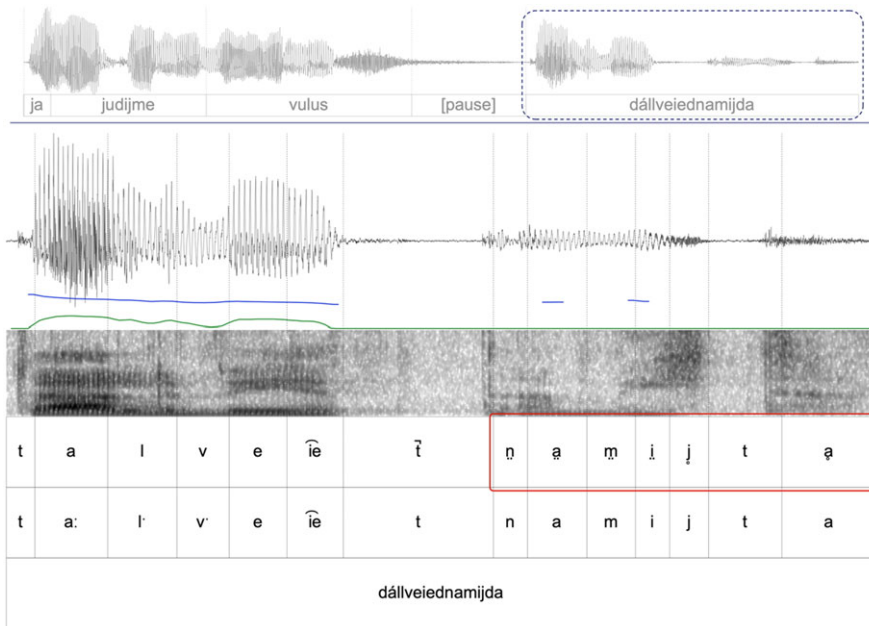


Figure 3. A waveform, intensity trace (green), pitch trace (blue) and spectrogram for the final six syllables of the utterance in example (3) are shown below the blue horizontal bar; the top tier presents a rough phonetic transcription and is aligned with the visual representations of the acoustic signal, while the middle tier shows a phonemic representation and the bottom tier has the orthographic forms of the word forms; the syllables hosting UFW are inside the red box in the top tier. A wave form of the entire carrier utterance is shown above the blue horizontal bar, with the highlighted final six syllables in the light blue dashed box.

Table 1. Absolute and relative counts of UFW instances affecting one, two and three utterance-final syllables in the dataset

Syllable count	Absolute qty	Relative qty
1	138	0.758
2	39	0.214
3	5	0.027
Total	182	1.000

single syllable was by far the most common in the data, with two affected syllables much less frequent, and three affected syllables very uncommon.⁸ In Section 6.3 below, I briefly look at how there is a possible tendency for the oldest speakers to have longer UFW durations, as measured via syllable count.

The set of examples in (4) nicely illustrates the variation in the prosodic scope (as well as in the syntactic scope) of UFW. These were all produced by one speaker on the same day concerning the same event, and all end in the same noun phrase *aktav guolev* ‘one fish’ in accusative singular, but differ concerning the presence and scope

of UFW (here and elsewhere, the orthographic representation in boldface corresponds to the syllables hosting the instance of UFW).⁹

- (4) a. best-ijmin ju akta-v **guole-v**
drop-1DU.PST *indeed* *one-ACC.SG* *fish-ACC.SG*
 'We indeed lost one fish.' [n.a.]
- b. ádtjo-jmin akta-v **guole-v**
get-1DU.PST *one-ACC.SG* *fish-ACC.SG*
 'We caught one fish.' [UFW-104]
- c. besti-jmin akta-v **guole-v**
drop-1DU.PST *one-ACC.SG* *fish-ACC.SG*
 'We lost one fish.' [UFW-105]

In (4a), UFW is not present at all, as opposed to the examples in (4b) and (4c). In (4b), only the ultimate syllable is subject to UFW, and the onset of UFW does not align with a syntactic boundary, while in (4c), the final two syllables are subject to UFW, and the onset of UFW aligns with the syntactic border between the words *aktav* and *guolev*.

It is worth mentioning that the duration of the pause between the end of an instance of UFW and the onset of the following utterance could potentially also provide an additional interesting point of prosodic analysis. Unfortunately, the characteristics of the current dataset make it difficult to investigate this in a satisfactory way, mainly because of the limited number of UFW data points. Nonetheless, a relevant line of questioning and the results of a preliminary study are summarized here. The initial question is whether there is a general correlation between UFW and the length of a subsequent pause. A pilot investigation of the dataset indicated that pauses following UFW are longer on average (mean = 1012 ms, std = 1052 ms, $n = 190$) than pauses following modal utterances (mean = 609 ms, std = 999 ms, $n = 2099$), with a similar variance; a Mann-Whitney U test indicated that the difference in millisecond measurements between UFW and modal groups is significant ($U = 239020.5$, $p < 0.001$), but with a small effect size (the Cliff's-delta statistic is 0.20). However, a number of other factors which might also play a role in pause length should be considered to really understand if and how these results are meaningful; these factors include whether the utterance is part of a monologue or a dialogue, and, for the latter, whether or not the pause correlates with a change in speaker. Similarly, the duration of overlapping speech in dialogues could provide insight into UFW, namely to what extent overlaps co-occur with UFW and to what extent this deviates from modal overlaps. As mentioned, the current dataset is too limited to draw conclusions about these factors with any confidence since only two of the sessions in the dataset are dialogues with multiple active speakers, while the other nine sessions are essentially monologues (recordings in the dataset with more than one speaker were treated as monologues when one speaker clearly dominates the recording because he or she is narrating a story or recollecting past events). With this in mind, an exploration of pause length and UFW must be left for future research when a significantly larger dataset, especially one including more dialogues, is available.

Table 2. Absolute and relative counts of the word classes affected by UFW in the dataset; items missing a value in the fourth column are instances of UFW spanning more than a single word, and thus more than one word class is affected; the rightmost column shows the relative frequencies for word classes in utterance-final position in the rest of the dataset

Word class	Absolute qty	Relative qty	Relative qty in rest of dataset
N	76	0.417	0.205
V	54	0.297	0.217
Adv	22	0.121	0.107
Pron	9	0.050	0.062
Po	8	0.044	0.025
A	4	0.022	0.044
CS	2	0.011	0.008
Num	2	0.011	0.005
Pcle	1	0.005	0.148
N Po	1	0.005	
V Pron	1	0.005	
V CC	1	0.005	
Pron V	1	0.005	
Total	182	1.000	

4. Syntactic tendencies

There do not appear to be any strict restrictions on which syntactic units can undergo UFW, with the exception that these must be utterance-final. However, some word class preferences seem to be present. Table 2 presents the frequency for each of the different word classes¹⁰ among all words affected by UFW in the data. The rightmost column in the table shows the relative frequency for each of these same word classes in utterance-final position in the rest of the dataset's recordings, e.g. in the absence of UFW. Note that the dataset used to investigate syntactic structures here is a slightly smaller subset of the full dataset due to having removed uncertain syntactic analyses.

Of those word classes affected by UFW, there is a preference for nouns (~42%) and then verbs (~30%) and adverbs (~12%), while other word classes accounted for less than 5% each.¹¹ This tendency differs from the frequencies of utterance-final word classes in utterances not affected by UFW, in which nouns and verbs each account for around 21%. Adverbs are around the same for both UFW and non-UFW utterances, as they comprise around 11% of both subsets. The other noticeable difference is that utterance-final particles are clearly more frequently not subject to UFW (~15%), while there is only one instance of a particle being subject to UFW.

To explore this further, a statistical test was performed on the entire subcorpus to compare the distribution of utterance-final word classes subject to UFW and those

not subject to UFW. Specifically, a contingency table of utterance-final word classes (as the explanatory variable) and the presence or absence of UFW (as the response variable) was created; only those word classes with at least six instances per cell in the contingency table were included: nouns, verbs, adverbs, pronouns, and postpositions. The hypothesis was that the group of utterance-final word classes subject to UFW differs significantly from the utterance-final word classes not subject to UFW, while the null hypothesis stated that there is no significant difference between the two groups; in other words, the presence or absence of UFW correlates to some extent with word class. To test this, a chi-squared test was done on the contingency table; the results marginally reject the null hypothesis that there is no significant difference ($\chi^2 = 10.35$, $df = 4$, $p = 0.0348$; Cramér's $V = 0.104$, indicating a small association between the variables, applying effect size interpretations after Cohen 1988). In summary, this supports the conclusion that there is a correlation between UFW and word class, namely that UFW prefers (but is not restricted to) noun-final utterances; more data would undoubtedly contribute to a more robust analysis.

Looking at the alignment of syntactic boundaries and UFW, it is clear that the end of the UFW phase aligns with the end of the utterance unit, and thus also coincides with the end of a syntactic unit. The onset of the UFW phase, on the other hand, does not necessarily align with the left or initial edge of a syntactic unit. Of the 182 instances of UFW in this dataset, in only 37 cases (i.e. ~20%) does the syllable hosting the onset of the UFW phase also host the initial morpheme of a syntactic unit, as exemplified in (4c) above and in (5) here.

- (5) *dä gillgi-n gähtta-t gåk lä da-jna guli-jn*
then shall-1DU.PRS look-INF how be.3SG.PRS DEM.DIST-COM.SG fish-COM.SG
 'Now we shall see how this fish is.' [UFW-115]

In three cases (i.e. ~2%), this initial host syllable coincides with a word-internal compound boundary, as shown in (6).

- (6) *välldi-v tjänntá-saje-v*
take-1SG.PST housemaid-place-ACC.SG
 'I took a job as a housemaid.' [UFW-165]

In all other cases, the onset of the UFW phrase does not align with a syntactic boundary, as in (4b) above and in (7) here.

- (7) *båtsoj älgi-j sida-j állge-t vádtse-t*
reindeer.NOM.SG start-3SG.PST want-3SG.PST start-INF go-INF
 'The reindeer started, wanted to start moving.' [UFW-138]

In four cases, there is even a single syntactic boundary within the UFW phase (the affected word class combinations are missing a value in the fourth column in Table 2). One of these examples (showing UFW spanning a pronoun and a verb) is shown in (8).

- (8) idtji-v mǎn **da-jt** **ane**
not-1SG.PST 1SG.NOM DEM.DIST-ACC.PL have.CONNEG
 'I didn't have those.'

[UFW-077]

Keeping in mind these multiple and various possibilities concerning both affected word classes and alignment with syntactic boundaries, it seems that there is a preference for nouns and then verbs, but any other correspondence between UFW and syntactic units is most likely a coincidence; the statistical test mentioned above supports this analysis as well concerning word classes subject to UFW. I therefore conclude that syntactic constituency is not a directly relevant aspect of UFW. However, it could be indirectly relevant if a related pragmatic function were identified that could explain this preference for utterance-final nouns and/or verbs. The near minimal triplet examples featuring the utterance-final nominal phrase *aktav guolev* 'one fish' in (4) above, illustrates nicely how UFW is not directly linked to or dependent on syntactic structure. Indeed, the lack of any difference in the semantics of the final two syntactic components of these three clauses indicates that UFW does not mark any systematic semantic contrasts in the same way as for instance a rise in pitch can indicate a polar question in South Saami (Kowalik 2023:345) or Swedish (Gårding 1998:121–122). Finally, the fact that UFW can even cross word boundaries (as in example (8) above) shows that it is a post-lexical process and is neither morphologically nor lexically determined.

5. Possible pragmatic functions

While it is not entirely clear, based on the set of annotations in the dataset analysed in the current study, how exactly UFW is used pragmatically, it does seem that UFW conveys some kind of pragmatic function. Although the dataset is limited, a hint of a pattern still emerges, as UFW only occurs at the end of statements finalizing discourse-level information-containing units in both dialogues and monologues, while it never co-occurs with an interrogative or imperative meaning. This suggests that UFW could function as a marker of the end of some discourse unit, and perhaps also as a cue for turn-taking. Note that turn-taking cannot be its only function, since UFW is also found frequently in monologues, where turn-taking is not a relevant aspect of speech. However, the data is too limited to say with certainty that UFW conveys this function; indeed, it was not present in the speech of some speakers (as outlined at the end of the introduction to Section 6 below), indicating its usage might even be idiolectal or optional. Further support for UFW marking units larger than clauses comes from the fact that UFW also coincides with the end of a prosodic phrase, as shown by a concomitant fall in or loss of pitch and a fall in intensity (see Section 2), as well as the longer average duration of following pauses (see Section 3). In any case, its pragmatic function is certainly a topic worth addressing in future studies using a bigger dataset with more thorough annotations tracking discourse units and information structure.¹² Identifying any pragmatic functions, especially concerning information structure, could also explain the significant preference for nouns and verbs at the end of UFW utterances (see Section 4).

6. Potential sociolinguistic variables

The total number of speakers represented in the dataset is very small (only 11 different native speakers) so that it is very difficult to come to any definitive conclusions concerning how sociological variables correlate with UFW. Nonetheless some preliminary observations can be made concerning whether gender, dialect, or age appear to be a factor in whether or how often UFW occurs. To get an impression for whether these sociolinguistic categories could be a factor, I compared the frequency of UFW across all utterances for each speaker in the dataset, and then compared those ratios to sociolinguistic data about the speakers. In addition to the small size of the dataset available for this study, the limited breadth of genres in the recordings also makes it difficult to come to any decisive conclusions. Despite these limitations, exploring the frequency of UFW relative to sociolinguistic factors may still provide some insight into UFW in Pite Saami.

Note that idiolect may also play a role, as evidenced by the fact that the speech of some speakers exhibits UFW exceptionally rarely. To emphasize this point – albeit impressionistically – I looked at all the transcribed data in my entire spontaneous speech corpus for Pite Saami for the two speakers with the lowest relative UFW frequencies in the present dataset; in other words, for this task I also looked at recordings which were not in the present dataset because they had not been annotated thoroughly or consistently for lemma, word class and morphological categories. This showed that neither of these two speakers had other instances of UFW beyond those in the current dataset; one speaker had a single instance of UFW out of 3954 utterances, while the other speaker had two instances out of 8661 utterances. In both cases, the relative frequency of UFW is negligible (around 0.02% of their respective utterances features UFW). While this could theoretically be a coincidence, especially with this relatively small dataset, this fact more likely points to UFW being an optional feature of the Pite Saami language.

6.1 Gender

To investigate whether gender may play a role, speakers were divided into binary gender categories, ‘female’ and ‘male’, based on speaker metadata; the frequency of UFW versus no weakening for each group was then calculated and is presented as both absolute and relative frequencies in Table 3, along with descriptive statistics for the UFW data.

The frequencies themselves seem to indicate that males as a group (~13% of all utterances by males) generally produce more UFW than females as a group (~5% of all utterances by females). Because these group frequencies do not consider individual speakers, within-group tendencies and dispersion were assessed by calculating the means and standard deviations for UFW utterances (also presented in Table 3); in addition, this allows us to determine the likelihood that this distribution is not just coincidental. These latter results confirm that an average male speaker produces UFW more frequently than an average female, as the mean amount of utterances affected by UFW per speaker for males is 13.2% (with a standard deviation of 6.3 percentage points), while the average for females is 10.8% (with a standard deviation of 12.1 percentage points). However, there is more variation in the amount of UFW among

Table 3. Contingency table showing the frequency of utterances with weakening (+UFW) and of utterances without (–UFW) per gender group (female and male); for each cell, the absolute count is listed, followed by the relative frequency in parentheses. The relative frequency in each row was calculated relative to that row's total data points. For each +UFW cell, the mean and standard deviation (std) are shown

	+UFW	–UFW
females (<i>n</i> = 5)	43 (0.045) mean = 0.108 std = 0.121	905 (0.955)
males (<i>n</i> = 6)	187 (0.132) mean = 0.131 std = 0.063	1233 (0.868)
all speakers (<i>n</i> = 11)	228 (0.100) mean = 0.121 std = 0.095	2140 (0.900)

the female speakers. To test whether the effect of gender on UFW frequency is statistically significant, a Pearson's chi-squared test of independence between gender and frequency of UFW was performed. The results suggest that the effect is significant ($\chi^2 = 46.15$, *df* = 1, $p < 0.001$); however, the adjusted Cramér's *V* is 0.14 with 95% confidence intervals [0.11, 1.00], which indicates the effect is small (applying effect size interpretations after Cohen 1988).

Note that one female speaker has a striking amount of utterances with UFW at 34% and one male speaker uses UFW in around 26% of his utterances. These two speakers alone exhibit UFW considerably more often than all the other speakers (the other speakers' UFW rates are at 13% or less), and increase the mean and the standard deviation for each of the two test groups, and for the sample as a whole. While it cannot be stressed enough that the sample size is very small, such that these figures and statistical measurements must be taken with a healthy dose of scepticism, they are at least illustrative of the fact that there is significant variation in the frequency of UFW production within both groups and thus within the sample as a whole. With the small effect size and the large variation in mind, it does not appear that gender alone is a highly significant factor in whether or how frequently a speaker produces UFW.

6.2 Dialect

Although Pite Saami has historically always been and continues to be a small language community, it is still possible and reasonable to distinguish a number of geographically based dialects. Indeed, the existence of regular geographic variation in language patterns is evidence for the fact that the Saami languages are a dialect continuum (see e.g. Sammallahti 1998:1). The most salient features distinguishing Pite Saami dialects tend to be phonological or lexical.¹³ For this study, I use two phonological features to distinguish three dialect areas, which also roughly follow demographically relevant *sameby* (reindeer herding community) boundaries.¹⁴ The two phonological features are: (a) the extent of metaphony, which refers to a partial assimilation of the first syllable's vowel when the second syllable's vowel is /i/

or /u/ (Wilbur 2021), and (b) the variation in the behaviour of diphthongs corresponding to /u̯a/ in the central dialect (Wilbur 2014:69–70). The dialect areas are as follows.

- North: the northern side of Pite Saami territory from along the Swedish–Norwegian border into the forests of Sweden and roughly corresponding to Luokta-Mávas *sameby*; it features full metaphony and lacks the diphthong /u̯a/, but instead only has /u̯e/.
- Central: the central-western part of Pite Saami territory from along the Swedish–Norwegian border into the forests of Sweden and roughly corresponding to Semisjaur-Njarg *sameby*; it features full metaphony and realizes the diphthong /u̯a/ as [u̯e] when the following vowel is /e/.
- East: the eastern side of Pite Saami territory, roughly corresponding to Ståkke *sameby*; it features partial metaphony (a smaller set of vowels is subject to metaphony) and lacks the diphthong /u̯a/, using /u̯ɔ/ instead.

The speakers in the dataset were assigned to one of these three dialect categories based on the location of their childhood homes in these dialect areas, although due to the extensive contact and occasional inter-marriage between dialects, some idiolects are indeed often a mix of ‘pure’ dialects.

Due to the particularly small sample size, especially for the eastern dialect, which only has one representative in the dataset, the descriptive statistics concerning dialects and UFW must be treated as preliminary and possibly unrepresentative. The frequency counts for utterances with and without UFW in each of the dialects are presented in Table 4, shown as both absolute and relative frequencies. To better understand the dispersion of UFW in each dialect, especially because the raw frequencies do not consider individual speakers’ behaviour, the mean and standard deviation for each group were calculated; these are also presented in Table 4.

Based on these figures, there seems to be a tendency for central dialect speakers’ language to feature UFW more frequently, at an average of 16% of these speakers’ utterances hosting UFW (with a standard deviation of 0.107), than the speech of northern dialect speakers, who produce UFW in ~6% of their utterances (with a standard deviation of 0.047); the single eastern dialect speaker had UFW in almost 12% of his utterances, but this does not contribute to the significance of the test. A Pearson’s chi-squared test of independence between dialect and frequency of UFW suggests that the effect is statistically significant ($\chi^2 = 107.62$, $df = 2$, $p < 0.001$); the adjusted Cramer’s V is 0.21 with 95% confidence intervals [0.18, 1.00], indicating that the effect is moderate bordering on small (applying effect size interpretations after Cohen 1988). Clearly, UFW is prevalent in all Pite Saami dialects considered here; there may be a tendency for it to be more frequent in the speech of central dialect speakers, but more data is needed to determine if there is a clear preference for UFW in a given dialect.

6.3 Age

Finally, I consider whether a speaker’s age may correlate with the presence or frequency of UFW. In this, the speakers’ ages when recordings were made that were

Table 4. Contingency table showing the frequency of utterances with weakening (+UFW) and of utterances without (–UFW) per dialect group (north, central and east); for each cell, the absolute count is listed, followed by the relative frequency in parentheses. The relative frequency in each row was calculated relative to that row's total data points. For each +UFW cell, the mean and standard deviation (std) are shown

	+UFW	–UFW
north (<i>n</i> = 4)	44 (0.037) mean = 0.066 std = 0.047	1153 (0.963)
central (<i>n</i> = 6)	158 (0.170) mean = 0.160 std = 0.107	771 (0.83)
east (<i>n</i> = 1)	28 (0.116) mean = 0.116 std = 0.000	214 (0.884)
all speakers (<i>n</i> = 11)	228 (0.100) mean = 0.122 std = 0.095	2140 (0.900)

used in the dataset was not considered, but instead the speakers' birth years. The birth years represented span nearly 90 years, but about half of the speakers were born between 1940 and 1960. Rather than dividing speakers into age groups (analogue to the two gender groups or three dialect groups in the previous sections), I looked at the relative frequency of UFW for each speaker, as presented in Table 5, where each year of birth represents a single speaker.

To see if there is a correlation between frequency of UFW and birth year, the Pearson's *r* correlation coefficient was calculated, with a result of -0.70 .¹⁵ The data points and the overall linear regression line (in red) are plotted in Figure 4; here, the *x*-axis represents the year of birth and the *y*-axis the relative frequency of UFW. As this figure illustrates, the relative frequency of UFW has decreased slightly over time, as supported by the Pearson's product-moment correlation between year of birth and frequency of UFW, which is negative, statistically significant, and very large.¹⁶ This is supported by the negative correlation coefficient, which indicates a slight negative correlation between age and relative UFW frequency such that the earlier a speaker was born (e.g. a lower birth year), the more UFW was produced (a higher relative frequency).

However, if the two oldest speakers are removed so that only speakers born in 1927 or later are considered, this negative correlation disappears and a marginally positive Pearson correlation coefficient of 0.22 is evident instead, as illustrated by the shorter linear regression line in Figure 4 (in orange). In other words, there does not seem to be any meaningful trend in the frequency of UFW for all speakers born in 1927 or later; however, decreasing the sample size of an already small dataset also decreases the power of this statistic.

Relatedly, the average length of UFW instances, when using syllable count as a proxy to quantify UFW length (see Section 3), is higher for the oldest speakers in the

Table 5. Birth year of each speaker and relative frequency of UFW out of all utterances for that speaker in the dataset, ordered chronologically

+UFW		+UFW	
yob	rel. freq.	yob	rel. freq.
1890	0.340	1948	0.048
1906	0.260	1949	0.076
1927	0.020	1954	0.004
1927	0.116	1955	0.100
1944	0.114	1977	0.124
1946	0.133		

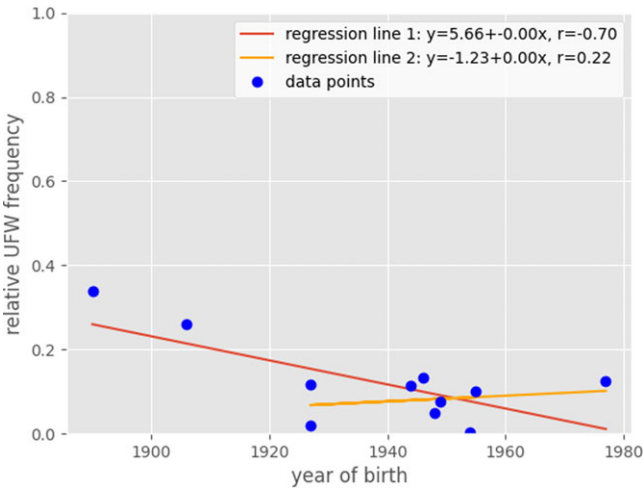


Figure 4. A plot of the relative frequency that UFW occurs for speakers based on birth year, including linear regression lines for all participants (red) and only for those born since 1927 (orange).

dataset. This was determined by dividing the UFW dataset into two groups: UFW found on one syllable (1) vs. UFW found on more than one syllable (2+). This division was chosen in order to create a binary variable, especially considering the low count of UFW corresponding to three syllables (see Table 1 for the absolute and relative counts for one, two, and three syllables bearing an instance of UFW). Then, a mixed-effects logistic regression model was fitted to predict the syllable group (1 vs. 2+), with the speaker as a random effect.¹⁷ Figure 5 visualizes the relationship between the number of affected syllables and the speaker, but uses year of birth to illustrate this relationship. This clearly shows how the oldest two speakers are more likely to have an instance of UFW occurring on two or more syllables than the other speakers, for whom the chances are generally less than 50% that UFW occurs on two or more syllables.

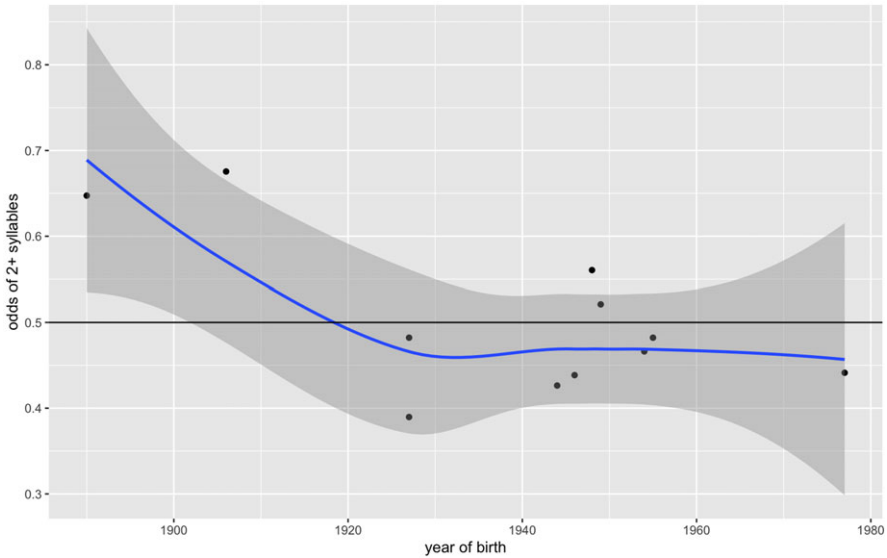


Figure 5. A plot of the probability that UFW occurs on two or more syllables (2+) for each speaker based on birth year. Each dot represents one speaker, with the birth year plotted relative to the *x*-axis and the probability relative to the *y*-axis (0.0 represents zero probability of two or more syllables, 0.5 is a 50-50 chance, and 1.0 a 100% likelihood); the blue line illustrates the predicted probability of UFW occurring on two or more syllables over time (fit using local polynomial regression); the grey shaded band shows the 95% confidence interval; the horizontal line at 0.5 is included just as a reference point showing equal outcomes.

The overall pattern in Figure 5 is strikingly similar to the raw frequencies and linear regression lines presented in Figure 4 above. In summary, it seems that the frequency of UFW has been decreasing over time, although it may have stabilized rather than encroaching on zero; similarly, the length of UFW – expressed as the number of weakened syllables – has decreased over time such that it is more likely to only affect a single syllable for younger speakers.

7. Beyond Pite Saami

It is well known that both intensity and pitch tend to decrease at the end of utterances (e.g. Vaissière 1983:62, Strik & Boves 1995, Gussenhoven 2010:110–113); UFW happens in addition to such a drop. While the current study has explored this prosodic phenomenon in Pite Saami, since I am most familiar with Pite Saami and have access to the Pite Saami data presented above, it is worth adding that I have noticed – impressionistically – what appears to be either nearly identical or at least very similar weakening phenomena (i.e. whisper, creak, and/or breathy voice) in other languages spoken in northern Europe, both in the Indo-European and the Uralic language families. With this in mind, it seems likely that UFW in general is a valid candidate for an areal feature that merits continued investigation in other languages beyond Pite Saami. While I have not investigated this systematically for other languages, it seems useful to summarize both what I have observed on my own

and what I have found in reviewing academic literature concerning other languages in the area, broadly speaking.

To start with, Pite Saami's closest neighbour Lule Saami features UFW, but I have not found any discussion of this in the literature. North Saami seems to have it, as implied by Nickel & Sammallahti (2011:20), who write that, in the final utterance of an intonation phrase, 'the *voice strength decreases* such that the last sound often sounds like *whispering*' (my translation, italics in the original), but without going into more detail about this utterance-final 'whispering'. Inari Saami seems to have an UFW phenomenon (e.g. Türk et al. 2019:39 mentions 'tokens with no traces of F0 mostly due to creaky voice quality and utterance-final devoicing'), but I am unaware of any investigations into this.

The main contact language for Pite Saami is *arjeplogsmål* 'Arjeplog dialect', which is the Swedish dialect spoken in Pite Saami territory. During my own field work, I have encountered many speakers of *arjeplogsmål* (including some Pite Saami speakers¹⁸) and I have observed clear examples of UFW in *arjeplogsmål* as well,¹⁹ although, unsurprisingly, it is not mentioned in the dialect descriptions of Wallström (1943) or Lindfors (2001), as neither deals with higher-level prosodic phenomena. According to my own observations, other North Germanic dialects (in addition to *arjeplogsmål*), at least in northern Sweden, also have it, as well as the Finno-Ugric language Meänkielli. However, I am unaware of any scientific research or publications that have dealt in any detail with something similar to UFW in any of these languages or dialects.

Anyone familiar with spoken Finnish will likely recognize a similar phrase-final phenomenon which is mainly realized as creak; for example, Iivonen (1998:322) states that 'aperiodic voice (laryngealisation, creaky voice) is connected with the ends of the final statements'. Ogden (2001) presents a conversation analysis study which uses a small corpus of spoken, spontaneous Finnish to explore prosodic turn-taking cues, especially those occurring-utterance finally. He summarizes that '[o]verwhelmingly, creak is used turn-finally, although other non-modal forms of phonation are used as well (such as breathiness, voicelessness and whisper)' (p. 140). It is worth highlighting that, even if Finnish features creaky voice most frequently, breathiness, voicelessness and whisper are also listed as possible prosodic correlates for marking essentially a similar, utterance-final component, just as in Pite Saami. The acoustic analysis of data collected in a controlled, experimental setting carried out by Arnhold (2016:104) further confirms this, showing that 'non-modal voice quality was more frequent later in the sentence'. Note also that Arnhold (2014:79, 81–82, 2016:96–98) has shown that information structure plays a role, with words in narrow focus and post-focal words more likely to be realized in a non-modal way.

In addition, a few other languages outside the Circum-Baltic area are worth mentioning which may have phenomena potentially similar to UFW in Pite Saami. Icelandic sonorant consonants are devoiced phrase-finally after voiceless consonants and, optionally, following voiced segments, although this appears to be a strictly phonological phenomenon (Thráinsson 1994:151); indeed, Árnason (2009:300) claims that 'the devoicing is optional since it is possible to utter the same phrase and skip the devoicing without a major difference in pragmatic value' and that 'the presence of final devoicing implies the end of (some sort of) a phonological phrase or utterance'.²⁰ Árnason et al. (2020:7) indicate that Faroese, which is of

course closely related to Icelandic, also has some utterance-final devoicing which sometimes co-occurs with vowel truncation (but no further details are provided). Fortescue (1984:343) claims that, in West Greenlandic (Eskimo–Aleut), the ‘final two morae are often devoiced in conjunction’ with utterance finality, while ‘West Greenlandic as spoken around Nuuk and south of it regularly devoices, reduces or deletes final consonants, syllable rhymes or complete syllables in final position (“clipping”), often associated with a lowering of final pitch’, which sounds like something potentially quite similar to UFW in Pite Saami, even if the prosodic scope is shorter. Árnason et al. (2020:14) also mention that phrase-final syllables are frequently ‘reduced or deleted’ in Aleut, an Eskimo–Aleut language of Alaska. Finally, Den & Koiso (2015) look at how utterance-final vowels may be devoiced in Japanese, although this seems to have strictly prosodic (specifically moraic) prerequisites and may also be highly influenced by a small set of frequent lexical items; it is not clear whether any of the other possible correlating factors investigated above for Pite Saami are relevant for Japanese.

While other languages may feature some version of utterance-final ‘weakening’ like what is described here for Pite Saami, it seems that there is a noticeable concentration of such languages in areas surrounding the Gulf of Bothnia. However, I have not found any mention of it as such in the literature on Circum-Baltic languages, including in the two-volume collection edited by Dahl & Koptjevskaja-Tamm (2001). Considering the evidence from Insular Scandinavian languages, West Greenlandic, Aleut, and Japanese, the actual area covered by utterance-final weakening phenomena may in fact be larger than just the Circum-Baltic area.

8. Conclusions

Utterance-final weakening is a noticeable and regular feature of the speech of many Pite Saami speakers, yet has hardly received any attention in previous descriptions of the language. This paper has attempted to describe UFW in Pite Saami concerning its acoustic and articulatory correlates, its prosodic scope, possible correlations with syntactic structures, potential pragmatic functions, as well as how it may correspond to the sociolinguistic categories of gender, dialect, and age. The main phonetic correlate is the whispering of segments in utterance-final position, and it typically affects the final syllable, although two or more syllables may also host it. Syntactically, it always aligns with the end of a clause, but no other syntactic structures seem relevant. It may have a pragmatic or a discourse function, but much more research is needed on this aspect. There is a slight tendency for males to produce more instances of UFW than females, while the speech of older speakers does typically have more UFW and longer instances of UFW. Speakers of the central Pite Saami dialect may tend to produce it more often, but more data is needed here as well. Indeed, the dataset used for this investigation is rather small, and further research is necessary to more robustly confirm or possibly revise or reject any of these findings.

This investigation has focused on Pite Saami, but identical or at least very similar phenomena appear to be found in other languages, especially those spoken in northern Fenno-Scandia around the Gulf of Bothnia, or even beyond, covering more northerly areas of the northern hemisphere. While some evidence for this in

other languages is only anecdotal or only briefly mentioned in linguistics literature, it does seem to exist in other Saami languages (at least Lule, North, and Inari Saami), in Meänkieli and Finnish, as well as northern North Germanic dialects (especially *arjeplogsmål*, the local contact dialect for Pite Saami); similar phenomena are even found in Insular Scandinavian, West Greenlandic, Aleut, and Japanese. This indicates that UFW should be considered having potential as an areal factor and is clearly worth further study. This paper hopefully provides not only a solid description of the phenomenon in Pite Saami, but also a starting point for comparative research of utterance-final phenomena in northern Europe, and possibly beyond.

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Endnotes

1 The abbreviations used in this article are as follows (according to the Leipzig Glossing Rules (Comrie et al. 2015) whenever possible): 1 = first person; 3 = third person; ACC = accusative case; A = adjective; Adv = adverb; CC = coordinating conjunction; COM = comitative case; CONNEG = connegative; CS = subordinating conjunction; DEM = demonstrative; DIST = distal; DU = dual number; ESS = essive case; freq = frequency; ILL = illative case; INE = inessive case; INF = infinitive; N = noun; NOM = nominative case; Num = numeral; Pcle = particle; PL = plural number; Po = postposition; Pron = pronoun; PRS = present tense; PST = past tense; qty = quantity; SG = singular number; std = standard deviation; UFW = utterance-final weakening; V = verb; yob = year of birth.

2 The most significant grammatical descriptions of Pite Saami are those of Halász (1896), Lagercrantz (1926), Ruong (1943), Lehtiranta (1992), Wilbur (2014), and Sjaggo (2015).

3 Due to the nature of natural spontaneous spoken language, determining such units is ultimately based neither on purely syntactic criteria nor on purely prosodic criteria (due to false starts, self-corrections, ‘incomplete’ sentences, interruptions, etc.), but instead using a somewhat impressionistic combination of both. However, this does not affect the identification of units containing UFW; while UFW is one of the potential cues marking the completion of such a syntactic and prosodic unit (see Sections 3 and 4), it is never the sole cue. Cole (2015:5) points to this conundrum succinctly by referring to ‘the difficulty in assigning syntactic structures to spontaneous speech given the prevalence of sentence fragments, run-on sentences and disfluency’.

4 Note that three additional native Pite Saami speakers are in these recordings, but they do not have any instances of UFW, probably because the data for them is so limited; one only has 15 utterances while the other two only have one utterance each in the dataset. Because the study investigates UFW in Pite Saami, the utterances of three non-native speakers in these recordings were excluded from the dataset.

5 Predominantly Swedish utterances were not removed from the full dataset used for sociolinguistics investigations because all speakers are bilingual and often code-switch, and also produce UFW in Swedish as well (Section 7 mentions UFW in the local Swedish dialect); in addition, code-switching may occur at various morphosyntactic levels, which can make it impossible to classify such utterances as exclusively Swedish or Pite Saami. Finally, the small number of such cases should not really affect the sociolinguistic variables.

6 Wilbur (2014:35–36) presents a brief and preliminary description of this drop in intensity.

7 Other languages also feature prosodic phenomena which correlate with final prosodic boundaries, including such effects as lengthening, strengthening, and F0/fundamental frequency effects; relatedly, both intensity and pitch are known to decrease towards the end of utterances (e.g. Vaissière 1983:62, Strik & Boves 1995, Gussenhoven 2010:110–113). Also see e.g. Cole (2015:6–7) for a summary of related studies and the observation that, for example, ‘certain laryngeal effects such as glottalization of domain-initial sonorants

and creaky voice in the final region of the prosodic phrase are observed in American English' and that '[v]oice quality effects and acoustic effects of articulatory strengthening may provide additional boundary cues in some languages'. Finally, refer to Section 7 for an overview of UFW-like phenomena in neighbouring languages.

8 The trend seems obvious looking at the numbers, and a Pearson's chi-squared test for goodness of fit confirmed that it is exceptionally unlikely that this distribution is coincidental ($\chi^2 = 157.43$, $df = 2$, $p < 0.001$).

9 There is no link to the dataset for the utterance in (4a) as it is not part of the downloadable dataset since it does not contain an instance of UFW.

10 These word class abbreviations are based on those used by Giellatekno for Pite Saami language technology tools (see <https://giellatekno.github.io/lang-sje/>, accessed 21 February 2025).

11 This seems to support the proposition in the passage by Schefferus (noted in the beginning of Section 1) that nouns are especially affected (Schefferus 1674:79).

12 Further motivation for considering the role of information structure and UFW comes from Arnhold (2014:79–82, 2016:96–98), who shows that information structure correlates with non-modal voicing in Finnish, a related Uralic language.

13 Wilbur (2014) discusses dialect differences throughout, while Lehtiranta (1992:4–9) details dialects and mixed dialects, especially highlighting how these generally follow reindeer herding district boundaries. Sammallahti (1998:22) briefly distinguishes three dialects (northern, central, and southern).

14 No speakers from the southwestern-most part of Pite Saami territory (roughly Svaipa *sameby*) are found in any of the Pite Saami documentation data, so no 'South' dialect is considered.

15 A Shapiro–Wilk normality test indicated that the distribution of UFW frequency was quite normal ($W = 0.93$, $p = 0.43$); the same test indicated the year of birth data was not really symmetrical but sufficiently normal ($W = 0.87$, $p = 0.095$).

16 Pearson's results: $r = -0.70$, 95% CI $[-0.92, -0.18]$, $t(9) = -2.96$, $p = 0.016$. However, non-parametric bootstrapping was performed with 1000 iterations to further check the robustness of the effect in the population based on such a small dataset. The mean value for r across those bootstrap samples was -0.623 with the 95% quantiles $[-0.96, 0.43]$ including 0; thus, bootstrapping suggests that there is not enough evidence against the null hypothesis of no correlation between date of birth and frequency of UFW.

17 I fitted a constant (intercept-only) logistic mixed model (estimated using ML and Nelder–Mead optimizer) to predict the syllable group (formula: $\text{syll} \sim 1$), including speaker as a random effect (formula: $\sim 1 \mid \text{speaker}$). The model's intercept is at -1.25 (95% CI $[-1.85, -0.65]$, $p < 0.001$); standardized parameters were obtained by fitting the model on a standardized version of the dataset, and 95% confidence intervals (CIs) and p -values were computed using a Wald z -distribution approximation.

18 All Pite Saami speakers are bilingual, but some speak more *arjeplogsmål* while others more standard Swedish, albeit with some distinctively northern Swedish features.

19 One clear, publicly available example is found in the recording sample of *arjeplogsmål* as spoken by an 'older woman' and collected as part of the SweDia 2000 dialect project (Eriksson 2004). A transcript (based on Swedish orthography) and sound files for this sample can be found at <https://swedia.ling.gu.se/Norrland/Lappland/Arjeplog/ow.html> (accessed 19 February 2025); note that the transcription does not indicate instances of UFW, but an informed listener should easily notice UFW in this sample, e.g. in her realization of the name *Arjeplog* itself.

20 Note also that Dehé (2014) provides an acoustic-phonetic study specifically concerning 'domain-final' devoicing of the lateral approximant /l/ in the Reykjavík dialect based on controlled experimental results; she reports that this can apply to other sonorants as well.

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