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Foreword

Language is the backbone of any human society. It appears in many forms, ebbs and flows like the ripples on a pond, but it remains constant. It is how we connect with others and express ourselves to the world. Without it, what do we have? Linguistics, the study of language, is a small but mighty field. We are young, inquisitive, and constantly changing, much like the nature of language itself. We are extremely privileged to present the 2024-2025 edition of *JournalLing*. Our 8 authors, extremely hard-working, incredible young linguists, have delved into the world of language, analyzing it from different vantage points, bringing us closer to a more holistic view of the field.

This year we have had two editors-in-chief. Sophia and I (Alli) have had the incredible opportunity to lead this team through a turbulent year of many changes to the publication as a whole. I have personally been involved in *JournalLing* since 2022, making this my third year as an editor, and my first year as the editor-in-chief. I joined *JournalLing* to become more involved with Linguistics at McGill, to make new friends, and to acquire new skills. I can say that I am leaving with far more than I bargained for. I have learned so much, not only about the field, but from my peers and our mentors. To our team, thank you for your hard work. It has been a privilege to work with you. Sophia, my partner in crime, I don't have enough words to say. From the moment we met I knew we would click. Thank you for the endless messages and calls at all hours, I couldn't have had a better partner. To Jackson, our Lingua VP Journals, this publication would not exist without you. You have poured countless hours into this project, ensuring that we would make it to print. You have not only been a joy to work with, but endlessly patient, answering all questions before we can even think to ask them. As I prepare to leave the halls of McGill, all I can think about is how grateful I am for *JournalLing*, and how excited I am to see how it evolves over time.

I (Sophia) have had the wonderful opportunity to be a co-Editor-in-Chief with Alli this year. I'm much newer to *JournalLing* than either Alli or Jackson, and I have greatly appreciated both of them being so patient with me as I learned how to make a journal alongside them. I was inspired to join the *JournalLing* team because, after taking many linguistics courses at McGill, I had fallen in love with both the field and the community of undergraduate students and wanted to get involved in a more meaningful way. *JournalLing* seemed like the perfect way to do just that, and I am so grateful to all of our team for working so hard this year to make it happen. To our media team, Natalia and Minji, thank you for making the journal look the best it can be with a beautiful cover and layout, and for creating the journal's first Instagram! To our hardworking editors, Katelyn, Teva, Fei, Frances, Ella, and Liliana, thank you for your patience and diligence in editing despite the time crunch of releasing a journal. To Jackson, our LingUA

VP Journals, thank you for ensuring that Alli and I had the smoothest transition possible into this leadership position, and for the incredible amount of research and time you dedicated to this project; we could not have made this happen without you. And of course, thank you Alli for being the most amazing coworker, leader and friend. It has been such a joy to work with you, and I can't imagine a better person to take on this journey with. As we both prepare to graduate this year, I hope that our time on the *JournalLing* team remains a favorite memory from our time at McGill, and I can't wait to witness where this publication goes in the future.

Lastly, we would both like to extend a heartfelt thank you to the team at the McGill Libraries: Robin Desmeules, Jennifer Innes, and Deepak Chauhan. They have graciously guided us through the creation of our first *JournalLing* website, advised us on our copyright and editing processes, and overall helped make everything so much smoother for this transition year of the publication. We could not have done this without you and we are so grateful for your time and patience.

We hope you enjoy reading the 2024-2025 edition of *JournalLing* as much as we enjoyed putting it together!

Alli McFarlane and Sophia Flaim

Co-Editors-in-Chief of JournalLing

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Deconstructing Kanien’kéha Kinship Terms

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LING 411: Structure of an Indigenous Language

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Abstract

In Kanien’kéha and other Northern Iroquoian languages, kinship terms are structured in a way that may appear unintuitive to second language learners from English or French backgrounds. Unlike English or French, which typically use a possessive pronoun followed by a familial noun (e.g. my father), a kinship term in Kanien’keha roughly includes a transitive pronominal prefix, a kinship stem, and a diminutive suffix (Koenig and Michelson 2010). This morphological structure comprises elements of both nouns and verbs, resulting in a word form that does not neatly fit into either category. In short, this paper, I go over the unique properties of Kanien’kéha verbs, nouns, and kinship terms, offering a basic framework for understanding how these terms can be categorized within the language's lexical system. To assist second language learners, I propose the Seven Families Kinship Terms Game, a pedagogical tool I designed to help L2 learners implement the morphological properties discussed, especially the use of pronominal prefixes. The game is made up of 42 printable cards, the script and instructions for which are included in section 5.

1 Introduction

In English, terms such as 'father,' 'mother,' 'daughter,' 'cousin,' or any other noun that specifies a familial relation are considered to be kinship terms. They are preceded by a possessive pronoun, like 'my,' 'your,' 'his,' or 'our,' which encodes person (first, second, or third), number (singular or plural), and sometimes a gender in the case of 'his' and 'hers.' In the phrase 'my father,' the pronoun 'my' marks ownership, while the kinship term itself specifies the type of relationship. Native speakers of English, for the most part, are not conscious of these operations that go into forming an utterance like 'my father.'

Because kinship is so intuitive in one's native language, it can be difficult to get a grasp of a system which functions in a completely different way, like that of Kanien'kéha, Oneida, and the other languages of the Northern Iroquoian family. In these languages, kinship terminology makes up its own part of speech, with a specific internal structure. For example, *ake'nisténha*[1] in Kanien'kéha translates to 'my mother' in English, but in addition to expressing the first person possessor and the kinship stem, it conveys a relation in which 'my mother' is a female family member who is older than me (Koenig and Michelson 2010).

As will be explored later in this paper, the term is structured like a transitive verb in that it identifies both an agent (subject) and a patient (object) in the family relation, so that the older member is the agent and the younger is the patient. The term's verbal structure suggests a meaning where 'mother' is performing the action of being an older female family member onto 'me.' While the pronominal prefix *ake-* clarifies both the third person singular agent and first person singular patient, *-'nisténha* identifies the mother in the relationship (Koenig and Michelson 2010). In English, this structure can be roughly replicated as '[she-to-me] - mother,' where 'she to me' is prefix *ake-* and *-'nisténha* is 'mother.'

In this paper, I will break down how Kanien'kéha and Oneida kinship terms carry this information with the help of both verb-like and noun-like linguistic properties. Section 1 will focus on how the two languages use pronominal prefixes to specify the person, number, gender, and role of an argument. In section 2, I will describe the structure of verbs in Northern Iroquoian languages, centering around the verbal characteristics that also apply to kinship terms. In section 3, I will introduce noun-like morphology, and section 4 will tie all of these aspects together in a specific analysis of kinship

[1] My sincere thanks to Wári McDonald for sharing her knowledge of Kanien'kéha terminology, and her general guidance in developing this project. Thank you also to Jessica Coon for her help and advice.

terminology. Section 5 is dedicated to the explanation and instructions of the Seven Families Kinship Terms game, a set of 42 printable cards for learners of Kanien'kéha to visualize the patterns that surface in kinship terms and how they can vary depending on context.

2 Pronominal Prefixes

Oneida and Kanien'kéha use a set of 58 pronominal prefixes to encode information about the arguments of a verb, which match up with possible combinations of person, number, gender, and role. In terms of this last category, role prefixes differentiate transitive verbs, which take two arguments, from intransitive verbs, which take only one (Michelson 2016). In English, these two types of verbs are differentiated by whether they take only a subject or both a subject and an object. In Oneida, the verb *katkétskwas* 'I get up' takes one argument, the subject, which is expressed by the first person agent *k-* prefix (Michelson 2016), rather than an independent pronoun like 'I', as shown in (1). In general, the first-person agent prefix is usually *k-* and the first-person patient prefix is usually *wak-* (Mithun 2010).

(1) ***k****atkétskwas*
k-*atkétskw-as*
1SG.AGENT-get.up-ASPECT
'**I** get up'
(Michelson and Doxtator 2002)

Nouns also contain pronominal prefixes similar to the ones on verbs. If the noun is unpossessed, such as 'the chair' or 'a chair' in English, the prefix only indicates the gender of the noun. On possessed nouns, like English 'my chair,' the prefix indicates the person, number, and gender of the possessor (Mithun 2010).

The roles that pronominal prefixes play on verbs and nouns both show up in kinship terms. The contrast between a first-person agent prefix like *k-* and a first-person patient prefix like *wak-*, then, is used to differentiate the older family member from the younger one.

3 Verbal Properties

In English, the arguments of a noun are marked as separate nouns or pronouns. Much like kinship terms, English intransitive verbs with one semantic argument take one pronoun; 'She danced', for example, has the pronoun 'she' to mark the subject of 'dance'. A transitive verb like 'she hugged him',

meanwhile, takes independent pronouns for both the subject and the object (Koenig and Michelson 2010).

In Kanienk'éha and Oneida, the pronominal prefixes on kinship terms pattern with the ones on verbs. Kinship terms take transitive pronominal prefixes, where the older family member is expressed as the agent and the younger member is expressed as the patient.

Example (2) shows a morphological gloss for the kinship term s*hakotléha*, 'his granddaughter,' where the glossed 'grandchild' is underlined to indicate the family member referenced by the term. In this case, the possessor of the relation (he) is older than the referent (the granddaughter). The term *shakotléha*, then, implements a transitive relation with a singular male agent and a singular female patient. Example (3), meanwhile, shows a morphological gloss for the verb phrase *wa?shakohnútlane?*, 'he caught up to her,' which similarly illustrates a transitive action with a singular male agent and a singular female patient. The relevant information in these examples is the transitive pronominal prefix *shako*, glossed as 3MASC.SG>3FEM.SG, which distinguishes the transitive relation present in both examples.

(2) **s*hako*-*tléha***
3MASC.SG>3FEM.SG-grandparent-grandchild
'his granddaughter'
(Koenig and Michelson 2010)

(3) *wa?-**shako**-hnútla-ne?*
FACTUAL.MODE-**3MASC.SG>3FEM.SG**-catch.up.to-PUNC.ASP
'he caught up to her'
(Koenig and Michelson 2010)

4 Nominal Properties

Despite patterning like transitive verbs in their realization of arguments, Oneida and Kanien'kéha kinship terms share a few characteristics with the structure of nouns. Phonologically speaking, the sounds in the prefixes that occur on kinship terms are more noun-like than verb-like (Koenig and Michelson 2010). The diminutive suffixes that often follow kinship stems also pattern with noun morphology, and the negation of a kinship relation follows that of nouns (Koenig and Michelson 2010).

As discussed in Section 1, the semantic arguments of nouns and verbs in Northern Iroquoian languages can be expressed as an agent, patient, transitive, or a possessive pronominal prefix. Although the possessive prefixes on nouns are similar in structure to those of intransitive arguments on verbs, they are more similar to nominal prefixes in that they lack an initial glide, like /w/ or /j/. Their verbal counterparts, on the other hand, begin with the glide. Example (4) shows the morphological gloss for Oneida *aksótha, '*my grandmother,' which encodes a first-person patient because the grandmother is the older family member. Example (5), on the other hand, shows a morphological gloss for Oneida *waknuhwáktanihe?* 'I am sick,' in which the first person 'I' is also the patient. Though both examples require the same prefix form, the first-person patient pronominal prefix in (4) lacks the initial /w/ that surfaces in (5).

(4) ***ak****sótha*
(w)*ak*-*hsotha*
3ZOIC.SG>1SG-grandparent-grandchild
'my grandmother'
(Koenig and Michelson 2010)

(5) ***wak****nuhwáktanihe?*
wak-*nuhwaktani-he?*
1SG.PAT-become.sick-ASP
'I am sick'
(Michelson and Price 2011)

Another similarity between kinship terms and nouns is characterized by the diminutive nominal morpheme which surfaces as *-ha* or *-a?.* This suffix is typically interpreted as an integral part of the noun on which it occurs, which makes it hard to pinpoint its meaning (Michelson and Price 2011). Example (6) is a gloss for Kanien'kéha *raksótha,* 'grandfather,' which ends in diminutive *-ha.*

(6) *rakhsót****ha***
*rak-hsot-****ha***
3MASC.SG>1.SG-grandparent-grandchild-**DIM**
'my grandfather'
(Mithun 2010)

In Northern Iroquoian languages, nouns and verbs follow different negation paradigms. To negate a verb in Oneida, for example, the verb must be preceded by the independent particle *yah* and prefix *te-*. This pattern is shown in (7), a morphological gloss for *yáh teʔwakataʔkalité*, 'I'm not feeling well.' Nouns follow a different pattern: while they also take the particle *yah*, they take a separate word *té·kʌ* after the noun (Koenig and Michelson 2010). Example (8), a gloss for the equivalent of 'She's not my mother in fact,' demonstrates how kinship terms follow the latter negation pattern.

(7) ***yáh*** ***teʔ-****wak-ataʔkali·té*
NEG **NEG-**1SG.PAT-feel.well-STAT.ASP
'I'm not feeling well'
(Koenig and Michelson 2010)

(8) ***yáh*** *kiʔ* *né·* *ak-nulhá* ***té·kʌ***
NEG EMPHATIC ASSERTION 3ZOIC.SG>1SG-mother-child **NEG**
'She's not my mother in fact'
(Koenig and Michelson 2010)

5 Kinship Terms

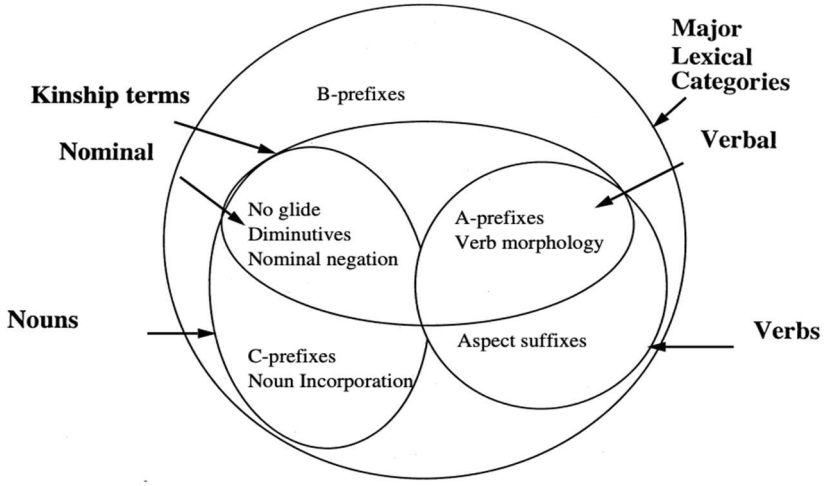
The two preceding sections detail some verbal and nominal properties that exist within kinship terms, leading us to an analysis that must combine these characteristics. Karin Michelson describes kinship terms as an independent part of speech in her 2016 paper on Iroquoian languages. She argues that, much like nouns and verbs, kinship terminology makes up an independent class of words that carry some type of inflection (Michelson 2016). The representations in (9), (10), and (11) compare the internal structures for verbs, nouns, and kinship terms, respectively. In these generalized representations, which I have simplified from Koenig and Michelson 2010, 'V/N neg' stands for whether the word would take verbal or nominal negation, 'pro' stands for pronominal prefix, and the verb (V), noun (N), or kinship (K) stem is followed by the appropriate suffix for that word class.

(9) Verbs: [V neg [*glide* + pro(transitive/intransitive) - V stem] - ASPECT]
(10) Nouns: [N neg [pro(intransitive/possessive) - N stem] - NOUN SUFFIX, DIMINUTIVE]
(11) Kinship terms: [N neg [pro(transitive) - K stem] - DIMINUTIVE]

The above representations summarize the relevant properties of kinship terms as they relate to verbs and nouns in Northern Iroquoian Languages. Like verbs, kinship terms must mark all arguments that they are semantically referencing through their pronominal prefix. Unlike verbs and like many nouns, they lack an initial glide, take a diminutive suffix, and use noun-like negation.

With this in mind, kinship terms can be considered to exist somewhere at the intersection of the noun class and the verb class. Koenig and Michelson suggest the Venn diagram in (12) and propose an analysis in which nouns are defined as [+N, -V], or the presence of a nominal feature and the absence of a verbal feature. By contrast, verbs would be defined as [-N, +V], and kinship terms as [+N, +V]. These 'nominal' and 'verbal' features do not encompass all properties of verbs and nouns but rather describe properties that, aside from the category of kinship terms, are specific to their verb or noun category.

(12)



(Koenig and Michelson 2010)

6 The Seven Families Kinship Terms Game

The Seven Families Kinship Terms game is made up of a set of 42 cards, where each card is specific to a Kanien'kéha kinship relation. In creating this game, I based the gameplay on the *Jeux des Sept Familles*, a go fish-style game that I loved playing as a child. I remember playing with classmates in a French immersion program, and I find games to be a fun and helpful pedagogical tool. Adapting this

game to such a different kinship term system was an interesting project, and I hope that it can help learners of Kanien'kéha practice the many kinship relations and integrate them into a dialogue with peers.

In my version of the game, any given card has a visual representation of the two members referenced in the relation, as well as two terms, one from the first person perspective and one from the third person perspective (McDonald 2024). The first-person kinship terms and the third-person kinship terms correspond with two gameplay options, allowing players to practice both sets of terms.

Among the cards, there are 7 families with 6 members each. Each of the 7 families contains kinship terms that are centered around one main family member - the younger sister, the older brother, the mother, the father, the grandmother, the grandfather, or the uncle. Players can then visualize the variation of pronominal prefixes in relation to one constant family member, based on the ages and genders of the second family member. Each of these families is represented by a unique clan, in this case, the Bear, the Wolf, the Turtle, the Snipe, the Beaver, the Deer, and the Hawk clans. The clans are meant to serve as a visual aid, and the table below shows the respective central family member for each clan. Along with getting familiar with the structure and the prefixes of Kanien'kéha kinship terms, the goal of the game is to collect the most families.

Clan name	**Central family member**
Bear clan	Younger sister
Wolf clan	Older brother
Turtle clan	Mother
Snipe clan	Father
Beaver clan	Grandmother
Deer clan	Grandfather
Hawk clan	Uncle

6.1 Reading the Cards

Each card features one black-and-white character and one in colour. The black-and-white character represents the constant family member, while the colour character determines the kinship term.

For example, in the bear family, every card has the little girl character in black and white, and the realization of the kinship term is based on the colour character beside her. The 7 characters look the same in each family, and the relationships between them are shown in the family tree included in the game. Each character's clan is shown beside them in the family tree. The arrow between the characters indicates age: it points up if the referent is older and down if they are younger.

To differentiate the first-person terms from the third-person ones, first-person terms are shown in speech bubbles to indicate the perspective of the black-and-white character. The term at the top of each card is in the third person, representing the outsider's perspective.

6.2 Instructions for Option 1 (Third-Person Gameplay)

In Option 1, players ask for members of a family in the third person.

1. Each player is dealt 5 cards (the game is best played with 3-6 players). The rest of the cards make up the "draw pile."

2. Player 1 asks any other player (for example, player 2) for a specific family member using the kinship term at the top of each card, with the goal of completing a family in their hand. A player must already have a member of a family in their hand in order to ask for another member of that family.

3. If player 2 has the requested card, they must turn it over to player 1. Player 1 can then ask for another card. If player 2 does *not* have the requested card, player 1 must draw a card from the pile. If player 1 draws the card they had asked for, they can ask for another card.

4. Players take turns clockwise, repeating steps 2 and 3. Players can ask any other player for a card regardless of order.

5. When a player has collected all members of a family, they must put the family face up in front of them.

6. The game ends when all families have been completed or when there are no more cards in the draw pile, and no player can ask another player for a card.

7. The player who has collected the most families at the end of the game wins.

6.3 Instructions for Option 2 (First-Person Gameplay)

In Option 2, players ask for a member of a family in the first person, as if the kinship terms referred to their own family members.

1. Before the game begins, one card from each clan is taken out of the pack. Each player must draw 1 of these 7 cards to determine their assigned clan, which they must keep secret. Once everyone knows their assigned clan, the cards are mixed back in with the pack. Each player is in charge of collecting all the members of their assigned family, acting as though they are the main character of that family, asking for family members in the first person.

   In this version, players must bluff and ask for family members who are secretly not part of their assigned family in order to keep their assignment a secret. Players each have two chances to guess one other player's family. If they guess correctly, that player is OUT.

2. The game proceeds by repeating steps 2 and 3 from option 1. Instead of asking for a card, a player may use their turn to make one of their two allowed guesses.
3. The first player to collect all members of their assigned family - without blowing their cover - wins.

6.4 Suggested Script

Below is a script that players can use to ask each other questions when playing the game. In the present version of the script, I have not yet developed a way for players to include the name of a clan in the dialogue. Although most terms in the deck are unique because of their specific relationship, a few overlap and will need a reference to their clan to help differentiate between them.

To ask player 2 for a card, player 1 can use *Sá:ien ken ne* 'Do you have' without noun incorporation or *Sahiatonhserá:ien* 'Do you [card] have' with noun incorporation. For the second option, *-hiatonhser-* is the incorporated stem for *kahiatónhsera* 'paper card.' Player 2 can also choose to answer with or without noun incorporation. If they have the card, they can answer with *Hen wákien ne* 'I have' or *Wakhiatonhserá:ien* 'I [card] have.' If they don't have the desired card, they can choose between *Iah tewákien* 'I don't have' and *Iah tewakhiatonhserá:ien ne* 'I don't [card] have.'[2]

[2] I would like to thank Wishe Mittelstaedt for developing this script with me, his knowledge was invaluable to creating this game.

Player 1:

Sá:ien ken ne (insert kinship term)*?* OR *Sahiatonhserá:ien ne* (insert kinship term)*?*

IF YES

Player 2: *Hen wákien ne* (insert kinship term)*!* OR *Wakhiatonhserá:ien ne* (insert kinship term)*!*

IF NO

Player 2: *Iah tewákien ne* (insert kinship term). OR *Iah tewakhiatonhserá:ien ne* (insert kinship term).

7 Conclusion

While kinship terms are one of the simplest units for second-language speakers to learn in European languages, the same cannot be said about Northern Iroquoian Languages such as Kanien'kéha. As a base, it can be helpful to understand the breakdown of noun-like and verb-like properties as a point of comparison. The nominal negation, transitive pronominal prefixes, kinship stem, and nominal diminutive suffix set kinship terms apart from other word classes. In general, I hope that pedagogical tools can help learners to visualize, memorize, and practice certain aspects of the language that are more daunting and complex. What I was able to develop of the Seven Families Kinship Terms Game is only a start, and it doesn't include all of the possible kinship combinations in Kanien'kéha. While it could use further development, it demonstrates the morphemes described in the paper above and shows a visual depiction of some of the possible variations that exist.

The card game can be accessed by scanning the QR code below:

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The Rise of International English: Navigating the Effects of Globalization on the English Language and its Implications on the Greater Linguistic Community

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LING 320: Sociolinguistics 1

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Abstract

In this paper, I shall discuss the effect of globalization on the English language, and the effect that the English language has had on the modern globalized world. First, I will compare the future of English to the fate of Latin, which led to the formation of the Romance languages. I will compare the spread of English in the modern world to the spread of Latin in Ancient Rome and argue that English will not split into separate languages as Latin did but instead will converge into a new standard of international English influence by speakers from both inside and outside of what is traditionally considered to be the Anglosphere. I will then explore the effect of the spread of English on communities that adopt it as a second language and argue against the subtractive approach to second language learning by which English continues to supplant thousands of minority languages. Instead, I will argue in favour of an additive language learning approach that teaches people to speak English without sacrificing local languages in the process. I will discuss the social, educational, and economic benefits that the adoption of English has on the individual, and the cultural and linguistic sacrifices that English brings to minority linguistic communities.

1 Introduction

There are many languages that have been used as lingua francas across human history, which have served the purpose of uniting people of different linguistic backgrounds under one common language. Renaissance Europe had Classical Latin, the Islamic world had Arabic, and the modern globalized world has English. In the past century, the English language has had an unprecedented rate of growth and is now taught as a second language to learners across the globe. As the world becomes more globalized, English is being adopted by increasingly more speakers as a way to take part in the international community and have access to opportunities beyond the bounds of one's own linguistic group. As English continues to spread, it makes one wonder what kinds of effects this new global status will have on English as it grows and changes, and the implications it will have for the people who adopt it. It is easy to draw connections between English and Latin, whose spread and development across Europe led it to break up into multiple unintelligible languages. Will English meet this same fate? The English language will diversify as its speakers do the same, but how significant will this diversification be? In this essay, I will discuss the future of the English language, and the effects of its ever increasing global status upon it. I will argue that the current dominant standards of the US and UK will eventually give way to a new global standard, escaping the fate of Latin and remaining intelligible to its vast array of speakers. Finally, I will describe that while the adoption of English has advantages for its learners, its damaging effect on minority languages will be dire if not treated carefully.

2 Discussion

As the world has become increasingly more globalized, the need for a common lingua franca has grown alongside it. Many linguists have attempted to rectify this issue by creating constructed languages intended to facilitate cross-cultural communication, such as Esperanto and Interlingua. These attempts have proven to be futile, however, as these constructed languages have become obsolete due to the omnipresence of English. English was initially spread by the colonialism of the British Empire and has spread even further now that its international status has been established. Nowadays, there are three layers to the English-speaking world: the inner layer in which it is spoken as a mother tongue, the outer layer, which consists of former British colonies in which it is a prestige language, and the extended layer, in which it is the most prominent foreign language (Tao 2019). Schneider (2015) explains that there are now roughly two billion speakers of English worldwide that can hold a basic conversation, and the portion of the world's population that can speak English has gone from a fifth to nearly a third within the last generation. This increase has been driven entirely by non-native speakers, as the number of native speakers remains stable at around 350-380 million. The strongest increase can be seen in the outer layer

of former British colonies, where English is spoken mainly (but not exclusively) by the elites and serves as either an official or de facto second language.

The colonial history of the British has not been the only catalyst of English's ever growing status, however, as the global dominance of the largely monolingual Anglophone United States has contributed as well. Harper (2011) argues that the US exerts hegemonic power structures that allow for subtle cultural dominance, which is echoed in the linguistic cultures of the many countries under its influence. He explains that this power structure is exerted not only from the top down, but also from the bottom up, as individuals choose to learn English for the opportunities and cultural prestige that come along with it. Though the US does not seem to do this on purpose, the effects are still the same. Tao (2019) echoes a similar sentiment, claiming that due to the Anglo-American dominance in the field of technology, English has become the primary technological language of satellite microelectronics, global satellite communication, computer network linkage, and information technology. This dominance in science and technology further contributes to the spread of English. Because English language skills are now directly tied to possibilities of employment and participation in the world economy, there is not only a strong incentive for individuals to learn, but national governments have begun to provide widespread English language education for their citizens as well (Harper 2011).

Globalization today is not an unprecedented phenomenon. The current trends seen with the spread of English continue a long history of intercultural contact facilitated by common, literary, and scientific languages used in research and higher education that has existed for millennia (Lo Bianco 2014). Lingua francas have historically been a by-product of the expansion of cultural influence and higher education. As previously mentioned, this same trend can be seen throughout history, with Classical Latin being used in the academic circles of Renaissance Europe, and Arabic being used in universities across the Islamic world. As the study of English becomes more popular, it seems to be losing its status as foreign language education and instead appears to be merging with general education as English proficiency joins the list of basic necessary skills, like the use of spreadsheets and email (Lo Bianco 2014).

As previously mentioned, the vast spread of English has led many to question what will become of the English language as a result of its widespread use. Graddol (2001) argues that the dominant use of English on the internet has been closing the gap between spoken and written English, and cultural trends have encouraged the use of informal style, leading to a greater tolerance for stylistic diversity. He points out that these trends suggest a weakening of the institutions and practices that have maintained national standard varieties of English and suggests that native speaking countries may be experiencing a 'destandardization' of English.

Non-native speaking countries have been experiencing a change in spoken English as well. Schneider (2015) explains that a range of 'new Englishes' have been emerging in countries in which English is spoken alongside the native language in regions such as Asia, Africa, the Pacific, and the Caribbean. This suggests that the so-called 'Queen's English' is unlikely to remain the global model moving forward, but the strong role of English will continue, with speech variability tolerated and skillfully used. As these new local varieties gain more prominence in their respective communities, English textbooks and classrooms will be more likely to pay attention to and teach these local varieties (Graddol 2001). Rajagopalan (2009) argues that the English language that has transformed itself to become the means of international communication is unlike the language spoken in monolingual households in the UK, US, and the rest of the inner layer of English-speaking countries. As he puts it, "the so-called 'natives' do not call the shots anymore" (Rajagopalan 2009:51). It is unrealistic to expect British or American standard English outside of their respective spaces. The English used by diplomats and CEOs may sound close to native speech, but these few exceptions pale in comparison to the millions of ordinary people that use English every day outside of what is traditionally considered to be the Anglosphere.

It is common to make a comparison to the Latin spoken in the Roman Empire, which stretched from Britain in the West to modern-day Turkey in the East. Latin was a lingua franca in ancient Rome in a similar way to English in the modern global world, so it is easy to draw parallels. The Latin spoken in communities in Europe slowly grew more and more distant until the varieties were no longer mutually intelligible and evolved into the Romance languages. Therefore, it is not unreasonable to worry that English could meet the same fate.

As explained by Rajagopalan (2009), Jenkins (2007) claims that the mutual intelligibility of English is under increasing threat as English spreads at its current exponential rate. In response to this claim, Rajagopalan points out the crucial difference between the English of today and the Latin of the declining Roman Empire: this emerging English is international and does not belong to any one particular place. He argues that this international variety is taking over, and thanks to the constant contact of globalization, it is truly the property of everybody. The Latin that diverged into the romance languages was not Classical Latin, but 'vulgar' Latin, spoken by common folk in local communities. Contact across the Roman Empire was scarce, and these people lived mostly in isolation from other Latin speaking areas. This isolation is what led Latin to diverge, as well as contact with other surrounding languages. Modern international English does not meet these criteria, and its function as a unifier of linguistic cultures has reinforced its usage far too much to diverge in this way (Rajagopalan 2009). Therefore, he claims,

international English is here to stay, and while it will continue to evolve and change, it is highly unlikely to dissipate as Latin did.

The spread of English has certainly had many benefits to those who adopt it, yet these benefits come at a cost. Within some counties in the Anglophone periphery, ethnic rivalries cause language choice to be a complicated and controversial matter. The rise of English has provided a solution to this, as it has become increasingly important as a lingua franca for interlocutors within these countries as well as between them. In these regions, the fact that English is not associated with any one ethnic identity makes it less controversial than local indigenous languages, as its use does not favour any one ethnic group. English functions as an impartial, neutral code, which allows people to converse while mitigating these ethnic and linguistic tensions (Schneider 2015). Phillipson (2009) offers a different take, suggesting that scholars who adopt this model falsely assume the neutrality of English. He argues that when English supplants another language, it accumulates linguistic capital in the region while other languages are robbed of their function and territory. This 'linguistic capital dispossession,' promoted by subtractive English language learning, takes over space previously occupied by the mother tongue of the region and displaces it within the linguistic community. He further argues that what is necessary to mitigate this issue is a more linguistically ethical, additive English language education that strikes a balance between English use and the use of local language such that learners achieve multilingual competence in both languages (Phillipson 2009).

Harper (2011) echoes this worry, citing that between 20-50% of the world's estimated 6800 languages are predicted to no longer exist by the end of the twenty-first century. When these languages are lost, knowledge, aesthetics, and cultural identities are lost as well. At the moment, 96% of the world's languages are spoken by a mere 4% of the world's population. This indicates that the threat of death is imminent to these languages and future levels of language decline are on track to be high. Language decline occurs most often in multilingual contexts, in which a majority language with greater political power and social prestige replaces the functions of local or minority languages, which has been observed to be occurring in many countries around the world (Harper 2011). Research on the topic suggests that of all the world's languages, around 600 are 'safe' and the remaining 90% are in increasing danger of extinction (Tao 2019).

Language loss is not the fault of the individuals who adopt English, however, as learning English provides great benefits to the individual. Use of English as an international communicative code fosters trade and brings social progress, economic development, and a rise of living standards (Tao 2019). Globalization has expanded the potential labour force for many jobs and companies now hire throughout

the world (Harper 2011). English proficiency is a very valuable skill in this context, as communication is impossible in international job markets without the use of a lingua franca. Many individuals now make the very rational decision to forgo the investment of time and resources into learning their local language in favour of learning English. There are individual benefits to this decision, but the collective results lead to the decline of local and minority languages. Much of the issue lies in the fact that in the current system, this must be a trade-off. Subtractive language immersion programs that suppress the use of the local code impair language proficiency and can lead to a lack of fluency in both English and the mother tongue (Harper 2011). Harper's solution mirrors that of Phillipson, suggesting that nations should provide systems of language education that prepare citizens to engage in the global marketplace while maintaining a strong connection to their own linguistic culture and heritage.

To summarize so far, as the English language continues to spread it is growing beyond its traditional territory in the Anglophone world and increasingly becoming the possession of the wider global linguistic community. Second language speakers already vastly outnumber those who call English their mother tongue and this number will only continue to increase. It is likely that the current dominant varieties of the US and UK will take a back seat in the future and give way to a new global standard of international English. This process can already be observed to be taking place, as modern English is comprised of not only these dominant varieties but a mixture of varieties from inside and outside of the traditionally English-speaking world. Countries may claim to teach one of the current national standard varieties, but the reality seems to be that the real spoken language is already diversifying past these models. A new international English is on the rise and may well soon become the global standard.

Despite its vast reach, English will not meet the same fate as Latin. The conditions which led to the divergence of Latin were different than that of English today, and the feature that distinguishes English from Latin is that it is global. The world is too connected, and English is too cemented as a communicative tool to grow apart as Latin did. The conditions leading to the development of the Romance languages were different, and the key factor is that these languages were shaped by the isolation of the communities in which they developed. The Romance languages, like English, were influenced by the variety of languages that they came into contact with, but while this was a catalyst for divergence in Latin, the same effect is impossible in English. The much more likely scenario is that these features will spread into the vernacular of different areas and perhaps enter international English themselves. The use of English as a lingua franca is far too established for mutual intelligibility to dissipate, and as long as the globalized world remains interconnected, so too will the English language.

The spread of English has had many benefits for individuals and nations alike and has worked wonders in uniting the world into one greater linguistic community. It serves as a relatively neutral code in countries in which language choice is a touchy and tense matter and helps mitigate much prejudice and ethnic resentment. The adoption of English education helps to bring countries and individuals into the international forum and allows them to participate in the global marketplace. English proficiency opens many doors to opportunities that would not otherwise be available to people around the globe. Its use in research and academia also allows research from all over the world to be read by the global community and provides individuals with opportunities to be educated all over the world. This contact with the global community brings social progress, economic freedom, and improved living standards for those who adopt English into their lives.

Despite its numerous advantages, the adoption of English comes at a great cost. The spread of English has been the catalyst for one of, if not the largest, cases of language decline in human history. The dominance that English has in the academic world has pushed local and minority languages out of their respective spaces and caused the reach of work done in those communities to be greatly limited. The overwhelming majority of world languages are now in imminent danger, and the English language has been the unintentional culprit. As English expands into more domains, local and minority languages are being pushed out for English to take their place. As these languages are lost, much of the knowledge, wisdom, history, and culture of their people is lost as well. The danger of English language adoption is great, and as English spreads, the rate of local and minority language decline will only increase. Unless something is done, the greater linguistic community will lose much of the diversity that makes it so great, and the clock is already ticking. With such liberating benefits and drastic consequences, the spread of English is a nuanced issue. English has done so much good in uniting the globe yet has left so much damage in its wake. It is important not to be blind to the danger that is impending on our planet's linguistic diversity. The best course of action to combat this issue would be to reassess how English is taught. As discussed by Harper and Phillipson, current subtractive language education programs should be abandoned in favour of new additive, bilingual programs that teach English without taking away from local languages. This way people can be given the benefits and opportunities that come along with English proficiency while still maintaining strong linguistic identities. Students would be given a strong command of both languages, allowing them to participate in the global marketplace without taking away from their linguistic cultures.

3 Conclusion

In this paper, I have explained the viewpoints of various scholars on the rise of English as a global language and discussed the implications of its new global status on the development of the language. English has risen to power through the expansion of the British empire in the seventeenth century and maintained its reach through the cultural influence of major English-speaking powers like the US and UK. The prevalence of English in world industries such as technology and academia has led English to spread further and cemented its place as the global lingua franca. The future of the English language is likely to be taken out of the hands of the traditional Anglophone world, as the language has already spread far past its borders. A new international English is on the rise and will likely soon overtake standard US and UK English and claim its place as the new global standard. Though many scholars compare it to Latin, English will not meet the same fate as Latin did as it is too cemented as a lingua franca on the world stage. While English has been very beneficial to the countries that have adopted it, it has proven to be devastating to local languages across the world. As members of the global linguistic community, great care must be taken to act responsibly with our new linguistic tool. There is plenty of work to be done, and research on the subject of additive language learning could greatly enhance our chances of stopping so many linguistic casualties. With care, however, our new unified world can continue to thrive without sacrificing the linguistic diversity that makes human language so beautiful.

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Antipassive Morpheme *-si* in Inuktitut: Split Ergativity or Something New?

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Abstract

This paper is an exploration of the antipassive in Inuktitut, a language spoken by the indigenous population of the eastern Canadian arctic including Northern Quebec/Nunavik, Nunatsiavut/Northern Labrador, and Nunavut. Data are from existing Inuktitut dictionaries and prior papers on the antipassive. First, I will provide an overview of Inuktitut and its usual alignment pattern. Then, I will introduce the antipassive. Next, I will outline the number of puzzles regarding the antipassive and Inuktitut. I will address some potential answers to these puzzles and a few problems with those answers. Afterwards, I will describe the antipassive in Inuktitut in more depth, as well as the overall linguistic understanding of the antipassive. This will allow me to arrive at the focus of this paper and clarify some definitions before moving forward. This paper will explore the interpretations of the Inuktitut antipassive by both Spreng (2006) and Compton (2017). I will then explore these arguments amongst other interpretations and discussions of the antipassive and split ergativity. Lastly, I will discuss my findings, outstanding questions and future research that could be done.

1 Introduction

1.1 Inuktitut Overview

Inuktitut is often characterized as a split alignment system. In most cases, there is an ergative/absolutive alignment system, shown in (1) and (2). The agent of the transitive sentence bears the ergative case, -up, while both the patient of the transitive and the subject of the intransitive bear the absolutive case, which is null (Compton 2017).

(1) Transitive (Compton 2017; Spreng 2006)

a. Piita-p mattak-∅ niri-vaa.
Piita-ERG mattak(ABS.SG) eat-IND.3SG.3SG
'Piita ate the mattak (=whale skin).'

b. anguti-up arnaq-∅ kunik-taa
man-ERG woman(ABS) kiss-PART.3SG/3SG
'The man kissed the woman'

(2) Intransitive (Compton 2017;Spreng 2006)

a. Piita-∅ tikip-puq.
Piita(ABS.SG) arrive-IND.3SG
'Piita arrived.'

b. anguti-∅ niri-vuq
man(ABS) eat-IND.3SG
'The man is eating.

This is always the case, except in antipassive constructions, like in (3). To form an antipassive, the patient of the transitive is demoted to bearing the oblique case, whilst the agent becomes the absolutive case. In this, the agent and subject share the absolutive case, while the patient bears the oblique case. This results in a nominative/accusative alignment system, resulting in split ergativity.

(3) Antipassive (Spreng 2006)

a. anguti-∅ kunik-**si**-vuq arna-mik
man(ABS.SG) kiss-**AP**-IND.3SG woman-OBL.SG
'the man kissed a woman'

b. anguti-∅ niri-vuq niqi-mik
man(ABS.SG) eat-IND.3SG meat-OBL.SG
'the man is eating meat'

To form an antipassive, the verb also changes. In both (3a) and (3b), the verb now bears the intransitive suffix -vuq. All morphology in transitives now look like intransitives, with the agent-like noun being absolutive and the verb suffix being intransitive. The only thing different is the oblique patient. Regardless of the split ergativity, something interesting is happening in these examples.

In addition to the intransitive suffix, the verb also has the option to bear the antipassive suffix morpheme *-si* like in (3a), but doesn't need to because (3b) is without it. In (3b), there is no antipassive morpheme, but it is still read as one, because of the different case assignments. This leads to the potential of *-si* being optional, is it?

2 The Puzzle

There are a couple puzzles here, split ergativity, normal antipassive construction (the intransitive suffix on the verb) and abnormal antipassive construction (optionality of *-si*). Most puzzling is related to the fact that Inuktitut is a pro-drop language, which, in the case of Inuktitiut means that if the verb suffix has subject agreement, the pronouns can be dropped, resulting in just the verb like in (4).

(4) (Spreng 2006)
   a. kunik-si-vuq
      kiss-IND.3SG
      's/he is kissing someone'
   b. niri-vuq
      eat-IND.3SG
      's/he is eating (something)'

Here, there are no nouns to bear a case assignment, and yet, the verb niri can still take the intransitive suffix, and have no antipassive morpheme. Notice that (4a) is different from (5a), which is what a 'normal' 3rd person singular/3rd person singular sentence would look like, without the antipassive reading. Meanwhile (4b) and (5b) look identical, without the antipassive morpheme.

(5) (Spreng 2006)
   a. kunik-taa
      kiss-PART.3SG/3SG
      's/he is kissing him/her'
   b. niri-vuq
      eat-IND.3SG
      's/he is eating something'

3 Potential Answers

Both Compton (2017) and Spreng (2006) hold that (4a) and (4b) cannot occur without a *-si* morpheme, but with no counterexamples shown, I would have liked to have evidence of these sentences being ungrammatical, like a possible elicitation in (6).

(6) Possible Elicitation Questions

a. ??? kunik-vuq
kiss-IND.3SG
's/he is kissing someone'

b. ??? niri-si-vuq
eat-**AP**-IND.3SG
's/he is eating (something)'

Spreng (2006) argues that when the verb has antipassive morphology like in (3b), the oblique case is assigned by v. This is opposed to when there is no antipassive morpheme, in which the oblique case is assigned by theta-roles as opposed to syntactic roles. Compton (2017) argues that the antipassive construction is not related to aspect, but rather something internal to the verb that yields different interpretations, which is less than ideal as antipassives are most understood as related to aspect.

What is interesting about both of these arguments is that they do not view the antipassive as a detransitivizing nor valency decreasing when antipassives are "widely discussed as both valency-reducing and detransitivizing constructions" (Heaton 2020). Polinsky (2017) writes that "antipassives have long been considered "exotic"—found in exotic languages and associated with exotic syntax…the antipassive is in fact well behaved, observable wherever the logical object of a transitive predicate appears as a non-core argument or an adjunct", and whether or not intentional, what both Spreng and Compton are doing is treating Inuktitut as "different". Polinsky (2017) finds that 30 out of the 48 languages in a study that have an antipassive construction, have the patient-like argument in the oblique case, which is like Inuktitut. A number of other languages need not always have an antipassive morpheme like Basque and Cavineña.

In every case in Inuktitut, except those with the pro-drop, the agent bears the absolutive case and the patient, the oblique case, which is a common antipassive construction, even without the overt *-si* morpheme. Inuktitut appears to be fully in line with the cross-linguistic antipassive construction. Thus, I do not find a need to treat it as a non aspectual-split, as there is no real reason to do so. The 'optionality' of the *-si* morpheme might seem odd and irregular, but I doubt that is really the case.

4 What is the Antipassive Construction?

Antipassives are transitive clauses whose logical object/patient is demoted to a non-core argument (Polinsky 2017). This is as opposed to a passive construction, in which the agent is demoted to a non-core argument, like in (8).

(7) Nonpassive (Allen and Crago 1995)

a. Jaaniup iqaluk nirijanga
Jaani-up iqaluk-∅ niri-janga
Johnny-ERG..SG fish(ABS.SG) eat-PAR.3SG.3SG
'Johnny is eating/ate the fish.'

(8) Passive (Allen and Crago 1995)
a. Iqaluk Jaanimut nirijaujuq
iqaluk-∅ Jaani-mut niri-jau-juq
fish(ABS.SG) Johnny-ALL.SG eat-PASS-PAR.3SG
'The fish was eaten by Johnny.'

(9) Antipassive (Spreng 2006)
a. anguti-∅ niri-vuq niqi-mik
man(ABS.SG) eat-IND.3SG meat-OBL.SG
'the man is eating meat'

In (8), the verb now bears a passive morpheme -jau, and the agent bears the allative suffix -mut. What the passive and antipassive construction have in common is they are valency decreasing mechanisms. Valency refers to the number of arguments a verb takes, thus a valency decreasing mechanism decreases the amount of arguments a verb takes. The passive construction decreases the valency by omitting or demoting the agent. The antipassive construction decreases the valency by omitting or demoting the object (Haspelmath 2022). As said before in this paper, in Inuktitut antipassives, the verb looks morphologically intransitive, while the semantic understanding is that the verb is transitive. This is in line with other antipassive constructions, as seen in Polinsky (2017) the antipassive verb "is semantically transitive, but does not project a direct object; hence, it is morphosyntactically intransitive."

5 Focus of this Paper

Cross-linguistic data shows that the absolutive/oblique case and two arguments with an intransitive verb are often concurrent with antipassive construction. For this reason, I am uninterested in the antipassives in (3), where the cases on the nouns might be enough to evoke an antipassive reading. What is of interest are the examples in (10) below, specifically the (10b) and (10c) which look exactly the same, but (10b) yields an active voice, and (10c) yields an antipassive reading, without any case markers or the antipassive morpheme.

(10) (Spreng 2006)
a. anguti-∅ niri-vuq
man(ABS.SG) eat-IND.3SG
'The man is eating' (non-antipassive intransitive with proper noun)

b. niri–vuq
eat-IND.3SG
's/he is eating (something)' (non-antipassive intransitive with pro-drop)
c. niri-vuq
eat-IND.3SG
's/he is eating something' (antipassive transitive with pro-drop.

This paper focuses on finding a way in which (10c) can be understood as an antipassive, without any hypotheses that there aren't detransitivizing or valency-decreasing constructions going on. Niri does not take the antipassive morpheme, with or without the pro-drop, which only encourages the conclusion that what is happening in sentences like (3b) is also happening in (10c). Because of this, (10c) has to be understood as an antipassive, in the same way (3b) is, which has to be understood as a detransitivizing or valency-decreasing operation. sentences with or without the *-si* morpheme must also be similar in construction, as both serve the end goal of antipassive construction.

There are a number of things that will be discussed in this paper. One is whether or not the antipassive and the following split ergativity results in an aspectual-split. Another is whether or not the antipassive is a valency-decreasing or detransitivizing operation. I will explore the possible interpretations of the antipassive in Inuktitut, and cross-examine it with other languages' antipassive constructions. I will gain a better understanding of what Inuktitut's antipassive looks like in terms of other antipassives, and determine which is more likely: the previous conclusions of Inuktitut being odd or Inuktitut actually being odd.

6 Some Clarifications and Definitions

Spreng's (2006) conclusion that the oblique case in an antipassive is assigned by vP is consistent with other syntactic approaches to the antipassive (Polinsky 2017). However, the conclusion that sentences with the antipassive morpheme are constructed differently than other antipassive sentences without the antipassive morpheme seems odd. Though some linguists might have different definitions for what constitutes an antipassive, I will use the diagnostic criteria in Polinsky (2017), which is the demotion of a semantic patient.

Unaccusative verbs and unergative verbs are both intransitive verbs. Unergatives are intransitive verbs that lack an object, e.g swim, dance, run. Unaccusative verbs lack an agent e.g. break, fall, melt (Gluckman).

6.1 Compton (2017)

As stated previously, Compton (2017) argues that aspect is "somewhat orthogonal to the antipassive in Inuktitut", it is not the construction that yields an antipassive reading, but perhaps something internal to the verb itself. He argues this with the following examples.

(11) (Compton 2017)

a. arnaup nirijanga aapu
arna-up niri-ja-nga aapu-∅
woman-ERG.SG eat-DECL.TR-3SG.3SG apple(ABS.SG)
'The woman is eating the apple.'

b. arnaq nirijuq aapumit
arnaq niri-ju-q aapu-mit
woman eat-DECL.INTR -3SG apple -OBL.SG
'The woman is eating an apple.'

(12) (Compton 2017)

a. qimmiup kiijaanga
qimmi-up kii-ja-nga
dog-ERG.SG bite-DECL.TR-3SG.1SG
'The dog bit me.'

b. qimmiq uvannit kiisijuq
qimmiq-∅ uvannit kii-si-ju-q
dog(ABS.SG) 1SG.OBL bite-AP-DECL.INTR-3SG
'A dog bit me.'

Compton argues that because niri 'eat' yields a default progressive interpretation in both (11a) and (11b) with or without the antipassive construction in (11b), and kii 'bite' yields a default recent past interpretation regardless of the antipassive construction that occurs in (12b). The antipassive might not have anything to do with aspect. As his conclusion is closely related to Spreng (2006;2012), I will address those conclusions first before discussing.

6.2 Spreng (2006)

Spreng (2006) is heavy on the theoretical syntax, which I cannot delve into the entirety of the argument in this paper. In short, AP morpheme *-si* occurs, it is in v and assigns the oblique-case to the patient. When there is no AP morpheme, the oblique case is assigned as a lexical case by the lexical head.

6.2.1 What is *v*?

v is a common practice in theoretical syntax, in which the arguments that a verb takes originate very closely to the verb, and might get moved around but hold some properties of its original place near the verb. In the case of Spreng's argument, *-si* originates closely to the verb and its arguments, so much

so that it can assign the oblique case to the object. If *-si* occurs in the sentence, Spreng believes that it looks something like the Figure 1.

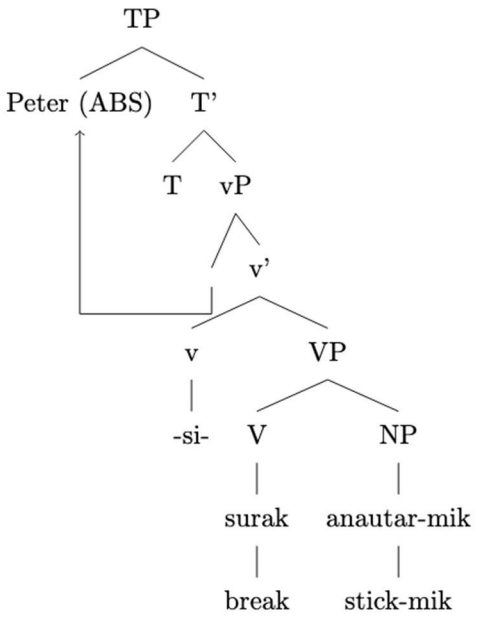

Figure 1(Spreng 2006)[1]

Spreng argues that in Figure 1, it is an unaccusative verb, in which the VP originates first, and the addition of Peter, is later that requires the *-si* morpheme. This is opposed to unergative verbs like in Figure 2 in which the object of eating is added later, and does not originate in the same VP as the verb.

[1] This is not a copy and paste syntax tree from Spreng's paper but rather a recreation of the syntax trees for clarity.

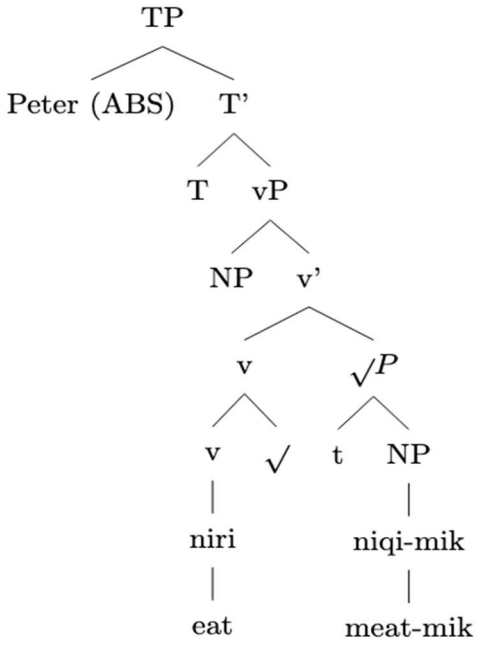

Figure 2 (Spreng 2006)[2]

In this example, the oblique case is assigned by thematic roles, as opposed to structural roles like in Figure 1.

7 Discussion

As Compton (2017) wrote, in other languages antipassive is connected to an aspectual-split, yet not in Inuktitut. In Coon (2013), there are two types of aspectual-splits: either imperfective aspects that are expressed with complex auxiliary constructions or imperfective aspects that involve demoted (i.e., oblique) objects. Though the former is likely true for Inuktitut, we have seen in (11) and (12) that the split ergativity does not result in a split from perfective to imperfective, but that the aspect reading might be internal to the verb. (11) has an imperfective reading regardless of alignment pattern, and (12) has a perfective reading. Polinsky (2017) writes that the aspectual interpretation is not necessary for an antipassive reading. I can reasonably conclude that progressive and imperfective readings are not caused by *-si* but potentially *-si* does relate to the aspect of the verb.

[2] Same as 1.

Though the antipassive in Inuktitut might have nothing to do with aspect, it is very unlikely that the antipassive and the existence of split ergativity in Inuktitut are not connected. As many academics (see Coon 2019; Polinksy 2017) note that no ergative language is 100% ergative,the split in ergativity is often related to transitivity decrease (Coon 2019). As seen in all Inuktitut examples, there is no ergative marking in the antipassive, because the agent of the verb is no longer the agent of a transitive sentence.

If this split in ergativity is not caused by the aspectual-split, there is another common factor in the triggering of split ergativity, which is a split in NP prominence (Coon 2019). There is a possibility that the split ergativity, the introduction of a nominative/accusative pattern, is based on the prominence of the NPs. In Inuktitut, the object gets demoted to a less important part of the subject, which further promotes the agent, which is consistent with this prominent NP hypothesis, of high prominence agents.

Another possibility is "agent foregrounding", leaving the most likely phenomenon occurring (Polinsky 2017). The antipassive might be for object demotion, which realistically occurs for agent promotion as focus for the agent. Though this is not universal within antipassive constructions, it might be helpful to further analyze this possibility within Inuktitut. There is a possibility that the oblique case on the object is an example of a lexical case. This interpretation of the antipassive does not account for the optionality of *-si.*

Through the entirety of my paper, I have found that in the current landscape, there is nothing "universal" about antipassive constructions. Though both Spreng (2012) and Compton (2017) are different than other antipassive interpretations, when considering the belief that the antipassive is an object demotion tool, there is no overwhelming evidence to find that it is not in line with other antipassive interpretations, as there is no universal antipassive interpretation. Overwhelmingly I agree that the antipassive in Inuktitut is not an aspectual-split, I still hold that it is most likely a valency decreasing operation.

A potential understanding of the optionality of *-si*, is not the aspect of *-si* itself, but instead how *-si* interacts with the internal aspect of a verb. Perhaps if a verb has the default progressive interpretation, it does not need to have the addition of the antipassive morpheme. This is consistent with the examples in (10), that it does not need the morpheme for an antipassive reading. In (12), we see the *-si* morpheme is needed for perfective verbs;however, it does not provide for the necessity of *-si* in examples like (3a) and (4a).

8 Outstanding Questions and Further Research

Most obvious to me is that more semantic elicitation needs to be done. I am beginning to wonder if the valency decrease only serves as focus for the agents. The antipassive in Inuktitut might not be structural at all, but rather mostly semantic. To come to a clearer conclusion, there needs to be elicitation in which the antipassive reading entails the focus of the agent, and we must see if entailment cancellation is possible.

I also am left wondering about the examples in (10), since there is no universal antipassive understanding; the pairs (10b) and (10c) would benefit from semantic elicitation. The antipassive reading in (10c) might occur from previous structural movement, in which there is something underlyingly left over that allows for an antipassive reading. The first thought I have is that something originating in the object NP moves up to the CP specifier, though I would need more information than I currently have on what Inuktitut syntax trees usually look like.

9 Conclusion

I no longer view Spreng (2006) or Compton (2017) as unprompted, as I have found out through my research nothing in the literature about a crosslinguistic form for the antipassive. I would have benefitted from a higher level of linguistics understanding to fully comprehend the conclusions of the Spreng (2006) paper. Inuktitut most likely has normal split ergativity when considering a cause of the split as NP prominence and potential agent focus. The construction of the antipassive in Inuktitut is in line with the majority of antipassive understanding, with the split ergativity and intransitive suffix on the verb. This becomes a problem when a verb has a potential transitive and intransitive reading, and there is a possible antipassive construction. I believe this most likely is either related to traces in the structure of the syntax or solely semantic understanding. The working conclusion of the examples in (13) is that the default progressive interpretation of niri does not require *-si* and so the main difference between the two is (13b) might have more semantics or previous focus going on than (13a).

(13) (Spreng 2006)

a. niri-vuq
eat-IND.3SG
's/he is eating (something)' (non-antipassive, intransitive with pro-drop)

b. niri-vuq
eat-IND.3SG
's/he is eating something' (non-antipassive, intransitive with pro-drop)

There is still much work to be done, but I have succeeded in a better understanding of the antipassive and split ergativity in Inuktitut and how it relates to the larger body of work regarding the antipassive.

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Word Meaning, Perceptual Roots: Grounding Philosophical Accounts of Common Nouns in Perception

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Abstract

What do common nouns like “cow” denote – a particular cow or a universal quality of cow-ness? This paper delves into the intricate theories of two ancient Indian philosophical schools - Nyaya and Mimamsa - by utilizing a conceptual metaphor approach. Inspired by Lakoff and Núñez's work, we bridge the gap between modern readers and ancient philosophers through the mapping of sensory experiences to abstract concepts. Through perceptual grounding, we explore the integration of Universal and Particular notions and the wholeness contributed by different schools of thought. Finally, this method sheds light on the potential of cognitive semantics.

1 Introduction

The puzzle of semantic understanding and linguistic ability has been tackled by philosophers and linguists alike, spanning thousands of years. Early exploration began in India around the 6th BCE with the Mimamsa Sutra and Gautama's *Nyaya Sutra* inaugurating the corresponding schools. From the Mimamsa school, further contributions were made by commentators Sabara and Kumarila; from the Nyaya school, by Uddyotakara. In recognition of the temporal and geographical gap between modern scholars and ancient Indian philosophers, I will use a conceptual metaphor as the method to bridge known and unknown concepts as well as to integrate seemingly incompatible claims. This conceptual metaphor method draws inspiration from Lakoff and Nunez's attempts to ground mathematics in the body in *Where Mathematics Comes From* (2000). This is achieved by setting up a source domain from which metaphorical expressions are drawn, and a target domain which represents the concepts we aim to understand. Following this, we construct mappings and relate the known and familiar (source domain) to the abstract and complex ideas of the target domain. In our case, we will establish mappings between perception as the source domain and the Mimamsa and Nyaya philosophy of language as the target domain. In addition, assuming the premise that human anatomy has not changed significantly in two-thousand-years, neuroscience will be used in support of this argument. For modern scholars, neuroscience provides the vocabulary to articulate parts of the human perceptual experience which might otherwise remain intuitions to astute minds of the past. I aim to ground both Mimamsa and Nyaya accounts of generic terms' meaning in perception, particularly vision. The discussion will begin with a presentation of the central metaphor story and modern neuroscience, serving as the source domain. Following this, I will ground *the universal* and *the particular*, two fundamental concepts, in perception, and proceed to mapping Mimamsa philosophy to *top-down processing* and Nyaya to *bottom-up processing*. Finally, I will evaluate the effectiveness of perceptual grounding by extending it to three aspects: explaining the differing notions of the individual, the various causes of recurrent cognition, and secondary meaning.

2 Background

Both Mimamsa and Nyaya schools distinguish the particular from the universal so, as a prerequisite, perceptual grounding must be able to capture this distinction. The particular and universal are grounded as perceiving the parts and cognizing the whole, respectively. The particular involves a unique individual localized in specific time and space, while the universal applies to different individuals across time and space. The first is obvious to our perception. We see objects and we act on specific, particular things. For the latter, universal requires going beyond the parts to grasp at the whole. The recognition of the parts as separate from the whole is further supported by the existence of disorders like visual agnosia.

In the central metaphor, one can see a dog and identify the key features but cannot name the animal, failing to recognize 'dogness.' Hence, it is the perception of the whole that connects, or gives rise to, a common cognition between different objects. In short, when looking at many mature green leaves from the same tree, we treat them as particulars if we pay attention to their individual differences, and as universals if we recognize their common qualities—being a leaf. With respect to terminology in the Indian traditions, *vyakti* means individual and belongs to the particular side. On the universal side, *jaati* means generic property or natural kind, and *aakrti* means shape, form, or generic property (Scharf 11).

School	Scholars (chronological)	Associated Terms
Mimamsa	Sabara, Kumarila	*vyakti*: individual *aakrti*: shape, generic property (=natural kind)
Nyaya	Gautama, Uddyotakara	*vyakti*: individual *aakrti*: shape *jaati*: generic property (=natural kind)

Table 1: Terms

3 Mimamsa Account

The Mimamsa account corresponds to top-down processing, claiming that a generic term denotes only the generic property (*aakrti*), which qualifies a particular individual directly or qualifies an individual by shape. As an example of applying the rule, the generic term "altar" in the phrase "one builds an altar" denotes only the generic property (*aakrti*) of "altar." From this notion, we qualify a particular object in the world to act on. The generic property of an altar comes before knowing an individual (*vyakti*), similarly to how top-down processing makes use of context and prior knowledge before "qualifying" an actual object in the world according to existing understanding. In the central metaphor, people walking dogs at the park predisposes us to interpret objects through preconceptions. When scanning the environment, we locate and "qualify" a potential candidate, a being of fluffy orange-brown fur and many other qualities matching our hunch of it being a dog. This initial cognition is evident by the desire to pet the animal. Continuing the metaphor, once we approach and observe the strange ears, a contradiction arises and it no longer qualifies as a dog. Then, by "impossibility," we only associate the being with a dog's shape, but not an individual dog (Scharf 261). The second part of the metaphor mirrors

Mimamsa's exceptional case—how to make sense of "falcon" in the phrase "one builds a falcon altar" where there is no individual falcon present. Thus, top-down processing may start with preconceptions from the mind, parallel to generic property, but still receive input from the environment in case of inconsistencies—similar to how impossibility would make a word denote a shape and not an individual. In the metaphor, the shapes and some features of a dog are registered in the mind, but one is well aware that there is no individual dog. While we compare Mimamsa reasoning to top-down processing, with respect to the bidirectionality of pathways, the Mimamsa account also uses bottom-up processing implicitly, for example, when picking out features of an object in the process of qualifying and realize what one assumed is a "dog" have abnormally sharp ears. However, explicitly and predominantly, the Mimamsa account most resembles top-down processing.

4 Nyaya Account

The Nyaya account corresponds to bottom-up processing: it is from the individual that one cognizes the form or generic property. While there are cases where words give knowledge of three components (*vyakti, aakrti, jaati*), often, a word denotes two elements, with one serving as the primary denotation and the other as secondary (Scharf 166). Consider the word "cow" in three distinct contexts: (1) "tie the cow" where all three components are present but *vyakti* is primary (2) "one should honor cows" with *jaati* as primary and *vyakti* as secondary and (3) "make cows consisting of flour" consists of form as primary and individual as secondary. Notably, the generic property is absent (Scharf 166-167). In the first two cases, all three components are present; in the last case, the *jaati* of cowness is absent. Invariably, an individual *vyakti* is involved, either as primary or secondary denotation. This agrees with bottom-up visual processing, as sensory input is received from the external world, enabling comprehension of the observed phenomenon. Curiously, in the second case, where the particular individual is secondary and the universal – in this case, the generic property – is primary, we arrive at a situation similar to top-down processing. The statement "one should honor cows" may apply to some individuals in that immediate environment, but as we continue our lives and encounter other cows, both the word "cows" and the sentence apply to cows in this new context as well. This parallels the bidirectionality of pathways. With regards to the final case, which contains the central metaphor, we initially notice (physical) features of this object. At first, the features correspond to the shape of a dog—the cognition registers the generic property of a dog. When one receives more information at a closer distance, it becomes clear that the animal is not a dog, and thus this information "blocks the inference" (Scharf 168) of dogness. Thus, it remains that there is an individual, which possesses the form of a dog, but there is no generic property of a dog. The perceptual reasoning closely parallels the analysis given by

Nyaya scholars. I shall note that while this perceptual grounding makes prominent the direction of knowledge from *vyakti* to *jaati* or *aakrti*, this directionality is interpreted from Gautama's definition. An individual is "the physical body" that houses "specific qualities" and a form "makes known the generic property and its indicatory marks" (Scharf 153)—which should be drawn from among the many specific qualities residing in the individual. Overall, the fact that an individual is always present makes the Nyaya account resemble bottom-up processing, but does not negate the possibility of a resemblance to top-down processing.

5 A Comparison of the Two Accounts

As top-down and bottom-up processing forms a seamless feedback loop, which permits visual perception, Nyaya and Mimamsa schools emphasize different aspects of semantic meaning. Their complementary approaches become even more evident in the difference in their notions of the individual (*vyakti*). Scharf notes one key difference between these philosophical doctrines is that where "Gautama calls a finite manifest substance an individual, Sabara only calls such a substance qualified by the denoted class property an individual" (259). Moreover, an individual is always involved in the Nyaya account, as Sabara allows for cognition of a word without "a real individual" (Scharf 257). While these definition choices appear to be contrasting, they become complementary when understood with the visual pathways. In our central metaphor, a Naiyayika could use the word "dog" for the unfamiliar being and asserts that an individual (*vyakti*) and form (aakrti) are present. Given that the unfamiliar being first evokes the impression of a dog, the term "dog" indicates that individual being. The form of a dog is present in that particular individual, but the generic property is absent, given that we later discover that it is not a dog. On the other hand, a Mimamsa scholar would use the word "dog" for the unfamiliar being and deny the presence of the individual, claiming that "dog" is used as a shape, indicating the properties of a dog. In short, we observe that to a Nyaya scholar, "the individual qualifies the form" (*aakrti*) (Scharf 188), while to Mimamsa scholar, the shape (*aakrti*) qualifies the individual. This difference in conceptualizing the individual (*vyakti*) aligns with each school's distinct role as mapped onto in visual processing. Thus the central metaphor grounds and unifies the notions of individual (*vyakti*) in both schools.

With regards to explaining different causes of recurrent cognition, perceptual grounding can distinguish between *aakrti* and *jaati*, but may struggle with words lacking a generic property (*jaati*) in the Nyaya conceptualization. In the Mimamsa tradition, distinguishing between generic property and shape is not a problem as the original text uses the word *aakrti* to mean both generic property and shape, and these two elements always occur together. For the Nyaya school, which is associated with bottom-up

processing, one would think that there is an individual (bottom) causing a certain cognition at the top – this cognition may be due to the presence of *jaati*, *aakrti* or neither. In perceptual terms, the form (*aakrti*) is solely visual, whereas *jaati* can draw from other perceptions like smell, taste, or the overall experience. A cow is not only a cow because of how it appears; it must perceptually *feel* like a cow when one touches it, hears the sound it makes, or interacts with it. When an object such as a clay cow only possesses the rough visual of a cow but lacks other perceptual qualities, we conclude that form is present but *jaati* is not. Hence, perceptual grounding succeeds at distinguishing *aakrti* and *jaati*, identifying how different elements in the target domain come from different elements in the source domain. However, *aakrti* and *jaati* are not the only cause of recurrent cognition. In Uddyotakara's example of 'the cook', there is no *jaati* ("cook") but the recurrent cognition arises out of "the action of cooking and relation of agency" (Scharf 155-161). It is worth noting that the cook example is different from the word 'cow' in the example "clay cow". There is a *jaati* connected with the word cow, however, in the case of this sentence, the *jaati* is absent as the inference has been blocked. However, in the word 'cook,' there is no *jaati* to begin with. The question remains: how does perceptual grounding distinguish between these two cases. On the one hand, we can say that in the 'cook' example, *jaati* is absent but the form is present, allowing us to proceed with the same analysis as "clay cow". The form involves a person in a particular setting – namely, the kitchen. On the other hand, if we posit that both *aakrti* and *jaati* are absent, it is unclear how this recurrent cognition can be explained with the processing pathway in a different way from recurrent cognition due to *jaati* or *aakrti*. In short, perceptual grounding can account for the recurrent cognition with jaati and *aakrti*, but may need more refinement when it comes to words without generic property (*jaati*) like 'the cook.'

The central metaphor with the two pathways, top-down and bottom-up, extends to explain secondary meaning as being perceptually close, particularly in time and space. To avoid confusion, I will distinguish between secondary meaning, and secondary denotation which is part of the primary meaning in Nyaya discussions. Primary meaning refers to what a word directly makes known, while secondary meaning encompasses what a word does not literally denote but we still comprehend—such as metaphoric or metonymic expressions. In ordinary life, we frequently use a word "for that which it does not denote" (Scharf 178) and yet maintain mutual understanding. Among the examples Gautama provides, many use cases which evoke proximity in space: accompaniment as in "the platforms are shouting" where platform denote the people on it, proximity as in "the cows roam on the Ganges" where Ganges denote the riverbank, and presence, measure, or connection (Scharf 178-179). Other cases evoke proximity in progression of time, Gautama gives examples of being for that purpose as in "he makes mat" where the word "mat" refers to the reeds which are used to make a mat, or causation as in "life-breaths" instead of

food as one sees food as bringing out breaths of life. With respect to perception, a word's primary meaning directs our cognition to a specific object or feature in a certain situation, characterizing a scene. When another word is used for secondary meaning, what this word denotes is part of the scene – like the platform in the scene of people crowding on top of a platform. We arrive at a common understanding because the scene is maintained. This current discussion relies on visual perception, but one could easily incorporate other senses that evoke comparable experience to create secondary meaning. For example, one can use "strong winds" or "storm" to refer to "challenging times" since strong winds elicit external instability and hard times elicit internal instability.

6 Conclusion

In short, perceptual grounding highlights the complementary dynamic of the Mimamsa and Nyaya accounts of denotations of generic terms. The Mimamsa approach, corresponding to top down processing, emphasizes how *aakrti,* a universal, qualifies an individual, while the Nyaya perspective, aligning with bottom-up processing, traces universal understanding from individuals. Perceptual grounding demonstrates its explanatory power in unifying Mimamsa and Nyaya's notions of the particular individual – which may appear incompatible at first, but under the metaphorical lens are shown to contribute to their role within a broader system, similar to how top-down and bottom-up processing serve the function of vision. Still, further work is needed to fully ground the universal and the different causes of recurrent cognition. While *aakrti* and *jaati* are adequately distinguished, words not associated with a natural kind (*jaati*) are minimally explained. Finally, extending perceptual grounding to secondary meaning invites readers to imagine further possibilities of perceptual grounding, both within and beyond vision. Overall, the central metaphor takes advantage of perception being more fundamental than language—the most direct mode of knowledge through which we understand the world, even prior to words acquiring meaning. Given what Gödel's incompleteness theorem suggests about inherent limitations of formal systems (Raatikainen 2022) and the burgeoning field of cognitive semantics, fundamental sensory experiences, along with the conceptual metaphor method, may provide us with a more robust approach for discussing natural language than natural language alone – a potential we have only but glimpsed.

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Teasing Apart Tone and Stress in Athabaskan

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Abstract

This paper undertakes an exploration of the relationship between tone and stress, drawing from evidence gathered from three Athabaskan languages. Rather than viewing tone and stress as homologous systems, I challenge the notion that they represent different applications of a singular phonological phenomenon. Through analysis of three understudied languages—Witsuwit'en, Upper Tanana, and Navajo—I posit that the conventional tone continuum inadequately captures languages that incorporate elements from multiple points across the conventional spectrum. The study finds that tone and stress are often conflated because they are indicated with similar acoustic cues but are in fact distinct processes in the phonology. Phonetic evidence, phonological analysis, and diachronic observations are presented to analyze Witsuwit'en's stress system, Upper Tanana's tonal system, and the interaction between tone and stress in Navajo. My goal is to disentangle tone and stress as separate mechanisms within language, as they tend to be misanalyzed and conflated for having pitch in common as a phonetic correlate. Exposing their differences in isolation and interactions in co-occurrence will contribute to a deeper understanding of linguistic typologies and help to avoid overlooking diverging entities in linguistic analyses.

1 Introduction

1.1 Preliminaries

Principally, work on Athabaskan linguistics has been comparative historical research by scholars such as Sapir, Krauss, and Leer. Leer and Kingston, in particular, focused on tonogenesis: the emergence of tone in language. This is a key field for this paper as languages in the Athabaskan-Eyak-Tlingit (AET) family present great variation regarding tonal systems, with only some members having developed tone at all. I will be reviewing past diachronic analyses of tone languages in the AET family (i.e. Upper Tanana) and juxtaposing their developmental characteristics with those of stress languages (i.e. Witsuwit'en).

In addition to a historical comparison, I explore the synchronic phonological behaviours of tone and stress. While tone has a feature-like autosegmental application, stress emerges from inherent rhythmic patterns and culmination. Through an examination of tone distribution, I conclude that tones are targets specified on tone-bearing units (TBUs). On the other hand, by exploring the predictability of stress, I conclude that stress is a prominence-based landmark located within word domains governed by language-specific parameter settings. In this way, I develop the abstract representations of tone and stress to better explain their patterns in surface realizations.

Finally, adopting a phonetic perspective, I investigate the acoustic properties of tone and stress. In AET languages, pitch (referring to the fundamental frequency of the utterance, or f_0) serves as a pivotal indicator of both prosodic devices. The salient nature of a high tone—namely, the spike in pitch—can sound almost identical to a stressed syllable. In other words, a high-low pattern (H-L) sounds similar to a strong-weak pattern (σ́-σ). Given these homogenous phonetic cues, supplementary acoustic evidence is needed to distinguish them. I contend that phonologically, tone exhibits specification that is target-like, in that its phonetic realization corresponds to a high versus low pitch excursion. The range of the expected f_0 envelopes of tones can fluctuate if stress is additionally superimposed onto it, as in some languages (i.e. Navajo). Interaction between tone and stress yields noticeable variation in pitch activity.

1.2 Athabaskan Languages

AET (also known as Na-Dene) is a family of languages that spans throughout North America and encompasses approximately 47 languages, though the count varies depending on the classification system

employed, and some of them are no longer actively spoken. Three branches of the Athabaskan[1] subgroup are generally acknowledged: Northern Athabaskan, Pacific Coast Athabaskan, and Apachean. Sapir (1915) initially formulated the Na-Dene phylum, which included the Athabaskan languages, Tlingit, and Haida. Lavine (1979) contested Sapir's inclusion of Haida and advocated for an AET genetic linkage which excluded Haida while including Eyak. Subsequent studies, such as Leer (2008), provided further support for this claim. In this paper, all three languages analyzed belong to the Athabaskan subgroup of AET, hence the terms AET and Athabaskan are used interchangeably to denote this family, although the latter term technically excludes Tlingit and Eyak. Figure 1, adapted from Cook & Rice (1989), illustrates the currently established genealogical connections among AET languages and excludes Haida from the family.

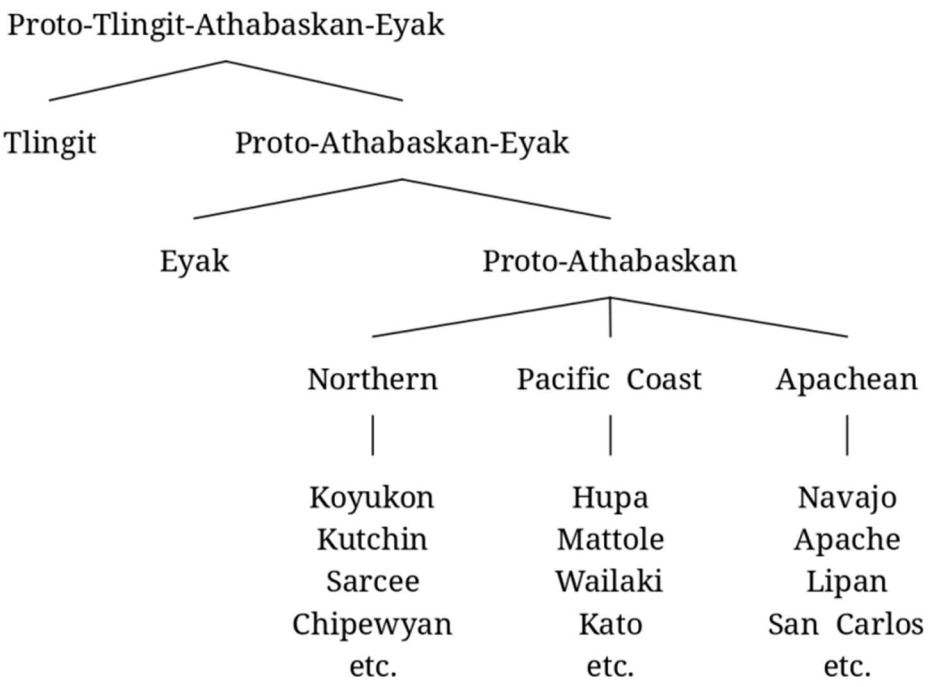

Figure 1: The most widely accepted genealogical family tree of AET (Na-Dene languages).

Upper Tanana (also Nabesna or Nee'aanèegn') belongs to the Northern Athabaskan branch and is spoken in communities situated in eastern Interior Alaska, near the border with the Canadian Yukon. The name refers to the upper reaches of the Tanana River. Despite its cultural richness, the language faces critical endangerment status, with an estimated 30 to 40 fluent speakers remaining (Lovick, 2020).

[1] This paper will use the spelling of *Athabaskan* though other spellings have been used historically to approximate pronunciation such as *Athapaskan, Athabascan,* and *Athapascan.*

Wistuwit'en (also Babine, Witsuwit'en-Babine, or Northern/Western Carrier) is also a member of the Northern Athabaskan branch, spoken along various rivers of west-central British Columbia. Translated as "people of the Wa Dzun Kwuh River" (or the Bulkley River), Witsuwit'en was classified as endangered in 2002 when the estimated speaker count was 185 (Hargus, 2007), predominantly composed of elders.

Navajo (also Navaho, Diné Bizaad) falls within the Apachean branch and is spoken primarily in the Navajo Nation in the southern United States. The etymology of the term Navajo remains uncertain, though it is suggested to be a Spanish loanword denoting a geographical location (Williams, 2009). Unlike the other languages discussed herein, Navajo has a fairly robust speaker base of around 170,000 according to the 2019 American census.

2 Background

2.1 What is Tone?

Tone is commonly regarded as a phonological primitive akin to phonological features such as [±nasal] or [±voice], primarily due to its role in distinguishing meaning in "tonal languages." In essence, phonological representations of tone allow for the distinction between two utterances when the difference between them corresponds to a distinction of signs in the system of the language (Anderson, 1978). We must note the difference between the phonetic specification of a given feature, which may involve a considerable range of potentially distinct values determined by language-particular factors, and the categorical interpretation of a feature, which entails a binary choice of whether a segment possesses the property associated with the feature or not. In the case of tone, f_0 will be the principal phonetic correlate responsible for the acoustic cue intended for contrastive interpretation, albeit subject to variation when applied in conjunction with intonation, accentual patterns, speakers' vocal ranges, etc. (Goldsmith, 1980). These extraneous factors must be abstracted away when searching for a theoretical representation of tone as a linguistic construct. Consequently, tone extraction from the acoustic signal parallels the parsing of linguistically relevant phonetic elements as features while filtering out acoustic interference.

Once phonetic observations are confined to factors systematically and discretely manipulated by a language's grammar, the groundwork is laid for formalizing a phonological theory of tone. With the advent of autosegmental phonology, phonological representation has evolved from a singular sequence of entities to multiple parallel sequences of entities. Tones, however, are conceptualized as constituents of a separate tier of autonomous entities equal to the string of consonants and vowels comprising the melody

(Halle & Vergnaud, 1982). This framework posits that segments and tones operate independently, yet are somehow synchronized. The principles listed below delineate the conditions for tone-segment synchronization as outlined by Halle & Vergnaud (1982), taken from Goldsmith's work.

i. All tones must be associated with (at least) one syllabic element.
ii. All syllabic elements must be associated with (at least) one tone.
iii. Association lines do not cross.

Additional parameters regarding rules on the tonal tier may vary depending on the analysis. However, this paper emphasizes the autonomy of the tonal tier from the melody, rather than delving into the derivation process of surface realizations. Under this perspective, tones are stored in the lexicon and are associated with TBUs (syllables or moras) at the time of utterance. Rules concerning tone refrain from long-distance assimilation or dissimilation; they are solely conditioned by adjacent tones, such as the interactions of tone sandhi in Mandarin (Woo, 1969). Woo argues that all tones serve as specifications for "levels" of high (H) and low (L) pitch that form part of lexical entries and undergo phonological rules independently. Thus, though tones are ultimately associated with TBUs and are densely specified for nearly all syllables in a language, their interaction remains detached from segments, although they act like any other feature in distinguishing minimal pairs. Finally, tones uniformly associate with long and short syllables without the distinction observed in stress systems; all syllables are equal TBUs and are paired with tones in a one-to-one fashion (McCawley, 1978).

2.2 What is Stress?

Stress is a system of metrically assigned prominence where a stressed syllable is marked with primary (or secondary) prominence relative to its surrounding syllables. Stress assignment consists of a word-level metrical structure, which locates a head akin to a landmark or anchor guiding one's orientation within its domain. Like tone, stress is a perceptual notion, but unlike tone, stress manifests through various phonetic cues such as excursions in f_0, syllable duration, intensity/loudness, and vowel quality (Hargus, 2007). While these acoustic correlates contribute to the perception of prominence, they are not all always present in the signal of a given token. There are two main criteria definitional to a stress accent system (Hyman, 2006):

i. OBLIGATORINESS: every lexical word has *at least* one syllable marked for the highest degree of metrical prominence (primary stress).
ii. CULMINATIVITY: every lexical word has *at most* one syllable marked for the highest degree of metrical prominence.

Obligatoriness is the more important of the two, constituting an absolute universal in stress systems for there to be an obligatorily headed metrical constituent built at the word level. We encapsulate these two properties under the Optimality Theory constraint HEAD(PWd), asserting that every phonological word must have a unique head and therefore one solitary accent (McCarthy, 2002). This constraint targets syllables and not other constituents like moras. Additional properties of a stress system include 1) privativity: stress is either present or absent on a given syllable, 2) demarcation: stress fixed on initial, final, etc. syllables can indicate where word boundaries are, and 3) rhythmicity: echo stresses (secondary prominence) frequently occur on every other syllable.

While suprasegmentals like tone (which corresponds to features) or length (which corresponds to timing slots or moras) are lacking in universality, stress exhibits promising universality. Hyman (2008) argues that most studies asserting stress absence in languages are "not looking hard enough." It is easy to see how this might happen, particularly in languages with concurrent tone, where stress identification becomes challenging. Even in extreme cases of stress absence, rhythmic groupings resembling Morse code persist, such as that observed in Pohnpei (Rehg & Sohl, 1981). Here, syllables are organized into word-based groups (potentially feet) devoid of obligatory prominence, thus violating HEAD(PWd), yet still showcasing some rhythmic properties. By capturing the predictable rhythmic and structural distribution of stress on a metrical grid (Hayes, 1986), we envision the syntagmatic assignment of prominence and its reiterations along the rest of the word like a constant beating drum.

2.3 Summary

Tones are featural, distinctive, and paradigmatic; in a tone system, one identifies the tones of each morpheme as they are specified as sequences of pitches in the lexical entry of each and are retained throughout derivation except when modified by phonological rules. Rules affecting pitch are conditioned by immediately adjacent tones and have no long distance interaction. The relevant units can be syllables or moras of any segmental composition with no short/long distinction.

Stress is structural, contrastive, and syntagmatic; in a stress system, one locates the peak in prominence within each lexical word through metrical computation, accentuating points with greater salience amidst their surroundings. Primary stress assignment may have long-distance effects of rippling secondary stresses across alternating syllables. Stress, exclusive to syllables, discriminates light versus heavy types based on their segmental material, asymmetrically attracting stress.

Tone and stress share a common phonetic tool in f_0 for their phonetic realization. The following sections will discuss how U. Tanana helps to distinguish tone (§4), how Witsuwit'en helps distinguish stress (§5), and how Navajo makes use of both systems (§6). These findings demonstrate the distinct phonological behaviours of tone and stress despite their near-identical phonetic outputs.

3 Tone in Upper Tanana

3.1 Tone Incorporation

In Lovick's grammar of U. Tanana (2020), we see that the language distinguishes between unmarked, low-marked, and high-marked syllables. Unlike its closely related neighbour Tanacross, U. Tanana has no contour tones at all, even as a result of suffixation. To prevent ambiguity, I will take "marked" to mean cross-linguistically rare as per OT, and "unspecified/underspecified" shall signify a lack of tonal specification; a departure from Lovick's terminology. In the following wordlist, many syllables in U. Tanana lack tonal specification, articulated instead at the average frequency of their locale in the utterance.

a.	gah	/kah/	[kah]	'rabbit'
b.	neetsǫǫ	/neːtsʰõː/	[neːtsʰõː]	'our grandmother'
c.	ihhaał	/ihhaːɬ/	[ihhaːɬ]	'I'm walking'
d.	neljit	/neltʃitʰ/	[neltʃitʰ]	'she is scared'

Figure 2: Syllables underspecified for tone.

L-tones in U. Tanana are lexical since minimal pairs are distinguished by their presence versus their absence, comparable with the presence/absence of a phoneme or feature as illustrated below.

Low-marked *Unspecified*

a.	na- /nà-/	‘CONT’	na-	/na-/ ‘IT’
b.	ih- /ìh-/	‘NEG.PFV:1SG.S:Ø’	ih-	/ih-/ ‘AA.PFV:1SG.S:Ø-’
c.	deeł	/tè:ɬ/ ‘PL go IPV’	deeł	/te:ɬ/ ‘PL go PFV’
d.	nän’	/nʌ̀nʔ/ ‘land’	nän’	/nʌnʔ/ ‘you SG’

Figure 3: Minimal pairs for L-tone.

H-tones in U. Tanana are phonetically salient, exhibiting signs of phonemic status, notably exemplified by its incorporation in the negative suffix -v́.

	Affirmative		*Negative*		
a.	shyah	/ʃʲah/	shyay	/ʃʲáj/	‘SG go PFV’ (N, T)
b.	‘į́h	/ʔĩh/	‘ą́y	/ʔą́̃j/	‘see IPV’ (N, T)
c.	deeł	/te:ɬ/	deel	/té:l/	‘PL go IPV’ (T)
d.	deeł	/tè:ɬ/	deel	/té:l/	‘PL go IPV’ (N)
e.	got	/kòtʰ/	godn	/kót/	‘punch PFV’ (N)

Figure 4: Minimal pairs for H-tone.

These examples from Lovick (2020) illustrate the distinctiveness of H- and L-tones in U. Tanana and how they are identified on each TBU. The functional load of lexical tone like that of U. Tanana resonates with phonological features, meaning even though it operates on its tier independent from segmental information, its overall contribution to the utterance is comparable. Cross-linguistic research has shown that tonal information can exist in the lexicon without segmental information just as how segmental information can exist without tonal information (see Broadwell & Zhang, 2000 for an example from Zapotec), exemplified by the tonal negative morphemes in Figure 4. To further support the featural properties of tone I will look at Lovick’s instrumental study on the phonetic realization of tones in U. Tanana.

3.2 Phonetic Evidence for Underspecification

In the previous section, I mentioned that U. Tanana has underspecification concerning tones, a property reminiscent of features. This section will portray how this phenomenon works analogously with

feature geometry, as elucidated by Lovick's findings. In phonological studies, the representation of segments may initially be underspecified but becomes fully specified. Various fill-in rule processes are proposed to ensure that all features attain values across segments in output forms. Keating (1988) argues that underspecified values persist in phonetic forms, where phonetic data reflect the presence or absence of feature values in surface forms.

While most Russian consonants contrast as either palatalized or not, /x/ operates differently. Instead, it relies on context for its value of [±back]. When a segment acquires features from a neighbour, it displays the relevant property of that feature to the same extent as the neighbour does. Thus, we anticipate /x/ before back vowels and /ç/ before front vowels. The fricative /x/ allows examination of the time course of assimilation effects. Below, (a.) shows the alleged generalized rule, (b.) shows the fronted form, and (c.) shows the unfronted form. /X/ represents the dorsal fricative unspecified for [±back].

a. [+cont, +cons, –son, DOR] → [αback] / __ [αback]
b. /X/ → [ç] / __ i
c. /X/ → [x] / __a

Keating's phonetic data contradicts this analysis when /X/ is placed in mirror-image contexts before and after /i/ as well as between two /a/ vowels.

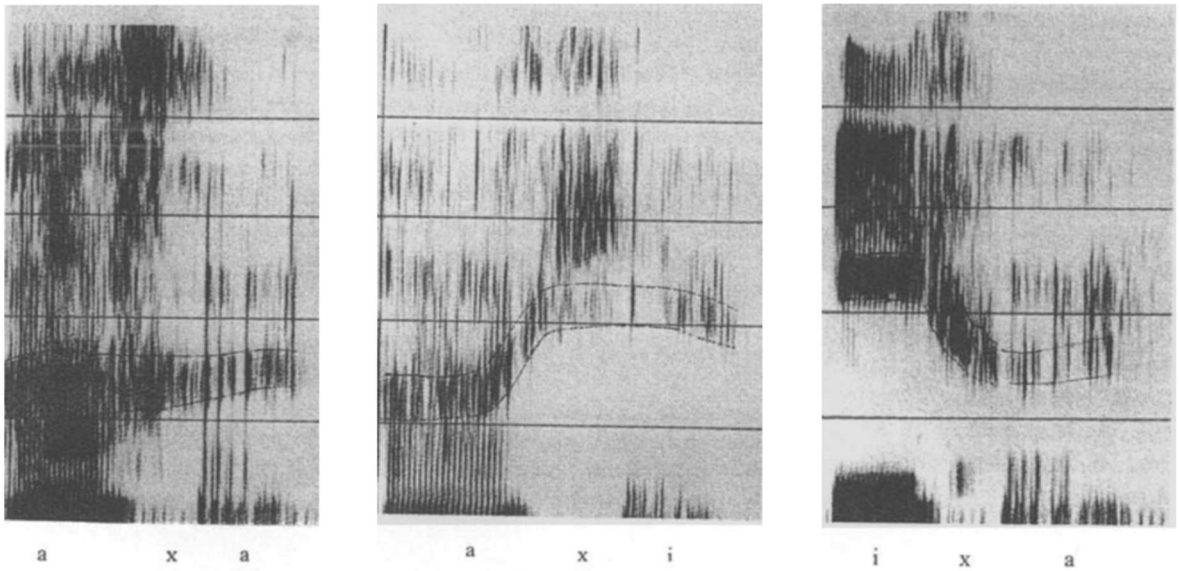

Figure 5: Fronting of Russian /x/ before /i/. Left, steady low f_2 frequency component in fricative. Middle, before

/i/, steady higher f_2 in fricative. Right, after /i/ transitional f_2 in fricative between the two qualities of the other two examples.

For the token /ixa/, the second formant, reflective of backness, shows a continuous transition from front to back. By contrast, for /axi/, the fricative is extremely fronted throughout its duration. This provides support for the idea that the fricative is [-back] for its entire duration rather than having only a transitional front quality. The /x/ preceding /i/ acquires a value for [-back] by spreading from /i/ whereas the other instances of/x/ remain unspecified for [±back], thereby displaying interpolatory effects.

This leaves three possible output representations for any given segment that may emerge from the phonology, each with different acoustic reflexes. These schematic representations are illustrated below using VCV sequences.

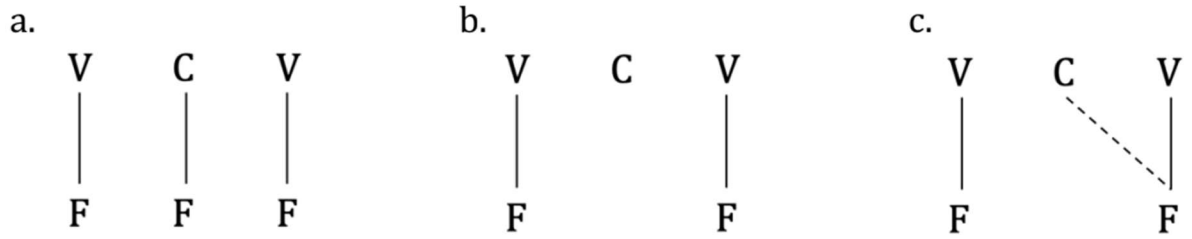

Figure 6: VCV sequences with the three possible representations for specification and underspecification that may be outputted by the phonology.

In (a.), each segment has a value for feature F, resulting in distinct phonetic qualities for each, with no vowel-to-vowel effect in either direction due to the consonant's feature value blocking such interactions. In (b.), a transition occurs between the two vowel targets and the consonant lacks its own phonetic quality, leading to a gradual shift. In (c.), the consonant acquires a value for F from V_2 via a spreading rule, yielding no coarticulation effect of V_1 on V_2 because the consonant's new value for F again blocks all interactions. However, there is an effect of V_2 on V_1 because the consonant's new feature will affect V_1. Lovick's analysis displays this precise behaviour for tone in U. Tanana.

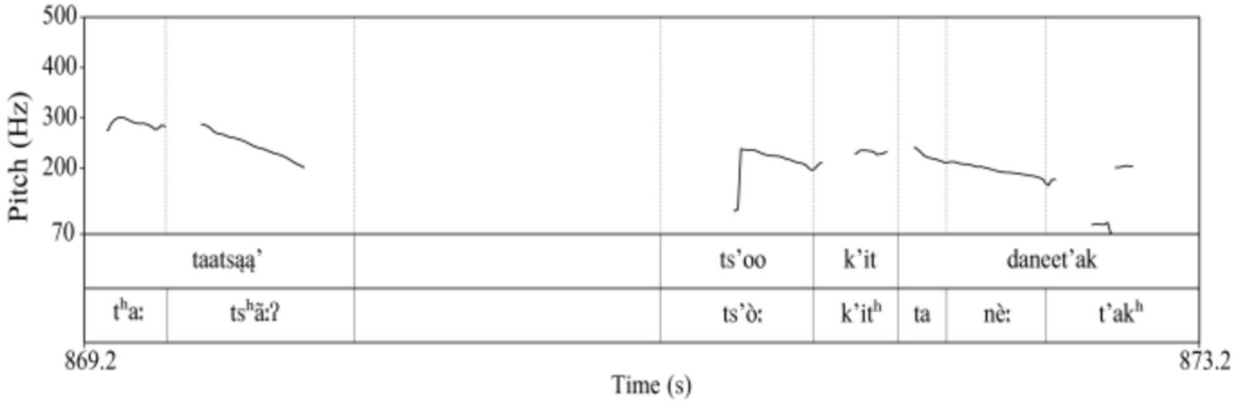

Figure 7: Pitch tracks for L and unspecified tones, taken from Lovick (2020)

The data presented demonstrates that syllables unspecified for tone adopt the same pitch range as their neighbours when positioned between two mirroring L-tones. The L-tones of the words /ts'ò:/ and /nè:/ enclose the unspecified words /k'itʰ/ and /ta/, giving a steady f_0 contained inside of the L-tone envelope. This occurs because T_1 and T_2 are both L and necessitate no gradual transition between their frequency targets. Therefore, since unspecified syllables have no pitch target, f_0 seamlessly bypasses them on its journey from $T_1$to T_2, yielding a constant pitch throughout.

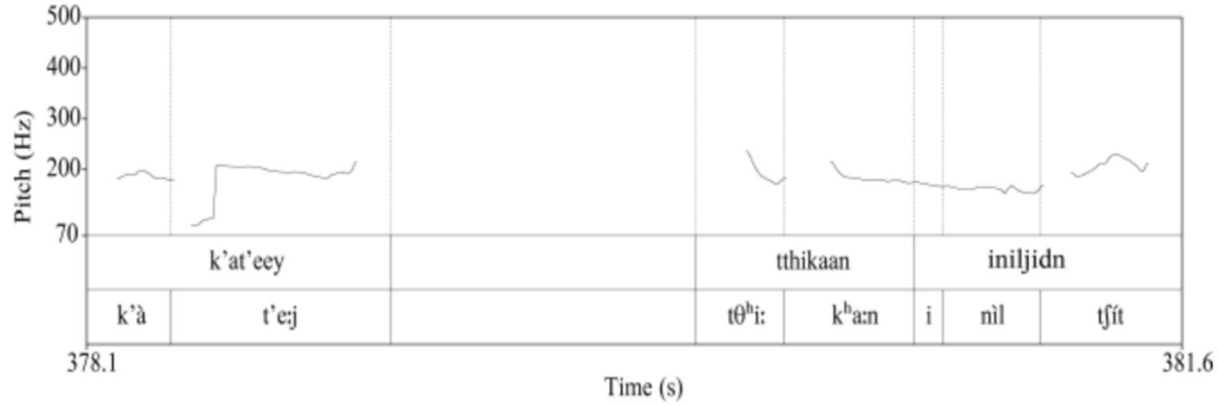

Figure 8: Pitch tracks for H and unspecified tones, taken from Lovick (2020)

The data presented demonstrates that syllables[2] unspecified for tone adopt the same pitch range as their neighbours when positioned between two mirroring L-tones. The L-tones of the words /ts'ò:/ and /nè:/ enclose the unspecified words /k'itʰ/ and /ta/, giving a steady f_0 contained inside of the L-tone

[2] Syllables, moras, vowels, etc. can associate with tones, but I have chosen the syllable as the TBU here in accordance with the data from U. Tanana though other languages may differ.

envelope. This occurs because T_1 and T_2 are both L and necessitate no gradual transition between their frequency targets. Therefore, since unspecified syllables have no pitch target, f_0 seamlessly bypasses them on its journey from $T_1$to T_2, yielding a constant pitch throughout.

Comparing the pitch change between an unspecified, an L-tone, and an H-tone, we observe the target-like properties of tones. From the unspecified tokens /tθʰiː/, /kʰaːn/, and /i/, f_0 descends to hit the L target on /nìl/, then sharply rises to hit the H target on /tʃĩt/. These examples indicate that for the Russian case, where a fricative unspecified for backness does not account for a point in the trajectory between back and front place, it behaves transitionally. In the case of U. Tanana, syllables unspecified for tone do not establish a target and are thus transparent to the pitch trajectory between two specified tones. See the following diagram for the three kinds of tonal outputs that result in different pitch reflexes.

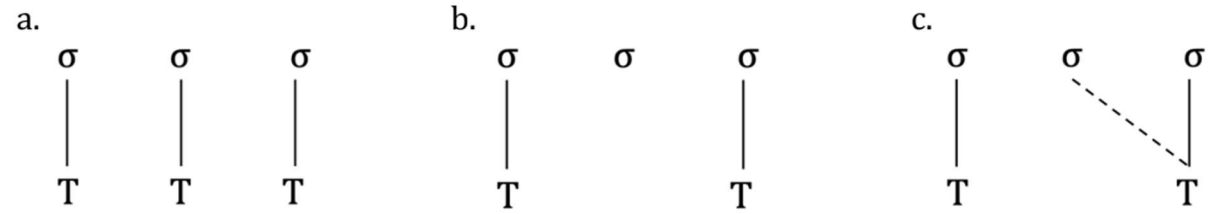

Figure 9: Syllable sequences with the three possible representations for specification and underspezcification of tone that may be outputted by the phonology.

In (a.), each syllable has a value for tone T, so each will have its own pitch target. In (b.), there will be a transition between the two pitch targets and the medial token lacks its specification for tone, resulting in a gradual shift in frequency. In (c.), the medial token acquires its surface tone value from a neighbour by a spreading rule.[3] Toneless syllables in U. Tanana correspond to option (b.) where they are fully unspecified for T, functioning as a sort of all purpose wildcard that takes the pitch of its adjacent tones. With this insight, tones are revealed to behave exactly like features in that they can be specified/underspecified, spread through rules, and interact with their neighbours once outputted. Tone, while manifesting as pitch cues and forming part of a language's prosody like stress, appears to share a closer connection with features and segments which are stored in the lexicon and undergo phonological derivation.

[3] Tones can spread in either direction depending on the language, not just right-to-left as shown here.

3.3 Tonogenesis

An alternative approach to isolating tone from stress is a diachronic perspective that looks at the birth and evolution of tone and how it is set apart from other features. From the data available we see that some languages in the family have no tone at all, some have a simple two-tone system, and others are reported to have up to four tones. Intriguingly, H-tones in some languages correspond to L-tones in others, and vice versa. This inconsistency in the existence and attributes of tone can be explained through a historical lens and proto-language reconstruction. I argue that the evolution of tone is parallel to the path of historical change taken by any segment, suggesting that tone, just like a segment, comprises featural information.

The rise of tone, known within the field as "tonogenesis," likely happened multiple times in the AET family. Typically, the process involves the suprasegmentalization of segmental information, as it transitions from the realm of the melody into the tonal tier. A noteworthy contemporary example of tonogenesis is unfolding in the Seoul dialect of modern Korean (Kim, 2012). Here, oral stop consonants exhibit a three-way contrast between voiceless, aspirated, and tense/ejective. The feature [+spread glottis] of aspirated stops underwent strengthening, affecting any following vocalic segments to produce an added "exhale" effect. The intensified release exerted an upward pitch modulation on the succeeding vowel, now being reinterpreted as an H-tone, whereas the originally unaspirated stop assumes an L-tone to maintain contrast. Eventually, the [±SG] contrast between aspirated and voiceless stops neutralizes syllable-initially, leaving behind a purely tonal contrast.

Similarly, languages in the AET family,[4] acquired tones through the assimilation of a [+glottal] feature (also termed [+constricted glottis]). Vowels assimilated with final glottalic consonants because of a [+glottal] spread to which vowels respond by constricting. The original contrast between glottalic and non-glottalic final consonants from Proto Athabaskan was retained in non-tonal languages while being lost in tonal languages (Kingston, 2005). From the constriction in some languages, the vowels tightened the vocal folds and prompted a higher f_0, later reinterpreted as an H-tone. In other languages, the increased tension and anticipation of the final glottal induced creaky voice, where the vocal folds come into contact in a way that is perceived as a low pitch. Whether constriction became an H- or L-tone designates if a language is high-marked or low-marked. In U. Tanana, glottalization gave rise to the L-

[4] Tonogenesis probably happened multiple times in AET at different points in time, but for simplification of discussion, I will group the birth of tone from glottalization in the Athabaskan (Dene) languages.

tone, making it low-marked (Leer, 1999). The asymmetries in the development of constriction from Proto-Athabaskan are summarized by Rice & Hargus (2005):

Pre-Proto-Ath	*Proto-Ath*	*High-marked*	*Low-marked*
VV	VV	V̀V̀	V́V́
VVʔ	Vʔ	V̀ʔ	Véʔ
vR	vR	v̀R	v́R
vR’	v’R’	v́R’	v̀R’
VVR	VVR	V̀VR	V́VR
VVR’	VVR’	V́VR’	V̀VR’
vT	vT	v̀T	v́T
vT’	v’T’	v́T	v̀T
VVT-R	VVT	V̀VT	V́VT
VVT(-T/S)	VVS	V̀VS	V́VS
VVT’-R	VVT’	V̀VT	V́VT
VVT’(-T/S)	VV’S	V́VS	V̀VS
VV’T(’)-R	V’T(’)	V́VT	V̀VT
VV’T(’)(-T/S)	VV’S	V́VS	V̀VS

Figure 10: The evolution of tone from Pre-Proto-Athabaskan to Proto-Athabaskan and to high marked and low-marked languages. T = stop/affricate, S = fricative, R = sonorant, V = short full vowel, VV = long full vowel, v = reduced vowel.

This generalization reveals the emergence of tone as a divergence from the laryngeal feature [+glottal], splitting off and becoming an individual distinctive entity. By drawing parallels with the lenition of Spanish intervocalic stops, a resemblance arises between tonogenesis and spirantization, both involving the spread of a feature to surrounding segments, precipitating a historical shift. Below are examples from Penny (2002).

Latin	*Spanish*	*Example*	*Gloss*
/-pp-/	/p/	[kuppa] > [kopa]	‘wine glass’
/-p-/	/b/(= /β/)	[kuːpa] > [kuba]	‘wine vat’
/-b-/	/β/	[kibu] > [seβo]	‘food’ > ‘bait’
/-tt-/	/t/	[gutta] > [gota]	‘drop’
/-t-/	/d/(= /ð/)	[kateːna] > [kadena]	‘chain’
/-d-/	/Ø/	[sedeːre] > [se.er]	‘to sit, be’
/-kk-/	/k/	[sikku] > [seko]	‘dry’

/-k-/	/g/(= /ɣ/)	[sekuru] > [seguro]	‘safe’
/-g-/	/Ø/	[lega:le:] > [le.al]	‘loyal’

All geminates simplify to singletons, intervocalic voiceless stops acquire a [+voice] feature from the neighbouring vowels, and intervocalic voiced stops acquire a [+continuant] feature becoming fricatives. Tonogenesis happens analogously with lenition as they both derive from historical feature spreading. However, we do not identify a [±tone] feature because of the independence that tone gains from the melody upon suprasegmentalization and its separate behaviour regarding rules and derivation. Nonetheless, tone is born out of features and is featural at its core. In the same way as some languages do not contrast [±voice] or [±nasal], the lack of contrasting tones in languages can be attributed to the featural essence of tone. I conclude that tonogenesis mirrors segmental change in its reliance on feature interaction, elucidating the featural behaviour of tone, albeit distinct from features themselves, owing to the newfound autonomy they possess.

4 Stress in Witsuwit’en

4.1 Morphology and Weight Sensitivity

In past analyses, Witsuwit’en has been erroneously categorized as tonal (Krauss, 2005). However, after closer inspection, it becomes evident that the positioning of “H-tones” within a word is dictated by a combination of morphological factors (stem/root vs. prefix syllable), syllable weight (closed vs. open syllable), position of syllable within a word, and vowel category (full vs. reduced vowel). This predictability points towards the language adhering to a system of prominence marking, not simply a tonal one. Early transcriptions of data, such as Barbeau’s, focused on pitch rather than tone, reflecting the fact that high pitch is one of the ways Witsuwit’en manifests stress (Hargus, 2007). Additionally, in words containing three or more syllables and prefix vowels that are all short, stress falls on the penult and preceding alternate syllables (Story, 1984). Though Story does not designate a single stress within the word as the strongest, the rhythmic alternation of echo stresses is compelling evidence for a primary and secondary stress system. This section will discuss the parameters governing stress assignment, exposing its predictability vis-à-vis tone.

Stress is attracted to stem syllables in Witsuwit’en as in many other Athabaskan languages (Rice & Hargus, 2005). Each stem receives some degree of stress, with compound words allocating primary stress to the leftmost stem and secondary stress to the subsequent stems.

a.	[c'əɬtə́y]	‘gun’	[sə́s-c'əɬtə̀y]	‘bear gun’
b.	[ɬəyə́l]	‘goat’	[ɬəyə́l-tsə̀y]	‘goat meat’

The notion that stress gravitates towards stems suggests that phonology is informed by morphosyntax, indicating that prominence is not purely phonologically decided (Crippen et al. 2023).

When all other factors are equal, stress is attracted to word-initial syllables. This is best illustrated with words containing vowels of the same quality and syllables of the same weight.

a.	[líli]	‘bed’
b.	[déde]	‘sickness’
c.	[dóso]	‘gunny sack’
d.	[búzu]	‘hello’ (handshake)

In trisyllabic words containing full vowels, secondary stress is apparent on alternating syllables from the left edge of the word.

a.	[nínincì]	‘it’s dired out’
b.	[nédibìs]	‘nighthawk’
c.	[déwesyèl]	‘I didn’t walk inside’
d.	[wéc’ezùʔ]	‘it’s not good’

Stress displays a preference for long vowels and full vowels, with primary stress falling on the long full vowel even when it is not the leftmost full vowel in the word. This gives us the ranking VV > V.

a.	[də́ɬ-neyé:ldə̀c]	‘they are talking to themselves again’
cf.	[də́ɬ-néyeldə̀c]	‘he’s talking to himself again’

b. [nqaʔáːninzèn] ‘they want you’

cf. [nqáʔninzèn] ‘he wants you’

c. [newec'óːɬyìts] ‘they shouldn’t rest’

cf. [néwec'oɬyìts] ‘she shouldn’t rest’

d. [ts'ɛnéːbətaɬdzèɬ] ‘he’s going to wake them up’

cf. [ts'ɛ́netadzèɬ] ‘he’s going to wake up’

Words containing both full and reduced vowels have stress on the leftmost syllable with a full vowel. Secondary stresses occur on sequences of syllables with reduced vowels.

a. [wédəzègəlkʷèts] ‘I’m not coughing’

b. [ʔèndənístgèɣ] ‘I made a mistake (speaking)’

Lastly, stress is attracted to closed syllables. If the first syllable is light and the second is heavy, stress skips the initial syllable and lands on the following heavy syllable.

a. [nə.gə́l.wès] ‘I’m hot’

b. [nə.c'ə́z.nə.qèy] ‘We’re sewing’

In totality, stress assignment in Wistuwit’en is quite complex and relies on the coming together of competing parameters in what may initially appear as a “random” distribution of high pitches that mimic a tonal pattern. Upon more careful inspection, we can retrieve the set of parameters that govern stress and predict its assignment.

4.2 “Quality” Sensitivity

On top of weight sensitivity, where long and short vowels are contrasted for having one and two moras respectively, some linguists have suggested a weight scale (Kenstowicz, 1996). We can observe in languages like Witsuwit’en that stress is indeed sensitive to vowel length as expected, but seemingly

vowel quality as well. The introduction of a scale allows for the categorization of how strongly different syllables draw stress without the binarity of a monomoraic versus bimoraic analysis. Below is a summary of Hargus' (2007) findings.

Parameter	*Stress is attracted to:*
Morphological category	Stems (vs. affixes)
Vowel quality	Peripheral: /a, e, i, o, u/ (vs. central: /ə/)
Vowel quantity	Long: μμ (vs. short: μ)
Position of syllable in word	Left edge of word (vs. word medial)
Syllable type	Closed CVC (vs. open CV) syllables

Figure 11: A descriptive account for the parameter settings for stress assignment in Witsuwit'en.

Hargus (2001) argues that Witsuwit'en stress, and by extension stress in other languages, prefers peripheral vowels over central vowels. This is similar to how Kwak'wala codas are only moraic if they are non-glottalized sonorants (Zec, 1989). Remarkably, the phonology can check not just the prosodic environment but also the feature information of a segment to determine whether it is stress-attractive or not. Hargus (2007) however, reconsiders this notion, proposing an alternative analysis wherein short central vowels are phonetically shorter than short full vowels, thus attracting stress to a lesser extent. This is motivated because short vowels make worse peaks than long vowels. She concludes that quality sensitivity is simply an extension of length sensitivity, proposing the following ranking for syllables.

$$VV > V(C) > əC > ə$$

Long full vowels are the heaviest, followed by full vowels with an optional coda, then schwa (central vowel) with a coda, and finally open syllables with schwa as the lightest possibility. She

explains this with the ranking of two constraints: *PEAK/v̆ >> *PEAK/V. This means that the avoidance of stressing "extra" short vowels outweighs the avoidance of stressing short vowels. Although her revised analysis aligns with the observed surface forms, it predicts a three-way phonological contrast, diverging from moraic theory. I suggest a traditional weight distinction between short vowels (V) corresponding to monomoraic syllables (σ_{μ}), and long vowels (VV) and closed syllables ((C)VC) corresponding to bimoraic syllables ($\sigma_{\mu\mu}$). This light/heavy division works in conjunction with an OT constraint, *PEAK(ə) that is violated by stress on reduced vowels, schwa in the context of Witsuwit'en.

The markedness of reduced vowels in stress systems motivates an approach utilizing *PEAK(ə) that is separate from binary weight distinctions but supplements weight distinctions during stress computation to output the observed patterns.

Thus, it appears stress is not contingent on vowel quality, but rather on a combination of sensitivity to syllable weight and the satisfaction of constraints. Nonetheless, the set of parameter settings of Witsuwit'en employed to locate prominence peaks is the mark of a true stress system. While these stresses may acoustically resemble H-tones, their distribution differentiates them as stresses.

4.3 The Nature of Stress Assignment

As previously noted, an H-L tone pattern is phonetically not very different from a σ́-σ pattern (Hyman, 2006), but it distinguishes itself through the rhythmic distribution of stress. While OCP constraints control underlying tones like they would any feature, something like stress adjacency is constrained by *CLASH, for example (Alber, 2005). To show how stress is regulated by a different collection of constraints than tone, I propose the following constraints, drawing from the patterns observed in Hargus (2001).

STRESS-STEM >> *PEAK(ə) >> STRESS-TO-WEIGHT >> ALIGNFOOTLEFT

Note that the precise ranking of these constraints may need to be refined for comprehensive data capture; my immediate aim is to identify the broad mechanisms in charge of stress assignment. STRESS-STEM refers to the priority stems receive when giving prominence. *PEAK(ə), as discussed above, serves as a markedness constraint that is violated by stressed reduced vowels. STRESS-TO-WEIGHT consolidates long vowels and closed syllables into heavy syllables, assigning them stress. Finally,

ALIGNFOOTLEFT expresses the preference for assigning stress to word-initial syllables, likely congruous with a left-to-right directionality in foot-parsing which competes with STRESS-STEM, given that stems are most often word-final. The nature of stress assignment operates under unrelated constraints to tonal ones such as OCP, *FLOAT, etc. (Meyers, 1997), presenting challenges in integrating both devices under a unified system with affiliated rules. Moreover, stress seems to emerge from foot structure which, in turn, arises from the inherent rhythmic organization of speech into binary alternating beats. Rather than forming part of lexical entries and participating in derivation, stress is rooted in the necessity of words to culminate and the disposition to locate landmarks within words, helping listeners to detect prosodic chunks and parse language input more efficiently. All these rudimentary qualities are intrinsic to stress, but by contrast, cannot be attributed to tone. Though tones can serve as boundary markers, their constraints and rhythmic properties differ significantly.

5 Tone-Stress Interaction in Navajo

5.1 Marking Prominence

Early grammars of Navajo make no mention of tone (Reichard, 1951; Morice, 1932) and some merely acknowledge a basic H-L contrast (Young and Morgan, 1987). However, analyzing the phonetic patterns of more complex words such as Navajo verbs, we can observe pitch effects over longer utterances and conclude that tone and stress are both active. Previous sections discussed tone and stress from a phonological perspective, conceptualizing them as abstract systems realized as detectable surface phenomena and attempting to explain how abstractions become real. This section takes a different path and focuses on concrete phenomena to derive their abstract representation from their tangible properties.

Declination (the gradual dropping in f_0 throughout an utterance) is a universal linguistic phenomenon. Visualized, the voicing bar of a spectrogram of an utterance tilts downward along the speech sample. Conventional phonological tone analyses strip the signal of intonation interventions and rescale pitch contours to horizontally flatten the average pitch throughout the utterance. This is a practice conducive to departing from pitch as a concrete entity and towards tone as an abstraction with polar values. However, eliminating declination and intonation also erases any traces of stress interactions. Retaining declination as a tilted baseline, tones and stresses are depicted as pitch deflections away from the average f_0 at any given moment. Taking declination into consideration makes McDonough's (1999) finding about phrase-final stem syllables stand out. She found that the f_0 range from H- to L-tones expands noticeably during stem syllables, which are known to attract prominence.

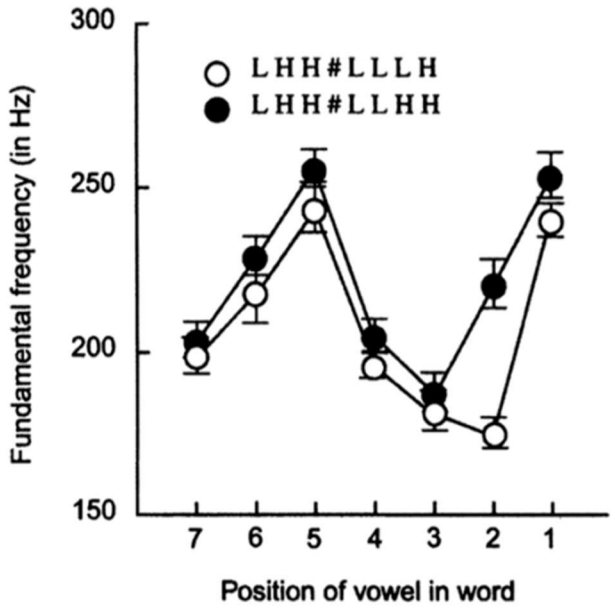

Figure 12: Average range of tones in words with LHH#LLLH and LHH#LLHH tonal contours.

Normally with declination, the envelopes for the H-tone band and the L-tone band would contract as the pitch depresses towards the end of the utterance, but in Navajo, the range suddenly widens at the end of the word where the verb stem syllable is located. Theoretically, tone is not concerned with how far its pitch excursions depart from the norm as long as H- and L-tones are higher or lower relative to each other. We expect a purely tonal contrast to have the amplitude of its range squeezed at the end of an utterance, but instead, a substantial widening of the range makes H-tones higher and L-tones lower. This is strong evidence for the involvement of another factor affecting the pitch. Since stress is concerned with greater versus lesser excursions (primary vs. secondary stresses) it is a viable candidate for causing heightened highs and lowered lows that are not inherently specified on the tonal tier.

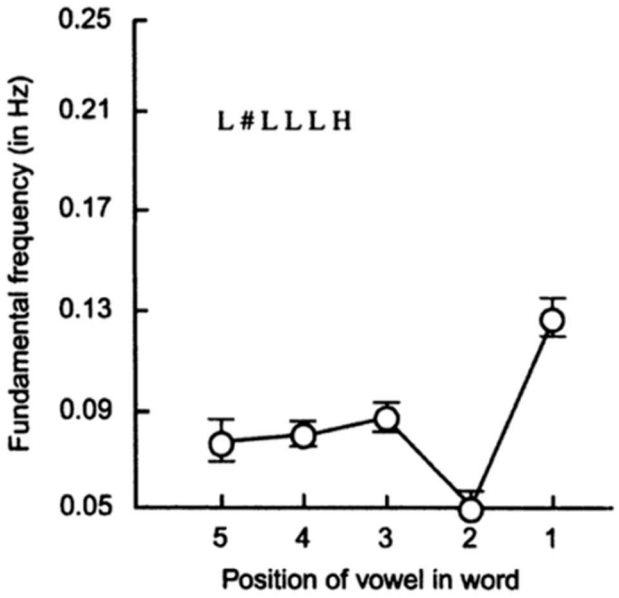

Figure 13: Average range of tones in words with a L#LLLH tonal contour.

In this example, L-tones preceding the final H-tone dip lower than the preceding L tones, defying tonal polarity. This is explained by anti-prominence constraints which dampen any salience as the main stress approaches, priming the stem syllable for prominence (Crippen et al. 2023). The prominent qualities of pre-stem syllables are constrained to intensify the prominence of the stem syllable and maximize the stress relative to its predecessors.

These acoustic data demonstrate that tone alone cannot be responsible for the observed pitch patterns. Unlike languages like Mandarin, where tone sandhi is triggered at any point of the sentence but has phonetically varying realizations due to declination (Goad & Qu, 2011), Navajo tonal indications appear to mostly adhere to declination but bifurcate substantially under stress influence, especially in regions expected to undergo compression if tone were exclusively considered.

5.2 Looking for Foot Structure

The Navajo language shows signs suggestive of both stress and tone, although discerning concrete evidence for their simultaneous existence as separate devices is challenging. When testing for stress, searching for signs of rhythmicity and foot structure is pivotal since they are the most salient surface characteristics that tell stress apart from tone. McDonough (1999) proposes a bipartite analysis

where words are made up of three domains based on their prosodic properties. She focuses on verbal morphemes and divides them into a disjunct (D-domain), a conjunct (I-domain), and a stem (V-domain). The stem is normally the final syllable of a verb, preceding it is the conjunct consisting of inflectional morphemes, and at the left edge is the disjunct which consists of adverbial and clitic-like content. Importantly, the disjunct is optional and the conjunct is generally optional, except for one morpheme which McDonough calls the mode-subject morph, which is always the penultimate syllable of the word as it appears immediately before the obligatory monosyllabic stem. This arrangement leaves the mode-subject syllable and the stem syllable as the smallest permissible verb, forming an obligatory paradigm of AUX+STEM, thus constituting a bisyllabic core (McDonough, 2003). Although there is little additional evidence, this enforced word minimality constraint may be due to a metrical requirement based on words necessitating binary feet. Additionally, stems typically exhibit greater prominence, suggesting a right-aligned iambic foot. To better understand how stems mark prominence, I will illustrate certain tendencies observed in Navajo verb structure.

Firstly, stems tend to comprise heavier, more complex syllables (CVV or CVC), whereas conjuncts, barring the mode-subject morph, predominantly consist of lighter, simpler syllables (overwhelmingly CV in shape). Contrary to Witsuwit'en, this contrast hints at a higher ranking of WEIGHT-TO-STRESS than STRESS-TO-WEIGHT, presuming stem syllables attract stress. Following this parameter and variance in constraint ranking, weight will gravitate toward the stem. Secondly, stem syllables are realized as phonetically longer than disjunct or conjunct syllables, though this may be due to final lengthening rather than prominence markers of an iambic foot. Notably, tones, often used to mark prominence, are disproportionately L to the left of the stem while stems demonstrate an on-par distribution of H- and L-tones. These disparities between stem and non-stem syllable types point to the likely construction of a right-headed, right-aligned foot in Navajo verbs, where prominence is realized through complexity, weight, length, and tone. Furthermore, diminished prominence seen in non-stem syllables is attributed to anti-prominence constraints on the conjunct and disjunct, like those documented in Tlingit (Crippen et al., 2023), thereby allowing stems to receive greater relative prominence.

Though foot structure in Navajo is evident from word minimality and prominence constraints, the occurrence of iterative feet supporting a rhythmic stress system remains somewhat elusive. The disjunct, conjunct, and stem combine to form a singular prosodic word because the independence of these domains would entail the culmination of each, which is not attested. As well as this, if iterative iambic feet were being parsed, we would expect secondary stresses on alternating syllables to the right of the stem, or a pattern similar to Witsuwit'en where stress is both attracted to the word-final stem and the left edge because of a left-to-right directionality of computation. Unfortunately, we do not see any signs

of secondary stresses, instead, the overwhelming distribution of L tones to the left of the stem resembles that of a pitch accent system. Here, I interpret pitch accent as the rhythmic distribution of tones as markers of accent. Although little attention has been dedicated to the predictability of pitch accent in Navajo, I posit the presence of a simple stress system characterized by a single peak per word, owing to the non-iterative construction of feet in addition to a set of prominence constraints that regulate the distribution of prominent phenomena, such as H-tones, heavy syllables, and long vowels.

6 Discussion

Linguists in the past have proposed a continuum (McCawley, 1978; McDonough 1999) where "tonal" typologies are defined by three main factors: the independence of the tonal tier, the function of tone, and the density of specification. This conceptual framework predicts that tone, pitch accent, stress, and intonation represent varying manifestations of a single mechanism, with languages occupying distinct points along the continuum. This premise cannot be true if U. Tanana shows that tone is featural and paradigmatic, Witsuwit'en shows that stress is culminative and rhythmic, and Navajo shows signs of having both devices. A spectrum on which languages can shift is hence not the right approach.

Tones in U. Tanana prove to be specified and underspecified in the lexical entries of morphemes. They are subject to rules and derivation akin to other features, undergoing spreading, assimilation, and interaction with immediate neighbours. Conversely, Witsuwit'en stress cannot function this way because its assignment is contingent on a set of parameters and constraints that dictate prominence peaks at a consistent location. The shape of the word and its syllable types influence the locus of stress, not the underlying specification of each word. If tones were assigned like stress and not stored underlyingly, the phonology would require an ordered script in which tones are first located through one set of rules and then interact with each other through a separate set of rules, each at a different time in the derivation. Correspondingly, if stress was stored underlyingly, the lexical entry would need to be informed by the syllabification of the word after all phonological processes post-derivation and this is unfeasible. Additionally, if stresses were fixed underlyingly, it would not be variable after compounding or the incorporation of clitics, contrary to the facts in the data.

Tone functions as a polar (sometimes multipolar) system of distinctive values that correlate with pitch excursions relative to an average level. Importantly, H-tones lift above the baseline into the upper envelope while L-tones fall below. How spaced out their frequency interval is should not be relevant as long as H is relatively higher than L to successfully mark a contrast. Especially toward the end of the utterance, the frequency envelope of H- and L-tones should be fairly compressed, but the data from

Navajo suggest differently. Stress is a hierarchical system of contrastive levels of prominence and a sudden expansion of the pitch envelope at the verb stem indicates the presence of stress on top of tone. Because stress utilizes f_0 and needs to be the highest prominence peak, it must amplify the tonal specification already present and decrease any other surrounding salient elements to stick out as much as possible. Tone alone is not capable of achieving this nor does it need to because it solely relies on a comparative difference, whereas stress is the opposite: it relies on marking a single syllable in a domain with maximum saliency.

The origins of tone and stress should also rule out their relationship. Tonogenesis involves the suprasegmentalization of material in the melody in the same way as features can affect each other, spread, or erode over time with the differentiation that tone is taken up to its independent autosegmental tier. By contrast, there is no process of "accentogenesis" denoting the birth of stress, rather stress appears to be a cognitive fact. Rhythm is universal because humans have a tendency towards repetitive patterns. Consonant-vowel alternation is simply the bouncing closure and opening of the speech organ stemming from the elasticity of the articulators. These alternations are grouped into syllables, which are grouped into feet and are assigned beats, reflecting rhythmic binarity at all levels of scope. Heartbeats also come in binary strong-weak patterns because of dual contractions, our walking is binary because of our lateral symmetry, and a 4/4 time signature can be found universally in all music traditions around the world. All these activities are impossible not to rhythmicize because alternating patterns are precognitively programmed into our biology, and this the same phenomenon that gives rise to stress. In other words, stress is simply the phonetic culmination within a rhythmic pattern. The same cannot be said for tone because, unlike stress, tonality is not an intrinsic reaction to rhythm; instead, tonal distinctions are developed language-specifically.

7 Conclusion

The examination of tone and stress as linguistic systems reveals their interaction and distinct characteristics. Tones, as distinctive elements, form part of lexical entries alongside features and are subject to diachronic change and exclusively local phonological rules. Conversely, stress is a symptom of inherent rhythm and operates as a structural and contrastive phenomenon, positioning itself as a peak within the metrical structure of word domains. Despite their fundamental differences, both tone and stress rely on phonetic mechanisms, particularly f_0, for their manifestation in speech, which leaves room for their common categorical association. Understanding the differing mechanisms and interactions of these systems sheds light on how language organizes prosodic constituents and autosegments. Further

research into the overlaying of tone and stress will enrich our comprehension of language typologies and their role in communication.

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How Skookum is This? A Survey of Variation and Change in Vancouver English

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Abstract

This study examines linguistic variation and change in Vancouver English (VE), focusing on shifts in the currency and vitality of local terms, general vocabulary usage, and pronunciation patterns across different age and gender groups. Using data from the Survey of Vancouver English (SVEN) (1974-1984) and the Survey of Canadian English (SCE) (1972) for comparison, this research investigates whether local vocabulary–particularly words deriving from Chinook Jargon—has declined among younger speakers. Additionally, it analyzes general vocabulary preferences to assess whether VE has converged with Standard Canadian and American English. Results indicate a significant decline in local lexical items, with younger speakers showing minimal usage and knowledge of these terms. Words such as saltchuck and oolichan have largely disappeared from younger Vancouverites' lexicons, while skookum has undergone a semantic shift from 'strong' to 'cool' or 'great.' Pronunciation changes, such as the shift in the local place name, Kitsilano, further support a trend toward linguistic standardization. Additionally, general vocabulary preferences reveal a continued movement away from traditional Canadianisms such as chesterfield and eavestroughs, toward more widespread North American terms. The findings suggest that VE is undergoing a shift towards a more standard, homogeneous form of speech, evidenced by the disappearance of distinct local terms and pronunciations.

1 Introduction

In the vibrant linguistic landscape of Vancouver, a city as diverse and dynamic as its inhabitants, the aspects of language are ever-changing. This study aims to explore the variation and change in Vancouver English (VE) over time, as well as between age and gender groups. Through my exploration, I expect to find the development of VE to be punctuated by a convergence towards Standard Canadian and American English across all demographics, evidenced by the disappearance of certain distinctive features. This survey is not exhaustive; it will focus primarily on vocabulary, with some investigations into pronunciation and semantic interpretation. Change and variation will be observed through a comparison of data from the *Survey of Vancouver English* (SVEN) (Gregg 2004), conducted between 1976 and 1984, and the *Survey of Canadian English* (SCE) (Scargill and Warkentyne 1972), as well as selected participants from different age and gender groupings. The study is broken into two parts. The first part will examine the vitality, currency, pronunciation, and semantic interpretations of certain local lexical items, while the second will examine the variation of general vocabulary preferences. In the study of local vocabulary, eight items, most deriving from Chinook Jargon, a pidgin language of the Pacific Northwest, were examined:

- *saltchuck,* from English *salt* and Nootka *ch'a'ak* 'water' (Gregg 2004: 68)
- *skookum,* from Chehalis *skukm* 'big,' 'strong' (Gregg 2004: 69)
- *squamish,* the name of a town at the north end of Howe Sound, but in this study is defined as 'a wind that blows from neighbouring valleys down this inlet' (Gregg 2004: 70)
- *oolichan,* from Chinook Jargon *ûlakân* 'a small fish' (Gregg 2004: 71)
- *saskie,* from Squamish Salish *tsa'tsqi* (Gregg 2004*:* 72)
- *saskabush,* derived from *Saskatchewan* or *Saskatoon* and *bush* (Gregg 2004*:* 72)
- *Kitsilano,* a local place name deriving from the name of a former Squamish Salishan chief (Gregg 2004: 75)
- *slough,* from Old English *slōh* 'inlet on a river,' 'backwater' (Gregg 2004: 73)

These terms were taken from the SVEN, but where Gregg expected to find them known and used by many Vancouverites (and was affirmed in this assumption), I expect to find the opposite. I hypothesize these lexical items have been extinguished in the lexicon of young, especially female, speakers of VE. It was observed in the SVEN that these terms had begun to lose their currency among this group, and I believe the process has been completed. I also hypothesize that individuals with at least one parent from

Vancouver will know more of these local terms as opposed to those without, due to the opportunity for transmission from parents. In the study of general vocabulary preferences, 21 items and their variants were explored and compared with data from the SVEN and the SCE. I expect to find that terms regarded as Canadianisms have disappeared in VE and to see a higher frequency of terms more commonly used in the United States. I believe that due to Vancouver's proximity to the American border, and the increased interaction with, and pervasiveness of, American media, some of their vocabulary preferences may have trickled into VE. Furthermore, the similarities between western Canada and the northwestern US have already been documented in their phonological systems, so it is not a great leap to assume they may share a homogeneity of vocabulary too (Boberg 2000: 15).

2 Methods

Speakers of VE have been defined in this study as individuals with English as their native language who have lived in the Greater Vancouver area since at least the age of seven, and have spent no more than two years of their adolescence thereafter outside of the area. After discerning speakers of VE, the sample was then divided into four groups separated by age and gender: young females (YF), young males (YM), older females (OF), and older males (OM). The survey consisted of 34 participants, 32.4% (11) YFs, 26.5% (9) YMs, 17.6% (6) OFs, and 23.5% (8) OMs. Young individuals were born from 2001–2005, and older individuals were born from 1967–1972. Please note here the disproportionality of the groups when examining the presented data. Convenience played a large role in the collection of data; this is an unfortunate consequence that will have to be taken into account. Responses were collected via an online survey, and speakers of VE were then parsed by a set of background information questions.

In the examination of local vocabulary, participants were first asked if they knew the local item; if they responded yes, they were then asked 1) what the word meant, 2) if they had ever heard the word before (this was later taken out of the discussion due to overlap with reports of knowledge), 3) if they used the word themselves, and 4) if they had any additional information they wished to provide. The term 'know' can be relatively ambiguous; therefore, I specified to participants that they should only say they do not know the word if it was wholly unrecognizable. This allowed for responses from participants who may not be able to define the word, but had seen or heard it somewhere. For some of the lexical items, participants were asked about pronunciation as well. In the section regarding general vocabulary preferences, participants were provided with an image and a corresponding written prompt, and asked to select what word they would use. This was a reconciliation of the methods used in the SVEN and the SCE. In Gregg's SVEN, he possessed the advantage of interviewing his participants in person and used

visual-aural prompting to evoke the most relaxed form of speech, avoiding the use of printed or written word (Gregg 2004: 77). Alternatively, the SCE used written word alone. These differences in methodology, though minute, have the potential to impact the validity of comparison between the surveys, so this should be taken into account when examining the data.

After the collection of data, responses were then compared against those from the SVEN and the SCE. The data from the SVEN was collected from three age groups: young (16–34), middle (35–59), and old (over 60), with the oldest participant born in 1888 and the youngest born in 1963. The SCE, undertaken in 1972, examined responses of Grade 9 students and their parents. Both surveys also separated responses by gender. It should be noted that for ease of comparison, the data collected from the middle and old groups from the SVEN were pooled together into a single age grouping to represent the older population, therefore spanning the ages 35-60+. This should be taken into account, as the older group thus covers a much wider age range than that in the current study (51-56); this was a result of collection restraints. Furthermore, the SVEN younger group also covers a much wider range of ages (16-35) than the current study (18-22). In both cases, the current study's range falls within the windows set by Gregg. However, they cover a much narrower scope, lacking responses from a middle sample (23-51), and an old sample (57+). This should be taken into account when viewing the data. In addition, I should note that the data taken from the SCE concerned speakers from British Columbia (BC) as a whole. Nevertheless, one can assume the majority of respondents were from in and around Vancouver as it is the most populated city in BC. Also, keep in mind that this method of self-report may not necessarily yield responses indicative of one's true speech tendencies in everyday life. Finally, it is worth noting that the following report will exclusively feature data showing the most interesting patterns. However, if you are curious, the full data set is available in the appendix.

3 Results

3.1 Local Vocabulary

	Epp (2023)					Gregg (2004)				
Local Item	YF	YM	OF	OM	Total	YF	YM	OF	OM	Total
saltchuck	0%(0)	0%(0)	17%(1)	38%(3)	12%(4)	66%	82%	86%	100%	89%
skookum	36%(4)	33%(3)	100%(6)	88%(7)	59%(20)	42%	60%	87%	96%	78%

oolichan	0%(0)	11%(1)	33%(2)	75%(6)	27%(9)	56%	74%	89%	91%	82%
slough	55%(6)	33%(3)	67%(4)	88%(7)	59%(20)	72%	94%	99%	99%	94%
*saskie**	0%(0)	22%(2)	50%(3)	50%(4)	27%(9)	(0)	(1)	(5)	(3)	4%(9)
*saskabush**	0%(0)	0%(0)	17%(1)	88%(7)	24%(8)	N/A	N/A	N/A	N/A	39%(67)

Table 1: Reported Knowledge of Local Lexical Items

*In Gregg's survey, the terms *saskie* and *saskabush* were latecomers to his list, and thus he and his team were able to elicit 203 and 176 responses, respectively, instead of the 300 from the rest of his terms. The data for *saskie* is presented without percentages, as such a small number of participants knew the term. I also did not have access to comprehensive gendered and aged data for *saskabush*, so that is not represented in this table.

	Epp (2023)					Gregg (2004)		
Local Item	YF	YM	OF	OM	Total	F	M	Total
saltchuck	0%(0)	0%(0)	0%(0)	25%(2)	6%(2)	38%	72%	55%
skookum	0%(0)	0%(0)	50%(3)	75%(6)	26%(9)	32%	58%	45%
oolichan	0%(0)	0%(0)	0%(0)	38%(3)	9%(3)	58%	72%	65%
slough	18%(2)	11%(1)	50%(3)	75%(6)	35%(12)	N/A	N/A	N/A
*saskie**	0%(0)	11%(1)	17%(1)	13%(1)	9%(3)	N/A	N/A	N/A
*saskabush**	0%(0)	0%(0)	17%(1)	75%(6)	21%(7)	N/A	N/A	N/A

Table 2: Reports of Having Used Local Lexical Items

*In Gregg's presentation of his data of usage of these local lexical terms, he only provided aggregate data of women and men, therefore, his data has been represented in terms of gendered differences alone.

As evidenced by the data in Tables 1 and 2, the prevalence of local vocabulary among speakers of VE has been greatly diminished, especially among younger individuals. The data shows a net decrease in knowledge and usage for all the presented items except *saskie*. The terms that have undergone the largest drop in currency appear to be *saltchuck* and *oolichan*, both dropping from percentages of knowledge in

the eighties (89% and 82%) to 12% and 27%, respectively. *Skookum* and *slough* are the only words that appear to have some remaining vitality among speakers of VE, with reports of knowledge at 59%. However, this is largely confined to the older population: 100% of OFs and 88% of OMs for *skookum*, and 67% of OFs and 88% of OMs for *slough.* Usage of *skookum* was confined exclusively to the older individuals, and *slough* was only reported to be used by two younger individuals, but with a different meaning than OFs and OMs, defined as 'to remove'. Only one other word was reported as used among younger participants: *saskie,* used by just one YM.

Among semantic definitions given by participants, some variation was observed. For *skookum*, the most popular definitions covered the semantic range of good, great, cool, amazing, well done, etc., given by 65% of participants, with no particular distinction between gender groups. Similar meanings of 'very good,' 'fine,' 'OK' were only given by 33% of women and 18% of men in the SVEN. The most popular meanings in the SVEN were related to 'big,' 'strong,' 'athletic,' etc. given by 64% of men, and 35% of women. This was the definition given by only 10% (2) of my respondents. The term *saskie* was only known by 4% (9) of the participants in the SVEN, and was defined generally by all as 'the shoots of a plant or bush.' Not only was this term known by a greater percentage in my study (27% (9)), but it was also given different meanings; 78% (7) defining it as 'someone from Saskatchewan.' For the term *slough*, the majority of respondents (55% (11)) cited it with the nounal meaning of 'a body of water' such as a swamp, river, or river runoff. However, three young respondents defined it as a verb, meaning 'to remove' or 'to fall off'. Definitions of the other terms stayed consistent with those given by Gregg's respondents: *saltchuck* meaning 'ocean,' *oolichan* being a '(small, oily) fish,' and *saskabush* meaning 'Saskatchewan or Saskatoon,' or someone from those places.

	Epp (2023)					Gregg (2004)		
Variant Pronunciations	YF	YM	OF	OM	Total	F	M	Total
[aɪ]	0% (0)	0% (0)	0% (0)	13%(1)	3% (1)	49%	48%	48%
[ɑ]	0% (0)	0% (0)	17%(1)	38%(3)	12%(4)	39%	33%	35%
[æ]	91%(10)	89%(8)	83%(5)	50%(4)	79% (27)	5%	8%	6%

Alternates	9% (1)	11%(1)	0% (0)	0% (0)	6% (2)	N/A	N/A	11%

Table 3: Variant Pronunciations of the Vowel in the Third Syllable of *Kitsilano*

For the term *Kitsilano,* I was concerned with pronunciation rather than survival and currency. In the SVEN, the pronunciation preferred by 48% of participants was [aɪ] for the vowel in the third syllable, followed by 35% for [ɑ], and 6% for [æ]. This ordering of preference is swapped in my data, with 79% preferring [æ], 12% [ɑ], and only one participant preferring [aɪ]. Two respondents (6%) alternated between [ɑ] and [æ] in my study, while 11% fluctuated in Gregg's, with one form usually being [aɪ].

3.2 General Vocabulary Preferences

	Epp (2023)					Scargill and Warkentyne (1972)				Gregg (2004)
Variant	YF	YM	OF	OM	Total	FS	MS	FP	MP	Total
Couch Sofa Chesterfield Other	91% (10) 9% (1) 0% (0) 0% (0)	100% (9) 0% (0) 0% (0) 0% (0)	67%(4) 33%(2) 0% (0) 0% (0)	100% (8) 0% (0) 0% (0) 0% (0)	91% (31) 9% (3) 0% (0) 0% (0)	N/A 6% 67% 25%	N/A 8% 72% 16%	N/A 4% 90% 5%	N/A 6% 88% 3%	16% 11% 72% N/A
(indoor) Tap Faucet Either tap or faucet	 27% (3) 18% (2) 55% (6)	 67% (6) 22% (2) 11% (1)	 33% (2) 50% (3) 17% (1)	 63% (5) 25% (2) 13% (1)	 47%(16) 27%(9) 27%(9)	 95% 4% N/A	 92% 6% N/A	 92% 6% N/A	 92% 6% N/A	 67% 25% 8%
Curtains Drapes Either one	91% (10) 0% (0) 9% (1)	89% (8) 11% (1) 0% (0)	67% (4) 17% (1) 17% (1)	88% (7) 0% (0) 13% (1)	85% (29) 6% (2) 9% (3)	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	44% 51% 5%
(cloth) Serviette Napkin Either one	 0% (0) 100%(11) 0% (0)	 11% (1) 89% (8) 0% (0)	 0%(0) 100%(6) 0%(0)	 0% (0) 88% (7) 13%(1)	 3% (1) 94% (32) 3% (1)	 33% 43% 23%	 31% 47% 21%	 42% 39% 19%	 32% 48% 20%	 N/A N/A N/A
(paper) Serviette Napkin Either one	 9% (1) 82% (9) 9% (1)	 0% (0) 100% (9) 0% (0)	 17%(1) 83%(5) 0%(0)	 12% (1) 75% (6) 13% (1)	 9% (3) 85% (29) 6% (2)	 26% 54% 19%	 33% 48% 18%	 52% 30% 17%	 44% 38% 17%	 N/A N/A N/A

Eavestroughs Gutters Other	0%(0) 100%(11) 0%(0)	0% (0) 100% (9) 0% (0)	33% (2) 67% (4) 0% (0)	0% (0) 100% (8) 0% (0)	6% (2) 94% (32) 0% (0)	40% 31% 22%	40% 41% 11%	82% 14% 3%	76% 22% 0%	N/A N/A N/A
Bus station Bus depot Bus terminal Bus stop	55% (6) 0% (0) 0% (0) 45% (5)	56% (5) 0% (0) 0% (0) 44% (4)	67%(4) 0%(0) 17%(1) 17%(1)	75% (6) 0% (0) 13% (1) 13% (1)	62% (21) 0% (0) 6% (2) 32% (11)	36% 58% 4% N/A	40% 50% 9% N/A	17% 76% 6% N/A	15% 75% 9% N/A	N/A N/A N/A N/A
(a) quarter to three two forty-five either one	18%(2) 64%(7) 18% (2)	0% (0) 89% (8) 11% (1)	17% (5) 67% (4) 17% (1)	63% (5) 25% (2) 13% (1)	24% (8) 62% (21) 15% (5)	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	96% 3% N/A
(a) quarter after eleven (a) quarter past eleven Eleven fifteen	0% (0) 0% (0) 100% (11)	0% (0) 11% (1) 100% (11)	17% (1) 0% (0) 83% (5)	50% (4) 13% (1) 34% (3)	15% (5) 6% (2) 79% (27)	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	47% 28% 23%

Table 4: Comparison of Preferred Variants of General Vocabulary Items

Data regarding general vocabulary preferences showed a trend away from Canadianisms such as *chesterfield* and *eavestroughs*, as well as older-fashioned terms like *serviette.* The items that elicited the largest change in variant preference were *tap/faucet, couch/sofa/chesterfield, gutters/eavestroughs, serviette/napkin, curtains/drapes, (bus) station/depot/terminal/stop* and mechanisms of telling time.

4 Discussion

4.1 Local Vocabulary

I hypothesized that the local words introduced in Gregg's study had undergone a reduction or extinction in the lexicon of younger speakers of VE, specifically women. In this, I was partially supported. My hypothesis was affirmed in its speculation regarding the disappearance of these terms among the younger group, with the large majority reporting no knowledge, usage, or occurrences of hearing these words. The only terms that exhibited any vitality among the younger individuals (here I will take this to be represented by reports of usage) were *slough* and *saskie*, reported by three and one individual, respectively. However, the reported definitions of these words were different from what was provided by the OFs and OMs (this will be explored more later in the section). The second part of my

hypothesis was not supported by the data. Gender appears to have no bearing among the younger individuals on knowledge of the terms, with both YFs and YMs having equally little familiarity with the terms.

That being said, gender did appear to have some effect on the older groups. The local words were commonly cited in the SVEN as 'a man's word rather than a woman's,' and this was supported by the responses in my survey (Gregg 2004; 69). For all of the items, except for *skookum*—which was an exception, with generally equal reports of usage and knowledge for OFs and OMs—OMs had higher percentages of knowledge and usage. So, in two respects, Gregg's observations were continued: the local items may still be considered more of (older) men's words, and they have lost ground among the young, though this has now progressed to a full-scale deletion of these terms from the lexicon of young Vancouverites (Gregg 2004: 69). My other hypothesis regarding higher levels of knowledge of these terms among individuals with at least one parent from Vancouver was not conclusively supported. The only term which appeared to suggest some impact of this variable was *saltchuck*, where all four of the respondents who knew the term had at least one parent from the city. For the rest, though, there was no correlation; many participants with neither parent from Vancouver still reported knowledge. Therefore, I can conclude word knowledge and usage were affected more by transmission from one's environment than their parent's lexicon. Before I move on, I did want to note a potential reason explaining why the terms *skookum* and *slough* had so many more reports of knowledge. I believe the reason may lie in the fact that *skookum* and *slough* were the only terms to be cited in conjunction with places in BC. Three individuals cited *skookum* in relation to Skookumchuck River, or Skookumchuck Narrows, a hike on the Sunshine Coast. *Slough,* similarly, was mentioned in association with Deas Slough near the George Massey Tunnel by two individuals. I believe these items' presence in place names has somewhat ensured their survival, as locations are rarely renamed, and are more likely to make their way into the awareness of individuals who live in the area. Even still, these terms do appear to be undergoing a retreat from VE. Ultimately, this disappearance of local vocabulary in speakers of VE may be interpreted as a sign of a departure from a distinctive lexicon.

In the examination of the pronunciation of *Kitsilano*, a shift towards more standard orthography, or conventions is also visible. The distinct pronunciation of [aɪ], has essentially disappeared, with only one respondent, an OM, reporting use of it. 53% of participants responded that they were not even aware of this pronunciation. The new, dominant pronunciation is [æ], preferred by 79% of individuals, a more common phonetic interpretation based on spelling. There are no conclusive gendered differences in this variable, but a higher percentage of younger individuals do use [æ].

In addition to the local words' obvious descent into obscurity, some other interesting developments concerning the lexical connotations of the terms warrant some examination. These will be explored below.

4.1.1 *Skookum*

The word *skookum* derives from the Chehalis word *skukm,* which means 'big' or 'strong' (Gregg 2004: 69). In comparison with the SVEN, the vitality of the word seems to have remained consistent among my older participants—values of knowledge and usage being similar, if not higher among the OMs and OFs in my survey. However, it appears the meaning of the word has trended away from its original, or intended meaning of 'big/strong' to meaning something more like 'great/good/cool.' The definitions given by my participants were as follows:

- (really) cool: 4
- (really) good/great/amazing: 7
- Very solid/ top notch: 1
- Something very well done/ very complete: 1
- Big/strong: 2
- Not sure: 3

As you can see, the definitions favoured by most respondents (65%) were descriptions of something of high merit or value (good, amazing, cool, well done, etc.). In the SVEN, this definition was offered by 33% of women and only 18% of men. The definition that came out on top in his survey 'covered the semantic range of big, strong, husky, hefty, healthy, and energetic,' offered by 64% of men and 35% of women (Gregg 2004: 69). This was the meaning offered by only 10% (2) of the respondents in my survey. Gender did not appear to have any significant effect on my survey responses, as much as age. The two respondents who gave the definition 'big/strong' were older individuals, an OF and an OM. There were only two young individuals who provided a definition, two YFs, who both said it meant 'cool.' This further highlights the trend from 'big/strong' to 'great/good/cool' over time. It is hard to say why this shift occurred, but I hypothesize it may be due to semantic broadening of the connotations over time as the term is progressively applied to more things, and thus encompasses broader concepts . Regardless, this term is on its way out, with zero reports of usage among younger individuals.

4.1.2 *Saskie*

A very interesting trend arose in my examination of *saskie.* In his survey, Gregg thought he had caught *saskie* on the brink of extinction, with only 9/203 participants knowing the word. However, my data shows a rebound of the word following this observance, with 50% of OMs and OFs reporting knowledge. Interestingly, this rebound was accompanied by a change in the meaning of the word. In the SVEN, the general meaning given by participants was 'the shoots of a plant/bush'. In my study, however, the meaning given by 78% (7) of respondents was 'someone from Saskatchewan.' Of the remaining two, one OM said 'a Riders fan,' referencing the CFL team, the Saskatchewan Roughriders, and the other, the only young individual, a YM, said it meant 'either Saskatchewan or a sasquatch.' One has to assume this term and its lexical connotations are owed to the resemblance of the words *saskie* and *Saskatchewan.* I believe *saskie* naturally became some sort of nickname, using the same mechanisms by which we may refer to individuals from Newfoundlands as Newfies. It is interesting, however, to note that it seems *saskie* took on a similar meaning to another word in our data: *saskabush.* Whatever its origins, *saskie* is also on its way out, being used by only one young individual, in a different context.

4.1.3 *Slough*

The term *slough* exhibited some lexical differences as well, though I believe these may be owing largely to the method of data collection. Unlike Gregg, I did not have the opportunity to pose this question orally, using the pronunciation /slu/. Therefore, I asked participants to also tell me how they would pronounce the word before giving a definition. The local semantic interpretation Gregg sought to examine was *slough* as a sort of body of water, ranging from a swamp to a river channel. Of the 11 individuals who pronounced the word /slu/ (32%), all but one YM, who didn't know the word, provided definitions along this semantic line. Nine of these respondents were older individuals. The most popular pronunciation given was /slaʊ/, by 38% (13) of my respondents, nine of whom did not know or could not define the word. However, there was one OM and one OF who pronounced it /slaʊ/ and still gave meanings of waterway' or 'body of water.' Three young individuals defined the word as a verb meaning 'to remove' or 'to fall off.' None of them pronounced the word /slu/. Therefore, we can conclude *slough* has lost its previous, local semantic interpretation and pronunciation among younger individuals, and is more often cited with its verbal meaning. However, I believe if I had asked the question with *slough* pronounced /slu/, I would have received fewer reports of knowledge and definitions from young individuals. As such, a change in semantic meaning may not be an accurate description of this phenomenon. Rather, one may attribute it to a decrease in knowledge of what a slough (/slu/) is among young individuals.

4.2 General Vocabulary

Regarding general vocabulary preferences, my hypothesis was again partially supported. I was correct in my assumption about the disappearance of Canadianisms such as *chesterfield* and *eavestroughs*, though this has already been noted by Chambers (1995: 156–66), and displayed in data from the *North American Regional Vocabulary Survey* (Boberg 2014). However, there was no conclusive evidence to suggest vocabulary preference is being taken over by American terms. For example, I observed my respondents trending *away* from the American term *drapes* in favour of *curtains.* The only variable that suggests some American encroachment is the decline in the term *tap,* and an increased use of, or alternation with, the American term *faucet.* This was particularly observed among women. 55% of YFs and 17% of OFs vacillated between the two, and 18% of YFs and 50% of OFs used *faucet* exclusively. Vancouver's proximity to the border, then, and the reach of media, may have *some* influence on vocabulary preference. However, it is not enough to draw any general conclusions. Another interesting development was the large number of people who selected *bus stop* as the place to catch the bus. *Station* remains on top, but *stop* is on the rise with 32% reporting it, especially younger individuals. However, this could be due to differences in interpretation, with those choosing *stop* imagining the place on the street where the bus picks you up, and those choosing *station* imagining the building one may go to to get a bus. The final items of interest were those having to do with telling the time. There appears to be a very large shift away from casual phrases such as 'a quarter to' or 'a quarter after' among younger individuals, with them favouring the more formal 'two forty-five' or 'eleven fifteen.' The individuals that use these phrases most appear to be OMs. This again highlights a trend towards the use of more standard phrases, as they are easier to understand for people with a limited knowledge of English. I propose that the use of e.g. 'two forty-five' over 'a quarter to' may be a result of the drastic increase in the use of digital clocks over analog, where visualizing 'a quarter to' is significantly less intrinsic. However, this dip in reported use may also be due to the formal nature of the questionnaire. If I were able to employ the same method as Gregg, asking in person, I may be able to observe results more similar to his.

5 Conclusion

This study examined variation and change in VE as a product of time, age, and gender, employing previous studies as bases for comparison. Ultimately, the survey showed a general movement of VE towards a more homogenous, standard style of speech. This is evidenced by the departure from and disappearance of distinctive local vocabulary, pronunciation, and semantic interpretation, and casual,

typically “Canadian” vocabulary preferences. My assumptions regarding gender were not supported, with YFs undergoing similar variations and changes in speech as YMs. I was supported in my assumption that it was especially among younger individuals that these changes had occurred, with the last vestiges of a distinct speech visible among the older individuals. My data also did not support the assumption that general vocabulary preferences would exhibit an obvious influence of American conventions. Perhaps if I examined newer vocabulary variants not already explored in the SVEN and SCE, I may find evidence of this trend however, from the terms I observed, no clear conclusions could be made. Future research concerning changes in VE vocabulary may aim to explore new local terms, as I have observed with *saskie* that new local items can appear and fade fast.

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Appendix A – General Vocabulary Preferences

	2023 Data					Scargill and Warkentyne (1972)				Gregg (1976-1984)
Variant	YF	YM	OF	OM	Total	FS	MS	FP	MP	Total
Rug (for a large floor covering)	0%(0)	0%(0)	0%(0)	0%(0)	0%(0)	N/A	N/A	N/A	N/A	18%
Carpet (for a large floor covering)	92%(10)	67%(6)	100%(5)	100%(8)	91%(31)	N/A	N/A	N/A	N/A	66%
Either	8%(1)	33%(3)	0%(0)	0%(0)	9%(3)	N/A	N/A	N/A	N/A	9%
Carpeting	0%(0)	0%(0)	0%(0)	0%(0)	0%(0)	N/A	N/A	N/A	N/A	4%
Can	(7)	(4)	(4)	(3)	53%(18)	N/A	N/A	N/A	N/A	N/A
Tin	(1)	(2)	(1)	(0)	12%(4)	N/A	N/A	N/A	N/A	N/A
Tin can	(2)	(2)	(1)	(5)	29%(10)	N/A	N/A	N/A	N/A	N/A
Any one	(1)	(1)	(0)	(0)	6%(2)	N/A	N/A	N/A	N/A	N/A
Couch	(10)	(9)	(4)	(8)	91%(31)	N/A	N/A	N/A	N/A	16%
Sofa	(1)	(0)	(2)	(0)	9%(3)	6%	8%	4%	6%	11%
Chesterfield	(0)	(0)	(0)	(0)	0%(0)	67%	72%	90%	88%	72%
Davenport	(0)	(0)	(0)	(0)	0%(0)	1%	1%	0%	1%	<1%
By another name	(0)	(0)	(0)	(0)	0%(0)	25%	16%	5%	3%	N/A
(indoor)										
Tap	(3)	(6)	(2)	(5)	(5)	47%(16)	95	92	92	67%
Faucet	(2)	(2)	(3)	(2)	(2)	26.5%(9)	4	6	6	25%
Spigot	(0)	(0)	(0)	(0)	(0)	0%(0)	0	2	0	N/A
Valve	(0)	(0)	(0)	(0)	(0)	0%(0)	0	0	0	N/A
Either tap or faucet	(6)	(1)	(1)	(1)	(1)	26.5%(9)	N/A	N/A	N/A	8
(outdoor)										
Tap	(4)	(4)	(4)	(6)	53%(18)	96	88	91	88	N/A
Faucet	(4)	(4)	(1)	(0)	26.5%(9)	9	6	3	1	N/A
Spigot	(0)	(1)	(0)	(0)	3%(1)	1	1	0	0	N/A
Valve	(0)	(0)	(0)	(0)	0%(0)	3	4	4	9	N/A
Either tap or faucet	(3)	(0)	(1)	(2)	18%(6)	N/A	N/A	N/A	N/A	N/A
Silverware	(0)	(0)	(0)	(2)	6%(2)	N/A	N/A	N/A	N/A	15%
Cutlery	(9)	(8)	(6)	(5)	82%(28)	N/A	N/A	N/A	N/A	46%
Knives, Spoons, Forks	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	8%
Utensils	(2)	(1)	(0)	(1)	12%(4)	N/A	N/A	N/A	N/A	3%
Tableware/ Dinnerware	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	3%
Silver	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	3%
Blinds	(10)	(9)	(6)	(7)	94%(32)	N/A	N/A	N/A	N/A	81%
Shades	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	11%
Either one	(1)	(0)	(0)	(1)	6%(2)	N/A	N/A	N/A	N/A	8%

Curtains	(10)	(8)	(4)	(7)	85%(29)	N/A	N/A	N/A	N/A	44%
Drapes	(0)	(1)	(1)	(0)	6%(2)	N/A	N/A	N/A	N/A	51%
Either one	(1)	(0)	(1)	(1)	9%(3)	N/A	N/A	N/A	N/A	5%
(cloth)										
Serviette	(0)	(1)	(0)	(0)	3%(1)	33	31	42	32	N/A
Napkin	(11)	(8)	(6)	(7)	94%(32)	43	47	39	48	N/A
Either one	(0)	(0)	(0)	(1)	3%(1)	23	21	19	20	N/A
(paper)										
Serviette	(1)	(0)	(1)	(1)	9%(3)	26	33	52	44	N/A
Napkin	(9)	(9)	(5)	(6)	85%(29)	54	48	30	38	N/A
Either one	(1)	(1)	(0)	(1)	6%(2)	19	18	17	17	N/A
Chips	(0)	(0)	(0)	(0)	0%(0)	48	45	49	56	N/A
French fries	(2)	(3)	(1)	(5)	29%(10)	42	44	49	40	N/A
Fries	(9)	(6)	(5)	(3)	71%(24)	8	19	2	3	N/A
Eavestroughs	(0)	(0)	(2)	(0)	6%(2)	40	40	82	76	N/A
Gutters	(11)	(9)	(4)	(8)	94%(32)	31	41	14	22	N/A
Other	(0)	(0)	(0)	(0)	0%(0)	22	11	3	0	N/A
Copse	(1)	(0)	(0)	(0)	3%(1)	2	3	0	2	N/A
Bluff	(0)	(2)	(0)	(0)	6%(2)	3	3	10	15	N/A
Clump	(5)	(1)	(1)	(2)	26.5%(9)	49	46	47	43	N/A
Grove	(4)	(5)	(4)	(5)	53%(18)	42	41	42	38	N/A
Spinney	(0)	(0)	(0)	(0)	0%(0)	1	0	0	0	N/A
Other	(1)	(1)	(1)	(1)	12%(4)	0	0	0	0	N/A
Bus station	(6)	(5)	(4)	(6)	62%(21)	36	40	17	15	N/A
Bus depot	(0)	(0)	(0)	(0)	0%(0)	58	50	76	75	N/A
Bus terminal	(0)	(0)	(1)	(1)	6%(2)	4	9	6	9	N/A
Bus stop	(5)	(4)	(1)	(1)	32%(11)	N/A	N/A	N/A	N/A	N/A
Loaned	(1)	(1)	(1)	(5)	23.5%(8)	14	23	46	46	N/A
Lent	(10)	(7)	(5)	(3)	73.5%(25)	79	69	50	50	N/A
Borrowed	(0)	(1)	(0)	(0)	3%(1)	2	2	2	2	N/A
Any one	(0)	(0)	(0)	(0)	0%(0)	0	6	1	2	N/A
Dinner	(11)	(9)	(6)	(5)	91%(31)	N/A	N/A	N/A	N/A	14%
Supper	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	5%
Either one	(0)	(0)	(0)	(2)	6%(2)	N/A	N/A	N/A	N/A	24%
Usually dinner, sometimes supper	(0)	(0)	(0)	(1)	3%(1)	N/A	N/A	N/A	N/A	36%
Usually supper, sometimes dinner	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	21%
(hard)										
Icing	(10)	(6)	(6)	(7)	85%(29)	88	84	90	94	N/A
Frosting	(1)	(3)	(0)	(1)	15%(5)	11	12	8	4	N/A
(soft)										
Icing	(6)	(6)	(4)	(6)	65%(22)	70	77	61	72	N/A
Frosting	(5)	(3)	(2)	(2)	35%(12)	29	21	36	26	N/A

(a) quarter to three	(2)	(0)	(1)	(5)	23.5%(8)	N/A	N/A	N/A	N/A	96%
Two forty-five	(7)	(8)	(4)	(2)	62%(21)	N/A	N/A	N/A	N/A	3%
Either one	(2)	(1)	(1)	(1)	15%(5)	N/A	N/A	N/A	N/A	N/A
(a) quarter after eleven	(0)	(0)	(1)	(4)	15%(5)	N/A	N/A	N/A	N/A	47%
(a) quarter past eleven	(0)	(1)	(0)	(1)	6%(2)	N/A	N/A	N/A	N/A	28%
Eleven fifteen	(11)	(8)	(5)	(3)	79%(27)	N/A	N/A	N/A	N/A	23%
Any one	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	N/A
Half past ten	(0)	(0)	(0)	(0)	0%(0)	N/A	N/A	N/A	N/A	18%
Ten thirty	(10)	(8)	(6)	(7)	91%(31)	N/A	N/A	N/A	N/A	82%
Either one	(1)	(0)	(0)	(1)	6%(2)	N/A	N/A	N/A	N/A	N/A
Other	(0)	(1)	(0)	(0)	3%(1)	N/A	N/A	N/A	N/A	N/A

Three-Step Parsing in Kanien'kéha

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LING 488: Independent Study

Professor Jessica Coon

Abstract

Morphological parsing is the task of transforming a surface linguistic form into its underlying morphological components. Parsing is an essential part of studying morphologically complex languages, where surface words can obscure the underlying linguistic structure. Many such languages are endangered and/or under-resourced, which restricts the usage of the more common data-driven methods in NLP that could automate this task. As a result, most parsing programs are implemented using symbolic finite-state machines. One of the most common architectures for finite-state models of morphology uses a two-step process, which first defines grammatical morpheme sequences, then applies a series of morphophonological rules to derive a surface form (Beemer et al., 2020; Koskenniemi, 1986). I propose a three-step architecture that divides morphophonological and phonological alternations. I claim that this addition constrains the power of the model in a way that mirrors predictions of theoretical linguistics on the structure of morphophonology. As a demonstration of these claims, I implement a three-step parser for verbs in Kanien'kéha, a morphologically complex and highly endangered language. I argue that the results demonstrate that this constrained architecture is still powerful enough to model the language and describe some theoretical findings of the structure of the language. I also further discuss the theoretical and practical questions raised by the choice of model architecture.

1 Introduction

Morphological parsing is the task of extracting morphological information from a surface form in natural language. It is an essential part of analyzing morphologically complex languages: that is, languages with a high number of morphemes per word.[12] It is a routine part of doing linguistic work with such languages. Figure 1 schematizes the task, applied to a word from Kolyma Yukaghir (Maslova, 2003).[3]

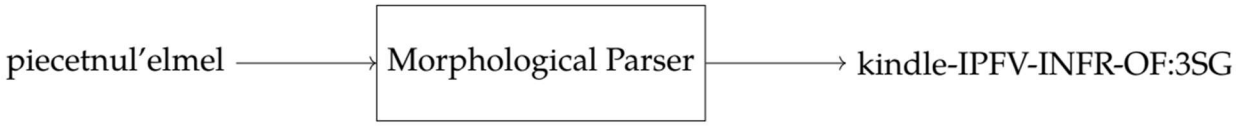

Figure 1: Representation of Morphological Parsing

Many morphologically complex languages are under-resourced. This makes it difficult to use traditional data-intensive approaches for NLP tasks in these languages (Kazantseva et al., 2018). As a result, tools dealing with morphological tasks in these languages are often implemented with a **Finite-State Transducer** (FST), a construct which allows direct, symbolic representation of the language's morphophonology. The FST also allows the usage of generative models as parsers.

The most common architecture for these FSTs divides the modeling process into two components or steps (Beemer et al., 2020; Hulden, 2009; Kazantseva et al., 2018). The first is the lexicon, which is

[1] *Niawenhkó:wa* to Wari McDonald and Akwiratékha' Martin for sharing their knowledge of Kanien'kéha with me and the rest of the McGill Linguistics department. *Niáwen* to Wari McDonald and to Wishe Mittelstaedt for teaching me to speak what I can. Thank you to Akwiratékha' Martin, Anna Kazantseva, Chase Boles, Heather Goad, and the members of the Roti'nikonhrowá:nens reading group for guidance and feedback throughout my research process. And especially thank you to Jessica Coon, for teaching and guidance, and for supervising the independent study which let me pursue this project.

[2] For the purposes of this task, I take a word to an *orthographic* word: that is, a string delimited by punctuation or whitespace. It is within these words that morpheme boundaries are not clearly defined by orthography, making it the domain in which parsing is required. I make no claims regarding the relationship between this word and the phonological or morphological word.

[3] Morpheme breakdowns follow the Leipzig Glossing Conventions. Abbreviations are as follows: AG — agentive, BEN — benefactive, DUP — duplicative, FACT — factual, HAB — habitual, JR — joiner, NEG — negation, NMLZ — nominalizer, NP — noun prefix, NSF — noun suffix, OPT — optative, PUNC — punctual, REP — repetitive, STAT — stative, TRANS — translocative. The pronominal prefixes, described in Section 4.2, distinguish the following features: 1 — first person, 2 — second person, SG — singular, DU — dual, PL – plural, INCL — inclusive, EXCL — exclusive, M — masculine, F — feminine, N — neuter, I — indefinite; agent prefixes are indicated with A, patient prefixes are indicated with P, and the transitive prefixes use > to separate the subject and object respectively.

responsible for (a) defining grammatical sequences of morphemes and (b) replacing morphosyntactic forms with corresponding phonological forms (analogous to the process of Vocabulary Insertion in Distributed Morphology (Halle and Marantz, 1994)). The second is the morphophonology, which transforms the strings of morpheme forms into a surface form, by applying a series of morphophonological rules, illustrated in Figure 2 with the word "wishes".

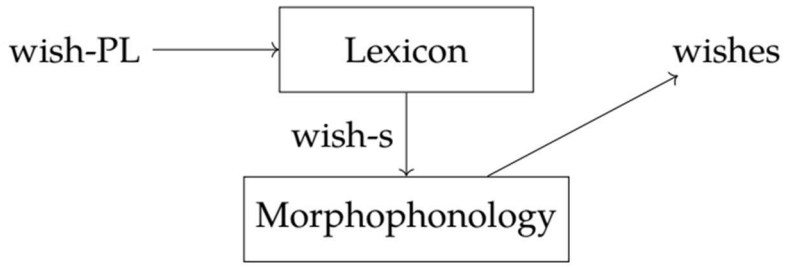

Figure 2: Two-Step Model

While this approach is robust, and many comprehensive finite-state models have been implemented using it (Dunham, 2014; Kazantseva et al., 2018; Lachler et al., 2018; Snoek et al., 2014; Zueva, Kuznetsova, and Tyers, 2020), it makes several implicit assumptions, chief among them, that each morpheme has a default phonological form, which are all inserted simultaneously. This simultaneous insertion complicates the modeling of **phonologically-conditioned allomorphy**, a phenomenon that arises when different allomorphs occur depend ing on phonological context; but, the alternation cannot be explained by phonology alone (i.e., it is suppletive) (Rolle, 2023). For example, in Kanien'kéha (Iroquoian), the neuter agent pronominal prefix has the form *ka-* in most cases, but *w-* before a verb stem beginning with *a*, as demonstrated in (1) and (2).

(1) **ka**hiá:tons
ka-hiaton-s
NA-grab-HAB
'She writes' (Martin 2023:68)

(2) **w**atá:wens
w-atawen-s
NA-swim-HAB
'She swims' (Martin 2023:68)

This alternation is consistently conditioned by the first segment of the verb throughout the language, meaning the trigger is phonological. Additionally, there is no *ka* ∼ *w* alternation in other environments, meaning it cannot arise from phonology.

As an alternative architecture, I propose a three-step model. The first step models the morphology: it defines valid orders of morphemes and other syntactic dependencies. The second step transforms morphemes into their appropriate phono logical forms. The third step represents the phonology: it applies the phonological transformations necessary to derive surface forms. Crucially, the morphology does not make reference to phonology, and the phonology does not make reference to morphology. The second step is entirely responsible for inserting phonological forms: by conditioning these rules, a significant amount of allomorphy can be captured at this step instead of in the phonology. Figure 3 schematizes this with the same word: wishes.

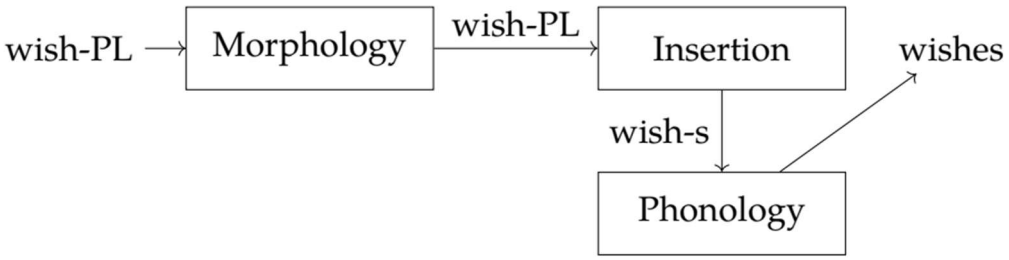

Figure 3: Three-Step Model

The change models a cross-linguistic generalization predicted by certain linguistic models of morphophonology: **phonologically-conditioned allomorphy is almost always conditioned towards the root** (Rolle, 2023; Rolle and Bickmore, 2022).[4] Essentially, if morphosyntactic information is replaced with phonological information from the root outwards, phonological conditioning for spellout will only be available on the side of a morpheme closest to the root (Gouskova and Bobaljik, 2019): Step 2 of Figure 6 shows an example of this operation. Spellout enforces separation of morphosyntactic and phonological information, and constrains suppletive allomorphy.

[4] This pattern is predicted to be universal, though some phenomena have been argued to break it (Rolle, 2023). Regardless of whether it is a near-universal or a true universal, I believe it is still strong enough to inform a choice of model architecture.

As a test for whether these constraints still allow sufficient power for a language model, I implement a parser for basic verbs in Kanien'kéha.[5] I argue that the three-step architecture is still sufficient to represent the language, and that it carries several benefits. In attempting to model the language with these constraints, and building off of previous theoretical and descriptive work, I also present some expanded analyses of Kanien'kéha morphology.

This paper is organized as follows. In Section 2, I describe the problems as sociated with morphological parsing in low-resource languages, and compare the two-step and three-step architectures for finite-state modeling. In Section 3, I give background on Kanien'kéha, the language of interest. In Section 4, I describe specific results of modeling verbs in Kanien'kéha, centered around linguistic findings. In Section 5, I discuss the theoretical and practical generalizations arising from the creation of the parser, and discuss the results of using a three-step architecture. Section 6 concludes.

2 Morphological Parsing

2.1 Problem Description

Morphological parsing is the task of extracting morphological information from surface forms. Since implementation of this task can vary, I define the goal of my parser as being able to produce strings of morphemes, such that each morpheme maps to a separable phonological form.[6] More practically, the goal of this parser is to specifically replicate the manner of parsing performed by linguists, mapping the first line of a standard Inter-Linear Gloss to the third line, as counted in (3).[7]

(3) reader
read-er
read-AG
'reader'

[5] What counts as "basic", or even a "verb" for the purposes of the parser, is defined in Section 3.2.

[6] There are some cases where morphemes can appear fused with others. These are glossed with a period, per Leipzig glossing conventions. These are not to be confused with the morphemes that appear as a fusion of features that are not analyzed as separate synchronically, like the transitive agreement prefixes.

[7] Due to the nature of the finite-state architecture, segmenting the word into phonological strings is not possible without first identifying the morphemes that these strings represent. As such, while extracting these phonological forms of the morphemes (as in the second line of the example) is a useful task, it must follow from the extraction of the morphemes themselves.

2.2 The Finite-State Transducer

The Finite-State Transducer (FST) is a common construct used for morphological parsing or morphological analysis in general. It has the advantage of allowing direct implementation of morphological and phonological rules. These rules can model the analyses created by linguists (Dunham, 2014), meaning that large amounts of data are not required to make a functioning system, as opposed to many of the standard techniques in NLP. As a result, the FST is ideal for modeling under-resourced languages.

FSTs also have the property of reversibility. So, a well-constructed generator FST will also function as a recognizer or parser. Since most linguistic analysis is done from the generative perspective: deriving surface forms from underlying structures, the reversibility property is advantageous. As a result, making a parser only requires implementation of a generative model. In this paper, I will be discussing FSTs and their corresponding linguistic analyses as generative models.

2.3 Two-Step Parsing

The contemporary architecture for finite-state morphological models involves two steps. Both are reflected in the functionalities provided in finite-state toolkits like *foma* (Hulden, 2009), and in the structure of contemporary finite-state models, such as those presented in Kazantseva et al., 2018; Lachler et al., 2018; Snoek et al., 2014.

The first step is variously referred to as the lexicon or the lexical layer, which is responsible for defining grammatical sequences of morphemes (and potentially other subword units, like annotations) (Koskenniemi, 1986).

The second step is the phonology or morphophonology. It is responsible for applying phonological rules. Depending on the language and architecture, it may be responsible for applying morphophonological rules: that is, rules that need to be specified for certain morphological contexts. Certain models, like those in Dun ham, 2014 and Kazantseva et al., 2018, apply all morphophonological rules in this step. Others, like Snoek et al., 2014, divide the process by listing suppletive forms within the lexicon whilst handling more regular morphophonological alternations within the phonology. Figure 2 schematizes this two-step division.

2.4 Components of a Parser

In examining these models, the task of any morphological model can be divided into three components. These components can be viewed as an abstract process, or from two other complementary perspectives. These are their practical implementations in a computational system, and their theoretical equivalents in formal models of linguistics. These are summarized in Table 1.

Each component is described in further detail in Sections 2.4.1-2.4.3.

2.4.1 Morphology

The morphology is responsible for defining valid sequences of morphemes through defining lists of morphemes, and their relationships to each other. Linguistically, this might correspond to a morphological template; computationally, it might be implemented as a large regular expression.[8]

	Morphology	Phonology	Morphology-Phonology Mapping
Role	Defining Grammatical Word Structure	Enforcing Phonological Processes	Mapping Abstract Morphemes to Phonological Equivalents
Implementation	*lexc* Tree, Regular Expression	Rewrite Rules, *TwoLC* constraints	Various
Linguistic Theory	Morphological Template, Generative Grammar	Phonological Rules, Optimality Theoretic Constraints	Distributed Morphology Vocabulary Insertion Rules

Table 1: Components of a Morphological Model

[8] The suitability of morphological templates for this purpose is addressed in 5.3.

2.4.2 Phonology

The phonology models phonological and orthographic rules that are applied as a result of the morphemes being concatenated. Linguistically, this might correspond to a series of ordered generative phonological rules. Computationally, this might be implemented using a cascade of rewrite rules.[9]

2.4.3 Morphology-Phonology Mapping

Since the morphology is defined in terms of abstract morphemes, and the phonology is defined in terms of phonological strings, the model must have a way of mapping between morphemes and their phonological forms. In the framework of Distributed Morphology (Halle and Marantz, 1994), this is analogous to the process of Vocabulary Insertion, or the broader concept of spellout. As such, I adopt the term **spellout** to refer to this process. Like phonology, spellout can be implemented using rewrite rules.

2.5 Spellout in Two-Step Parsing

Spellout in finite-state models is almost always implicitly handled by the lexicon. Figure 4 shows a sample of the *lexc* file presented in Snoek et al., 2014. The line < +Obv:a > ; indicates that the +Obv tag should be spelled out as a.

```
LEXICON ANSTEMLIST
apiscacihkos ANDECL ;
apisimˆosos ANDECL ;
LEXICON ANDECL
< +N:0 +AN:0 +Sg:0 @U.noun.abs@ # > ;
< +N:0 +AN:0 @U.noun.abs@ OBVIATIVE > ;
LEXICON OBVIATIVE
< +Obv:a # > ;
```

Figure 4: Sample of the Plains Cree Lexicon from Snoek et al., 2014

I argue that this model of spellout complicates modeling of **phonologically-conditioned allomorphy** (PCA). Per Rolle, 2023, I take PCA to be allomorphy which is suppletive (i.e., it cannot be attributed to a broader phonological process) and conditioned on the presence of a phonological property. PCA is complicated by the fact that it needs to make reference to both morphological information (the

[9] This can also be implemented using parallel constraints on surface forms (Koskenniemi, 1986). In linguistics, this is analogous to the constraint-based phonology of Optimality Theory (Violin Wigent, 2006).

relevant morpheme) and phonological information (the relevant trigger for the allomorphy). As a result, it must be conditioned at one of two parts of the morphological derivation: either (1) during the process of spellout or (2) after the process of spellout, with morphological information still visible in some fashion. However, the two-step model also makes the following assumptions:

- **Every morpheme has a default allomorph:** by listing pairs of morphemes and allomorphs, these allomorphs are assumed to be default forms.
- **Morphemes are all spelled out simultaneously:** by associating default allomorphs with morphemes in the same structure that morpheme sequences are being defined.

As a result of these assumptions, there is no control during the process of spellout, since all morphemes are spelled out in predetermined forms simultaneously. Option (2) is the only one available for modeling PCA in a two-step model. In other words, the two-step morphological model **requires** morphological information to still be available after spellout is complete. Figure 5 demonstrates this with a derivation of the Kanien'kéha word *watá:wens*. The initial *a* of the verb stem *atawen* conditions the allomorph *w-* for the NA prefix. However, the prefix is instead spelled out with its default form, *ka-*. It must then be readjusted with a specialized rule which requires the presence of morphological annotations:[10]

[10] The phonology is simplified as it is not relevant to the process of spellout. I make no claims about the general structure that is required for phonology, such as overt morpheme boundaries, morphophonological domains, or cyclic rules.

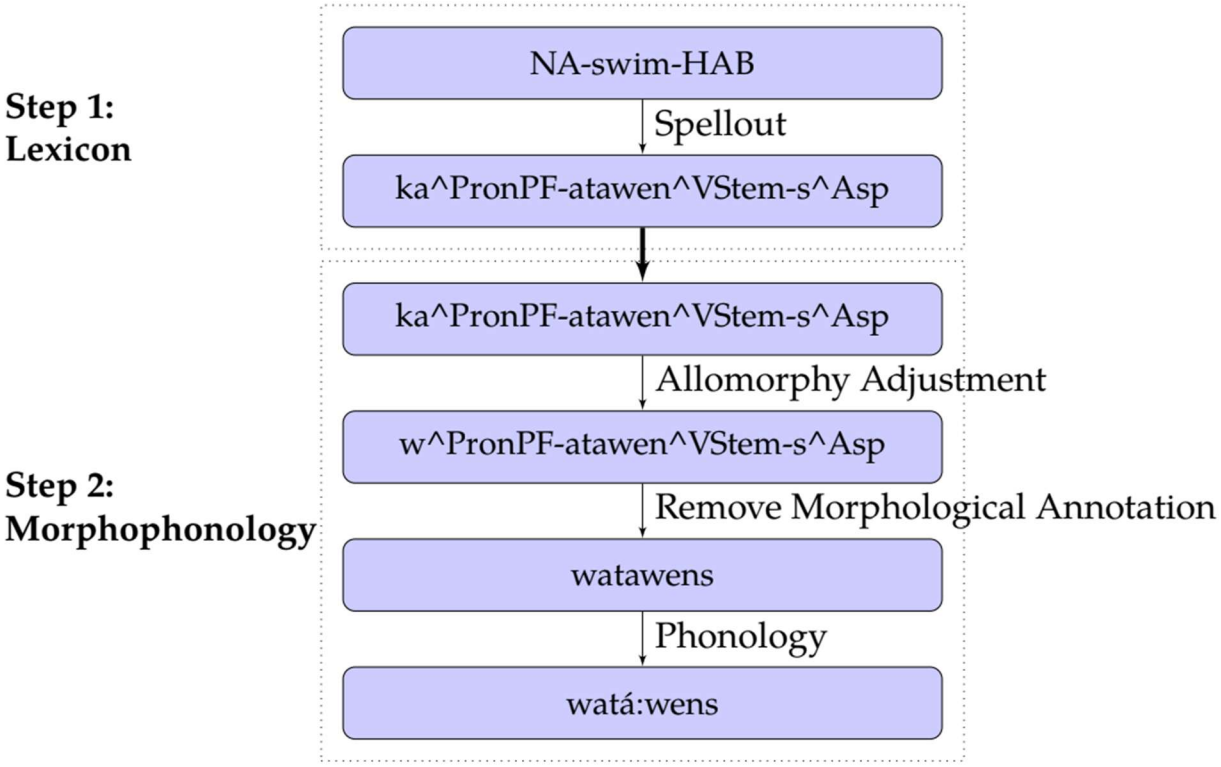

Figure 5: Two-Step Modeling of Phonologically-Conditioned Allomorphy

2.6 Three-Step Parsing

As an alternative, I propose a three-step architecture for morphological models, grounded in the following principles in theoretical linguistics:

1. **Late Insertion**: spellout of morphemes only occurs **after** the entire morphological structure has been built, a core component of Distributed Morphology (Halle and Marantz, 1994).
2. **Cyclic Insertion:** spellout of morphemes occurs in a sequential manner. Per the principles of Distributed Morphology, I assume this begins in the root and proceeds outwards one morpheme at a time (Gouskova and Bobaljik, 2019).

To do this, the three-step architecture aims to separate morphophonological pro cesses, especially phonologically-conditioned allomorphy, from the other components of the model entirely. This is done by

removing all spellout rules from the lexicon, all readjustment rules from the phonology, and defining spellout rules within an entirely new component. The result is a three-step process: the morphology/lexicon, which feeds the spellout, and in turn feeds the phonology. The process is shown in Figure 6, where a three-step model derives the same word, *watá:wens*, that was used in the example in Figure 5:

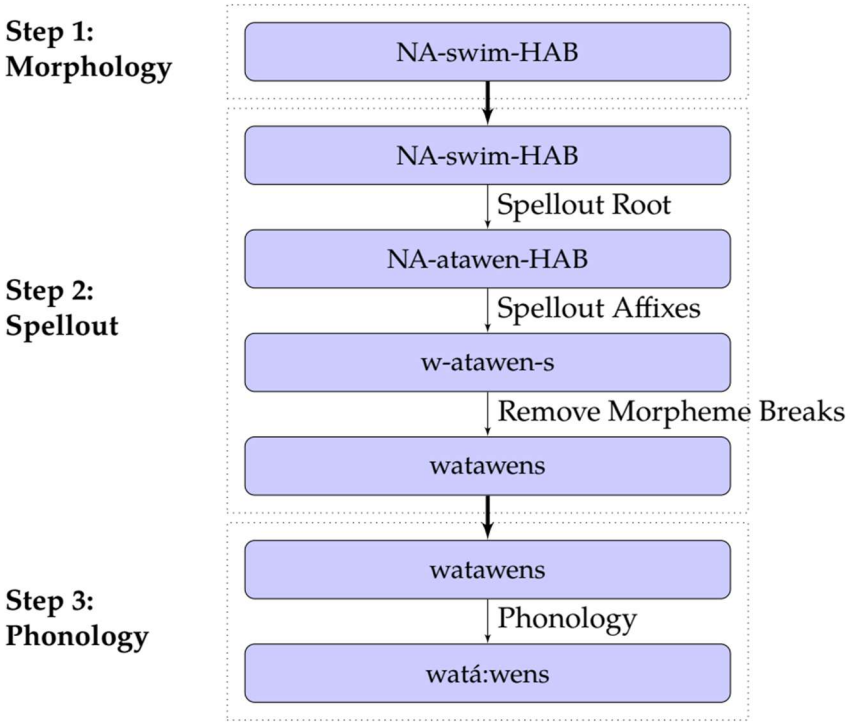

Figure 6: Three-Step Modeling of Phonologically-Conditioned Allomorphy

As seen in this derivation, phonological material is only available towards the root, as it gets gradually inserted. As a result, the correct allomorph of the neuter agent, *w-*, is inserted immediately. The principal benefit of this approach is that it removes redundant suppletive readjustment rules, simplifying the structure of the model.[11]

2.7 Immediate Theoretical Considerations: Phonologically-Conditioned Allomorphy

[11] It is likely that minimization of the FST would result in no practical increases in runtime efficiency. The benefits I argue for here primarily concern program architecture.

An immediate implication of this architecture is that phonologically conditioned allomorphy that is conditioned outwards (away from the root) is absent. This generalization is well supported by the near total lack of such phenomena cross-linguistically, with models like Distributed Morphology predicting them to be totally absent (Rolle, 2023). As a result, I argue that this loss of expressive capability within the model architecture is well-justified, and thus a desirable simplification.

Further theoretical and practical considerations of the three-step architecture are discussed in Section 5.

3 Language Background: Kanien'kéha

3.1 Ethnography

Kanien'kéha (also known as Mohawk) is a language belonging to the Lake Iroquoian branch of the Iroquoian language family (Michelson, 1988). It is spoken by the Kanien'kehá:ka, who today live in territories and communities throughout Ontario, Quebec, and New York State. Kanien'kéha is classified as severely endangered on the UNESCO Intergenerational Transmission Metric, and Moribund or Nearly Extinct on the Graded Intergenerational Disruption Scale (GIDS). This reflects a severe language shift that took place in the 20th century, mostly as a result of government programs like residential schools and forced adoption. Today, like with many other indigenous communities, there is a strong language revitalization movement (DeCaire, 2023).

3.2 Language Description

Kanien'kéha is described as being a polysynthetic language: defined as a language with a high morpheme to word ratio (DeCaire, 2023). Kanien'kéha has three lexical categories: nouns, verbs and particles. Particles are uninflected and usually relatively short. Nouns consist minimally of a noun stem, with a noun prefix and a noun suffix. Verbs contain minimally a verb stem, pronominal agree ment prefix, and aspect suffix (Michelson, 2020). Examples of a noun and verb are shown in (4) and (5) respectively.

(4) ò:niare'
o-hniar-'
NP-snake-NSF
'snake' (Michelson et al. 2024:135)

(5) rón:nis
hr-onni-s
MSGA-make-HAB
‘He makes it.‘ (Martin 2023:68)

Since particles are, by definition, uninflected, they do not require parsing. Nouns have some morphological complexity, but are generally transparent. Verbs present a much broader range of morphosyntactic structures and morphophonological phenomena, as seen in (6).

(6) Wahakeriseranénhsko’
wa-**hak**-**ris**-er-**a**-nenkshw-’
FACT-MSG>1SG-sock-NMLZ-JR-steal-PUNC
‘He stole the socks from me.‘ (McDonald 2024:2952)

This word showcases many characteristic traits of Iroquoian morphology, such as the use of a transitive pronominal prefix *hak* that represents agreement with both the subject and indirect object, noun incorporation of the direct object *ris*, and the insertion of a joiner vowel and an e epenthetic vowel to resolve illegal consonant clusters. Such phenomena are widespread, and cannot be ignored in a description or analysis of the language, be it pedagogical, theoretical, or descriptive. As a result, verbs are an ideal domain to test the full capabilities of automatic parsing.

It should be noted that these categories are defined structurally, not semantically. Words that are structured like verbs can be used referentially, as demonstrated in (7).

(7) Rana’tarón:nis wà:rewe’.
ra-na’tar-onni-s wa-hr-ew-’
MSGA-break-make-HAB FACT-MSGA-arrive-PUNC
‘The baker arrived (lit. He who makes bread arrived)’ (McDonald 2024:850)

For the purposes of defining the target morphological domain in which parsing should be successful, a "verb" is a word which fulfills the structural definition, not the semantic definition. Figure 7 defines the portions of the verb which the current version of the parser recognizes. Elements in parentheses are optional, while the square brackets delimit the domain of the verb stem.

(DUPLICATIVE)-(MODAL)-PRONOMINAL PREFIX-[(**REFLEXIVE**)-**VERB ROOT**]-ASPECT

Figure 7: Target Section of the Kanien'kéha Verb

Some previous work has been done in computational modeling of Kanien'kéha morphology. Alicia Assini created a finite-state parser for nouns in Kanien'kéha. This program was created in *foma* and can parse a subset of nouns in Kanien'kéha (Assini, 2013), similar to my project, except my goal is a parser for verbs.

A team with members from the Onkwawénna Kentyóhkwa Kanyen'kéha im mersion school and the Canadian National Research Council's Indigenous Language Technology lab created Kawennón:nis, a verb conjugator for Kanien'kéha. Designed as an aid for students learning the language, it is capable of conjugating hundreds of verb roots across a variety of combinations of person, aspect, and other important features. At its core is a finite-state transducer, which models the morphological and phonological processes which transform underlying features into surface forms (Kazantseva et al., 2018).

Like all finite-state transducers, this FST can be run in reverse, resulting in a verb parser; however, since it was designed as a generator which works with English translations, doing so causes some issues. One is that there can be semantic ambiguity in the results. For example, parsing watá:wens returns two parses, one marked habitual and one marked state. These presumably correspond to the multiple meanings available in the habitual aspect: however, these both correspond to the same morpheme structure. These could in theory be adapted or discarded in order to make a machine that parses only syntactic information. The more important quality of the Kawennón:nis FST is that it was constructed as a two-layer model. As such, creating a three-layer parser for Kanien'kéha is not a redundant task, given the existence of machine with similar capabilities. Rather, it can serve as a metric for comparing the two architectures.

4 Results

As a symbolic model of the language, practical results of choices in implementing the parser are inextricably linked to theoretical findings of linguistic analysis. Key findings regarding the behavior of specific morphemes are described below.

4.1 Theoretical Assumptions

4.1.1 Morphology

As a result of the finite-state machine constraints, I assume a templatic model of morphology, with a limited number of long-distance dependencies.

4.1.2 Spellout

I assume spellout takes place cyclically, with phonological and morphosyntactic conditioning available to Vocabulary Insertion in line with the constraints introduced in Section 2.

4.1.3 Phonology

I model the phonology as a system of rules with potentially intrinsic ordering, motivated primarily by two factors:

1. Most descriptive and analytic literature on Iroquoian phonology uses a rule based framework. This notably includes Michelson, 1988, upon whose analysis my implementation relies heavily.
2. A rule-based phonology allows mechanisms implemented for Vocabulary Insertion to be reused.[12]

I assume the operation of certain rules to be necessarily constrained by morphophonological domains. Due to the practical constraints of implementing phonological rules in environments with morpheme boundaries, I avoid making reference to morpheme boundaries within rule formulations. However, I do not outright reject their use in this context.

4.2 Pronominal Prefixes

[12] An example is the spreadsheet to source code compiler described in Section 5.2.

As one of the three mandatory parts of any verb in Kanien'kéha, a comprehensive model of pronominal prefixes is required to model the structure of verbs. They can mark agreement in various combinations of person, number, gender, clusivity, and thematic role. These thematic roles can represent an agent (active participant in the verb), patient (less active participant in the verb), or a transitive relation (both active and less active participants). (8), (9), and (10) demonstrate these respectively.

(8) khiá:tons
k-hiaton-s
1SGA-buy-HAB
'I buy (it)' (Martin 2023:68)

(9) wakenoròn:se'
wak-noron's-e'
1SGP-exhausted-HAB
'I am exhausted' (Martin 2023:78)

(10) konhró:ris
kon-hrori-s
1SG>2SG-tell-HAB
'I tell you' (Martin 2023:72)

These prefixes are also subject to pervasive phonologically-conditioned allomorphy, where the first segment of the verb stem can condition suppletive forms.[13] As demonstrated in previous sections, the neuter agent pronominal prefix can occur variably as *ka-* before C-stems or *w-* before A-stems. Some allomorphs can be analyzed as a result of synchronic phonology. In trying to explore the exact mechanics of phonologically-conditioned allomorphy, I have attempted to synchronically analyze each set of allomorphs such that they are small as possible, reducing alternations to provably synchronic phonological processes.

Descriptions of stem classes vary in linguistic and pedagogical literature, counting as many as 9 (McDonald, 2023a). Most settle on 5, however: **C-**, **A-**, **I-**, **E-**, and **O-**stems (DeCaire, 2023; Martin, 2023; Michelson, 1988). Allomorphs are listed exhaustively for the sake of symmetry, and often for ease

[13] This segment can be a part of an incorporated noun, the verb root, or a reflexive or semi reflexive.

of teaching. However, even in these analyses there are many identical forms. With a fine-grained analysis, and additional well-motivated phonological rules, most can be collapsed into one or two sets of allomorphs. These phonological rules include:[14]

1. **Hiatus resolution** rules based on Hopkins, 1987 such as /ai/ → [ɶ̃] and a variety of deletion rules.
2. **Hiatus resolution** rules based on Michelson, 1988 such as /w/ → [j] */ V _ V*.
3. **E-epenthesis** rules from Michelson, 1988.
4. **Coda glide deletion:** /w/, /j/ → *∅ / V _ C*. This is motivated by observations of corpus data: no glides were observed in this environment.

For example, the **1incl>FI** is usually listed with three allomorphs: *iethi*, *iethii*, and *ieth*. These can be unified into one allomorph with form /jethij/, which undergoes glide deletion before C-stems, or experiences the changes in (11) before I-stems:

(11) /jethij-i/ … ——————————> /jethi-i/ ——————————————————> /jethi/

Deletion of /j/ before /i/ Deletion of identical sequences of vowels

A full list of allomorphs from the analysis can be found in Appendix A. The prefixes with three or more forms are the FI.A, MPLA, FPLA, 2SG>1SG, 2SG>1DU, 2SG>1PL, and MSG>1DU.

4.2.1 Second Person Transitives

Certain second person transitive pronouns are subject to another layer of allomorphy. Specifically, those with a *ta-* element have this element change to *hs-* when material is introduced before the prefix (Martin, 2023). Examples (12) and (13) characterize this alternation.

[14] These rules are formulated using IPA notation. In this section, I use IPA in contexts where orthography would be ambiguous, such as underlying forms where *enV* could represent a vowel nasal-vowel sequence or a sequence of a nasal vowel and a vowel in hiatus. The IPA and orthog raphy are identical, except in the following cases: <*i*> before a vowel is the palatal glide /j/, the nasal vowels <*en*> and <*on*> are /ɶ̃/ and /ũ/, and the glottal stop <*'*> is /ʔ/. IPA is indicated with slashes // or brackets [].

(12) takhró:ris
tak-hrori-s
2SG>1SG-tell-HAB
'You tell me' (Martin 2023:66)

(13) iah tehskehró:ris
iah te-hsk-hrori-s
NEG NEG-2SG>1SG-tell-HAB
'You don't tell me' (Martin 2023:66)

These are also sometimes conditioned by the stem class. This can lead to two dimensional variation, as seen in Table 2 with the 2SG>1SG prefix.

	Preceding Material?	
Stem Class	No	Yes
{a}	takw-	hskw-
Elsewhere	tak-	hsk-

Table 2: 2nd Person to 1st Person Allomorphs

The extra dimension is of note, since it constitutes an example of **outwardly conditioned allomorphy**. In accordance with the generalization that phonologically conditioned allomorphy is always inward-conditioned, we should expect the trigger of this alternation to be the presence of syntactic material, and not phonological material. This is borne out by imperative forms like (14): the pronominal prefixes optionally undergo the same alternation, despite the absence of any overt preceding material.[15][16]

(14) skhní:non's
hsk-hninon-'s
2SG>1SG-buy-BEN

[15] These forms are idiolectal in Kanien'kéha, but are common in Oneida (Lounsbury, 1953).

[16] Preliminary evidence indicates that there is a difference in meaning between the forms in *tak* and *hsk*-, making this not a purely optional alternation (Chase A. Boles, p.c.).

‘Buy (it) for me‘ (McDonald 2023)

(14) suggests the presence of some sort of imperative prepronominal prefix, which is always spelled out as null. Indeed, this was the simplest way to encode this into the parser architecture. However, for the purposes of dissecting allomorphy, the important takeaway is that this allomorphy cannot be conditioned phonologically. Since it is sensitive to a distinction between the absence of a preceding element, and a phonologically null preceding element, a phonological trigger would require a distinction between two types of “null” phonology; an unappealing prospect. Therefore, the trigger must be syntactic, in line with the generalizations on allomorphy described.

4.2.2 Interim Conclusions

In summary, in applying a broad enough set of well-motivated phonological pro cesses, the allomorphic variation in the pronominal prefixes can be greatly reduced. These reduced sets of allomorphs correspond to natural classes along with an “elsewhere” case. Rare cases of outwardly-triggered allomorphy are based on syntactic elements, in line with cross-linguistic trends in allomorphy.

Given the complexity of the system of pronominal prefixes and the attention given to them in Iroquoian linguistics, this analysis is likely incomplete in some aspects. The discussion of whether the prefixes can be synchronically divided into agent and patient elements is present in many works (c.f. Hopkins, 1987). I do not attempt this question because it complicates modeling of phonological processes, especially hiatus resolution rules. Additionally, transitive prefixes are not always easily separable into agent and patient components, suggesting morpheme fusion. An analysis breaking down these components would need to address synchronic alternations between fusion and non-fusion. This would also require a theory on whether the fusion is a result of morphosyntactic factors (such as interactions between Phi-features) or morphophonological factors (interactions between morphemes during Vocabulary Insertion). I present an analysis of once instance of morpheme fusion between pre-pronominal prefixes in Section 4.3.3. Examination of fusion phenomena within this less complex domain might provide answers about the patterns of fusion that should be expected within pronominal prefixes.

4.3 Modal Prefixes

Modal prefixes, which occur before the pronominal prefixes, are also subject to a significant degree of allomorphy. Their analysis in this section relies strongly upon the descriptions of this variation in Martin, 2023.

4.3.1 Factual

The factual has the form *we-* before *s* and *t*, shown in (15) and (16):

(15) Nahó:ten **we**senihní:non'?
nahoten we-sni-hninon-'
what FACT-2DUA-buy-PUNC
'What did you buy?' (McDonald, 2024)

(16) Nahó:ten **we**tewahní:non'?
nahoten we-twa'-hninon-'
what FACT-2INCLA-buy-PUNC
'What did we buy?' (McDonald, 2024)

As in (17) and (18), it has the form *wa'-*, with a glottal stop, before *i* (/j/) and *k*:

(17) wa'kón:ni'
wa'-k-onni-'
FACT-1SGA-make-PUNC
'I did make it' (Martin 2023:95)

(18) wa'ehiá:ton'
wa'-ie-hiaton-'
FACT-FI.A-write-PUNC
'She did write' (Martin 2023:96)

Elsewhere, the factual surfaces as *wa-*. However, under the assumption that allomorphy is conditioned by natural classes, positing *wa-* as the default morpheme would require stipulating {/k/,/j/} be a natural class, which is difficult to argue. As such, *wa'-* must be the default allomorph, with *wa-* surfacing before *w*. The conditioning environments are summarized in Table 3.

	Preceding Material?	
Prefix Class	No	Yes
{s,t}	we-	?
{w}	wa-	
Elsewhere	wa'-	

Table 3: Factual Allomorphs

Since modals can only occur before pronominal prefixes, which are limited in their initial segments, the "elsewhere" case is limited to the segment set {/k/,/j/,/r/}. The first two are accounted for. *r* surfaces as *h* with preceding material, ensuring that the factual will only be prefixed to an *h*. To explain the surface forms in *wah-*, all that remains is to posit a laryngeal reduction rule of /P/ $\longrightarrow \emptyset$ / /h/ (Michelson, 1988).

4.3.2 Optative and Future

The future has one form, *en-* (Bonvillain, 1973; Martin, 2023). The optative has two forms: the default is *aa-*.[17] Another form surfaces before {s,t}, which can be variable, demonstrated by (19) and (20):

(19) **ae**sakonhré:konke'
ae-sa-konhrek-on-k-'
OPT-2SGP-hit-STAT-CONT-PUNC
'You should have hit it' (Michelson 1988:37)

(20) **aie**tsatekhón:ni'
aie-ts-at-kh-onni-'
OPT-2DUA-SRFL-food-make-PUNC
'Yous d. ought to have a good meal' (Martin 2023:100)

[17] See Hopkins, 1987 for motivating the underlyingly long form.

The variation between *ae-* and *aie-* can be derivationally linked by a process which epenthesizes /j/ in the vowel sequence: ∅ −→ /j/ / a e. With these forms reduced, a striking parallel with the factual emerges, demonstrated by the allomorph table in Table 4.

	Modal	
Prefix Class	Optative	Factual
{/s,t/}	/ae/	/we/
Elsewhere	/aa/	/wa(ʔ)/

Table 4: Parallel Optative and Factual Allomorphs

This suggests a phonological process is responsible for these alternations, though whether it is synchronic remains to be seen.

4.3.3 Duplicative + Factual

Due to its occurrence before a large number of verbs, the duplicative was the sole non-modal prepronominal prefix I investigated extensively in this analysis. (21) and (22) show its form before a consonant and vowel respectively:

(21) **te**satonhontsó:ni
te-sa-atonhontsoni
DUP-2SGP-want/need.STAT?
'You want/need' (Martin 2023:84)

(22) **ta**hsenónniahkwe'
t-aa-hs-nonniahkw-'
DUP-OPT-2SGA-dance-PUNC
'You ought to dance' (Martin 2023:86)

In (21), <ts> is a valid consonant cluster in initial position, so the <e> must not be epenthetic. However, if the <e> were underlyingly present in (22), the hiatus resolution rule adopted from Hopkins, 1987 would predict a surface form of **tehs-*. This motivates an analysis where the duplicative has the

allomorph *te-* before consonants and *t-* before vowels. However, as seen in (23) and (24), the introduction of the factual causes several puzzling effects.

(23) wa'tkennónniahkwe'
wa'-t-k-nonniahkw-'
FACT?-DUP?-1SGA-dance-PUNC
'I danced' (Martin 2023:84)

(24) wa'tisatonhóntsohse'
wa'-ti-sa-atonhontsohs-'
FACT?-DUP?-2SGP-want?-PUNC
'You did want it' (Martin 2023:85)

(25) wa'tisatonhóntsohse'
wa'-ti-sa-atonhontsohs-'
FACT?-DUP?-2SGP-want?-PUNC
'You did want it' (Martin 2023:85)

First, the positions of the modal and the duplicative have swapped. Whereas the duplicative preceded the optative (and the future (Martin, 2023)), it follows the factual. Additionally, the factual does not have the expected form: before a /t/, we would expect it to be realized as /we/-. Finally, the duplicative also does not have the expected -/e/- before consonants, and has the form /ti/- before /s/.

I argue that this puzzle can be resolved by analyzing the *wa't(i)-* forms as a fusional form: it is not actually separable into a factual and a duplicative. The allomorphs would then be those listed in Table 5.

	Morpheme(s)	
Environment	Duplicative	Duplicative-Factual
{a,e,i,o,ʌ̃,ũ}	/t/	
{/s,t/}		/waʔti/
Elsewhere	/te/	/waʔt/

Table 5: Duplicative and Duplicative+Factual Allomorphs

Under this analysis, the modal and duplicative do not swap positions: they combine in certain cases. This allows for a simplification of syntactic analysis: for example, some morpheme templates, like those in Bonvillain, 1973, have an extra slot containing just the factual, seemingly only to resolve this one case.

This analysis also simplifies phonological analysis. By positing an underlying /e/ only in the non-fused form, the distribution of surface [e] becomes explainable. Michelson, 1988 mentions that it is not clear whether the duplicative contains an epenthetic [e] or not, since the form *te-* occurs in cases where epenthesis is not predicted, but that in other cases it does not surface at all. In the examples below, (26) contains an epenthetic vowel as a result of the *-'tkt* cluster, while (27) does not, since *-'tk-* is a valid cluster.

(26) wa'tekté:ni'
wa't-k-teni-'
FACT.DUP-1SGA-change-PUNC
'I changed (it)' (Michelson 1988:135)

(27) wa'tkené :ra'ke'
wa't-k-nera'k-'
FACT.DUP-1SGA-mistake-PUNC
'I mistook (it)' (Michelson 1988:136)

In ignoring the duplicative forms that occur without the factual, the surface in stances of [e] in the context of the factual can be derived using e-epenthesis rules.

5 Discussion

Having presented the architecture of the three-step model, as well as the linguistic analyses that arise from its constraints, I now discuss its other theoretical and practical consequences.

5.1 Implementation

I implemented my model in *foma*, a finite-state toolkit (Hulden, 2009). *Foma* provides the full functionalities required to construct finite-state machines from regular expressions and rewrite rules. It natively supports the usage of .lexc files, which are a common format for defining the lexicon step in a two-step program.

Implementing a three-step parser within this framework is an approach that only requires two components:

1. The lexicon must not spellout morphemes. This allows the spellout com ponent full control over allomorphy without resorting to later readjustment rules. It may be dispensed with if the relevant morphemes do not participate in or trigger allomorphy.
2. If the usage of a single .lexc and a single .foma file is required, the spell out can be included in the .foma file, composed before the phonology. It is also helpful to define filters that ensure that the process of spellout is complete in the generative and recognition directions, since the separation of morphology and spellout does not guarantee that morphemes are converted to phonology. A sample pattern for a filter for this output would be [C | V | "-"]*, assuming that consonants and vowels are defined, and that morpheme breaks should be available to the phonology.

5.2 Allomorphy Constraints

Since the three-step framework avoids readjustment rules, allomorphy conditioning is much more limited in its scope. Outwardly-conditioned allomorphy can only be grammatical, and inwardly-conditioned allomorphy is potentially only phonological. Regardless of the framework used, this allows for these conditioning variables to be formalized. For example, sets of allomorphs, inward conditioning, and outward conditioning could be represented by the following 3-tuple, where P is the segmental inventory of the language and G is the set of grammatical features conditioning allomorphy:

(28) $\{(a \in P^*, i \in (G \cup C \text{ for } C \subseteq P), o \in \{T, F\}) : C \text{ is a natural class}\}$

This particular formulation predicts that inward-conditioned allomorphy can be sensitive to a grammatical feature or a natural class of segments, while outwardly conditioned allomorphy is

conditioned on the binary presence of a syntactic element (as seen with the prefixes in Table 2).[18] I was able to use this consistency to store lists of allomorphs in a spreadsheet, which could then be automatically compiled to *foma* using a python script. This spreadsheet format allowed for easier data storage and visualization, and avoided errors in the development process that might be triggered by working directly with the *foma* source code. Spreadsheets are one of the most widely used tools for storing and organizing linguistic data: as such, this also improves cross-compatibility between sources of data, and avoids the destruction of legible linguistic data when encoding it into the source code of the program (Littell et al., 2024).

5.3 Morphosyntactic and Semantic Dependencies

Verbs in Kanien'kéha exhibit many features that reflect morphosyntactic and semantic dependencies, often over long distances: for example, modal prefixes only occur with a punctual suffix. I attempted to model this phenomenon and others in the morphology layer of my parser, and was most successful through defining several alternative templates for specific paradigms. This reflects a key limitation in finite-state modeling of morphosyntax: finite-state machines can only model regular languages (Koskenniemi, 1986), whereas natural language morphosyntax is minimally context-free and not regular (Chomsky, 1956). The mirror of this in linguistics is the general finding that morphological templates are insufficient theoretical tools for modeling and prediction (Crippen, 2019).

5.4 Separating Morphology

As a consequence of separating spellout from the morphological component, the latter is not strictly required for generation. Since the spellout and phonology are entirely capable of transforming a morpheme string to a surface form, the morphology can be replaced by another generative component. As mentioned in Section 5.3, this could be desirable, as a more adequately powerful model of morphosyntax could be employed instead of the limited template. This would reflect a modular theory of linguistics, where the output of the syntax feeds the (morpho-)phonology.

However, this optionality of the morphological component leads to an interesting result. In the parsing or recognition direction, potential underlying forms need to be pruned out by some morphological component. Since the pruning mechanism must be able to be concatenated and then minimized with the other components to avoid overgeneration, it must be regular and not context-free. This contradicts the

[18] As demonstrated by the list of segment sets conditioning allomorphy in Appendix A and the corresponding natural classes in Appendix B, phonologically conditioning segments form natural classes, as expected by the principle that phonology is sensitive to features and not segments.

necessity of a minimally context-free model of morphosyntax. Thus, one of the following assumptions must be made within a morphological model in order to avoid overgeneration of underlying forms at any point in the derivation:

1. There is a regular grammar, like a morphological template, that is active only when recognizing linguistic material and not generating it.
2. There is a regular grammar, like a morphological template, that is active within the generative and recognition process, which redundantly filters the output of a more powerful generative component.
3. Phonological rules are heavily constrained such that they do not create an exponentially larger number of underlying forms.

Option 3 is potentially the most desirable, since it results in a grammar that is neither redundant nor asymmetric, nor does it appeal to inadequate mechanisms like templates. However, it also requires the most care when implemented practically, since the creation of morphological models is done from the generative direction, and it is quite easy to overlook the potential overgeneration that is available when reversing any given transformation. The addition of a redundant or asymmetric component is therefore a more secure option to avoid overgeneration.

6 Conclusion

I have claimed that the introduction of an intermediate layer in an FST would result in a necessary reduction in expressive power. I have shown that the three-layer architecture is still powerful enough to model a variety of linguistic phenomena, at least in this experiment. The problems it experiences, such as challenges with long-distance dependencies, are a result of the finite-state framework itself. This reduction in expressive power also creates some practical benefits for development of these models, as well as raising theoretical questions of their development being automated. Probing the architecture of these models also raises interesting questions about the components which are necessary both in theoretical models of morphology and their practical implementations.

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Appendix A: Table of Allomorphs

Class contains the name of the morpheme category (if **Form** is specified with < or >), the subcategory (if **Form** is blank), or the gloss/lexical form of the morpheme. **Form** specifies either the directionality of conditioning of a certain class of morphemes, or a phonological form of a certain morpheme. **Inwards** specifies the segment or set of segments that condition the given allomorph. **Outwards** specifies whether the given allomorph occurs when there is material further from the root: this is specified with a *?*. Each morpheme should have one allomorph that is unspecified for either direction: this is the "elsewhere"/default form. **Notes** contains notes for current and future investigations.

	Class	Form	Inwards	Outwards	Notes
0	VRoot	<			
1	1a				
2	swim	atawv			
3	hang.out	aterakvrie			
4	sew	'nikhu			
5	write	hyatu			
6	buy	hninu			
7	make	uni			
8	fold	hwe'nuni			
9	cook	khuni			
10	ascend	rathv			
11	control	anuhtu			
12	do.best	ateweyv'ton			
13	point.at	ahtsatu			
14	pour/spill	awru			
15	put.down	yv			
16	see	kv			
17	organize	rihwahseruni			
18	close	hnhotu			

19	control	anuhtu
20	knit	riseruni
21	speak	atati
22	tell.story	karatu
23	wash/clean	nohare
24	ask	rihwanutu
25	show	na’tu
26	close.door	hnhotu
27	dress	atsherunyanyu
28	move.around	atoriahnru
29	tear	ratsu
30	take	haw
31	2a	
32	become	atu
33	touch	yena’
34	defend	hnhe’
35	become.happy	atshennuni
36	2b	
37	like	nuhwe’
38	learn	weyvtehta’
39	be.ready	atateweyvnvta’
40	get.scared	htru’
41	recover	yehwvta’
42	remember	ehyahra’
43	step.on	rata’
44	understand	’nikuhrayvta’
45	disappear	ahtu’
46	hire	hnha’
47		
48	Reflexive	>

49	Reflexive			
50	REFL	atat(v)		
51	SRFL	ar	a	only some
52		an	i	
53		at		
54		atv		only some
55		a		only some
56				
57	PronPF	>		
58	agent			
59	1sgA	k		palatalizes before y (East)
60	2sgA	ts	[i | y]	
61		hs		first phase only?
62	MsgA	hr	[e | v | o | u]	
63	ha			
64	FsgA	iak	[e | v | o | u]	
65		iawa	a	
66		ie		
67		w	[e | v]	io?
68		wa	a	
69		y	[o | u]	
70		ka		
71	1incl.duA	ty	a	
72		tni		e epenthesis
73	1excl.duA	yaty	a	
74		iakni		e epenthesis
75	2duA	ts	a	
76		sni		e epenthesis
77	MduA	hy	a	

78		hni		
79	FZduA	ky	a	
80		kni		
81	1incl.plA	ty	o	on??
82		twa		
83	1excl.plA	yaky	o	on?
84		yakwa		
85	2plA	ts	o	on?
86		swa		
87	MplA	hun	[i | e | v | o | u]	
88		hawa	a	awa?
89		hati		
90	FZplA	kun	[i | e | v | o | u]	
91		ku	a	
92		kunti		awa?
93	patient			
94	1sgP	wak		
95	2sgP	s	[e | v | o | u]	
96		sa		
97	MsgP	haw	[e | v | o | u]	
98		ho		
99	FsgP	yakaw	[e | v | o | u]	
100		yako		
101	NP	yaw	[e | v | o | u]	
102		yo		
103	1duP	yuki	a	
104		yukni		
105	2duP	ts	a	
106		sni		

107	MduP	hon	[a | e | v | o | u]	
108		hoti		
109	FZduP	yon	[a | e | v | o | u]	
110		yoti		
111	1plP	yuky	o	
112		yukwa		
113	2plP	ts	o	
114		sewa		
115	MplP	hon	[a | e | v | o | u]	
116		hoti		
117	FZplP	yon	[a | e | v | o | u]	
118		yoti		
119	transitive			
120	1sg>2sg	kuy	[a | i | e | v | o | u]	
121		ku		
122	1sg>2du	ky	a	
123		kni		
124	1sg>2pl	ky	o	
125		kwa		
126	1sg>Msg	hiy		
127	1sg>FI	khey		
128	1incl.du>Msg	tshity	a	initial e
129		tshitni		
130	1incl.pl>Msg	tshity	e	
131		tshitwa		
132	1excl.du>Msg	hshaky	a	
133		hshakni		
134	1excl.pl>Msg	hshaky	e	
135		hshakwa		

136	1incl>FI	yethiy			
137	1excl>FI	yakhiy			
138	2sg>1sg	hskw	a	?	
139		takw	a		
140		hsk		?	
141		tak			
142	2sg>1du	hsky	a	?	
143		taky	a		
144		hskni		?	
145		takni			
146	2sg>1pl	hsky	e	?	
148		hskwa		?	
149		takwa			
150	2sg>M	tsh			initial e
151	2sg>FI	hshey			
152	FIsg>1sg	yukw	a		
153		yuk			
154	FIsg>1du	yukhiy			
155	FIsg>2sg	yesa			
156	FIsg>2du	yesthsiy			
157	FIsg>Msg	ruway	o		
158		ruwa			
159	FIsg>FI	yutat			
160	Fisg>FZsg	kuway	o		
161		kuway			
162	Msg>1sg	hakw	a		
163		hak			
164	Msg>1du	hshuky	a		
165		hshuka	i		

166		hshukni		
167	Msg>1pl	hshuky	o	
168		hshukwa		
169	Msg>2sg	hya		
170	Msg>2du	tshits	a	initial e
171		tshitsni		
172	Msg>2pl	tshits	o	
173		tshitsw		
174	Msg>Msg	haw	[e | v | o | u]	
175		ho		
176	Msg>FI	hshakaw	[e | v | o | u]	
177		hshako		
178	Mpl>FI	hshakon	[a | e | v | o | u]	
179		hshakoty		
180	Fpl>Mpl	ruwan	[a | e | v | o | u]	
181		ruwaty		
182	Fpl>Fpl	kuwan	[a | e | v | o | u]	
183		kuwaty		
184	Fpl>FI	yakon	[a | e | v | o | u]	
185		yakoty		
186				
187	Aspect	<		
188	Punctual			
189	PUNC1a	’		
190	PUNC2a	’		
191	PUNC2b	n’		
192	Habitual			
193	HAB1a	s		
194	HAB2a	s		

195	HAB2b	s			
196	Stative				
197	STAT1a	0			
198	STAT2a	’u			
199	STAT2b	’u			
200					
201	Modal	>			
202	Modal				
203	OPT	a(y)e	[s | t]		
204		aa			
205	FUT	v			
206	DUP””FACT	wa’ti	[s | t]		
207		wa’t			
208	FACT	e	[s | t]	?	
209		a		?	
210		wa	w		
211		we	[s | t]		check NA
212		wa’			y disappears
213	Imperative	>			
214	Imperative				
215	IMP	0			
216					
217	PrePron1	>			
218	PrePron1				
219	DUP	t	[a | e | i | o | v | u]		
220		te			

Appendix B: List of Allomorphy Classes

Per Michelson, 1988, natural classes are formulated with the assumption that phono logically, /ɐ̃/ is a mid front vowel and /ũ/ is a mid back rounded vowels: essentially, nasalized versions of /e/ and /o/.

Segment Set	Natural Class
{/a/}	/a/
{/i/}	/i/
{/e/}	/e/
{/o/}	/o/
{/i/,/j/}	Palatal Sonorants
{/e/,/ɐ̃/}	Mid Front Vowels
{/o/,/ũ/}	Mid Back Vowels
{/e/,/ɐ̃/,/o/,/ũ/}	Mid Vowels
{/i/,/e/,/ɐ̃/,/o/,/ũ/}	Non-Low Vowels
{/a/,/e/,/ɐ̃/,/o/,/ũ/}	Non-High Vowels
{/a/,/i/,/e/,/ɐ̃/,/o/,/ũ/}	Vowels
{/w/}	/w/
{/s/,/t/}	Coronal Obstruents

Influence Across Which Side of the Pond? A Comparative Analysis of the Vowel Systems of Bermudian English and PNW English

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Abstract

While Bermuda was established as, and still remains, a British-governed territory, it has had increasingly close contact with the United States due to historical, economic, and political connections between the two that have strengthened over the last century. Considering the shifting economic and social affiliations of Bermuda away from the UK and towards North America, the primary goal of this paper is to establish whether, and to what degree, General North American English has influenced modern Bermudian English, and whether this influence runs along ethnic lines. This study explores this question through a comparative analysis of Bermudian English's vowel system against Pacific Northwest English, standing in as a representative of General North American English (GNAE), and discusses the status of ethnolinguistic variation within Bermudian English, including a demographic (Latinx speakers) not included in previous research. It analyzes the most salient phonological features of Bermudian English as well as its foreign (a) nativization pattern, a phenomenon with clearly demarcated national differences. This study finds that, at a structural level, the vowel system of Bermudian English still diverges significantly from GNAE, continuing to align itself closely with British English, while easily transferrable word class switches have penetrated this variety from American English. Additionally, while White Bermudians were generally less advanced than Black Bermudians on Bermudian English-associated features, the study finds greater intra-ethnic variation than reported in previous literature.

1 Introduction

Bermuda is a British Overseas Territory in the North Atlantic Ocean that lies 580 nautical miles east of its closest neighbor, North Carolina, USA. A current population of 63,779 inhabits the island's 20 square miles. The first permanent settlement on the previously uninhabited island was established in 1612 by a group of British settlers, and it has never changed hands since, making Bermuda the oldest continuously inhabited and the smallest "most geographically isolated of England's New World colonies" (Eberle and Schreier 2013, 284).

Bermudian English is uniquely situated among English varieties as being one of the first English varieties to be spoken outside of the British Isles. The rapid establishment of an island-born enslaved population and close contact between Black and White Bermudians in the early years of the colony fostered the decreolization of any creole the enslaved population may have brought with them (Hall 2018). When further coupled with the fact that the island lacked the kind of language contact conducive to population-wide creolization, this positions Bermudian English as "one of the least documented varieties of English that has undergone full nativization," in which the language is spoken as a mother tongue (Eberle and Schreier 2013, 279). Beyond the pioneering work of Ayres in 1933, Bermudian English has only begun attracting the attention of scholars in the last decade (Holliday 2016; Hall 2018; Trudgill 2019) and remains a neglected area of study.

Much of the past work on this variety has focused on its phonology; researchers argue there is a sharp ethnolinguistic division between the speech of White and Black Bermudians, the former grouped with the dialects of the American Coastal South and the latter classified a Caribbean variety (Trudgill 2019, Ayres 1933, Hall 2018). Holliday (2016) and Hall (2018) have performed an acoustic analysis of the vowel system of Bermudian English. Holliday analyzed the speech of 5 young Black Bermudians who had recently moved to the US as compared to General North American English (GNAE), while Hall focused on the speech of 8 Black and 8 White Bermudian men to analyze racial linguistic parody, arguing that the typical Bermudian accent is associated with Black speech. Holliday reports the fronting of back vowels GOOSE and GOAT, backed THOUGHT and PALM vowels, as well as the presence of the SQUARE/NEAR centralization and merger. Hall identifies the GOAT and MOUTH vowels as the most salient features of Black Bermudian English: GOAT is typically fronted while MOUTH is monophthongized. The backing of the THOUGHT vowel identified in Holliday's work, which distinguishes it from LOT, represents one of the key pivot point conditions for the Southern Shift dialect as described in Labov (1991). Other authors have also attested to the presence of the TRAP/BATH split—characteristic of RP English—in

Bermudian English, as well as the phenomenon known as Canadian Raising in both MOUTH and PRICE vowels (Trudgill 2019, Ayres 1933).

As Bermuda was settled before the TRAP/BATH split emerged in England, the presence of this feature signals the continued influence of England on Bermudian speech (Hall 2018, 52). Similarly, the allophonic variant of GOAT that occurs before voiceless consonants and in open syllables is described as an "RP-like diphthong" by Hall (52), an indication of historical continuity with the speech of the original British settlers who primarily came from the London area (Ayre 1933, 4). In fact, fronting of back vowels GOOSE and GOAT is a "second diagnostic feature of the Southern Shift" (22), a dialect chain shift pattern that southern England dialects participate in. Thus, in this regard, it appears that Bermudian English is strongly affiliated with the English of England.

However, Bermuda's connection to North America has only grown stronger throughout the last century and into the 21st due to the United States' prominent role in developing the economic backbone of Bermuda: tourism and financial management (Eberle and Schreier 2013). Additionally, throughout the 20th century, a considerable number of US military forces were stationed on Bermuda to aid US defense efforts, leading to "immediate and everyday contact between Bermudians and US military personnel" (Eberle and Schreier 2013, 286). Considering the shifting economic and social affiliations of Bermuda away from the UK and towards North America, one of the primary goals of this paper is to establish whether, and to what degree, General North American English has influenced modern Bermudian English.

This research question involves taking a comparative analysis of Bermudian English's vowel system. I will be taking Washington State speakers of Pacific Northwest English (PNWE), which stands in as representative of General North American English, as a point of comparison. The Pacific Coast is characterized as "newly settled and linguistically mixed" (Atwood 1971, 29), meaning the processes of linguistic innovation that lead to dialect divergence have not yet had a chance to develop distinct features. Thus, the PNW variety does not significantly diverge from GNAE. Recent acoustic analyses in this region, however, have confirmed the advancement of the GOOSE vowel (Wassink 2015), affiliating PNWE with the western U.S. region. PNWE participates in the Low Back Merger Shift (LBMS), the third dialect Labov (1991) identifies as "essentially an American phenomenon" (30), whose defining feature, or pivot condition, is the merging of the THOUGHT and LOT vowels. This increased margin of security between the remaining vowels in the system inhibits the push shifts characteristic of the Northern Cities Chain Shift and the Southern Shift dialects. However, it triggers the environment for a pull shift that has started to drag the short front vowels down and back towards

the newly open space in the low-central region (Boberg 2021, 129-30). Considering Labov's (1991) sound change principle that "mergers expand at the expense of distinctions" (29), it appears likely that a merging of the THOUGHT and LOT vowels would be an early indication of GNAE influence on Bermudian English.

Another prominent variable with distinct national patterns between British and American English is foreign (a) nativization, as discussed in Boberg (2020). In standard British English, this variable is primarily dependent on phonological cues of vowel length, produced as the long PALM vowel in open syllables before voiced consonants and word finally, and as short TRAP in closed syllables before voiceless consonants or consonant clusters. In North America, meanwhile, patterns diverge along national boundaries, with the US assignment of a word to either the PALM or TRAP class dependent on its perceived foreign status. In the US, words perceived as foreign are assigned PALM, and there is an "overwhelming preference" in American English for assigning words to this class (Boberg 2020, 34). This phenomenon has yet to be studied in the Bermudian context where competing British and American influences prompt various plausible nativization patterns.

This paper attempts to construct a comprehensive modern view of Bermudian English in order to compare the competing influences of North American and British English on its vowel system. It analyzes the most salient features of Bermudian English, namely: the fronting of GOOSE and GOAT, the monophthongization of voiced MOUTH, Canadian Raising in voiceless MOUTH and PRICE, the TRAP/BATH split, the SQUARE/NEAR merger, and the absence of a THOUGHT/LOT merger, as well as its foreign (a) nativization pattern.

Since previous research has already established ethnolinguistic divisions between Black and White speakers on the island, with Black Bermudian speech regarded as typically Bermudian, I hypothesize that White Bermudian speakers will be more receptive to GNAE influence than Black Bermudians and will produce fewer of the features associated with traditional Bermudian English. Likewise, the foreign (a) nativization pattern in Bermudian English will diverge along ethnic lines, with White Bermudians following the American pattern, and Black Bermudians following the British pattern.

2 Methods

Participants for this research project were recruited using the friend-of-a-friend method, particularly for the Bermudian speakers, thus leading to a sampling bias that overrepresents the social

networks of relatively few individuals. This introduced a large proportion of Latinx participants into the Bermudian sample, an ethnicity that is not reported on by the Bermuda Census and that has not been factored into previous research on ethnic divisions in Bermuda. This presented an opportunity to examine whether the Latinx Bermudian population would follow White or Black Bermudian speech patterns, or pattern differently altogether.

PNWE speakers were recruited through a mixture of personal contacts as well as faculty and students (18+) at Newport High School in Bellevue. Both sample sizes are predominantly young and female, with the PNWE sample size more significantly skewed in this regard.

	Black	White	Mixed	Asian	Latinx
Bermuda	52%	31%	9%	4%	*N/A
Sample	20%	30%	20%	0%	30%
Information sourced from Bermuda Census 2016, pp 31. *The census has no category for Latinx as a racial or ethnic identity and thus did not report on the Latinx population in Bermuda.					

Figure 1: Racial/ethnic identity of Bermuda vs Sample size

	White	Latinx	Asian	Black	Other
WA State	64%	14%	9%	4%	9%
Sample	65%	15%	10%	10%	0%
Information sourced from United States Census 2020 on Washington State.					

Figure 2: Racial/Ethnic identity in WA State vs Sample Size

	Total Participants	**Gender**	**Race/Ethnicity**	**Age**
WA State	20	15 F 5 M	12 White 3 Latinx 2 Black 2 East Asian	18: 18-35 2: 36-65

Bermuda	20	12 F 8 M	6 White 6 Latinx 4 Black 4 Mixed (Black+White)	16: 18-35 4: 36-65

Figure 3: Sample Sizes for PNWE and Bermudian English Speakers

Both my personal exposure to Bermudian English and previous research substantiate that Bermudians tend to "display a high degree of context sensitivity" that leads to style shifting towards formal registers, particularly for foreigners (Eberle and Schreier 2013, 288). In order to mitigate this effect while still maintaining a uniform set of data to draw from, I designed a reading passage that included the variables of interest and anchor vowels so participants could focus on the narrative content rather than the quality of their speech. However, this proved unfeasible and inefficient for the foreign (a) words, many of which are relatively uncommon in everyday speech. Thus, they were elicited in a separate word list adapted from the larger set of tokens used in Boberg (2009).

This reading passage and word list were uploaded to a Wix website along with a demographics survey that asked for participants' year of birth, gender, race/ethnicity, native language(s), as well as what region they grew up in and whether they still live there. Participants were asked to record themselves reading out the passage and word list and given the option to send these recordings through WhatsApp or via email, though I received the overwhelming majority through WhatsApp. Only variables in stressed syllables were analyzed, with generally 3-5 tokens of each allophone, although I only elicited 2 tokens each for PALM and voiceless PRICE, and 1 token of GOOSE before /l/ as an anchor vowel.

The F1 and F2 formant values of each token, respectively corresponding to vowel height and backness, were analyzed on Praat. Measurements of vowel nuclei were taken at the maximal value of F1, which corresponded to the midpoint of the vowel sound for short vowels and a quarter of the way into the vowel for long vowels. An additional measurement was taken three quarters into the long vowels of GOOSE, GOAT, MOUTH, PRICE, SQUARE, and NEAR to measure the glide. Data for each speaker was then normalized with the scaling factors calculated using the anchor vowels.

Group means for PNWE and Bermudian English speakers were calculated based on the speaker means for each variable. For the foreign (a) variable, once the group means of target vowels PALM and TRAP were established, the F2 distance between these values was divided into fifths following a modified

version of Boberg's (2009) "middle-third" method. Lower values indicated foreign (a) realizations closer to the PALM vowel while higher values indicated a TRAP vowel. Strong TRAP vowels were those with an F2 value of 4/5ths of the distance to TRAP or more, to accommodate allophonic pre-nasal raising that could exceed target F2 values, while strong PALM vowels were 1/5th of the distance to TRAP or less, to include instances of allophonic retraction such as before /l/. Tokens that fell within the middle-fifth were treated as intermediate. The two standard deviations method employed in later works (Boberg 2020) could not be replicated in this study, as there weren't enough tokens to reliably calculate the standard deviation for each speaker.

For evidence of the presence or absence of the SQUARE/NEAR and THOUGHT/LOT mergers, I calculated the mean Cartesian distance between these vowel pairs for each speaker. I also calculated the mean Cartesian distance between the nucleus and glide for the SQUARE and NEAR vowels individually to measure centralization in these word classes independently of their relation to each other.

Group means between PNWE and Bermudian English speakers and between male and female speakers were statistically analyzed using two-tailed t-tests, while ethnicity was analyzed as an independent variable using one-way ANOVAS. Bermudian White group means, Latinx group means, and Black and Mixed joint group means were compared to establish patterns along ethnic lines.

3 Results/ Analysis

	*T-test:	PNWE Mean	Bermudian English Mean
/owD/ F2	p = .203	1421.33	1489.94
/owD/ nucleus - glide F2	p = .**012**	128.74	-24.28
/ow/ F2	p < .**001**	1209.51	1452.46
/uw/ F2	p < .**001**	1762.18	1990.24
/æh/ F2	p = .239	1491.73	1470.08
/æ/ F2	p = .079	1603.15	1675.66
/æ/ - /æh/ F2	p = .**002**	111.41	205.58
/æN/ F2	p = .138	1868.41	1804.79

/æ/ - /æN/ CD	p = .**002**	342.15	206.41
/awT/ F1	p = .**002**	825.89	752.76
/aw/ F1	p = .**005**	790.15	727.84
/aw/ - /awT/ F1	p = .569	-35.73	-24.92
/aw/ nucleus - glide F1	p = .**002**	213.45	114.72
/ayT/ F1	p = .119	722.18	690.37
/ay/ F1	p = .**018**	797.02	741.36
/ay/ - /ayT/ F1	p = .230	74.85	50.98
/eyr/ - /iyr/ F1	p = .**007**	116.73	64.75
/eyr/ - /iyr/ CD	p = .448	318.04	285.04
/eyr/ nucleus - glide CD	p = .379	287.30	247.68
/iyr/ nucleus - glide CD	p = .135	545.86	428.59
/o/ - /ɔ/ CD	p < .**001**	81.92	223.03
*Significance at p < 0.05			

Figure 4: Group Mean Comparisons Between PNWE and Bermudian English with Statistical Significance

Differences in the degree of fronting of the GOOSE and GOAT vowels between PNWE and Bermudian English speakers proved to be highly statistically significant, with a p-value of less than 0.001 each. Bermudian speakers fronted GOAT 243 hz more than PNW speakers, and GOOSE 228 hz more. Differences in F1 voiced MOUTH nucleus-glide values between regions proved to be only slightly less statistically significant, with a p-value of 0.002, demonstrating the saliency of MOUTH and GOAT: the vowels identified by Hall, as emblematic features of Bermudian English.

Differences in the Cartesian distance between THOUGHT and LOT were also highly statistically significant, with the two vowels 142 hz further apart in the vowel space for Bermudians than for PNW speakers. THOUGHT was both higher and further back for Bermudians than PNW speakers while its LOT value was nearly identical to the merged THOUGHT-LOT values of PNWE, confirming the stable maintenance of the THOUGHT/LOT distinction in Bermudian English.

While neither BATH nor TRAP vowel differences between regions were statistically significant on their own, differences in the distance between these two values across F2 space was quite significant at p=0.002, with the two vowels 94 hz further apart for Bermudian speakers than for PNW speakers. Inter-regional differences in the raising of pre-nasal TRAP were found to have the same high level of statistical significance, with PNWE speakers raising and fronting this allophone 136 hz more than Bermudian speakers.

Curiously, the opposite pattern emerges for the MOUTH vowel. The Bermudian F1 value for voiceless MOUTH is lower than that of the PNW group—a difference that reaches a statistical significance of p=0.002—however, it is actually slightly higher than the Bermudian voiced MOUTH value, demonstrating that there is no widespread raising of this vowel. PRICE has similar results; while the Bermudian F1 value of voiceless PRICE is lower than its PNW counterpart, the Bermudian voiced and voiceless allophones are actually closer to each other in F1 space than they are in PNWE. These results indicate that Canadian Raising is no longer a consistent feature of Bermudian English.

The SQUARE/NEAR merger showed mixed results, as there were statistically significant regional differences in the distance between the two vowels when measured along the F1 dimension, but when measuring the Cartesian distance between the two— which more accurately gauges the actual distance in the vowel space—this difference disappeared. Additionally, there was no significant difference between regions in the Cartesian distance between each vowel's nucleus and glide, indicating that neither the SQUARE/NEAR merger nor centralization of these vowels is a general feature of Bermudian English. The distribution of this feature will be discussed further below.

	*One-way ANOVA	White Mean	Latinx Mean	Black+Mixed Mean
/owD/ F1	p = .885	1475.36	1462.66	1521.33
/owD/ nucleus - glide F2	p = .111	117.47	-142.99	-44.02
/ow/ F2	p = .240	1365.29	1537.12	1454.34
/uw/ F2	p = .109	1918.58	2017.23	2023.73
/æh/ F2	p = .288	1410.74	1460.69	1521.63
/æ/ F2	p = .334	1610.57	1697.76	1707.90

/æ/ - /æh/ F2	p = .699	199.83	237.06	186.28
/æN/ F2	p = .662	91.30	120.38	164.07
/æ/ - /æN/ CD	p = .344	152.03	205.66	247.76
/awT/ F1	p = .293	774.86	713.32	765.77
/aw/ - /awT/ F1	p = .227	-19.04	6.81	-53.12
/aw/ nucleus - glide F1	p = .216	161.38	83.94	102.82
/ayT/ F1	p = .641	698.69	668.31	700.68
/ay/ F1	p = .900	741.80	731.32	748.55
/ay/ - /ayT/ F1	p = .930	43.10	57.22	47.87
/eyr/ - /iyr/ F1	p = .042	119.71	32.72	47.55
/eyr/ - /iyr/ CD	p = .022	404.25	193.22	248.59
/eyr/ nucleus - glide CD	p = .056	384.20	132.74	209.39
/iyr/ nucleus - glide CD	p = .012	699.27	291.83	308.23
/o/ - /ɔ/ CD	p = .893	210.14	213.78	239.63
*Significance at $p < 0.05$				

Figure 5: Group Means between White, Latinx, and Black+Mixed Bermudians with Statistical Significance

Contrary to my hypothesis, the one-way ANOVAs comparing group means for Bermudian ethnic groups demonstrated much variation in speaker patterns that did not closely align with ethnic boundaries. This could be due to a large degree of intra-speaker variation. In fact, only the SQUARE and NEAR variables had statistically significant correlations with ethnicity, with Latinx Bermudians consistently producing the most merged and centralized SQUARE and NEAR vowels, followed closely by Black and Mixed Bermudians. The most categorical merging of SQUARE and NEAR only occurred in the speech of three Latinx siblings, and even then, SQUARE and NEAR tokens were variably merged for each speaker.

Intriguingly, while not statistically significant, Latinx speakers were at times the group with the most pronounced production of "typical" Bermudian features, and in others served as an intermediary

between White and Black and Mixed group means. Along with the presence of the SQUARE/NEAR merger in their speech, Latinx Bermudians produced the most monophthongization of voiced GOAT and voiced MOUTH, the fronting of GOAT, and the greatest distinction in their TRAP and BATH vowels. Black and Mixed Bermudians, meanwhile, demonstrated the most advanced GOOSE fronting and fronting of voiced GOAT, as well as the most distinction between their THOUGHT and LOT vowels. White Bermudians, on the other hand, tended to produce the least "Bermudian" variant, with the exception of their comparative lack of pre-nasal TRAP raising, which is likely the traditional variant, for reasons discussed below.

Bermudian English	*T-test:	Male Mean	Female Mean
/æT/ - /æN/ F2	p = .**027**	43.03	186.53
PNWE	T-test:	Male Mean	Female Mean
/æT/ - /æN/ F2	p = .908	271.88	263.05
*Significance at p < 0.05			

Figure 6: PNWE and Bermudian English Male vs Female Group Means for TRAP Nasal Raising

One of the most prominent examples of interregional sociolinguistic variation in this study was the allophonic variation between pre-nasal TRAP and TRAP elsewhere. While I have already established a general difference in raising and fronting in this environment between PNWE and Bermudian English speakers, further demographic breakdown between each group reveals differences in the role gender plays in this variation. In Bermudian English, gender was a statistically significant factor in this raising and fronting, with female speakers tending to front pre-nasal TRAP 143 hz more than their male counterparts. In PNWE, meanwhile, there was virtually no gender-driven variation, as both male and female speakers fronted this vowel to the same degree.

As many studies demonstrate that women tend to be leaders of linguistic innovations (Walt and Schilling-Estes 2017, 728), the gender discrepancy in Bermudian English suggests that pre-nasal TRAP raising is a change in progress that has not yet diffused across all sociolinguistic groups. This change is still in its preliminary stages, as Bermudian female fronting of this vowel still has not reached the advanced fronting of either PNWE gender group. Meanwhile, the equal participation of both genders in

the fronting of pre-nasal TRAP in PNWE is an indication that this change has reached or is nearing its completion.

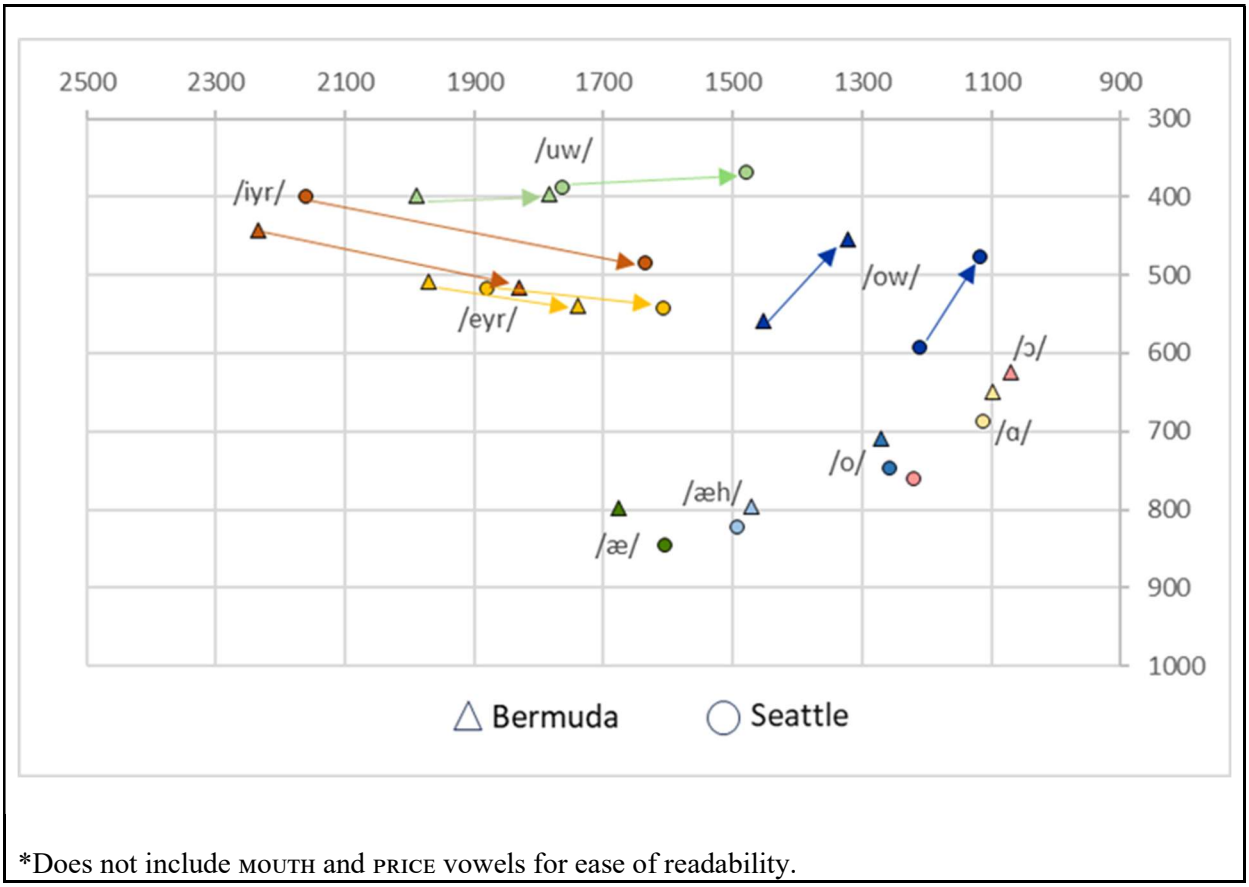
Foreign (a)	*T-test:	PNWE:	Bermudian English:
lava	p = .547	1.35	1.25
drama	p = 1	1.35	1.35
façade	0.279	1.58	1.35
macho	p = .446	1.6	1.4
picasso	p = .173	2.05	1.65
soprano	p = .348	4	3.5
slavic	p = .322	1.8	2.2
taco	p = .279	1.5	1.8
avocado	p = .115	1.85	1.4
llamas	p = .529	1.3	1.2
colorado	p = **.011**	2.45	1.5
mantra	p = .198	1.55	2.15
banana	p = .104	5	4.8
mascara	p = **.006**	4.7	3.65
morale	p = **.025**	3.6	2.6
pasta	p = .463	1.35	1.55
mafia	p = .801	1.35	1.3
scenario	p = .170	4.45	3.85
1: strong PALM vowel 2: PALM vowel 3: intermediate vowel 4: TRAP vowel 5: strong TRAP vowel			

*Significance at $p < 0.05$

Figure 7: Foreign (a) pronunciation Group Means between PNWE and Bermudian English

There are only three instances of statistically significant differences in pronunciation between regions. “Mascara” emerged as the most salient foreign (a) word, with six Bermudians producing a PALM vowel in this word, two producing an intermediate vowel, and only 12 producing a TRAP vowel. Meanwhile, 19 PNWE speakers, or 95% of my sample, produced this vowel as TRAP. Similarly, Bermudians prefer PALM for “morale,” in line with the British nativization pattern, while PNWE speakers prefer TRAP. The move towards TRAP in PNWE for “Colorado” is in line with its place as a regional variable in GNAE, with Western Americans more likely to assign it as TRAP. Five PNWE speakers, or 25% of my sample size, pronounced this word as TRAP, while not a single Bermudian participant did so.

Though not statistically significant elsewhere, Bermudian speaker means tend slightly towards the British pattern in most instances of inter-regional variability. This includes movement towards TRAP for closed-syllable words like “mantra” and “pasta” as well as movement towards PALM in the open-syllables of “soprano” and “scenario.” Additionally, ethnicity was found not to be a statistically significant factor for any token of foreign (a), contrary to my hypothesis that only White Bermudians would follow the American pattern. In fact, the only two Bermudians who assigned the British PALM vowel to “banana” were White.



*Does not include MOUTH and PRICE vowels for ease of readability.

Figure 8: Vowel Space of PNWE and Bermudian English Speakers

4 Discussion

The vowel systems of Bermudian English and PNWE demonstrated strong divergences, the most prominent being the behavior of GOOSE, GOAT, THOUGHT and LOT. GOOSE and GOAT were both highly fronted in Bermudian English compared to PNWE. Considering the fact that PNWE belongs to a dialect region that also participates in the fronting of high back vowels and has been found to advance GOOSE, Bermudian English GOOSE and GOAT fronting is even more remarkable, and the further advancement of GOOSE in Bermudian English likely attests to fronting in PNWE being a more recent innovation.

The distinction of THOUGHT and LOT in Bermudian English, in comparison to the merged pair in PNWE, preserves a central dialectal pivot point and ensures that the vowel systems of each region remain fundamentally structurally distinct. Taken together, THOUGHT and LOT distinction and the fronting of high and mid back vowels are the defining characteristics of the Southern Shift dialect. That these remain the

most salient features of Bermudian English indicates that this variety still strongly aligns itself with British English over GNAE.

My hypothesis that White Bermudians would be more receptive to GNAE than Black Bermudians was generally supported by the results of the study, as White Bermudian group means were the least advanced in nearly all the features associated with Bermudian English. Black and Mixed Bermudians, meanwhile, were the most advanced in the three most salient features of Bermudian English mentioned above: GOOSE and GOAT fronting, and the distinction of THOUGHT and LOT. However, most of this inter-ethnic variation was not statistically significant, pointing to much greater intra-ethnic variation than I expected.

Latinx speakers, who were not considered in my original hypothesis, fluctuated in their position as intermediate between White and Black and Mixed means, and their position as the most advanced speakers of Bermudian English, indicating a strong affiliation with Bermudian culture. As the families of many of the Latinx participants in the study are recent migrants to the island, this close affiliation to "Bermudianness" could serve as a way to move themselves away from the highly politically sensitive status of "immigrant" and stake a claim to the island and to their Bermudian identity in a context in which "cultural citizenship is an ever-present and contentious issue" (Hall 2018, 25).

Contrary to the results of the other variables in this study, analysis of the foreign (a) variable shows clear dominance of the American nativization pattern over the British pattern in Bermudian English speech, with PNWE and Bermudian English speakers generally aligning in their assignment of a word to either the PALM or TRAP word class; Bermudians participate in the American "overwhelming preference" for assigning words to the PALM word class. While most variation in pronunciation of individual tokens between PNWE and Bermudian English is not statistically significant, where there is variation, Bermudian speakers tend towards the British nativization pattern, suggesting a residue of British influence that is being outcompeted by American influence. Unlike the other variables involved in this study, foreign (a) nativization involves variation across word classes rather than within a word class, making variation in pronunciation particularly socially salient, as listeners must make perceptual binary classifications. This social salience could explain why the direction of influence on Bermudian English seemingly reverses for this variable in the direction of the more modern American input.

5 Conclusions

This study set out to investigate the degree of influence that General North American English has had on Bermudian English in light of the increasingly close contact between Bermuda and the United States. This contact is owed not only to the current influx of American tourists and immigrants to the island but also to historical economic and political connections between the two that have strengthened over the last century. It analyzes some of the phonological features identified to be most salient in Bermudian English, including the fronting of high and mid back vowels, monophthongization of voiced MOUTH, Canadian Raising, the distinction of TRAP/BATH and THOUGHT/LOT, and the presence of the SQUARE/NEAR merger. It also investigates the patterning of Bermudian English in foreign (a) nativization, a phenomenon with clearly demarcated national differences.

This study found that structurally, at the level of phonological inventory, Bermudian English still aligns itself with British English, while easily transferrable word class switches have penetrated this variety from American English.

There are many avenues for future research in this field, and in particular, if I were to advance the results of this study, I would like to take a more detailed sociolinguistic approach to some of these variables. Canadian Raising, which I found no clear presence of in Bermudian English, would be an interesting variable to further explore to ascertain whether this is a feature that is receding among younger generations. This study would also benefit from a more robust sociolinguistic follow-up study that included other methods, such as interviews and minimal pairs, to investigate the social factors that govern style-shifting in Bermudian English.

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