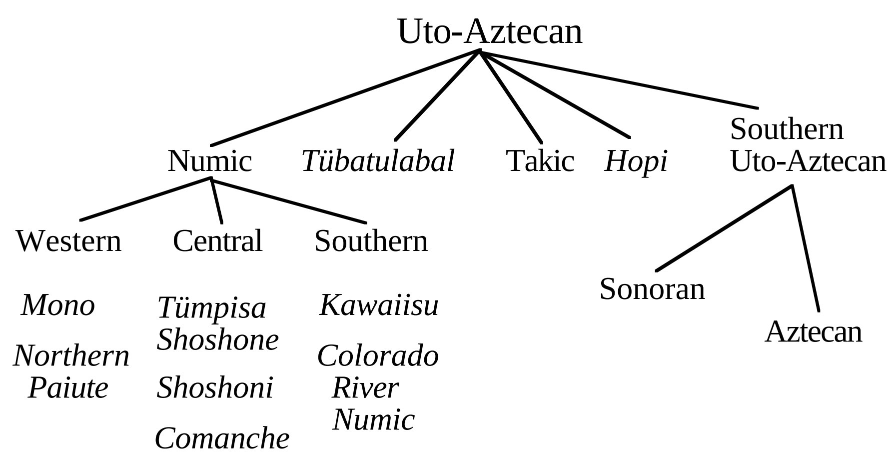
Chapter 1: Introduction

1. Gosiute as a Numic Language

The Numic languages form one of the five immediate sub-families of the large Uto-Aztecan language family (1) and comprise a far-flung group ranging from Death Valley and the lower Colorado River valley in the south and west to central Wyoming and the Southern Plains of Oklahoma and Texas in the north and east. Despite the wide area covered by Numic languages, they form a linguistically tight-knit family.

(1) Uto-Aztecan Family Tree (Miller 1983, Miller 1984)



The Numic family is divided into three branches: Western Numic, Central Numic, and Southern Numic. There has been an attempt to group Central and Southern Numic together into a branch coordinate with Western Numic (Freeze and Ianucci 1979), but the interpretation of the evidence for this grouping is controversial. In this work, I will not enter into a discussion of the internal classification of Numic and assume the traditional tripartite division of Numic which is illustrated in (1).

Within each branch of Numic there is a basic division between a "core" and a "periphery" language (Lamb 1958: the terms "core" and "periphery" are mine). The core Western Numic language is Mono, the core Central Numic language is Tümpisa Shoshone (Panamint), and the core Southern Numic language is Kawaiisu. The core languages occupy a much more restricted area and display greater internal dialect diversity than do the periphery languages. Furthermore, the dialects of the periphery languages that are closest to the core show greater internal diversity than the dialects located farther away; dialect boundaries become increasingly difficult to determine the farther one goes from the core. The clearest boundary in the periphery languages is found in Central Numic between Shoshoni and Comanche. This is due to a mounted migration of one or several bands of Eastern Shoshoni speakers to the Southern Plains in the early 1700s, which effectively removed them from contact with their former Shoshoni neighbors (Shimkin 1986).

The relative positions of the Numic languages are shown in (2). The language names are given in a larger typeface, with important dialects noted in smaller type. I have labelled the Southern Numic periphery language in (1) and (2) *Colorado River Numic*; I use this term to avoid cumbersome circumlocutions like "Chemehuevi-Ute" (Kroeber 1907, Lamb 1958) or to avoid applying to the whole branch misleading and potentially offensive labels such as "Ute" (Lamb 1958, Miller 1983). Following Dayley (1989) I have also labelled the Central Numic core language in (1) and (2) *Tümpisa Shoshone* rather than Panamint.[1]

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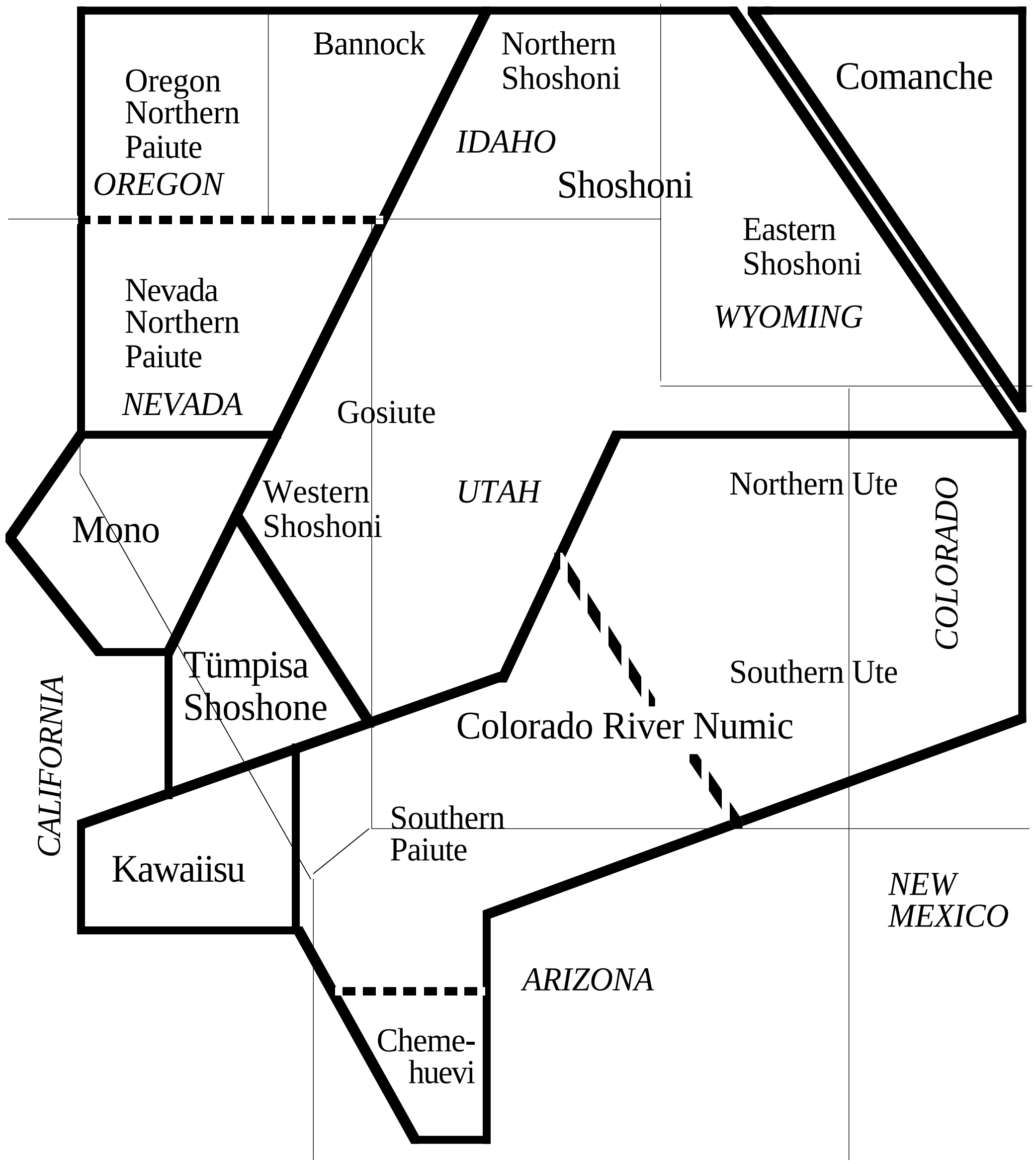
[1]The spelling "Timbisha" is the spelling used by speakers; Dayley (1989) spells this "Tümpisa."

(2) Relative locations of the Numic languages (based on Nichols 1974: 9; the political boundaries are not to scale)



2. Consonant Alternations and Numic "Final Features"

The Numic languages, especially Southern Paiute, have been a source of great theoretical interest for phonologists (see for example Sapir 1949, Harms 1966, Chomsky and Halle 1968 (pp 345-51), Miller 1982, McLaughlin 1984, Suzuki 1995). This is due in large part to consonant gradation which is present to some degree in every Numic language. Data such as that in (3) from Gosiute illustrate a typical Numic gradation pattern; the initial consonant of the suffix -pai 'have NOUN' has four different alternants—voiced stop preceded by a homorganic nasal (3a), geminate voiceless stop (3b), voiceless fricative (3c), and voiced fricative (3d)—depending on the noun stem to which it is attached.[2]

(3)	a.	'bead'	[t̪θoː]
		'have beads'	[t̪θoːmbai]
	b.	'pine nut'	[tɨβa]
		'have pine nuts'	[tɨβappai]
	c.	'money'	[moni]
		'have money'	[moniɸai]
	d.	'house'	[kahɾ̃i]
		'have a house'	[kahɾ̃iβai]

There are similar series of alternations for nasal-initial suffixes. The initial consonant of the suffix -mai 'with' has different alternants—geminate nasal (4a, b), cluster of [h]+nasalized glide (4c), or voiced nasalized glide (4d)—again, depending on the stem to which it is attached.

(4)	a.	'bead'	[t̪θoː]
		'with the bead'	[t̪θoːmmai]
	b.	'pine nut'	[tɨβa]
		'with the pine nut'	[tɨβammai]
	c.	'mouse'	[ponai]
		'with mouse'	[ponaihw̃ai]
	d.	'house'	[kahɾ̃i]
		'with the house'	[kahɾ̃iw̃ai]

[2]I make use of the following conventions in transcribing Gosiute: [t̪θ], [t̪t̪θ], and [d̪ð] are interdental affricates, and [tš], [ttš], and [dž] are palato-alveolar affricates; long vowels are written [Vː] while heterosyllabic sequences of identical vowels are written [VV]. Vowel clusters in which [i] is the second member are tautosyllabic (e.g. [ɨi], [ui], [oi], [ai]), while all other vowel clusters are heterosyllabic.

The alternations shown in (3) and (4) are quite regular, and provide the basis for distinguishing four lexical classes of noun stems. The first group of stems is followed by a nasal-voiced stop cluster or a geminate nasal (3a, 4a) and are referred to as *Nasalizing* stems. The second group is followed by a geminate, either oral or nasal (3b, 4b), and they are referred to as *Geminating* stems. The third group is followed by a voiceless fricative or partially voiceless nasalized continuant (3c, 4c) and are referred to as *Aspirating* stems. Finally, the fourth group is followed by a voiced fricative or nasalized continuant (3d, 4d); this group is the most numerous and are referred to as *Spirantizing* stems. The effect of a stem on a following consonant is called the *final feature* of that stem.[3] The terms 'Nasalizing', 'Geminating', and 'Spirantizing' were introduced in Sapir (1930: 62); the term 'Aspirating' was coined by Wick Miller.[4]

The same range of consonants and clusters found at morpheme boundaries is also found morpheme-internally. This is illustrated in (5).

(5)	a.	'wild carrot'	[yamba]
		'brown'	[ondɨ]
	b.	'father'	[appɨ]
		'snow'	[takka]
	c.	'pine cone hook'	[exo]
		'five'	[naːɸaiθɨ̥]
	d.	'sun'	[taβe]
		'grandmother (MoMo)'	[kaɣu]
	e.	'jackrabbit'	[kammu]
		'aspen'	[sɨnnaβi]
	f.	'husband'	[kuhw̃a]
		'house'	[kahr̃i]
	g.	'tooth'	[taw̃a]
		'mouse'	[por̃ai]

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[3]The term "final feature" was first used in Nichols (1974: 13) and has since become a standard term in Numic literature. Note that the use of the word 'feature' in this term is non-theoretical and does not presuppose an analysis based on distinctive feature theory.

[4]In this dissertation I will capitalize the terms referring to Numic final features (i.e., Nasalizing, Geminating, Aspirating) in order to distinguish them from more general phonetic and phonological processes which occur in the world's languages.

(5a) illustrates morpheme-internal nasal-voiced stop clusters, analogous to Nasalization; (5b,e) illustrate morpheme-internal geminate stops and nasals, analogous to Gemination; (5c,f) illustrate morpheme-internal voiceless fricatives and partially voiceless nasalized continuants, analogous to Aspiration; and (5d,g) illustrate morpheme-internal voiced fricatives and nasalized continuants, analogous to Spirantization. A table summarizing the Gosiute consonant series is given in (6); alternants in parentheses occur following a front vowel [i] or [e]. In this table, I also include the continuants [s, h, y, w]; however, these segments do not participate in the alternations discussed in (3-5).

(6) Gosiute consonant series

	Initial	Nasalized	Geminated	Aspirated	Spirantized
Labial	p- m-	-mb- -mm-	-pp- -mm-	-ɸ- -hw̃-	-β- -w̃-
Dental	tθ-	-n̪d̪ð- (-ñdž-)	-t̪t̪θ- (-ttš-)	-θ- (-š-)	-ð- (-ž-)
Alveolar	t- n- s-	-nd- (-n̪d̪-) -nn- -s-	-tt- (-t̪t̪-) -nn- -s-	-θ̠- (-θ-) -hɾ̃- (-hỹ-) -s-	-ɾ- (-ð-) -ɾ̃- (-ỹ-) -s-
Palatal	y-	-y-	-y-	-y-	-y-
Velar	k-	-ŋg-	-kk-	-x-	-ɣ-
Labio-velar	kʷ- w-	-ŋgʷ- -w-	-kkʷ- -w-	-xʷ- -w-	-ɣʷ- -w-
Glottal	h-	-h-	-h-	-h-	-h-

This dissertation is an extended analysis of the table presented in (6).

3. Theoretical Assumptions

In this section, I lay out the theoretical assumptions I am making in this dissertation. In section 3.1, I provide a short introduction to Optimality Theory. In 3.2, I discuss the

Grounding Hypothesis (Archangeli and Pulleyblank 1994) and an extension of it, Positional Grounding.

3.1. Optimality Theory

Optimality Theory (see Prince and Smolensky 1993, McCarthy and Prince 1993a, McCarthy and Prince 1995, among others) arose from the observation that many generalizations in phonology can take the form of constraints on a surface string. This view was first articulated in generative phonology in Kisseberth (1970), where it was noted that rules of formally different types may conspire to produce surface strings with similar phonotactic properties. He introduces *derivational constraints* to capture the phonotactic properties which rules conspire to produce, and which prevent a derivation from yielding an illicit surface string.

Optimality Theory elevates this notion of 'constraint' from a meta-grammatical device which evaluates possible derivations to an active component of the grammar proper. Optimality Theory takes the notions of constraint satisfaction and well-formedness as central concerns. The form which an Optimality Theoretic grammar takes can be described as the composition of two functions, Gen and Eval, shown in (10).

(10) Gen(input) $\rightarrow$ {cand_1, cand_2, … }
Eval({cand_1, cand_2, … }) $\rightarrow$ ouput

Gen supplies a set of analyses of an input in the form of candidate outputs; in doing so, it may modify the input in building the candidate set by inserting, deleting, permuting, or changing segments and features and by providing or altering prosodic structure. Eval rates the well-formedness of each member of the candidate set thus produced by means of a set of constraints, each of which is ideally a true statement describing the output. Constraints are generally of three kinds: Faithfulness Constraints, which demand identity between underlying and surface forms; Markedness Constraints, which constrain surface forms based on considerations of phonetic and phonological plausibility; and Structural Constraints, which govern the arrangement of linguistic constituents.

In typical cases, the output will actually violate one or more constraints. By ranking these constraints with respect to each other, distinctions of *relative* well-formedness can be made. That candidate which best satisfies the most highly ranked constraints, even at the expense of violating lower ranked ones, will be favored over other candidates. This is illustrated schematically in (11).

(11) A » B

	/input/	A	B
a. ☞	$cand_1$		*
b.	$cand_2$	*!	

In this tableau, the constraints A and B are listed in ranked order from left to right across the top. This ranking is also expressed by the statement 'A » B'. The candidate outputs are listed in a column, with the sign '☞' indicating the candidate which is judged by Eval as optimal. An asterisk in a cell indicates a violation of the constraint by the candidate in that row and an exclamation point indicates a fatal violation, one which excludes a candidate from further consideration. Shaded cells in the tableau indicate that whether a candidate satisfies or violates a constraint is no longer relevant to the outcome of Eval and the selection of the optimal candidate.

3.2. Grounding

Archangeli and Pulleyblank (1994) contains several important proposals concerning the cooccurrence of features and the structure of segments. Perhaps the most important proposal is the Grounding Hypothesis itself, for which the book is named. This, in brief, is the idea that statements governing the cooccurrence of features in segments must be phonetically motivated. In formalizing this notion, they define the domain of cooccurrence statements as a *path*. Informally, a path is a set of associated nodes, features, or prosodic categories such that no more than one token of any node, feature, or prosodic category is included in the set (Archangeli and Pulleyblank 1994: 21, 50). They define cooccurrence statements as *path conditions*; a path condition is an implicational statement which determines whether paths between features are well formed or ill formed (Archangeli and Pulleyblank 1994: 169). Path conditions which express phonetically motivated feature cooccurrence statements are called *grounding conditions* (12).

(12) Grounding Conditions (Archangeli and Pulleyblank 1994: 177)

I. Path conditions invoked by languages must be phonetically motivated.
II. The stronger the motivation for a path condition Φ,
 a. the greater the likelihood of invoking Φ,
 b. the greater the likelihood of assigning a wide scope to Φ within a grammar,
 and vice versa.

Common grounding conditions which are introduced and explored by Archangeli and Pulleyblank (1994) include the following:

(13) a. HI/ATR: If [+high], then [+ATR]; if [+high], then not [–ATR].
 b. LO/ATR: If [+low], then [–ATR]; if [+low], then not [+ATR].

Each of these statements expresses not only a positive requirement but also a prohibition on the cooccurrence of features.

In this dissertation, I introduce grounding conditions in my analysis of the distributional and alternation patterns of Gosiute consonants. Such conditions include those in (14) below; motivation for these conditions will be presented as they appear in the analyses which follow.

(14) Some grounding conditions used in this dissertation

OBS/VOI: If [–sonorant] then [–voice]; if [–sonorant] then not [+voice].
SG/VOI: If [+spread glottis] then [–voice]; if [+spread glottis] then not [+voice].
NAS/CONT: If [nasal] then [–cont]; if [nasal] then not [+continuant].

Grounding conditions have been adopted into OT as constraints; as such, they are rankable and violable like any other constraint. (For work in OT which adopts grounding conditions as constraints, see Archangeli and Suzuki 1995, Pulleyblank 1994, 1997).

3.2.1. Positional Grounding

In Gosiute consonant gradation, stops are variously voiced, voiceless, continuants, or stops, depending on the position they occupy in a word or phrase. For example, stops are voiceless word-initially,

(15)	[pia]	'mother'
	[t̪θuhr̃i]	'bone'
	[tua]	'child; son'
	[kɨnu]	'grandfather (FaFa)'
	[kʷasu]	'shirt'

but medially these voiceless stops alternate with voiced fricatives,

(16)	[nɨβia]	'my mother'
	[nɨðuhr̃i]	'my bone'
	[nɨrua]	'my son'
	[nɨɣɨnu]	'my grandfather'
	[nɨɣʷasu]	'my shirt'

and following nasals, initial voiceless stops alternate with voiced stops.

(17)	[ɨmbia]	'your (2s) mother'
	[ɨn̪d̪ðuhr̃i]	'your (2s) bone'
	[ɨndua]	'your (2s) son'
	[ɨŋgɨnu]	'your (2s) grandfather'
	[ɨŋgʷasu]	'your (2s) shirt'

Westbury and Keating (1986) suggest that the position of a stop within a word or phrase is as important as its laryngeal configuration in determining the naturalness or likelihood of voicing. They maintain that intervocalic position is a fine place for stop consonant voicing, while utterance-initial or utterance-final positions are less good. Lindblom (1983) makes a similar suggestion for continuancy (in the guise of "undershoot"); that is, continuants are at home intervocalically, but less so in other positions. In other words, the alternation patterns in Gosiute conform to phonetically motivated markedness restrictions on consonants in various environments.

This kind of pattern can be captured using grounded path conditions and narrowing the scope of these conditions by including positional requirements. Assume the grounded path condition in (18).

(18) OBS/VOI: 'if [–son] then [–voice]; if [–son] then not [+voice]'.

Positional Grounding would restrict the scope of OBS/VOI based on position to yield the conditions in (19).

(19) positionally grounded conditions interacting with OBS/VOI

a. VOI: V_V: 'if intervocalic then [+voi]'
b. VOI: N_: 'if post-nasal then [+voi]' (= *NC; Pater 1996)

For the effects of a positionally grounded constraint to be apparent, the relationship between the features expressed by the more general grounded condition must be modified. In (18), the relationship between [–sonorant] and [voice] is such that [–voice] is required in case [–sonorant] is present. In the positionally grounded constraints this relationship is altered so that i) [+voice] is required when [–sonorant] is present, and ii) both features are on a path which occurs intervocalically (19a) or post-nasally (19b). Formally speaking then, positional grounding involves the local conjunction of constraints (Smolensky 1995, Zoll 1998); however, the phonetic literature shows that these kinds of positional requirements on featural cooccurrence are robust enough that they can be discussed without further decomposition into their conjoined components. The tableau in (20) illustrates how positional grounding interacts with context-free grounding; the data is taken from (17), and involves the voicing of post-nasal stops.

(20) VOI: N_ » OBS/VOI

input: /ɨn-pia/	VOI: N_	OBS/VOI
a. ☞ ɨmbia		*
b. ɨmpia	*!	

In this tableau, the positionally grounded constraint is ranked above the context-free grounded constraint. The result is that the candidate which has a voiced stop following a nasal (20a) will beat a candidate which has a voiceless stop following a nasal (20b).

Beckman (1997) argues for a type of IDENT constraint in which faithfulness is sensitive to positions like initial syllable, stressed syllable, onset, and so forth. In effect, what Positional Faithfulness does is limit the occurrence of otherwise licit features and feature combinations in certain positions by ranking an IDENT-<position>-[F] constraint above some kind of markedness constraint which is in turn ranked above a garden variety IDENT-[F] constraint.

Beckman (1997) presents an analysis of Shona vowel harmony which makes use of positional faithfulness. In Shona verbs, the mid vowels [e] and [o] are constrastive only in root-initial syllables. These vowels may appear in non-initial syllables only when preceded by a mid vowel in the first syllable of the root. In (21) the verb roots are augmented by either an applicative suffix -*ira* or the causative suffix -*isa*. When the verb root contains a mid vowel, the suffix also contains a mid vowel (21a); otherwise, the suffix contains a high vowel (21b). (The data in (21) is taken from Beckman 1997, who cites as her source Fortune 1955).

(21) Shona Height Harmony

a.	pera	'end'	per-e̲ra	'end in'
	sona	'sew'	son-e̲ra	'sew for'
	oma	'be dry'	om-e̲sa	'cause to get dry'
b.	ipa	'be evil'	ip-i̲ra	'be evil for'
	bvuma	'agree'	bvum-i̲sa	'make agree'
	vava	'itch'	vav-i̲ra	'itch at'
	pamha	'do again'	pamh-i̲sa	'make do again'

Beckman analyzes this pattern using a positional faithfulness constraint IDENT-σ_1, defined in (22).

(22) IDENT-σ_1(hi): A segment in the root-initial syllable in the output and its correspondent in the input must have identical values for the feature [high].

By ranking this constraint above the markedness constraints *MID and *HIGH, which prohibits the feature combination [–high, –low] and [+high, –low], respectively, Beckman shows that the desired restriction on mid vowels emerges logically from constraint interaction.

(23) IDENT-σ_1(hi) » *MID » *HIGH » IDENT(hi) (Beckman 1997: 18)

input: /per-ira/ / \\ [–hi,–lo][+hi,–lo]	IDENT-σ_1(hi)	*MID	*HIGH	IDENT(hi)
a. perira / \\ [–hi,–lo][+hi,–lo]		*	*!	
b. ☞ perera \\ / [–hi,–lo]		*		*
c. pirira \\/ [+hi,–lo]	*!		*	*

In the tableau in (23), three candidates are considered for the input /per-ira/ 'end in'. Candidate (23c) violates the positional faithfulness constraint IDENT-σ_1(hi) and is eliminated from the competition. Candidate (23a) violates the markedness constraint *HIGH, and is also eliminated, leaving candidate (23b) as the optimal candidate output. The effect of Positional Faithfulness is to limit the distribution of normally contrastive segments; mid vowels in Shona are contrastive, but only in the root-initial syllable.

In Gosiute, the distribution of contrastive elements is not at issue; rather, it is the distribution of non-contrastive elements which is of interest. While it would be possible to use IDENT constraints to capture the distributional properties of non-contrastive elements, this is not very insightful. If segments never contrast but are completely predictable based on their surface environments, using faithfulness costraints to capture the allophony misses important generalizations. This is especially true in Gosiute given the phonetic plausibility of the Gosiute patterns. Capturing phonetic plausibility is something that grounding conditions do well, and adding positional information to grounding conditions can capture the Gosiute distributional and alternation facts in a clear and phonetically insightful way. Faithfulness as such would play a diminished role in this kind of analysis.[5]

The rest of this section illustrates the utility of Positional Grounding by exploring the relationship between the grounded condition HI/ATR and the positionally grounded condition ATR:_C]$_\sigma$, defined below.

(24) a. HI/ATR: If [+high] then [+ATR]; if [+high] then *not* [–ATR].
b. ATR:_C]$_\sigma$: in closed syllables vowels are [–ATR].

In the following section, I discuss the neutralization of the [±ATR] distinction in mid vowels in French closed syllables. I contrast the European French example with a similar case of [ATR] neutralization in closed syllables in Canadian French, this time extended to high vowels as well as mid vowels.

3.2.2. French Mid Vowels

French mid vowels show complementary distribution; [–ATR] mid vowels occur in closed syllables, while [+ATR] mid vowels occur in open syllables; this is illustrated in (25).[6]

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[5]Please note that I am not claiming that Positional Faithfulness should be supplanted by Positional Grounding. In the discussion on nasal-stop homorganicity found in chapter 2 I make use of a Positional Faithfulness to account for the preference for preservation of onset place of articulation; see chapter 2, section 3.3 for details of nasal-stop homorganicity in Gosiute.

[6]Valdeman (1976: 57) confines this distributional pattern to a particular dialect group, the Méridional dialects, spoken in southern France. Casagrande (1984), however, does not restrict this distributional pattern to any particular dialect.

(25) Distribution of French mid vowels (Casagrande 1984: 89-90)

[selɔ̃]	'we seal'	[sɛl]	'they seal'
[sedɔ̃]	'we yield'	[sɛdʁɔ̃]	'they will yield'
[ʁeñã]	'reigning'	[ʁɛñ]	'they reign'
[tete]	'to nurse'	[tɛt]	'she nurses'
[so]	'stupid.m'	[sɔt]	'stupid.f'
[devo]	'devout.m'	[devɔt]	'devout.f'
[vø]	'wish'	[vœl]	'they want'
[pø]	's/he can'	[pœv]	'they can'
[ø]	'eggs'	[œf]	'egg'

In French, the activity of the positionally grounded condition ATR:_C]$_\sigma$ (24b) yields [-ATR] vowels in closed syllables. When this positionally grounded condition is ranked above IDENT$_{IO}$[+ATR], the complementary distribution of mid vowels follows (26).

(26) ATR:_C]$_\sigma$ » IDENT$_{IO}$[+ATR]

input: tète /tet/	ATR:_C]$_\sigma$	IDENT$_{IO}$[+ATR]
a. tet	*!	
b. ☞ tɛt		*

Because ATR_C]$_\sigma$ outranks IDENT$_{IO}$[+ATR], any candidate which includes a [+ATR] vowel in a closed syllable will lose to a candidate which is identical except in the value for [ATR] on the vowel in the closed syllable, regardless of its input specification.

Canadian French extends the closed syllable laxing pattern of French mid vowels to high vowels; thus, high vowels also show the effects of the positionally grounded condition ATR:_C]$_\sigma$. In Canadian French, high vowels in open syllables are [+ATR] (27).

(27) [+ATR] in Canadian French high vowels (Picard 1987: 59)

[i]		[y]		[u]	
[viʁilite]	'virility'	[ʒyliɛn]	'Julienne'	[kuʁaʒ]	'courage'
[tʁavɛsti]	'travesty'	[deby]	'début'	[peʁu]	'Pérou'
[imaʒ]	'picture'	[ynivɛʁsɛl]	'universal.m'	[uvɛʁtʏʁ]	'opening'

However, high vowels in closed syllables are [–ATR] (28).

(28) [–ATR] in Canadian French high vowels (Picard 1987: 57-58)

[ɪ]		[ʏ]		[ʊ]	
[emɪl]	'Emile'	[zʏl]	'Jules'	[seʊl]	'Seoul'
[pɪp]	'pipe'	[venʏs]	'Venus'	[sʊp]	'soup'
[afrɪk]	'Africa'	[tʏb]	'tube'	[rʊt]	'route'
[bɪskɥi]	'biscuit'	[bʏltɛ̃]	'bulletin'	[bʊlvaʁ]	'boulevard'
[fɪltras]	'filtration'	[gʏstav]	'Gustave'	[gʊʁme]	'gourmet'
[mɪʃlɛ̃]	'Michelin'	[pʏʁte]	'purity'	[pʊʁsɥɪt]	'pursuit'

Thus high vowels show complementary distribution with respect to [ATR]. In open syllables, high vowels are [+ATR], while in closed syllables they are [–ATR]. The presence of [–ATR] high vowels in closed syllables is interesting in the present context because it is in direct conflict with the grounded condition HI/ATR, defined in (29).

(29) HI/ATR: if [+high] then [+ATR]; if [+high] then not [–ATR]. (Archangeli and Pulleyblank 1994: 174)

According to HI/ATR, all high vowels should be [+ATR], but this condition is violated in closed syllables. To account for the high vowel pattern in Canadian French, the positionally grounded constraint ATR_C]$_\sigma$ is ranked above the grounded constraint HI/ATR (30).

(30) ATR:_C]$_\sigma$ » HI/ATR

input: [pip] 'pipe'		ATR:_C]$_\sigma$	HI/ATR
a.	pip	*!	
b.	pɪp		*

In (30), candidate (30b) contains a [–ATR] vowel in a closed syllable and satisfies ATR_C]$_\sigma$; this candidate bests candidate (30a) which satisfies the general grounded condition HI/ATR. This is exactly the type of interaction one would expect between a positionally grounded condition and a grounded condition without positional restrictions. Notice also that this result is achieved without recourse to constraints on the identity of segments under correspondence, but is rather the result of the interaction of phonetically grounded constraints on surface forms. Identity constraints may well be present (and given the universal nature of Con, most likely are), but they play no role in the selection of the optimal candidate.

4. Overview of the Dissertation

The rest of this dissertation is organized as follows. In chapter 2 I discuss the distribution of continuancy and voicing in obstruents in Gosiute. Voiced obstruents occur intervocalically or following nasals, voiceless ones occur elsewhere. Likewise, continuants occur intervocalically while stops occur elsewhere. These simple facts, which underlie the system of Gosiute consonant gradation, are readily described and explained by positional grounding interacting with context-free grounding and faithfulness requirements.

In chapter 3 I provide an introduction to the analysis of final features in Gosiute. I discuss the distributional properties of final features and examine Gemination in some detail. I show that there are arguments for considering final features to be full segments rather than floating features or "latent segments" (Zoll 1996). The argument for Gemination consists in the featural content of the final feature itself. I propose that Gemination consists of a root node specified [+consonantal] since its effects are restricted to consonants.

In chapter 4 and 5 I give accounts of Nasalization and Aspiration in Gosiute. Like Gemination, I argue that these final features are best considered full segments rather than latent segments. The argument for segmental status of these final features comes from their interaction with the accusative suffix *-a*.

Chapter 6 is an examination of coronal alternations in Gosiute. Coronal obstruents are found in distributional patterns which depend on the presence or absence of a preceding front vowel. In the pattern I call Fronting, alveolar stops alternate with dental stops—dental stops occur following front vowels, while alveolar stops occur elsewhere. In the pattern I call Palatalization, dental affricates alternate with palato-alveolar affricates—palato-alveolar affricates occur following front vowels, while dental affricates occur elsewhere.

I argue that the change in place of articulation involved in Fronting is a result of the greater surface area of the tongue in contact with the roof of the mouth. This alternation thus reduces to an alternation between laminals and apicals, with laminals following front vowels and apicals occurring elsewhere. Palatalization, on the other hand, is a change in stridency; dental affricates are non-strident, while palato-alveolar affricates are strident. Gosiute Fronting and Palatalization can thus be seen as a two step chain shift: alveolar > dental > palato-alveolar. To capture the chain shift of the Gosiute alternations requires the Local Conjunction of constraints. Viewing the alternations in this way confirms their relationship to each other—a relationship suggested by the identity of their triggering environments—and provides another argument in favor of the Local Conjunction of constraints as part of the toolbox of Universal Grammar.

5. Empirical and Theoretical Contributions

There are three main contributions which are made by this dissertation. First, this dissertation provides a thorough description of the consonantal system of a Numic language. While the Numic languages have been under phonologists' scrutiny since Sapir (1949), a study of this length concerning the consonantal system of a single Numic language has not been undertaken until now. This dissertation thus provides an important piece of documentation for this language family.

Second, this dissertation provides an example of the efficacy of Optimality Theory as an analytical framework in the investigation of a single language. Much of the work currently undertaken in Optimality Theory is typological in nature. While this typological work is of tremendous value, it is also important to demonstrate that Optimality Theory is up to the task of a more detailed examination of the phonological phenomena of a single language; in this respect, this dissertation follows the lead of McCarthy and Prince (1993), which provides a survey of prosodic phenomena in Axininca Campa.

Third, the Gosiute language provides an ideal proving ground for the Grounding Hypothesis, since much of the phonology of Gosiute is driven by phonetic considerations. This has important implications within Optimality Theory concerning the nature of the input. Since so much of Gosiute phonology can be shown to be driven by phonetic considerations (as formalized in the Grounding Conditions), the role of faithfulness to underlying representations is greatly reduced. This leaves open the possibility that inputs need not be uniquely specified and that a given output may have many potential inputs. This idea was introduced in Prince and Smolensky (1993: 191) as *Richness of the Base*. Briefly, Richness of the Base prohibits an OT grammar from placing requirements on potential inputs (in essence, applying constraints to potential inputs), therefore all inputs are possible, whether they are underspecified, partially specified, or fully specified. It is left to the constraint hierarchy to decide on a uniquely specified output. In the following chapters I will show that Gosiute phonology has this property; constraints rooted in phonetic considerations determine the output forms present in the language.