ABSTRACT

TOPICS IN CHUKCHANSI YOKUTS PHONOLOGY AND MORPHOLOGY

In this thesis I analyze the phonology and morphology of verbs in the Chukchansi dialect of Yokuts. I explore epenthesis and syllabification, prosodic templates, and vowel quality changes. I respond to previous accounts of Yokuts verbs and propose some new analyses building upon these accounts.

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August 2011

TOPICS IN CHUKCHANSI YOKUTS PHONOLOGY AND MORPHOLOGY

by

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A thesis

submitted in partial

fulfillment of the requirements for the degree of

Master of Arts in Linguistics

in the College of Arts and Humanities

California State University, Fresno

August 2011

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ACKNOWLEDGMENTS

First I need to acknowledge the outstanding cooperation and generosity of my language consultants, Holly and Jane Wyatt. They have offered their own time, unrewarded, and put up with my often inscrutable linguist questions. Their dedication to both the description and the preservation of their ancestral tongue is inspiring.

I thank my thesis committee: Chris Golston, Brian Agbayani, and Niken Adisasmito-Smith. They have worked alongside me, given me invaluable advice and suggestions, and encouraged me in this effort. I especially thank my adviser Chris for the many hours of his time we have spent in conversation about Chukchansi verbs, and all the resources he has offered me to help me better under the subject matter. I thank as well my fellow classmates in the field methods class where much of this data was collected, for being my partners in the linguistic discovery of Chukchansi. I also thank Sharon Rose for her exhaustive comments on a previous draft of this thesis.

Finally, I thank my friends and family who have put up with my complaints and have lifted me up with their praise. I especially am grateful to my wonderful girlfriend, Marilyn Gomez, who not only was my rock when I was discouraged with this project, but moreover always offered insight and advice, without which this thesis would not have been completed.

I dedicate this work to my grandfathers, Bernard Guekguezian and John Shahinian, who are my forebears physically, intellectually, and spiritually. May this work make you proud!

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CHAPTER 1: INTRODUCTION

Chukchansi Yokuts is a dialect of the Yokuts language family native to Central California. Yokuts dialects were spoken in the San Joaquin Valley and the surrounding foothills from the Fresno and Chowchilla rivers in the north down to the where the valley ends in the Tehachapi mountains in the south (Kroeber 1963). There were originally around forty Yokuts tribes, each speaking a distinct yet related dialect. Kroeber (1963) estimated that most of these dialects were mutually intelligible; Whistler and Golla (1986) stated that this is probably not true, though dialects within a branch of the Yokuts family likely could understand each other. The Chukchansi tribe inhabits the foothills in the north of Yokuts territory, around present-day Ahwahnee and Coarsegold. Many Chukchansi still live in these foothills about 30 miles north of Fresno; this is where the headquarters of the tribe, Picayune Rancheria, is today. Figure 1 shows the location of the three major (non-linguistic) groups of Yokuts tribes among the Native American tribes of California: Northern Valley, Southern Valley, and Foothill Yokuts. The Chukchansi tribe inhabited the northernmost corner of Foothill Yokuts territory.

According to Kroeber's (1963) system of classification, based on the presence of the imperative suffix [-ka] and the form of the negative morpheme [ohom’], Chukchansi is a Valley dialect of the Yokuts family, not a Foothill dialect, despite its location in the Sierra foothills. While Whistler and Golla (1986) disagree with Kroeber over the integrity of Foothill group, they do agree that Chukchansi is a Valley dialect. Specifically, it is in the Northern Hill subgroup of the Northern Valley branch, closely related to the Yokuts dialects Chawchila and Dumna. Figures 2 and 3 show the family tree of Yokuts: the first one shows the

Figure 1. Map of Native American tribes of California[1]

branching from the outermost Yokuts groups to Valley Yokuts, and the second shows the place of Chukchansi in the Valley Yokuts group. Figure 4 is a map of these groups, and only covers the Yokuts areas of California. Chukchansi is located at the small number 11, in the Northern Hill area in the northeastern corner of Yokuts territory, bordering the Southern Sierra Miwok and the Western Mono.

[1]This map was downloaded from the Survey of California and Other Indian Languages at UC Berkeley: http://linguistics.berkeley.edu/~survey/documents/maps/indian-library-map.jpg. The map is originally from the California Indian Library Collections.

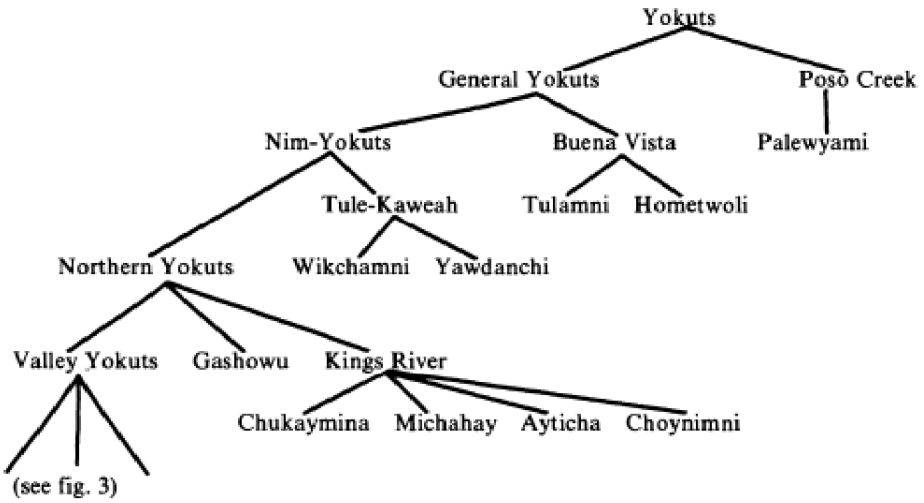

Figure 2. Yokuts language family tree – upper half (Whistler and Golla 1986)

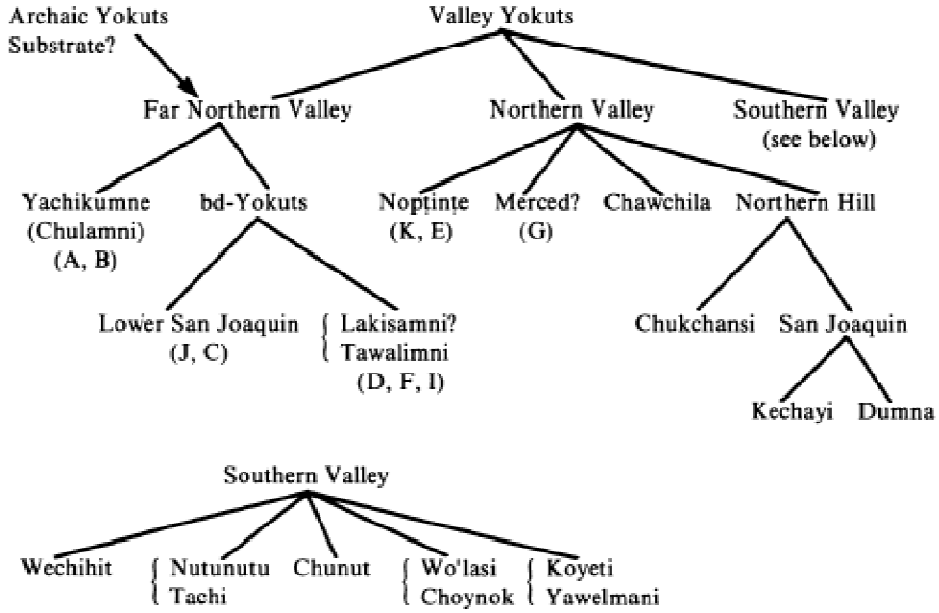

Figure 3. Yokuts language family tree – lower half (Whistler and Golla 1986)

Figure 4. Map of dialects in Yokuts territory (Whistler and Golla 1986)

Chukchansi has all the major features common to the Yokuts family. Both stops (including affricates, which pattern with stops) and sonorants have contrastive glottalization, while stops also have contrastive aspiration. On the surface there are the five cardinal vowels, with contrastive length; unlike the Yokuts dialect of Wikchamni, there are no front rounded vowels (Gamble 1978). Stress is usually penultimate, though there are some complicating morphological factors. Chukchansi morphology is almost entirely suffixing, and is dependent-marking: nouns have cases, while possessors are marked in the genitive; adjectives optionally agree with nouns in case marking. Verbs have suffixes to indicate tense, aspect, voice, and mood, but do not mark participants, neither subject nor object. Word order in Chukchansi is very free: all six canonical orders of subject, object,

and verb have been elicited. Chukchansi is not polysynthetic: there is no productive process of incorporation. See Appendix A for the phoneme inventory of Chukchansi and the transcription used in this paper, and Appendix B for a list of verb suffixes found in this paper and their use.

Probably the most salient feature of the Yokuts language family is its complex verbal morphophonology, i.e., how the morphological structure of verbs interacts with and influences their phonological structure. Chukchansi is certainly no exception to this: the sound and shape of verbs, especially the vowels of the verb roots, can vary in profound and interesting ways. Much previous research on Yokuts languages has focused on how these verb roots vary, and there have been several different accounts describing their variation. In this paper I present three thorny points of Chukchansi verbal morphophonology: epenthesis and syllabification, the inventory of prosodic templates, and vowel quality changes, such as lowering and harmony. I exemplify these phenomena with the Chukchansi data I have collected and give several arguments in favor of my analysis of these areas.

Language Consultants

Every fully-formed Chukchansi word in this paper was spoken by either of my two language consultants, Holly and Jane Wyatt of Coarsegold, California. They were raised by their Chukchansi-speaking grandmother, and thus are native speakers of Chukchansi. They are of course English speakers as well, and seem to be more comfortable in English than Chukchansi. However, while their Chukchansi speech contains many English loanwords, these all conform to Chukchansi phonology. Moreover, their use of Chukchansi syntax seems to be free of English influence, testifying to the robustness of their native-speaker

intuitions and the resistance of their mental Chukchansi grammars to encroachment by English.

All the Chukchansi data in this thesis were elicited from the Wyatt sisters in two separate semesters of a field methods class at California State University, Fresno, as well as a few individual sessions outside of this class. My fellow researchers and I elicited the verb forms that are the focus of the analysis by asking them to loosely translate English sentences into Chukchansi, often with a supporting context given. I transcribed their Chukchansi speech by hand, while checking it for accuracy with fellow researchers. Because the focus of this thesis is on the forms of the verbs themselves and not on the associated syntax and semantics, there should be few worries that the elicitation method has caused English interference on the Chukchansi data.

Literature Review

The Chukchansi dialect of Yokuts has received two major treatments to date: Collord (1968), *Yokuts Grammar: Chukchansi*, which comprehensively overviews the phonology and morphology of Chukchansi, and Newman (1944), *Yokuts Language of California*, which is a deeper and more exhaustive analysis of six Yokuts dialects, including Chukchansi. Kroeber (1963), *The Yokuts Language of South Central California*, focused on the Yaudanchi and Yawelmani dialects of Yokuts, but appends only cursory information on other dialects, including one page on Chukchansi with a handful of pronoun forms, inflected nouns and verbal morphemes with exemplifying verb forms. Newman's treatment of the Yokuts language includes six dialects: Chawchila, Choynimni, Chukchansi, Gashowu, Wikchamni and Yawelmani. While he mainly uses Yawelmani forms to exemplify morphological patterns, he gives examples from each dialect for every pattern and

suffix, and notes when dialects differ in form and usage. Collord's analysis, which covers the Chukchansi dialect of Yokuts alone, presents information that contradicts some of Newman's statements: e.g., the latter states that Chukchansi does not use verb reduplication, while such a process is fully documented by Collord.

Both Collord and Newman give the same general description of Chukchansi verbs. Verbs are invariably composed of a root, which provides the lexical content of the verb, and one or more suffixes, which indicate functional matters such as voice, mood, aspect, and tense. The majority of verb roots have two or three consonants; while Newman gives all verb roots two underlying vowels of the same quality, Collord describes them as either monosyllabic or disyllabic, the latter allowing different quality vowels. There are two types of suffixes: optional non-final suffixes, which mostly refer to voice or aspect, and final suffixes, which indicate tense or mood, and one of which obligatorily appears at the end of every verb. When suffixes attach to verb roots, two kinds of changes can occur: general phonological processes such as epenthesis, shortening, and harmony can affect both roots and suffixes, while certain suffixes change the vocalic structure of roots in ways that are not predictable from the phonological environment.

Newman's description of the Yokuts language family has provided the data for several important studies in generative phonology. Kuroda (1967), *Yawelmani Phonology*, was the first such reanalysis, indeed a landmark paper in generative phonology in addition to its account of Yokuts. Many papers analyzing specific aspects of Yawelmani phonology followed; this line of research accounts for the general phonological processes affecting verbs, as well as the other Yawelmani words in general, with broad rules operating in a strict order; Archangeli (1991)

cited the major such rules as occurring in the following order: epenthesis of high vowels, round vowel harmony, long vowel lowering, and closed syllable shortening. Starting with Archangeli (1983), Yokuts research describes both the underlying shape of verb roots and suffix-conditioned changes to them by means of abstract shape templates, posited first as CV-skeletons, then as prosodic units following McCarthy and Prince (1986). Optimality Theoretic (OT) research has also been done on Yokuts languages, including Zoll (1993), Russell (1999), and Hansson (2005). This area of research includes much debate over how to describe the complex interaction of morphological and phonological processes in these languages. Blevins (2004) has challenged the consensus of Yokuts research, specifically the generality of some phonological rules proposed, such as long vowel lowering.

Most of the secondary research on Yokuts (i.e., not based on first-hand data) has focused only on the Yawelmani data of Newman (1944), while most of the primary research is old enough to have missed the past few decades' advances in phonology and morphology. This thesis fills the gap between these two strains of research by providing both first-hand data of Chukchansi Yokuts and an up-to-date analysis of verbal morphophonology. I do not intend to give an exhaustive account of how the Chukchansi verb works or a complete phonology of the language. Rather, I investigate three specific topics in the phonology and morphology of Chukchansi verbs, incorporating the insights of previous Yokuts research and noting where this research fails to accurately describe my Chukchansi data. These topics include epenthesis and syllabification, the inventory of prosodic templates, and vowel quality changes in verb roots.

CHAPTER 2: EPENTHESIS AND SYLLABIFICATION

The first phenomenon I investigate in this thesis is syllabification in Chukchansi and its effects on the surface forms of verbs. A strict maximum on syllable size and the stability of consonants requires the epenthesis of vowels in some surface forms and the shortening of vowels in others. An Optimality Theoretic (OT) account can explain these surface forms without directional syllabification. I propose an OT account that escapes the ranking paradox implied in the previous account of Zoll (1993). I also show how one suffix, the intransitive /-n-/, epenthesizes differently than other morphemes in Chukchansi, and thus introduces an exception to the unified, general account of Chukchansi syllabification.

Data

The following surface verbs show the complementary distribution of high vowels with zero in different surface forms of certain verb roots, and of short vowels with long vowels in the surface forms of other verb roots. These surface forms all conform to a general CVX maximum on syllables. Syllables in Chukchansi can be either CV, CV:, or CVC, but not smaller or bigger: e.g., there are no VC, CV:C or CVCC syllables on the surface.[1] The fact that syllables can have a long vowel (CV:) or a coda (CVC) but not both is evidence for a bimoraic maximum and moraic codas. CVC and CV: are both bimoraic on this account,

[1] A handful of words with syllables exceeding the CVX maximum have been elicited: [ʃi:ʃwi.lit] "was embarrassed" (CVVC [ʃi:ʃ] or CCV [ʃwi]), [maal.deʔ] "sticks tongue out" (CVVC [maal]), [lee.li.layʧ'] "teacher" (CVCC [layʧ']), [k'a.maa.newʃtaʔ] "dried himself a while ago" (CVCC [newʃ] or CCVC [ʃtaʔ]). Note that all the examples involve the glides or liquids [w y l].

while bigger syllables such as CV:C would exceed the bimoraic maximum (violating *SUPERHEAVY). Combined with constraints against onsetless syllables (ONSET) and complex onsets, nuclei, and codas (*COMPLEX), this describes the Chukchansi syllable as CV(X), with an onset, a vocalic nucleus, and up to two moras, either due to a long vowel or a coda consonant.

High Vowel~Zero Distribution

Many verb roots have an alternation where one form has a high vowel that does not appear in another form. For example, the root /ʃawk/ "buy" has the two forms [ʃawk-] (1) and [ʃawik-] (2) below:

1) ʃawk-eʔ
buy NON PAST
"he will buy/buys"

2) ʃawik-taʔ
buy REMOTE PAST
"he bought (a long time ago)"

Notice that both [ʃaw.k-eʔ] and [ʃa.wik-.taʔ] have syllables that fit the CVX syllable maximum. However, without the extra vowel [i], [ʃa.wik-.taʔ] cannot fit the CVX maximum: both *[ʃaw.k-taʔ] and *[ʃawk-.taʔ] contain illegal tautosyllabic consonant clusters.

Certain suffixes display this alternation as well. The recent past suffix /-t/ has the two forms [-t] (3) and [-it] (4) below:

3) hu:ʃe-t
drive-RECENT PAST
"he just drove"

4) ʧiʃ-it

cut-RECENT PAST
"he just cut"

Again, both [hu:.ʃe-t] and [ʧi.ʃ-it] conform to the CVX syllable maximum. Note that without the extra vowel [i], [ʧi.ʃ-it] cannot fit this maximum: *[ʧiʃ-t] contains an illegal tautosyllabic consonant cluster. These examples show that a Chukchansi word epenthesizes the high vowel [i] so that all the underlying consonants can fit into CVX syllables: [ʃa.wik.taʔ], [ʧi.ʃit] . If all these consonants fit into CVX syllables without the extra vowel, that vowel does not appear: [ʃaw.keʔ], [hu:.ʃet].

Shortening

Many verb roots also have an alternation where one form has a long vowel that appears short in another form. For example, the root /bala:ʃ/ "crawl" has the two forms [bala:ʃ-] (5) and [balaʃ-] below:

5) bala:ʃ-eʔ
crawl-NON PAST
"he will crawl/crawls"

6) balaʃ-hil
crawl-MIDDLE PAST
"he crawled (yesterday)"

Once again, these forms, [ba.la:.ʃ-eʔ] and [ba.laʃ-.hil] follow the CVX maximum. Without a short vowel in the second syllable, *[ba.la:ʃ-.hil] contains a superheavy CVVC syllable [la:ʃ], which is bigger than the CVX maximum allows. This phenomenon must be shortening of an underlying long vowel to satisfy the CVX maximum, not lengthening of an underlying short vowel in an open syllable, because there are many words with CV syllables (i.e., open syllables with short vowels): [**ʃa**.wik.taʔ], [**ʧi**.ʃit], even [**ba**.la:.ʃeʔ] itself. Thus

there is no phenomenon of lengthening (contrary to Collord 1968), but instead there is a general phenomenon of closed syllable shortening (as in Newman 1944, and all subsequent research using his data).

Some roots require either shortening or epenthesis, depending on whether the suffix attaching to them begins with a vowel or a consonant. For example, the root /be:wn/ “sew” has the two forms [bewn-] (7) and [be:win-] (8) below:

7) bewn-eʔ
sew NON PAST
“he will sew/sews”

8) be:win-taʔ
sew REMOTE PAST
“he sewed (a long time ago)”

Like all the preceding examples, [bew.n-eʔ] and [be:.win-.taʔ] fit the CVX maximum. Neither *[be:wneʔ] or *[be:wntaʔ] can be syllabified to fit this maximum. Note that when shortening can syllabify all the underlying consonants, it is used instead of epenthesis: [bew.n-eʔ], not *[be:.wi.neʔ]. Only when shortening cannot syllabify all these consonants does epenthesis occur: *[bewn-taʔ] has too many consonants in a row to fit into CVX syllables, so the form [be:.win.taʔ] with the epenthetic vowel surfaces. Thus shortening takes precedence over epenthesis.

Analysis

As shown above, Chukchansi's CVX syllable maximum forces extra vowels to appear in some surface forms and long vowels to shorten in others. I first demonstrate that in general, an account of Chukchansi where high vowels are epenthesized in some situations is superior to one where high vowels are syncopated in other situations. Then I examine the OT account of syllabification

proposed by Zoll (1993) for the related Yokuts dialect of Yawelmani. While this account predicts the majority of surface forms in Chukchansi, it cannot predict the surface forms of verbs with certain suffixes. I propose a similar OT account that predicts some of these problem forms, but not all of them.

Epenthesis, not Syncope

Above I described the phenomenon of epenthesis where certain words have high vowels in some situations that do not appear in others; the epenthesis is driven by a CVX syllable maximum. For example, the root /ʃawk/ "buy" has the non-past form [ʃaw.k-eʔ] and the remote past form [ʃa.wik.-taʔ]; the vowel [i] that appears in the second form but not the first is epenthetic. This epenthesis account is present in Newman (1944), who calls this vowel an "interpolation" (Newman 1944, p. 25); the analyses that use his data, starting with Kuroda (1967), all agree with this. Collord (1968) gives the mirror-image account where the [i] vowel is actually underlying, and syncopates in some forms: e.g., the underlying form of "buy" would be /ʃawik/, with the high vowel [i] syncopating to prevent the appearance of a weak open syllable in *[ʃa.wi.keʔ]. In Collord's account, high vowels syncopate in the environment VC_CV, while non-high vowels do not do so. This in itself is not troubling, since many phonological processes are sensitive to vowel height.

However, this account creates a puzzling situation: while he does give disyllabic roots with the same vowel in both syllables (e.g., /hewet/ "walk," /holoʃ/ "sit," and /balaʃ/ "crawl"), when there are mixed vowel qualities in a disyllabic root, the second vowel is always high; e.g., /ʃawik/ "buy," /lihim/ "run," /be:win/ "sew", /ha:tim/ "sing," /hoyin/ "fly," /yunuʃ/ "shake." There are no roots with other combinations of vowel quality; e.g., there are no roots with any of the

forms /CeCaC/, /CiCaC/, /CaCeC/, /CaCoC/, or /CuCoC/. This gap does not follow from any general cross-linguistic principle, but must be accounted for by simply stipulating that disyllabic roots cannot have a mix of vowels when the second vowel is non-high. It is probably not an accident of data collection, either: Collord gives dozens of disyllabic verb forms, but none with these underlying shapes. Nor can any of the dozens of three-consonant verbs elicited from my consultants fit into these underlying patterns.

Under the syncope account, we either have to ignore or live with this uncomfortable gap. The epenthesis account easily solves this: the reason that the second vowel must be high is because this vowel is not really present underlyingly, but instead is an epenthetic vowel, which is always high in Chukchansi. In addition, this yields the generalization that only one vowel quality is ever present in the underlying form of most roots; the appearance of other vowel qualities on the surface is due to epenthesis. This suffices to make the epenthesis account superior to the syncope account.

An OT Account of Syllabification (Zoll 1993)

Zoll (1993) gave an OT analysis of vowel epenthesis and syllabification in Yawelmani, a Yokuts dialect related to Chukchansi. Her analysis is based on the rule-based account of Yawelmani syllabification in Archangeli (1991), where epenthesis precedes shortening. Archangeli (1991) analyzed Yawelmani syllabification as a directional process, which must occur in steps.[2] This account

[2]Archangeli says that "the complete derivation [of directional syllabification] consists only of two presentations – the input and the output" (p. 238). By this she indicates that no other phonological rules can intervene between steps of the derivation. However, a directional process must necessarily be characterized by intermediate steps: if syllables are created from right-to-left, their creation must be step-wise, not simultaneous, opposed to what Archangeli seems to imply by stipulating that there is only a single input and output.

cannot be transferred as is to an OT model, which does not allow intermediate steps. Zoll instead explained whether and where vowel epenthesis occurs with four crucially ranked constraints:

> MAX: Every segment in the input must occur in the output
>
> DEP: Every segment in the output must occur in the input
>
> ALIGN(Template, R, σ, R): The end of every template aligns with the end of a syllable. (ALIGN-T)
>
> ALIGN(Morpheme, R, σ, R): The end of every morpheme aligns with the end of a syllable. (ALIGN-M)

She ranked these constraints as follows: MAX > DEP > ALIGN-T > ALIGN-M. Ranking MAX over DEP ensures that consonant clusters are syllabified with vowel epenthesis (a violation of DEP) rather than being deleted (a violation of MAX). ALIGN-M picks a morpheme-internal epenthetic candidate (such as [ʃa.wi̲k-.taʔ] "he bought" in 2) over *[ʃaw.k-i̲.taʔ], so that all morphemes end at the end of a syllable. Ranking DEP over ALIGN-T makes closing the root syllable (and thus misaligning the template) preferable to epenthesizing a vowel (and keeping the template aligned). The constraints that enforce the CV(X) syllable shape in Yokuts languages (ONSET, *COMPLEX, *SUPERHEAVY) are undominated, as all surface words obey these constraints.

Problems with Zoll (1993)

Zoll's constraint ranking shows how epenthesis can be explained with general preferences of the language, e.g., epenthesis rather than deletion, and syllable-closing over epenthesis. However, there are some problems with her

analysis. First, while consonants are never deleted in Chukchansi, a suffix vowel is deleted to avoid hiatus instead of a glottal stop being epenthesized. For example the underlying form /gosneeno-al/ “he might cook” surfaces as [gos.nee.no-l] form in (9), not *[gos.nee.no-.ʔal]. For comparison, the /a/ of the potential suffix /-al/ surfaces after the root /ʃawk/ in (10).

9) gosneeno-l
cook POTENTIAL
“he might cook”

10) ʃawk-al
buy POTENTIAL
“he might buy”

In (9), the vowel deletion candidate [gosneeno-l] (violating MAX) beats the epenthetic candidate *[gosneeno-ʔal] (violating DEP), opposite to the MAX > DEP ranking above. This is easily solved by splitting MAX into MAX-C and MAX-V, and ranking DEP in between them; in other words, epenthesis is better than consonant deletion, but worse than vowel deletion.

Some suffixes also cause trouble for Zoll's analysis. The intransitive suffix involves a complementary distribution of a high vowel and zero, which I above showed to be an effect of epenthesis. For example, the intransitive suffix /-n-/ has the two forms [-n-] (11) and [-un-] (12) below (the [u] is like epenthetic [i], but is rounded due to vowel harmony):

11) t'ul-n-ut
burn-INTRANSITIVE-RECENT PAST
“it just burned (intr.)”

12) t'ul-un-taʔ
burn-INTRANSITIVE-REMOTE PAST
“it burned (intr.) (a long time ago)”

This is a clear example of epenthesis. However, the position of the epenthetic vowel in some forms is not predicted by Zoll's constraint ranking. For example, the underlying form /ʔodb-n-eʔ/ “it will open/opens (intr.)” surfaces as [ʔo)d.b-i.n-eʔ] in (13), not the expected form *[ʔo).dib-.n-eʔ] that conforms to Zoll’s alignment constraints (the right-parenthesis indicates the end of the verb template).

13) ʔodb-in-eʔ
open-INTRANSITIVE-NON PAST
“it will open/opens (intr.)”

Table 1 shows that Zoll's constraint ranking incorrectly picks the form *[ʔo).dib.-n-eʔ] instead of [ʔo)d.b-i.n-eʔ].

Table 1. Ranking Problem with Intransitive Suffix

/ʔodb-n-eʔ/	DEP	ALIGN-T	ALIGN-M
ʔo)d.b-i.n-eʔ	*	*!	*
💣 ʔo).dib.-n-eʔ	*		

As can be seen, verbs with the intransitive suffix simply epenthesize differently from most other suffixes. While it is possible that the high vowel [i] is actually underlying, so that the form of the intransitive suffix is /-in-/, this would demand a constraint to delete this vowel in forms like [t’ul-n-ut] “it just burned” in (11) from underlying /t’ul-in-t/. I have not encountered any other cases of vowels deleting in this environment, so this account is problematic. In any analysis, the complementary distribution of high vowels with zero is no longer a single phenomenon: it is either sometimes the effect of epenthesis and other times the effect of syncope, or the effect of two different kinds of epenthesis.

The imperative /-ka/ and precative /-xa/ suffixes also cause trouble for Zoll's analysis. These suffixes lose their word-final vowel /a/ when preceded by a vowel, but not by a consonant. For example, the precative suffix is /-xa/ in (14) with the root /□awk/, but /-x/ in (15) with the root /panaa/:

14) ʃawik-xa
buy PRECATIVE
"let (us) buy!"

15) pana-x
arrive-PRECATIVE
"let (us) arrive!"

The deletion of the word-final vowel in (15) can be motivated by FINAL-C, which demands that words end in a consonant; the word-final vowel in (14) cannot delete without creating a tautosyllabic cluster, i.e., [kx] in *[shawik-x]. However, Zoll's constraints and FINAL-C cannot account for both the forms in (14) and (15), as the ranking paradox in Table 2 shows:

Table 2. Ranking Paradox with Precative Suffix

Input	Output	DEP	FINAL-C	MAX-V	ALIGN-T	ALIGN-M
/panaa-xa/	☞ pa.na)-x			*	*	*
	pa.naa)-.xa		*!			
/ʃawk-xa/	☞ ʃa).wik.-xa	*	*💣			
	ʃa)w.k-ix.	*		*	*	*

Table 2 shows that to pick the surface form [pana-x] (15) over *[panaa-xa], FINAL-C must outrank MAX-V, ALIGN-T, and ALIGN-M. However, to pick the

surface form [ʃawik-xa] (14) over *[ʃawk-ix], one of the latter three constraints must outrank FINAL-C. This ranking paradox demonstrates that either another general constraint other than ALIGN-M is needed to predict the place of epenthetic vowels, or else the precative suffix (and the imperative, which acts like it) is a case of subgrammatical variation, which requires a lexically-indexed constraint or cophonology.

Proposed OT Account

I propose a general constraint that solves this ranking paradox: ALIGN(Suffix, L, C, R), or ALIGN-C, which demands that suffixes be preceded by a consonant. Also, instead of Zoll's Yokuts-specific constraint against closing a template syllable with a coda consonant, ALIGN(Template, R, Syllable, R), or ALIGN-T, I use the language-universal constraint IDENT-LONG to act similarly without referring to input templates (which are problematic, as I argue in Chapter 3). DEP must outrank ALIGN-C so that consonants are not epenthesized to satisfy the latter constraint; ALIGN-C must outrank FINAL-C to pick [ʃawik-xa] over *[ʃawki-x]; and FINAL-C must outrank MAX-V and IDENT-LONG to pick [pana-x] over *[panaa-xa]. Table 3 shows this ranking: DEP > ALIGN-C > FINAL-C > MAX-V, IDENT-LONG (the dash here indicates the left edge of the suffix, which must follow a consonant).

ALIGN-C also predicts the position of the epenthetic vowel in forms like [ʃawik-taʔ] (see Table 4), in the same way as Zoll's constraint ALIGN-M.

However, not only can ALIGN-C not account for the intransitive suffix /-n-/ in forms like [ʔodbi-n-eʔ] (just like ALIGN-M in Table 1 above), it also cannot account for the recent past suffix /-t/ in forms like [ʧiʃi-t], because according to Table 3 ALIGN-C is ranked above FINAL-C. Tables 5 and 6 show these problems.

Table 3. Ranking Paradox Resolved

Input	Output	DEP	ALIGN-C	FINAL-C	MAX-V	IDENT-LONG
/panaa-xa/	☞ pa.na-x		*		*	*
	panaa-xa		*	*!		
	panaa-xaʔ	*!	*			
	panaʔ-xa	*!				
	panaʔ-xaʔ	**!				
/ʃawk-xa/	☞ ʃawik-xa	*		*		
	ʃawki-x	*	*!		*	
	ʃawik-xaʔ	**!				

Table 4. ALIGN-C Predicts Epenthesis

/ʃawk-taʔ/	DEP	ALIGN-C
☞ ʃawik-taʔ	*	
ʃawki-taʔ	*	*!

Table 5. Ranking Problem #1 with ALIGN-C

/ʔodb-n-eʔ/	DEP	ALIGN-C
💣 ʔodib-n-eʔ	**	
ʔodbi-n-eʔ	**	*!

Table 6. Ranking Problem #2 with ALIGN-C

/ʧiʃ-t/	DEP	ALIGN-C	FINAL-C
💣 ʧiʃ-ti	*		*
ʧiʃi-t	*	*!	
ʧiʃ-tiʔ	**!		

There is a solution to this problem: make the high vowel that appears sometimes before intransitive and recent past suffixes an underlying vowel, i.e., they are /-in-/ and /-it/ respectively, with the vowel deleting in certain situations. Zoll's analysis would also have to do something similar, since it is also unable to describe the complementary distribution of high-vowels with zero as a single phenomenon. Thus Zoll's analysis is on par with the analysis I propose in regards to these epenthesis problems, while mine accounts for vowel deletion in the imperative and precative suffixes. However, I do not consider this matter settled, but rather a good area for future research.

CHAPTER 3: PROSODIC TEMPLATES

As I wrote above, Archangeli (1983) was the first to analyze verb roots in Yawelmani, a Yokuts language, as having shape templates. Following the theory of Prosodic Morphology, proposed in McCarthy and Prince (1986), Archangeli (1991) described these templates as prosodic units: L (light syllable), H (heavy syllable), and LH (iambic foot). The templates take the one underlying vowel quality of the root and associate that quality to fill the moras of the prosodic unit. Certain suffixes condition the occurrence of specific templates in the roots they attach to. When there is no such suffix to assign a template to the verb root, the root chooses its own "default" template. In Archangeli's analysis, both suffixes and roots must pick one of the three templates above (L, H, or LH) in the Yawelmani inventory.

In this section I show how prosodic templates work in Chukchansi. While the general outline above can account for some verbs, it cannot account for all of them. More templates than the three above occur in Chukchansi verb roots: there are HL roots, e.g. /we:le/ "stir," and there are suffixes that impose LL templates on certain roots, e.g. [maxa-ʔa-n'] "he is collecting" from /ma:x/ "collect." Roots and suffixes draw from different sets of templates: roots can choose an H, LH, or HL template, while suffixes either choose an LL or an LH template. Roots with apparent L templates are more accurately described as not having a template (Russell 1999). There are also many roots that act differently: they have more than one vowel quality, and no suffixes assign templates to them.

I do not have space in this thesis to address all the issues surrounding where these templates occur in Chukchansi phonology, whether they are underlying or imposed by the grammar, and what exact linguistic mechanism is responsible for

the association of roots, suffixes, and templates. These issues could take up the space of a whole paper much larger than this one, and they involve thorny areas of theoretical abstraction (e.g., richness of the base, co-phonologies vs. lexical constraints, etc.). I follow the analysis of Russell (1999), but I do not purport to prove it to be free from any problems. I strive here to present a solid empirical foundation to the study of Chukchansi verbal morphophonology, and leave these theoretical questions to the future. Hopefully these data will provide a good basis for solving these questions.

Data

Verb roots in Chukchansi fall into two main classes: roots that can be characterized with one underlying vowel that fills a root- or suffix-conditioned shape template, and roots that cannot. These latter roots have a mixture of underlying vowel qualities, and never receive a template from a suffix. I present these two kinds of roots, "one-vowel" and "multi-vowel," separately.

One-vowel Roots

Newman (1944) first noticed that most verb roots in Yokuts languages have one underlying vowel quality, which can come in three shapes. Kuroda (1967) supported this, positing a rule of epenthesis that accounts for the presence of different vowel qualities on the surface. Chapter 2 outlined how Zoll's (1993) OT account predicts epenthetic verb forms. Other than epenthesis and shortening, there are no changes to the surface shape of verb roots before most suffixes, i.e., suffixes that do not condition specific root templates.

In Chukchansi, there are four suffixes that condition a certain template to appear in one-vowel roots: the progressive /-ʔa-/, the adjunctive /-ʔhiy-/, the gerundive /-ʧ'-/, and the causative, which has the various forms /-la-/, /-e-/, and

/-a-/, all of which can condition templates in roots. The progressive and causative are both non-final verbal suffixes; I show them with the final non-past /-n'/ and remote past /-taʔ/ suffixes, respectively. The adjunctive and gerundive are both nominalizing suffixes, so noun cases attach to them. I show the adjunctive in the nominative case, which causes glottalization of the final /y/, and the gerundive in either the nominative or accusative, whichever form surfaces without shortening of the root template vowel (predictable from syllable structure and epenthesis, as shown in Chapter 2).[1] These suffixes condition different templates depending on where the root has two or three consonants; two-consonant LH roots moreover act differently from two-consonant L and H roots. Also, these suffixes do not condition template changes on any of the HL roots I have found; these roots always surface with HL template. I look at each of three groups of one-vowel roots (2C L and H; 2C LH; and, 3C) in turn.

The progressive and adjunctive suffixes condition an LL template in the two-consonant L and H roots they attach to, such as /xat/ "eat," /ʧiʃ/ "cut," and /se:p/ "tear (intr.)," and /ma:x/ "collect", as in (16-19) below. The second syllable always has the vowel [a]; I argue in Chapter 4 that this vowel is part of the templatic root, not the suffix.

<u>Progressive (2C, L and H)</u>

16) xata-ʔa-n' (LL template)
eat-PROGRESSIVE-NON PAST
"he is eating"

---

[1] The nominative case suffix shows up as a glottal stop after a vowel and as glottalization on a sonorant; after an obstruent, it does not show up at all. It seems that the nominative case suffix is underlyingly just a [glottal] feature, which can surface as a segment itself, a feature on a segment, or nothing at all. In the examples below, I mark it as an apostrophe or as zero, depending on its surface form.

17) sipa-ʔa-n' (LL)
tear-PROGRESSIVE-NON PAST
“it is tearing (intr.)”

Adjunctive (2C, L and H)

18) ʧiʃa-ʔhiy-' (LL)
cut-ADJUNCTIVE-NOMINATIVE
“the cutting place”

19) maxa-ʔhiy-' (LL)
collect-ADJUNCTIVE-NOMINATIVE
“the collecting place”

The gerundive and causative suffixes condition an LH template in the two-consonant L and H roots they attach to, as in (20-3). Like with the LL template, the second syllable vowel is always low, i.e. [a:]. However, the causative suffix, which is always /-la-/ with these roots, does not always condition a template on the root, as with the root /xat/ (24). Sometimes, the LH template conditioned by the causative suffix ends in a glottal stop, as with the root /wa□/ “tell a story” (25) The distribution of different root forms (suffix-conditioned vs. root-conditioned template, LH template with long vowel vs. glottal stop) with the causative is random, as far as I can tell.

Gerundive (2C, L and H)

20) xata:-ʧ'-i (LH template)
eat-GERUNDIVE-ACCUSATIVE
“one who eats (acc.)”

21) sipa:-ʧ'-i (LH)
tear-GERUNDIVE-ACCUSATIVE
“one that tears (intr.) (acc.)”

Causative (2C, L and H)

22) ʧiʃa:-la-taʔ (LH)
cut-CAUSATIVE-REMOTE PAST
“she made him cut”

23) maxa:-la-taʔ (LH)
collect-CAUSATIVE-REMOTE PAST
“she made him collect”

24) xat-la-taʔ (L – Default template)
eat-CAUSATIVE-REMOTE PAST
“she made him eat”

25) waʃaʔ-la-taʔ (LH with ʔ)
tell a story-CAUSATIVE-REMOTE PAST
“she made him tell a story”

Two consonant LH roots such as /pana:/ “arrive” and /xaya:/ “put down” have different forms with different suffixes. The adjunctive and gerundive suffixes do not cause any templatic changes on these roots (26-27); since the root has a default LH suffix, it is unclear whether the suffix conditions the same LH template on the root or conditions no template at all. The long root-final vowel predictably shortens before the adjunctive /-ʔhiy-/, due to the CVX syllable maximum. The progressive suffix also occurs with an LH template in these roots; however, the second syllable ends in a [y] (28). The causative form conditions an H template on the root, so that the second, long vowel disappears (29). This is the only verb form I have found in Chukchansi where the root is shorter with a template-conditioning suffix than in its regular form.

2C, LH Roots

26) pana-ʔhiy-' (LH)
arrive-ADJUNCTIVE-NOMINATIVE
“the arrival place”

27) xaya:-ʧ'-i (LH)
put down-GERUNDIVE-ACCUSATIVE
“one who puts down (acc.)”

28) panay-ʔa-n' (LH)
arrive-PROGRESSIVE-NON PAST
“he is arriving”

29) xay-la-taʔ (H)
put down-CAUSATIVE-REMOTE PAST
“she made him put down”

Three-consonant one-vowel roots, such as /ʃawk/ “buy,” /ʧ'ibn/ “get skinny,” /diʔʃ/ “make” (L template), /ha:tm/ “sing,” /be:wn/ “sew” (H template), /hewe:t/ “walk,” and /bala:ʃ/ “crawl” (LH template), act similarly before all four of these template-conditioning suffixes. These suffixes condition an LH template on the three-consonant roots they attach to, as in (30-5); the appearance of a long or short root vowel in the heavy syllable is predictable from the account in Chapter 2. The adjunctive /-ʔhiy-/ appears as [-hiy-] because the third root consonant fills the coda position; Hansson (2005) explains the disappearance of this consonant as a ranking of DEP-V over MAX-C for templatic suffixes. Notice that L roots with the high vowel /i/, like /ʧ'ibn/ and /diʔʃ/, surface with mid vowels [e] when they have the LH template, as in (30) [deʔeʃ-ʔa-n'] and (38) [ʧ'ebe:n-a-taʔ]. I investigate this vowel lowering in Chapter 4.

Progressive (3C)

30) deʔeʃ-ʔa-n' (LH template)
make-PROGRESSIVE-NON PAST
“he is making”

31) bewen-ʔa-n' (LH)
sew-PROGRESSIVE-NON PAST
“he is sewing”

Adjunctive (3C)

32) hatam-hiy-' (LH)
sing-ADJUNCTIVE-NOMINATIVE
"the singing place"

33) hewet-hiy-' (LH)
walk-ADJUNCTIVE-NOMINATIVE
"the walking place"

Gerundive (3C)

34) ʃawa:k-itʃ'-Ø (LH)
buy-GERUNDIVE-NOMINATIVE
"one who buys (nom.)"

35) bala:ʃ-itʃ'-Ø (LH)
crawl-GERUNDIVE-NOMINATIVE
"one who crawls (nom.)"

The causative suffix shows a split: the /-la-/ suffix does not condition a template on the three-consonant roots it attaches to (36), but the suffixes /-e-/ and /-a-/ condition an LH template on three-consonant roots (37-8). Like in (25) above, these causative suffixes sometimes condition an LH template that ends in a glottal stop (39). Again, this distribution of different root forms with the causative suffix is probably random; sometimes the same root forms the causative in multiple ways, like /ha:tm/ (40-1).

Causative (3C)

36) ʃawik-la-taʔ (L – Default template)
buy-CAUSATIVE-REMOTE PAST
"she made him buy"

37) bewe:n-e-taʔ (LH)
sew-CAUSATIVE-REMOTE PAST
"she made him sew"

38) ʧ'ebe:n-a-taʔ (LH)
get skinny-CAUSATIVE-REMOTE PAST
“she made him get skinny”

39) balaʔʃ-a-hil (LH with ʔ)
crawl-CAUSATIVE-MIDDLE PAST
“she made him crawl”

40) ha:tim-la-taʔ (H – Default template)
sing-CAUSATIVE-REMOTE PAST
“she made him sing”

41) hataʔm-e-t (LH with ʔ)
sing-CAUSATIVE-RECENT PAST
“she made him sing”

Multi-vowel Roots

There is a long list of roots that do not fit the above patterns. These roots are usually two or three syllables and contain more than one vowel quality. They can have any shape, and can end in a vowel or consonant, e.g., /hu:ʃe/ “drive,” /ʧ'edma/ “think,” /ʔoyi:sa/ “be happy,” /gewe:wa/ “lie down,” /hayk'it/ “finish,” and /lak'wun/ “get down from.” The mixture of different vowel qualities may be evidence for Collord (1968)'s suggestion that these roots were once morphologically complex, but have become opaque and unanalyzable. In fact, there is a group of multi-vowel roots that do appear analyzable: inchoative deadjectival verbs (“get/become X”) that have the pattern CVCe:Ca. While the C's and V are supplied by the adjective root, their shape is strongly reminiscent of the other Chukchansi suffixes above that demand a template in the root. Examples include [gaye:sa-] “get better” from /gays/ [gayis] “good,” [hoʃe:wa-] “get cold” from /hoʃw/ “be cold,” and [leme:k'a-] “get dark” from /limk'/ [limik'] “dark” (the second vowel in [gayis] and [limik'] is epenthetic). I analyze these verbs as having

a suffix /-a-/ that imposes an LH template on the root and demands the last vowel be mid and front, i.e. [e:]: /gays-a-/ → [ga.ye:.s-a-].

Like HL roots, multi-vowel roots never change before the template-conditioning suffixes above. The adjunctive /-ʔhiy-/, causative /-la-/ and /-e-/, and gerundive /-ʧ'-/ never change the form of these roots. The progressive uses the suppletive form /-xo-/ that appears when it does not condition a template on the root. The forms below show multi-vowel roots with all these suffixes:

Multi-vowel Roots

42) ʔoyi:sa-ʔhiy-'
be happy-ADJUNCTIVE-NOMINATIVE
"the happy place"

43) hu:ʃe-la-taʔ
drive-CAUSATIVE-REMOTE PAST
"she made him drive"

44) lak'wun-e-taʔ
get down from-CAUSATIVE-REMOTE PAST
"she made him get down from"

45) hayk'it-iʧ'-Ø
finish-GERUNDIVE-NOMINATIVE
"one who finishes"

46) ʧ'edma-xo-n'
think-PROGRESSIVE-NON PAST
"he is thinking"

There is one exception to multi-vowel roots not being changed by suffixes: in the gerundive forms for /hu:ʃe/ "drive" and /ʔohyo/ "search," the last vowel of the root is long:

47) ʔohyo:-ʧ'-i
search-GERUNDIVE-ACCUSATIVE
"one who searches (acc.)"

Analysis

Now that I have laid out all the verb forms that occur with suffix-conditioned templates, I discuss the position of templates in Chukchansi. First I have a short discussion of how these templates work in previous accounts of Yokuts languages, such as Zoll (1993) and Russell (1999). While I follow the latter's account, I do not have the space in the thesis to lay out all the ramifications of different analyses. Then I investigate the template inventory of Chukchansi, and the different working of the template-conditioning suffixes with different types of verb roots. Roots choose their default templates from a different set (H, LH, and HL) from template-conditioning suffixes, which mostly choose LL and LH templates.

Templates in the Grammar

Zoll (1993) followed the previous work of Archangeli on the prosodic templates that roots take in Yokuts languages. Archangeli (1983) first connected the underlying shapes of verb roots with the shape changes imposed on these roots by certain suffixes. In this account, both roots and suffixes choose from an inventory of CV-skeletons: CVC(C), CVVC(C), and CVCVV(C). These CV-skeletons are associated with verb roots that have one underlying vowel and either two or three consonants. Archangeli (1991) revised this theory, following the theory of Prosodic Morphology proposed in McCarthy and Prince (1986), where demands on morpheme size and shape are accounted for using units of prosody. She replaced the CV-skeletons with prosodic templates that the verb roots take: L

(light syllable), H (heavy syllable), and LH (an iambic foot). Following Archangeli (1991), Zoll stated that the moras of these templates only dominate vowels, not coda consonants. She modeled this with an undominated constraint ALIGN-V, or ALIGN(Template, R, Vowel, R) which aligns the right edge of every verb template with the right edge of a vowel; i.e., a template must end in a vowel. Thus, one or more stem consonants may end up outside the template, as in /□awk/ "buy" (with an L template), /be:wn/ "sew" (with an H template), and /bala:□/ (with an LH template). The CVX syllable maximum of Yokuts languages forces these extra-templatic consonants to be syllabified, which in some situations requires closing a template syllable (which shortens underlying long vowels) or epenthesizing a high vowel.

Zoll's account begs the question of how the prosodic templates are assigned to roots. Since OT is a one-step derivation, with no intermediate projections between the input and the output, the templates cannot be assigned to roots separately, before the rest of the phonology kicks in. Either the template shapes must be present in the inputs or they must be the result of the grammar. In the OT manifestation of Prosodic Morphology proposed in McCarthy and Prince (1993), the grammar has alignment constraints that demand that edges of prosodic units and morphological categories coincide. In the case of Yokuts, these constraints would pick winning candidates that have the lexically-specified template aligned with the left edge of the root (e.g., the LH root /bala:ʃ/ would have to satisfy the constraint ALIGN(Root, L, LH, L)). Zoll seems to have taken the former route, with input-based templates: citing Archangeli (1991) she states that "template shape serves as [a] sort of underlying form," i.e., the templates in her account are already assigned to the root in the input form. However, she does not provide any mechanism for the correct template, conditioned by either the root itself or a

suffix, to associate to the root. This mechanism must be in place prior to the phonological component, so that the correct template shows up in the input form.

Russell (1999) did provide such a mechanism: he uses both a morphological and a phonological layer in his OT analysis. Russell described the templates as phonological reflexes of functional morphemic indices, which he called "grades." Both template-conditioning suffixes and verb roots are each associated with one of the grades by a constraint demanding the co-occurrence of all such suffixes and roots with a grade. The former constraints must outrank the latter constraints so that template-conditioning suffixes impose their preferred template on the verb roots they attach to. When a suffix that does not condition a template attaches to a verb root, the root's co-occurrence constraint picks the grade; thus the root's preferred template surfaces.

Russell analyzed the grades as having associated phonological constraints. For example, one grade imposes the prosodic constraint ALIGN([Func: grade2], L, Heavy syllable, L) in the grammar, which forces the verb (and thus the root, which is always at the left edge of the verb) to begin with a heavy syllable (H). Another grade likewise imposes a prosodic constraint, ALIGN([Func: grade3], L, Iambic Foot, L), making the verb begin with an iambic foot (LH). These alignment constraints are accompanied by all the general constraints on syllabification and faithfulness in their specific Yokuts ranking shown in Chapter 2. Russell also pointed out that the light syllable template (L) actually imposes no special prosodic structure of its own upon the verb root, whose segments are syllabified according to normal Yokuts syllable constraints, so that grade does not have an associated template alignment constraint. I follow Russell's analysis to describe how suffixes condition templates on verb roots. In Chapter 4, I will show how

Russell's analysis with morphological grades can also account for segmental changes in roots.

Template Inventory

I now turn to look at the template inventory. From the data section, the inventory for default, root-chosen templates is L, H, LH, and HL, while the inventory for suffix-conditioning templates is H, LL, and LH. Following Russell (1999), I dispense with the L template, since the form of L roots is predictable without a template. Moreover, unlike other one-vowel roots that appear with the template on the surface before all non-template-conditioning suffixes, L roots can have heavy first syllables, as with the verbs [ʧiʃ.-taʔ] from /ʧiʃ/ "cut" (48) and [ʃaw.k-eʔ] from /ʃawk/ "buy" (49, copied from 1).

48) ʧiʃ-taʔ
cut-REMOTE PAST
"he cut (a long time ago)"

49) ʃawk-eʔ
buy NON PAST
"he will buy/buys"

This does not make sense if an L template is demanded of these roots by an alignment constraint, but is predictable if there is no L template and these roots syllabify like other Chukchansi words.

One-vowel HL roots, such as /we:le/ "stir," /yo:yo/ "call," and /ʔa:pa/ "carry on the back," indicate the presence of an HL template. However, HL roots never appear with suffix templates imposed on them; rather, they are always unchanged, as in the forms [we:le-xo-n'] (50), [yo:yo-ʔhiy-'] (51), and [ʔa:pa-la-taʔ] (52).

50) we:le-xo-n'

stir-PROGRESSIVE-NON PAST
"he is stirring"

51) yo:yo-ʔhiy-'
call-ADJUNCTIVE-NOMINATIVE
"the calling place"

52) ʔa:pa-la-taʔ
carry on the back-CAUSATIVE-REMOTE PAST
"she made him carry (it) on his back"

If HL roots had the same status as other one-vowel roots, one might expect them to receive suffix-conditioned templates with the above suffixes. In fact, an analysis with underlying templates, such as Archangeli (1991) might not describe these as templatic one-vowel roots, whose default templates can be displaced by suffix-conditioned templates. Rather, they would be irregular roots that have two different underlying vowels that happen to have the same quality. In fact, there are HL multi-vowel roots in Chukchansi, such as /hu:ʔe/ "drive," /be:na/ "comb," and /ma:lo/ "caress." These roots do not take suffix-conditioned templates, either: analyses since Archangeli (1983) attribute this to such roots having a different underlying structure than one-vowel templatic roots.

However, I do analyze these HL roots as having one underlying vowel that is associated to an HL template. While Russell (1999) did not describe multi-vowel roots, his account could describe them as having a morphological co-occurrence constraint that dominates the constraint imposed by template-conditioning suffixes. This would explain why these suffixes do not condition templates on these roots, rather than positing some underlying phonological difference in these roots. HL one-vowel roots could then select a morphosyntactic grade with an alignment constraint demanding the verb begin with HL.

The data section also shows an important difference between Chukchansi and the related Yawelmani Yokuts dialect. Archangeli (1983) and subsequent analyses of Yawelmani have used the same prosodic templates for roots as for suffixes, but the LL suffix-conditioned template posited here does not occur in Chukchansi roots as a default template. It can be argued that in a language, both suffixes and roots should draw from the same inventory of templates. However, while I posit an HL default root template, there are no suffixes that condition HL templates in the roots. Chukchansi also has many H roots (about ten percent of all verb roots elicited), but the lone suffix-conditioned H template is the causative form of two-consonant LH roots such as /xaya:/ "put down," e.g., [xay-la-taʔ] in (53).

53) xay-la-taʔ
put down-CAUSATIVE-REMOTE PAST
"she made him put down"

Such two-consonant LH roots are exceedingly rare in the Chukchansi speech of my consultants: out of over 250 verb roots that have been elicited by fellow researchers and me, only four two-consonant LH roots have been found, less than two percent of the total. I think they constitute a closed set of lexical exceptions with a special morphology, so that the H template (and the progressive [xayay-ʔa-n'] with the mysterious [y]) is not a regular or active part of Chukchansi grammar. Thus the inventory of suffix-conditioned templates in Chukchansi is LL and LH, while the inventory of default root templates is H, LH and HL.

CHAPTER 4: VOWEL QUALITY CHANGES

In this chapter I turn from the prosodic structure of verb roots to look at the segmental changes that occur in them. The main such changes in Chukchansi are vowel lowering, where long high vowels [i: u:] become lowered to mid [e: o:]; rounding harmony, where rounded root vowels [o(:) u(:)] cause a suffix vowel of the same height to round; and [a]- and [e]-ablaut, where the second vowel of a root with a suffix template becomes [a(:)] or [e(:)]. The infixing of a glottal stop [ʔ] with some causative forms is a similar morphological imposition of a phonological feature. I follow Russell (1999) and Blevins (2004) in arguing that none of these changes are general phonological processes that apply across the language, but rather are specific to sections of the Chukchansi verb paradigm. I also propose a novel analysis, that all template-conditioning suffixes in Chukchansi impose disyllabic templates on one-vowel roots, along with certain of the different segmental changes above. This analysis unites the behavior of all such suffixes before both two- and three-consonant roots; however, it needs more data and more argument to decide firmly whether this is indeed the best account of root templates in Chukchansi.

Data

I present verb forms that show the effects of vowel lowering, rounding harmony, and other quality changes, as well as glottal stop epenthesis. These changes exclusively occur with one-vowel roots, and are closely bound up with certain templates, both default (root-chosen) and suffix-conditioned.

Vowel Lowering

High vowels in three-consonant roots like /diʔʃ/ “make,” /lihm/ “run,” and /ʧ'ibn/ “get skinny” are lowered to mid with suffix-conditioned LH templates, as in (54)-(57):

54) deʔeʃ-hiy-’
make-ADJUNCTIVE-NOMINATIVE
“the making place”

55) lehem-ʔa-n’
run-PROGRESSIVE-NON PAST
“he is running”

56) deʔe:ʃ-iʧ'-Ø
make-GERUNDIVE-ACCUSATIVE
“one who makes (nom.)”

57) ʧ'ebe:n-a-taʔ
get skinny-CAUSATIVE-REMOTE PAST
“she made him get skinny”

One-vowel-quality verb roots with default H, LH, and HL templates never occur with high vowels. There are many such roots with mid-vowels: the H roots /se:p/ “tear,” /go:b/ “gather,” and /be:wn/ “sew,” the LH roots /ʧ'oyo:/ “urinate,” /hewe:t/ “walk,” and /gomo:ʧ'/ “hug,” and the HL roots /we:le/ “stir” and /yo:yo/ “call.” But out of approximately 60 one-vowel H, LH, and HL roots elicited from my consultants, there are none with high vowels. This is probably not a coincidence of elicitation, as many other verb roots have high vowels, including about 20 of the approximately 90 one-vowel L roots (i.e., those without a template imposed on them), like the roots /ʧ'ibn/, /diʔʃ/, and /lihm/ above, as well as /ʧiʃ/ “cut” and /t’ul/ “burn.” This is possibly due to vowel lowering with the H, LH, and HL templates; I discuss this below in the analysis.

Vowel Harmony

Verb roots with rounded vowels cause certain suffix vowels to round. For example, the root /t'ul/ "burn" causes the middle past suffix /-hil/ to surface with a rounded vowel in (58), while the root /pot/ "hold" causes the remote past suffix /-taʔ/ to do the same in (59):

58) t'ul-hul
burn-MIDDLE PAST
"he burned (tr.) (yesterday)"

59) pot-toʔ
hold-REMOTE PAST
"he held (a long time ago)"

This rounding harmony is sensitive to vowel height. For example, /t'ul/ does not cause /-taʔ/ to surface with a rounded vowel in (60), while /pot/ "hold" does not cause /-hil/ to do so either in (61):

60) t'ul-taʔ
burn-REMOTE PAST
"he burned (tr.) (a long time ago)"

61) pot-hil
hold-MIDDLE PAST
"he held (yesterday)"

Mid suffix vowels pattern with high vowels. /t'ul/ causes the non-past suffix /-eʔ/ to surface with a rounded vowel in (62), while /pot/ does not (63):

62) t'ul-oʔ
burn-NON PAST
"he will burn/burns (tr.)"

63) pot-eʔ
hold-NON PAST
"he will hold/holds"

Roots with /o/ can act like high vowels. The root /holo:ʃ/ “sit” patterns like /t’ul/, causing /-hil/ (64) but not /taʔ/ (65) to round:

64) holoʃ-hul
sit-MIDDLE PAST
“he sat (yesterday)”

65) holoʃ-taʔ
sit-REMOTE PAST
“he sat (a long time ago)”

Lastly, non-templated roots with rounded vowels may or may not cause rounding harmony: /lak’wun/ “get down from” does (66), while /ʔohyo/ “search” does not (67-68).

66) lak’wun-oʔ
get down from-NON PAST
“he will get/gets down from”

67) ʔohyo-hil
search-MIDDLE PAST
“he searched (yesterday)”

68) ʔohyo-taʔ
search-REMOTE PAST
“he searched (a long time ago)”

Other Segmental Changes

There are other changes that can occur in verb roots, all of which are conditioned by template-conditioning suffixes. These include [a(:)]- and [e:]-ablaut of the second syllable of roots, and the infixing of a glottal stop [ʔ] in the coda of second syllables. [a(:)]-ablaut occurs when two-consonant roots receive suffix-conditioned templates, e.g., the progressive form of /t’ul/ “burn” (69) and the gerundive form of /ʧiʃ/ “cut” (70):

69) t’ula-ʔa-n’
burn-PROGRESSIVE-NON PAST
“he is burning (tr.)”

70) ʧiʃa:-ʧ’-i
cut-GERUNDIVE-ACCUSATIVE
“one who cuts (acc.)”

[e:] ablaut occurs with the inchoative verb form of adjectives with the /-a-/ suffix, such as /gays/ “good” (71). It occurs in the Chukchansi data of Collord (1968) with the distributive suffix /-e-/; I have only found one verb with the suffix, /ʃawk/ (72).

71) gay**e:**s-a-t
good-INCHOATIVE-RECENT PAST
“he just got better”

72) ʃaw**e:**k-e-n’
buy-DISTRIBUTIVE-NON PAST
“he keeps buying a shirt”

Glottal stop infixing occurs in the causative forms of some roots, such as /waʃ/ “tell a story” (73, repeated from 25) and /bala:ʃ/ “crawl” (74, repeated from 39):

73) waʃaʔ-la-taʔ
tell a story-CAUSATIVE-REMOTE PAST
“she made him tell a story”

74) balaʔʃ-a-hil
crawl-CAUSATIVE-MIDDLE PAST
“she made him crawl”

Analysis

The segmental changes above require additions to the analysis of root templates in Yokuts languages. I argue that the morphological grade analysis above (proposed in Russell 1999) can account for these changes as being associated with the different grades. I thus support the argument of Blevins (2004) against these segmental changes, especially lowering, as being part of the general phonology of Yokuts languages.

Segmental Changes and Templates

First I investigate the segmental change of a(:)-ablaut that occurs when LL and LH templates are conditioned on two-consonant roots (that are not LH by default). I argue that contrary to some analyses (such as Collord 1968), the [a(:)] must be part of the template root, not the suffix. This leads me to examine how these roots differ from three-consonant roots that receive suffix-conditioned templates. I argue that other than segmental changes, there is no difference between the two types of roots when they receive these templates. I go on to suggest that the four template-conditioning suffixes in Chukchansi may be imposing the same templates on these roots, too.

When two-consonant roots (that are not LH) receive suffix-conditioned templates, an [a]-vowel appears before the suffix. For instance the root /ʧiʃ/ has the adjunctive form [ʧiʃa-ʔhiy-'] (from 18) and the causative form [ʧiʃa:-la-taʔ] (from 22), while the root /se:p/ has the progressive form [sipa-ʔa-n'] (from 17) and the gerundive form [sipa:-ʧ'-i] (from 21). I assumed before that this [a]-vowel is part of the root with the suffix-conditioned template, rather than part of the suffix; I now argue that my assumption is correct. Note that the [a(:)] is not a special case of low-vowel epenthesis, since *[sip-ʔa-n'] and *[ʧiʃ-la-taʔ] fit the CVX syllable maximum. As in the case of epenthesis vs. syncope, there are two alternate

analyses possible: either the template-conditioning suffixes that attach to two-consonant L and H roots begin with /a(:)/, or when these roots receive an LL or LH template, their second vowels must become low.

If the [a(:)] is part of the suffix, it must impose an L template on the root, or in the Russell (1999) analysis, select the no-template grade: e.g., /se:p/ would become [sip-], as in [sip-aʔa-n'] and [sip-a:la-taʔ], and /ma:x/ "collect" would become [max-], as in [max-aʔa-n'] and [max-a:la-taʔ]. The forms of the suffix allomorphs would be [-aʔa-] (progressive), [-aʔhiy-] (adjunctive), [-a(:)ʧ'] (gerundive), and [-a:la-] (causative). Compare these with the allomorphs of the same suffixes for three-consonant roots: [-ʔa-], [-hiy-], [-(i)ʧ'], and [-la-]. The main difference is that in the former set an [a(:)] occurs at the beginning of each suffix, while the rest of the suffix is identical to the forms in the latter set (the [ʔ] of the adjunctive suffix cannot be syllabified with three-consonant roots, and is deleted, while the [i] of the gerundive suffix is epenthetic). There would appear to be a massive coincidence that all the template-conditioning suffixes begin with an extra /a/-vowel when they attach to two-consonant roots, and no good explanation is at hand.

If the [a(:)] is part of the root with the suffix-conditioned template, two important parallels emerge. First, all the suffixes now have the same underlying forms for two- and three-consonantal roots, as in the progressive forms repeated from (17) and (30) above, as (75) and (76), and the gerundive forms repeated from (21) and (34) above, as (77) and (78), respectively:

75) sipa-ʔa-n' (not [sip-aʔa-n'])
tear-PROGRESSIVE-NON PAST
"it is tearing (intr.)"

76) deʔeʃ-ʔa-n'

make-PROGRESSIVE-NON PAST
"he is making"

77) sipa:-ʧ'-i (not [sip-a:ʧ'-i])
tear-GERUNDIVE-ACCUSATIVE
"one that tears (intr.) (acc.)"

78) ʃawa:k-iʧ'-Ø
buy-GERUNDIVE-NOMINATIVE
"one who buys (nom.)"

This takes care of the odd coincidence that template-conditioning suffixes all begin with an extra /a(:)/ after two-consonant roots. In its place is the stipulation that the second syllable of such a root with a suffix-conditioned template must have a low vowel. Though this may seem just as arbitrary, segmental changes in roots associated with templates occur elsewhere in Chukchansi. Such changes includes the high vowel lowering of three-consonant L roots with the LH template (see 54-57 above), the glottal stop codas in the roots of some causative forms with the LH template (see 73 and 74 above), and the multi-vowel roots that are composed of the suffix /-a-/ and a root with an LH template and an [e:] vowel, e.g. /gays/ "good" → [ga.ye:.s-a-] "get better."

Second, the gerundive /-ʧ'-/ and causative /-la-/, /-e-/, /-a-/ suffixes now condition the same LH templates on both two- and three-consonant roots (77 and 78). Thus these suffixes have a single form and template selection for all one-vowel roots, instead of having a split between two- and three-consonant roots. The progressive /-ʔa-/ and adjunctive /-hiy-/ suffixes condition LL templates on two-consonant roots (75) and LH templates on three-consonant roots (76). However, I argue that this split is only apparent. Both root shapes are accounted for by having a disyllabic [σσ] template, with no specification for syllable weight. Two-consonant roots will surface as LL since both consonants are onsets ([si.pa.-ʔa-n'] in 75), while three-consonant roots will appear as LH with the third root in the

coda ([de.ʔeʃ.-ʔa-n'] in 76). DEP and *STRUC eliminate output candidates with long vowels (e.g., *[si.pa:.-ʔa-n'] or *[de:.ʔeʃ.-ʔa-n']) or an epenthetic vowel (*[de.ʔe.ʃi-ʔa-n']).

This analysis can be extended to the gerundive and causative suffixes, which attach to roots that have an LH template. If this template is simply disyllabic, these suffixes would also have to demand that the root have a heavy second syllable, either through a long vowel ([si.pa:-ʧ'-i] in 77) or a coda ([ʃa.wak.ʧ'-i] "one who buys (acc.)," the accusative counterpart to [ʃa.wa:.k-iʧ'] in 78). There is separate evidence for such a demand by the gerundive suffix: some multi-vowel roots have a lengthened final vowel in the gerundive form, such as /hu:ʃe/ "drive" (79) and /ʔohyo/ "search" (80, repeated from 47).

79) hu:ʃ**e:**-ʧ'-i
drive-GERUNDIVE-ACCUSATIVE
"one who drives (acc.)"

80) ʔohy**o:**-ʧ'-i
search-GERUNDIVE-ACCUSATIVE
"one who searches (acc.)"

Of course, I need to find more data like (79) and (80) to support this analysis, and argue out all that this analysis entails, integrating it with the picture of root templates in general. For now this remains a very interesting alternative analysis that unites all template-conditioning suffixing in Chukchansi.

Vowel Lowering and Underlying Vowel Height

Chukchansi verbs in the data section above showed the effects of vowel lowering and rounding harmony. Newman (1944) accounted for these vowel quality changes by positing a different vowel system for underlying verb roots. This underlying vowel system does not use the five cardinal vowels that appears

on the surface (short [a e i o u] and long [a: e: i: o: u:]), but rather four short and long vowels that have a binary difference in height and rounding /i a u ɔ e: a: o: ɔ:/. I show this vowel system below in Table 7 a two by two grid with height and rounding axes.

Table 7. Newman (1944)'s Underlying Chukchansi Vowel System

	Unrounded	Rounded
High/Mid	i e:	u o:
Low	a a:	ɔ ɔ:

Newman described both general phonological and suffix-conditioned processes that act on these vowels to produce the five cardinal short and long surface vowels; on the surface, the contrast between the high and low rounded vowels /ɔ(:)/ and /o(:)/ is neutralized to [o(:)]. This underlying four-vowel system can clearly describe the phenomenon of vowel harmony: as was first explicitly described in Kuroda (1967), a suffix vowel becomes rounded when following a rounded vowel of the same height. The low root vowel /ɔ(:)/ causes suffix /a/ vowels to round to [o], while the high root vowels /u o:/ causes suffix /e/ and /i/ vowels to round to [o u]. If the five cardinal vowels are posited to be the underlying root vowels, this harmony cannot be explained easily: some /o/s, as in /gomo:ʧ'/ "hug" (81-83), would cause the mid and high vowels /i e/ to harmonize, but not the low vowel /a/, while other /o/s, as in /holo:ʃ/ "sit" (84-86), would cause the opposite harmony.

<u>Rounding Harmony with Low Vowels</u>

81) gomoʧ'-ko — Harmony: /-ka/ to [-ko]
hug IMPERATIVE
"hug!"

82) gomoːʧ'-e-hil — No harmony
hug CAUSATIVE-MIDDLE PAST
"she made him hug (yesterday)"

83) gomoːʧ'-it — No harmony
hug RECENT PAST
"he just hugged"

Rounding Harmony with High Vowels

84) holoʃ-ka — No harmony
sit IMPERATIVE
"sit!"

85) holoʔʃ-o-t — Harmony: /-e-/ to [-o-]
sit CAUSATIVE-RECENT PAST
"she just made him sit"

86) holoːʃ-ut — Harmony: [-it] to [-ut]
sit RECENT PAST
"he just sat"

This difference would have to be arbitrary if both types of [o(o)] were underlyingly identical. Newman's analysis, splitting surface [o(:)] into high /oː/ and low /ɔ ɔː/, which then harmonize with vowels of the same height, easily explains vowel harmony, at the cost of introducing a break between the surface and underlying vowel inventories.

Most analyses of Yokuts following Kuroda (1967) have assumed that these languages have a similar underlying four-vowel system with short /i a u o/ and long /iː aː uː oː/, where the short and long vowels have the same height. This necessitates a rule of vowel lowering, whereby the vowels /iː uː/ assume the values [eː oː] that are found in Newman (1944). In addition to accounting for vowel harmony, the four-vowel system with lowering account also explain interesting vowel-quality gaps in different types of roots. One-vowel roots without a template

can have the vowels /i a o u/, such as the two-consonant L roots /t'ul/ “burn,” /ʧiʃ/ “cut,” /pot/ “hold,” and the three-consonant L roots /diʔʃ/ “make,” /ʃawk/ “buy,” and /hoyn/ “fly,” but there are no such roots with /e/. Conversely, other root types, with the H, LH, and HL templates, only have the vowels /e a o/. Thus there are two-consonant roots like /se:p/ “tear,” /go:b/ “gather,” /we:le/ “stir,” /ʔa:pa/ “carry on the back,” and /ʧ'oyo:/ “pee,” and three-consonant roots like /be:wn/ “sew,” /ha:tm/ “sing,” /hewe:t/ “walk,” and /holo:ʃ/ “sit,” but no H, LH, or HL roots with /i/ or /u/.

This is easily explained by the underlying /i a o u/ vowel system and lowering of long high vowels: there can be no /e/ vowels in short-vowel roots, because there is no short /e/ and short /i/ never lowers. On the other hand, templates with H syllables have underlying long vowels, so that /i:/ and /u:/ are lowered to [e:] and [o:]. While the L syllables in LH roots have high vowels in some Yokuts dialects (e.g., Chukchansi [hewe:t-] “sing” and [holo:ʃ-] “sit” are [hiwe:t-] and [hulo:ʃ] in these dialects), both vowels in LH and HL roots are lowered in Chukchansi. Newman (1944) describes this by a process of height assimilation, while Steriade (1986) accounts for it with melody copy; I am not sure how an OT account would describe it. The underlying four-vowel system also explains why the first vowel in the template-assigned form of /se:p/ is a high [i]: [s**i**pa(:)-]; the vowel would be underlyingly high /si:p/, so it shows up as high in the a-ablauted LL template form, where it is short and does not have a following mid vowel to assimilate to.

Vowel lowering accounts for vowel harmony in one-vowel verbs, as well the vowel-quality gaps in one-vowel roots and the behavior of these roots with suffix-conditioned templates. However, Blevins (2004) pointed out a gaping hole in this argument: there are many Yokuts words, including verbs, that have surface

long high vowels. In my data set, long high vowels are found in native Chukchansi nouns and multi-vowel verbs, such as [h**u:**ya-] "monarch caterpillar," [h**u:**ʃe-] "drive," [ʃ**i:**ʃwil-] "be embarrassed," and [ʔoy**i:**sa-] "be happy." Long high vowels also occur in loan nouns and verbs, such as [gay**i:**na-] "chicken," [kam**i:**sa-] "shirt," and [m**i:**sa-] "go to mass" (from Spanish "gallina," "camisa," and "misa," respectively). Also, a short [e] is found in many places where it cannot result from a lowered and shortened /i:/ vowel because it occurs in an open syllable; e.g. [hu:ʃ**e**-hil] "he drove (yesterday)," [l**e**lupsa-] "swing," and the causative suffix /-e-/, as in [gomo:ʧ'-**e**-hil] "she made him hug (yesterday)." These data clearly show both that the four-vowel system cannot account for all of Chukchansi vowels and that vowel lowering cannot be an automatic phonological process. These descriptions can only account for one-vowel verb roots, where lowered long high vowels seem to occur, not nouns, suffixes, or multi-vowel verb roots.

Morphological Grades and Segmental Changes

If vowel lowering is not an automatic rule, but rather is restricted to one-vowel roots, how is it to be described, i.e., how can we account for the apparent height-sensitivity of vowel harmony and the vowel quality gaps in templatic verbs? Blevins (2004) argued that a purely morphological approach is necessary to account for this: when Yokuts speakers learn verb paradigms, they also learn that high vowels are lowered in certain forms of certain roots. Russell (1999) had a similar analysis: verbs come in different morphological grades, chosen by either the root or the suffix. This morphological grade in turn imposes a prosodic template on the verb as well as sometimes a segmental constraint against high

vowels, requiring roots with high vowels to appear with them lowered in certain grades.

I follow the analysis in Russell (1999), and extend it to other segmental changes. Each morphological grade has both an alignment constraint (for the prosodic template) as well as segmental constraints that prohibit high vowels or demand the appearance [a] or [e] vowels or glottal stops in the second root syllable. To account for the vowel harmony and vowel quality gaps in the above section, the input of one-vowel roots must be underspecified, as they are in Russell (1999). In the input, the root vowel is specified only as round or non-round, and low or non-low. Low vowels surface as [a] (non-round) and [o] (round), while non-low vowels surface as mid [e] (non-round) and [o] (round) or high [i] (non-round) and [u] (round), depending on the presence of a constraint against high vowels. Round vowels that are low cause suffixes with an /a/ vowel to round; round vowels that are non-low cause suffixes with /e/ or /i/ vowels to round.

The grades with the H, LH, and HL templates must also have the constraint against high vowels, so that [i] and [u] never show up in these roots. Suffixes that condition a disyllabic template (per my suggestion above) select one of two grades: one with a constraint demanding [a]-ablaut for two-consonant roots, and the other with the constraint against high vowels for three-consonant roots. The causative suffix optionally selects a grade with a constraint demanding glottal stop infixation. This analysis neatly accounts for how certain segmental demands co-occur with certain templates, and do not show up outside of these sections of the verb paradigm.

CHAPTER 5: CONCLUSION

This thesis has presented new data on Chukchansi verbs, and has investigated how best to account for the morphophonology of the verbs presented. I have argued that some accounts of Yokuts (such as Collord 1968) are inadequate for describing this data, while other accounts (such as Russell 1999) are sufficient to do so. I have posited several of my own arguments in this paper: some of these are clear and well-supported by the data, while others need more fine-tuning and more supporting data to make them solid.

Major Findings

The first phenomenon I investigated in this thesis was the distribution of high vowels with zero in different surface forms of verbs with the same roots and suffixes. I argued that this distribution is due to epenthesis, not syncope, of the high vowels. I then looked at the OT account of epenthesis in Zoll (1993): this account explains most epenthetic forms, but not the intransitive suffix. This account also cannot describe word-final vowel deletion in the precative and imperative suffixes. I proposed the constraint ALIGN-C to describe this phenomenon; however, I could still not come up with a unified OT account of epenthesis.

I then explored the position of prosodic templates in Chukchansi. Like in other Yokuts languages studied, both roots and suffixes can condition these templates. I argued against templates being present in the input (Zoll 1993). Instead I followed the mechanism proposed in Russell (1999) whereby roots and suffixes pick a morphological grade that has a template alignment constraint as a phonological reflex. Unlike in some descriptions of other Yokuts languages, the inventory for root-conditioned templates is different from the inventory for suffix-

conditioned templates. I argued that the former inventory comprises H, LH, and HL templates and the latter LL and LH templates.

I finally examined the segmental changes in roots that accompany templates. I argued that when template-conditioning suffixes attach to two-consonant roots, the [a] vowel that appears between them belongs to the root, not the suffix. This led me to suggest that these suffixes condition the same disyllabic template on both two- and three-consonant verbs, rather than different LL and LH templates. I then argued for Blevins' (2004) analysis of vowel lowering as restricted to certain sections of the verb morphology, not a general process. I again followed Russell (1999) in associating vowel lowering with the morphological grades responsible for root templates, and proposed that other segmental changes in verb roots are also so associated.

Avenues for Future Research

In this thesis I suggest several avenues for future research. Some of these involve analyses that I suggested but need further exploration as well as more data elicitation to see if they can be supported. It needs to be seen if the different epenthesis of the intransitive suffix occurs in other suffixes. Constraints other than ALIGN-C must be investigated to see if they can account for both the phenomena of epenthesis and final vowel deletion. I also proposed that all template-conditioning suffixes in Chukchansi condition a disyllabic template, and some further demand that the second root syllable be long, resulting in an LH root. More data need to be elicited to see if there are other suffixes that make this demand. I suggested that two-consonant LH roots are a closed class that is not morphologically productive in Chukchansi. If a significant number of such roots are elicited, this suggestion is definitely wrong.

The phenomenon of segmental changes in verb roots is another ripe avenue for Chukchansi research. There are several suffixes that require more elicitation: the distributive and inchoative suffixes, which demand [e:]-ablaut, and the causative, which sometimes causes glottal stop infixation. It also needs to be seen if other suffixes cause segmental changes, and if these changes occur in any situation other than with root templates. Lastly, I want to know if the template inventory of Chukchansi has been completely examined, or if there are other root- or suffix-conditioned templates.

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APPENDICES

APPENDIX A: CHUKCHANSI PHONEME INVENTORY AND TRANSCRIPTION

Chukchansi has the following phoneme inventory. Following the majority of Yokuts research (starting with Newman 1944), plain stops are represented by voiced letters, aspirated stops by unvoiced letters, and the palatal glide /j/ is represented by <y>.

Table 8. Chukchansi Consonants

		Labial	Dental	Alveo-Palatal	Velar	Glottal
Stop	Plain	p (b)	t (d)	ʧ (ʤ)	k (g)	ʔ
	Aspirated	p^h (p)	t^h (t)	$ʧ^h$ (ʧ)	k^h (k)	
	Ejective	p’	t’	ʧ’	k’	
Fricative			s	ʃ	x	h
Nasal	Plain	m	n			
	Glottalized	m’	n’			
Glide	Plain	w	l	j (y)		
	Glottalized	w’	l’	j’ (y’)		

Table 9. Chukchansi Vowels

	Unrounded	Rounded
High	i i:	u u:
Mid	e e:	o o:
Low	a a:	

The aspirated stop /t^h/ and the ejective stops /t’ k’/ are often affricated: [$t^θ$ $t^θ$’ k^x’]. The alveolar fricative /s/ is sometimes pronounced retroflexed: [ʂ]. The short vowels /i e o u/ are usually pronounced lax: [ɪ ɛ ɔ ʊ].

APPENDIX B: CHUKCHANSI VERB SUFFIXES

The Chukchansi verbs shown in this paper are attached to eleven different suffixes. In the body of the paper I describe both the forms of these suffixes and how they affect verb roots; I do not, however, describe their functions. I will briefly overview the forms and effects of each suffix here, and then give a short description of their functions.

Table 10. Chukchansi Verb Suffixes

Suffix	Underlying Form	Template-conditioning?
Non-past	/-n'/ (post-V), /-eʔ/ (post-C)	
Recent past	/-t/	
Middle past	/-hil/	
Remote past	/-ta□/	NO
Imperative	/-ka/	
Precative	/-xa/	
Potential	/-al/	
Gerundive	/-ʧ'-/	
Progressive	/-ʔa-/	YES
Adjunctive	/-ʔhiy-/	
Causative	/-la-/, /-e-/, /-a-/	OPTIONALLY

The **non-past** is used with the adverb [miʔin] to form the future tense, with [taʔan] for the habitual aspect, and with other aspectual suffixes to form different

non-past statements. The **recent past** is used for an action that has just happened, or happened earlier today. Occasionally it is used for actions that have begun but are still continuing into the present; this may depend on the inherent lexical aspect of the verb root. The **middle past** indicates that the action happened yesterday, and the **remote past** that it happened before then, or long ago at some undefined time; it is often used in a narrative sense. The **imperative** and the **precative** are a 2nd person and a 1st person inclusive command, respectively ("go!" vs. "let's go!"). The **potential** indicates that the action of the verb is possible, not actual. The **gerundive** can be a nominalization, indicating someone or something that performs the action; it is also commonly used in subordinate clause constructions, as in (87):

87)	taʔiʃ-hil	na'	am	poto:-ʧ'-i
	see-MIDDLE PAST	I	him	hold-GERUNDIVE-ACCUSATIVE
	"I saw him **holding** (the basket)"			

The **progressive** is used for an ongoing action, and is most commonly attached to the non-past to indicate a present progressive action, but can also attach to the past tense suffixes to indicate a progressive action in the past. The **adjunctive** usually indicates the place of an action, but occasionally the instrument (e.g., "book" [leele-ʔhiy'], from /leele/ "read"). The **causative** indicates that the subject makes or causes the object to perform an action (sometimes on another object).