UNIVERSITY OF CALIFORNIA SAN DIEGO

Topics in the Phonology and Morphology of Torres Martinez Desert Cahuilla

A Dissertation submitted in partial satisfaction of the requirements
for the degree Doctor of Philosophy

in

Linguistics

by

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2023

The Dissertation of Incamu Ray Huaute is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

University of California San Diego

2023

DEDICATION

umun netax’u’niwetem miyik

This dissertation is dedicated to all of my Cahuilla language teachers

and all the Cahuilla elders before them who dedicated their lives

to the preservation of the Cahuilla language.

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LIST OF LINGUISTIC ABBREVIATIONS

1	first person
2	second person
3	third person
ABS	absolutive
ABL	ablative
ACC	accusative
ADJ	adjective
ADV	adverbial
AGT	agentive
AUG	augmentative
ATTR	attributive
BEN	benefactive
C	consonant
CAUS	causative
DAT	dative
DEM	demonstrative
DER	derivational
DIM	diminutive
DISTR	distributive
DM	discourse marker
DMY	demonym
DUR	durative
FUT	future
HORT	hortative
IF	immediate future
IMP	imperative
IRR	irrealis
INS	instrumental
INFL	inflective
LOC	locative
MOTC	motion coming
MOTG	motion going
MOTGA	motion going around
MOTP	purposive motion
MULT	multiplier
NEG	negation
NMLZ	nominalizer
OBJ	object
PL	plural
POSS	possessive
POSSB	possibility
PRET	preterite
REFL	reflexive
RED	reduplicant
REAL	realis
REL	relativizer
SG	singular
STAT	stative
SUB	subordinator
SUBJ	subject
TRNSF	transformative
TS	thematic suffix
V	vowel

LIST OF SOURCE ABBREVIATIONS

SPEAKERS

Christina Dominguez Morreo	CM
Gilbert Torro	GT
Chona Dominguez	CD
Alice Lopez	AL
Katherine Siva Sauvel	KS

SOURCES

Unpublished fieldnotes of John Peabody Harrington	JPH^{FN}
Unpublished fieldnotes of Hansjakob Seiler	HS^{FN}
Unpublished fieldnotes of Kijoro Hioki	KH^{FN}
Cahuilla Texts (Seiler 1970)	HS 1970
Cahuilla Grammar (Seiler 1977)	HS 1977
Cahuilla Dictionary (Seiler & Hioki 1979)	S&H
Chem'ivillu (Sauvel & Munro 1981)	S&M
Isily Hekwas Waxish (Texts by Sauvel & Elliott)	S&E

ACKNOWLEDGEMENTS

Most of all, I would like to acknowledge Mrs. Christina Dominguez Morreo and Mr. Gilbert Torro, who graciously provided a large portion of the Desert Cahuilla language for this study, and without whom this dissertation would not have been possible. Without their patience, kindness, dedication, and expertise, this dissertation would not have materialized into its current form. *Achama* (thank you). I would also like to thank the Torres Martinez Desert Cahuilla Indians (TMDCI) and Agua Caliente Band of Cahuilla Indians (ACBCI) tribal governments for granting permission to conduct some of the fieldwork used for this dissertation at their tribal facilities, and all of the Cahuilla community members who have supported my work. I would now like to thank and acknowledge the many others who have helped contribute to this work with their advice, support, friendship, patience, encouragement, and mentorship. The author bears full responsibility for any errors of data or analysis that remain in this document.

First, I would like to thank my dissertation committee members for their support and belief in my academic research and the language reclamation work that will no doubt result from it. I am forever grateful to my academic advisor Gabriela Caballero for her unwavering support and mentorship, and for being so generous with her time. Particularly, all of the helpful feedback and advice, as well as the encouragement she has provided me over the years that helped me to remain focused on what drew me to the field of linguistics in the first place and the importance of my work. Her diligence and dedication, not only to scholarship, but also to supporting students (both grad and undergrad) has been an inspiration to myself and others. I am also grateful for all that I have learned from her in the areas of linguistic fieldwork, phonology, and morphology. Thank you for being a wonderful role-model and

colleague. Gracias y *ʃinda?vi inoo* (thank you). I would also like to thank Marc Garellek and Sharon Rose for their support and mentorship, and for always being very generous with their time. My fascination with phonetics is due in great part to Marc being a wonderful and enthusiastic instructor. His passion for phonetics has inspired me to explore phonetic topics in my own heritage language. I also learned a great deal about laboratory phonetics, acoustic analysis, and suprasegmental phonology (i.e., speech prosody) from taking several of his seminars. Sharon, who served temporarily as my academic advisor, also taught me a great deal about phonology and morphology, and her attention to detail has made me a better linguist and scholar. I would also like to thank Andrew Garrett for graciously agreeing to sit on my dissertation committee. His work with Indigenous California languages and archival materials has enriched this dissertation and the Cahuilla people will be all the better for it. Finally, I am thankful for Rihan Yeh for also being a part of my committee. I appreciate her time and support and this dissertation has also benefited from her perspective as a linguistic anthropologist.

There are several others from my department and other institutions who I would like to acknowledge. I would like to thank all of the faculty and staff in the linguistics department at UC San Diego who have to mentor and support me in various ways. Specifically, Eric Baković, Will Styler, Ivano Caponigro, Farrell Ackerman, Emily Clem, Michelle Yuan, Grant Goodall, and Leon Bergen. I would also like to thank my fellow cohort members Nina Hagen Kaldhol, Maxine Van Doren, Seoyeon Jang, Jose Armando Fernandez Guerrero, as well as various other department colleagues past and present: Andres Aguilar, Adam McCollum, Alex Rodriguez, Josh Wampler, Yuan Chai, Matt Carter, Claudia Duarte-Borquez, Duk-Ho

Jung, Matt Zalansky, and Nico Tedeshi. Thank you for your friendship, advice, and for all the conversations both intellectual and casual.

Next, I would like to acknowledge Dr. Hansjakob Seiler, who graciously granted me access to his fieldnotes for my Master's thesis, as well as Dr. Nikolaus Himmelmann at the University of Cologne, who provided me with additional digitized materials from Seiler's collection housed at the university. I would also like to thank all those who advised and mentored me during my Master's thesis research at the University of Arizona: Ofelia Zepeda, Mary Willie, Stacey Oberly, and Sheilah Nicholas, as well as the late Jane Hill, who graciously met with me and provided feedback for my thesis. I would also like to thank fellow Indigenous linguists Adrienne Tsikewa, Joseph Dupris and Wesley Leonard for their support and mentorship. I am also grateful for all of the other colleagues at various academic institutions (who are too numerous to mention) who helped me to get to the stage I am in my academic career today.

I would like to acknowledge my mother Nashun Huaute and father Dan Arce, and all my family and siblings for their unconditional support. I would also like to thank all of my friends and extended family William Madrigal, Cheryl Madrigal, John Preckwinkle, Aunt Lori Sisquoc, Grandma Amuah (Tonita Largo), and the Madrigal Family who have continued to support and encourage me in my educational journey all these years. Finally, I am forever grateful and indebted to my wife Venessa who has been by my side and faithfully supported me throughout the last five years.

Chapter 4 includes some of the material as it appears in: Huaute, R. 2022. *A Preliminary Intonation Model of Torres-Martinez Desert Cahuilla*. Proc. Speech Prosody 2022, 254-258, doi: 10.21437/SpeechProsody.2022-52. The dissertation author was the primary investigator and author of this paper.

Research for this dissertation was funded by a grant (SG0599) from the Endangered Languages Documentation Programme and the UCSD Linguistics Department.

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Huaute, Ray (2022). A Preliminary Intonation Model of Torres-Martinez Desert Cahuilla. Proc. Speech Prosody 2022, 254-258.

ABSTRACT OF THE DISSERTATION

Topics in the Phonology and Morphology of
Torres Martinez Desert Cahuilla

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Professor Gabriela Caballero, Chair

Torres Martinez Desert (TMD) Cahuilla is variety of the Desert dialect of Cahuilla, a critically endangered language, spoken only by a few elderly speakers living on and near the Torres Martinez Desert Cahuilla Indian Reservation located near Thermal, California in the Western-Colorado Desert region. This study contributes to prior documentation on Cahuilla by presenting novel data from contemporary speakers of the language, including data from conversations and other speech genres, that were previously under-documented. This dissertation highlights various topics in the phonology and morphology, all of which illustrate the role of prosodic structure across grammatical domains. It also compares archival data from 50 years prior to the TMD Cahuilla data collected for this study to investigate whether there have been changes to the synchronic grammar, providing insight into the rarely examined dynamics of language change.

Chapter 1 begins with an overview of Cahuilla, its speakers, previous documentation, and information about the study, as well as current efforts to revitalize the language. Chapter 2 provides a description of the segmental phonology, including a comparison of previous phonological inventories and orthographies used within the last century of documentation. Chapter 3 discusses the phonotactic restrictions that govern much of the phonology, while Chapter 4 presents several aspects suprasegmental phonology of the language; stress and intonation. In particular, Chapter 4 provides phonological and phonetic criteria for positing primary stress in the TMD Cahuilla, however, no phonological or phonetic criteria could be established to posit secondary stress, a topic which has been extensively discussed in prior literature. Chapter 5 provides an overview of the morphology of nouns and verbs in TMD Cahuilla providing templates for each, as well as paradigms of fully inflected nouns and verbs. Finally, Chapter 6 discusses reduplication, a process that involves complex morphophonological processes in TMD Cahuilla, as well as other varieties of Cahuilla. Building upon prior research on Cahuilla, this dissertation provides a detailed and precise description of several salient topics in the grammar that will be useful to those studying other Uto-Aztecan languages, as well as language typologists, and Cahuilla community members and scholars looking to leverage the data from this study for language reclamation and revitalization and purposes.

Chapter 1 Introduction

1.1 Goals of this dissertation

This dissertation provides a detailed description of various aspects of the phonology and morphology of Cahuilla, examining previous documentation and making an empirical contribution by analyzing newly collected data from the Torres Martinez Desert (TMD) dialect of Cahuilla, a previously undocumented language variety. Cahuilla is a critically endangered Uto-Aztecan (UA) language of Southern California. Today there are less than five remaining first-language (L1) speakers of Cahuilla, all of whom reside on or near the Torres Martinez Indian Reservation located near the town of Thermal in California. However, language strengthening, and reclamation projects are currently underway in the tribal community. Previous language documentation has often been carried out without the perspective of members of the Cahuilla community. As a Cahuilla tribal community member, linguistics researcher, and speaker of the language, my work in this dissertation addresses this gap.

This dissertation presents phonological, and morphological data in a manner that seeks to be accessible to both linguists and other academic scholars, as well as members of the various Cahuilla communities. On the one hand, a precise description of the morphological and phonological system of Cahuilla that have not been previously addressed in the literature is not only of interest to those wishing to conduct comparative studies with other Uto-Aztecan languages and other Indigenous languages of California, but it also contributes to broader typological studies, which often lack representation from smaller non-Indo-European languages. On the other hand, much of the previous research on Cahuilla has remained largely inaccessible to the Cahuilla community, since it has often been presented in highly technical and theoretical

language that is incomprehensible to the non-linguist. This is not a trivial issue, as even someone with a linguistic background may periodically encounter studies that are either beyond their area of specialization, or which are written using non-standard terms. Such barriers have prevented non-academic tribal community scholars from leveraging linguistic materials for language revitalization and reclamation. In what follows, I discuss both of these issues and how this dissertation addresses them.

While Cahuilla has been documented and linguistically described in prior work carried out in the twentieth century, this dissertation seeks to address several gaps from previous studies. First, although previous research has focused on the various grammatical aspects of Cahuilla (Seiler 1957, 1965, 1967, 1970, 1977, 1979; Fuchs 1970; Hioki 1973, Sauvel & Munro 1981; *inter alia*), no previous work has addressed phonological and morphological phenomena as they relate to the prosodic structure of the language, including word-level stress, reduplication, and intonation patterns. This dissertation seeks to fill this gap by addressing these topics and providing carefully selected examples that illustrate the complex morphological patterns and morphophonological processes and patterns of pronunciation not addressed systematically in the previous literature. I also seek to identify the ways in which TMD Cahuilla resembles other related Takic, Uto-Aztecan, and California languages, linking the descriptions of patterns and other phenomena found in the language to relevant typological, theoretical, and descriptive literature, where pertinent.

In this dissertation, I also provide conversational data from contemporary speakers of the language. Documentation of other varieties of Cahuilla carried out in the early twentieth century focused largely on elicited speech, resulting in a lack of data representative of conversational discourse, as well as other genres of naturalistic and culturally relevant speech.

Given the paucity of conversational data for Cahuilla in previous records of the language, this dissertation provides examples of various phenomena that occur in conversational and other naturalistic speech such as phonetic reduction, intonational patterns, and variation in linguistic forms across speakers. These topics may be of interest not only to academics, but also to Cahuilla community members interested in leveraging linguistic materials for language revitalization and reclamation.

Unfortunately, the research project leading to this dissertation has suffered from the loss of invaluable insight and intuitions about TMD Cahuilla with the unexpected passing, over the past couple years, of two very dedicated language experts, Mrs. Christina Dominguez Morreo and Mr. Gilbert Torro, whom I had planned to conduct extensive fieldwork with. To supplement my materials on TMD Cahuilla, I have leveraged additional data from the unpublished fieldnotes of Hansjakob Seiler and Kojiro Hioki, which were graciously provided to me in digital form by Dr. Nikolaus Himmelmann from the University of Cologne. In addition, in this dissertation I examine data from several descriptive works published in the twentieth century (described in more detail below in §1.3). Thus, by examining these multiple sources of data on Cahuilla, this dissertation seeks to provide the most comprehensive picture of the language and provide preliminary data that may reveal diachronic changes. This observation was also noted by Seiler who documented notable differences in his data from 1955, to that of twenty years later when he published his grammar. As Seiler notes "such divergence... help[s] to bring out more clearly the factors of dynamism and variation inherent in any language... every language at every moment shows coexistences of archaisms and innovations" (Seiler 1977:3-5).

1.2 The Cahuilla language and its speakers

Cahuilla (ISO 639-3: chl) or ivilyu'at [ˈʔiviʎuʔat] in the Cahuilla language, is a critically endangered Uto-Aztecan (UA) language of Southern California historically spoken in the San Jacinto and San Gorgonio mountains and plains, as well as the Coachella Valley and Eastern Colorado Desert region. As mentioned above, there are currently less than five remaining first-language (L1) speakers of Cahuilla, all of whom reside on or near the Torres Martinez Indian Reservation located near the town of Thermal in California. Previous documentation on Cahuilla has identified three major dialects: the Mountain, Desert and Pass/Wanakik. This dissertation focuses on TMD Cahuilla, a Desert variety.

The Cahuilla language is a member of the Northern branch of the Uto-Aztecan language family. The Northern Uto-Aztecan group of languages includes four major branches: Numic, Tubatulabal, Takic, and Hopi. Cahuilla falls under the Takic subbranch, which can be further divided into three groups, namely Serran, Gabrieleño (Tongva), and Cupan. Cahuilla is part of the Cupan group of languages (along with Luiseño and Cupeño), which Hill and Hill (2019) further divide into Coastal Cupan (Luiseño) and Inland Cupan (Cahuilla-Cupeño). The four branches of Northern Uto-Aztecan languages are shown in Table 1. The two subgroups of Cupan languages in Miller's table correspond to Hill and Hill's Inland (b.i.) and Coastal Cupan (b.ii.) respectively.

Table 1. Classification of Northern Uto-Aztecan Languages (Miller 1984)

1. Numic
    Western Numic: Mono, Northern Paiute (or Paviotso)
    Central Numic: Panamint, Shoshone, Comanche
    Southern Numic: Kawaiisu, Ute (Chemehuevi, Southern Paiute, Ute)
2. Tubatulabal
3. Takic
    a. Serrano-Gabrieleño
        i. Serranan: (Serrano, Kitanemuk)
        ii. Gabrieleño: (Gabrieleño, Fernandeño)
    b. Cupan
        i. Cupeño, **Cahuilla**
        ii. Luiseño
4. Hopi

The group of Northern Uto-Aztecan languages listed in Table 1 belong to the larger Uto-Aztecan language family which spans a large geographic area, from the Great Basin in the Western United States all the way south into El Salvador and Nicaragua in Central America. The map in Figure 1 depicts the approximate geographic location of the Uto-Aztecan language family.

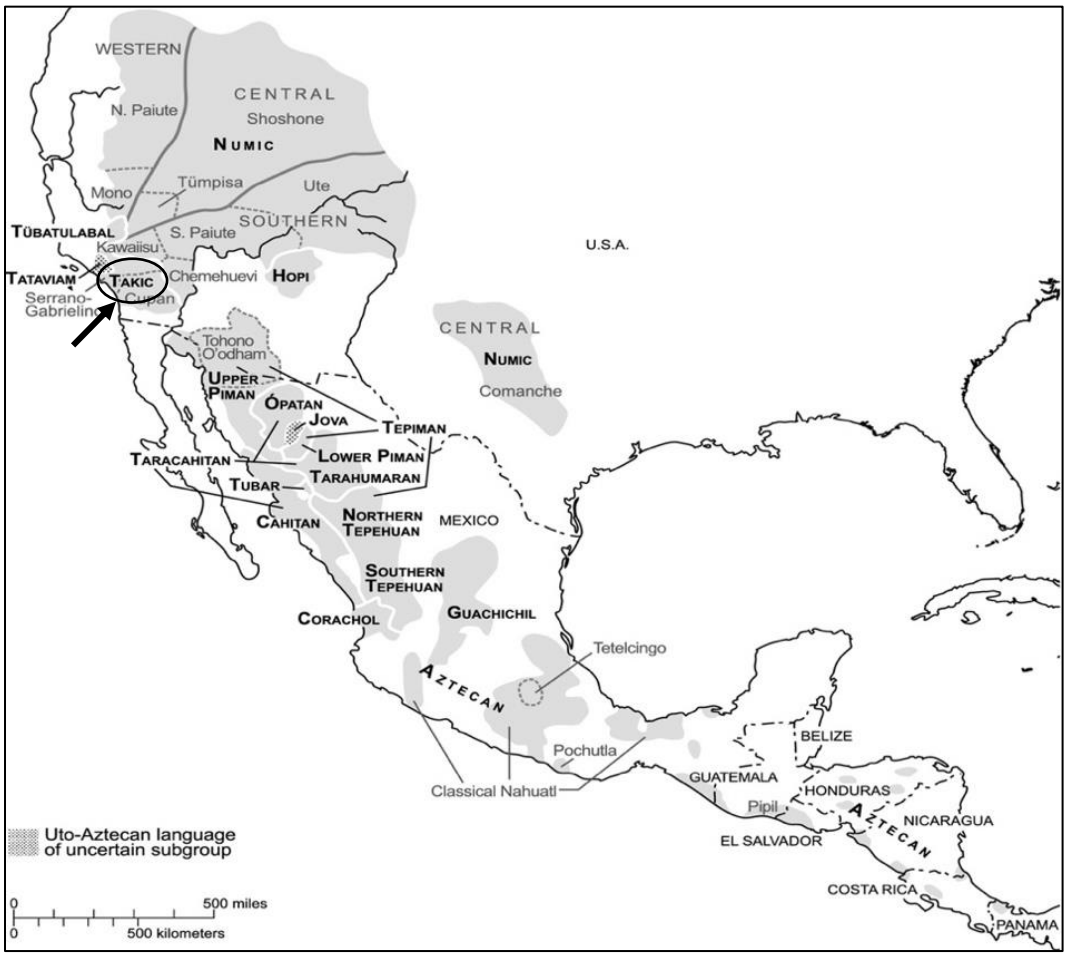


Figure 1. Map of Uto-Aztecan languages (Miller 1983)

Below in Figure 2 is a map of Southern California that shows the geographic location of the Takic languages (shaded areas), as well as the location of the Torres Martinez Desert Cahuilla Indian Reservation, where documentation for this dissertation was conducted.

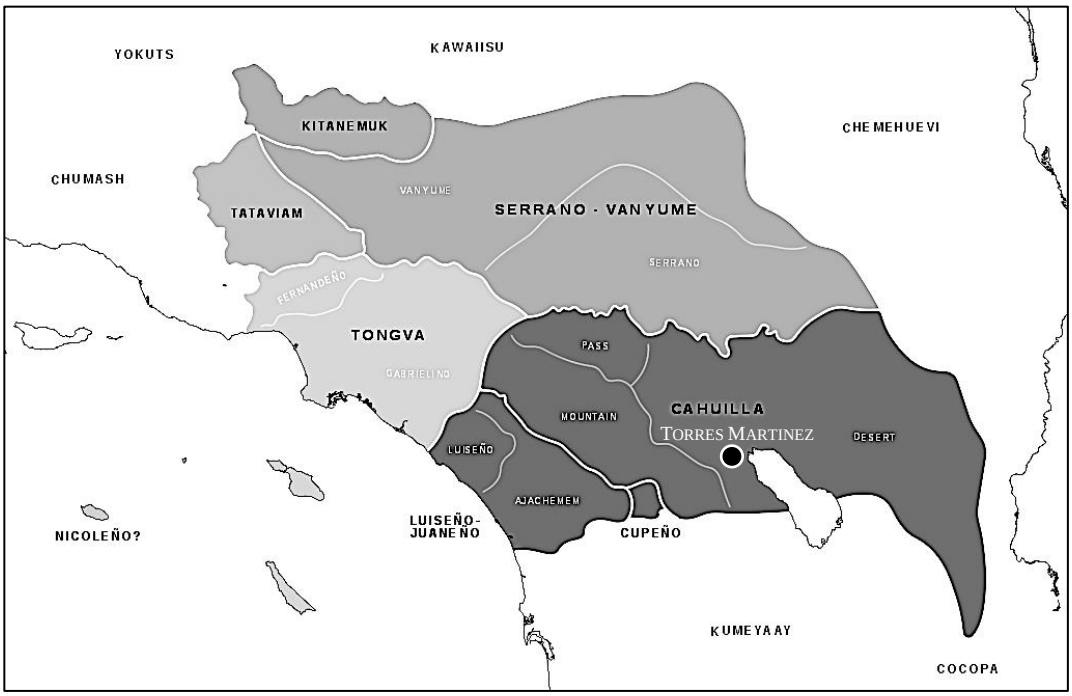


Figure 2. Map of Takic languages, Cahuilla dialects, and location of the Torres Martinez Cahuilla Indian Reservation (Howard 2019).

1.3 Previous research on Cahuilla

Aside from the scant documentation collected by missionaries and anthropologists during the nineteenth and early twentieth century, the earliest substantial body of documentation on Cahuilla comes from the unpublished fieldnotes of noted American ethnographer and linguist John Peabody (JP) Harrington. Harrington's collection consists of thousands of pages of hand-written notes, which includes comparative vocabularies, texts, notes on grammar, and other miscellaneous linguistic notes elicited from over a dozen language consultants between 1911-1952 (Mills and Brickfield 1986: 76-81). Other substantial bodies of documentation on Cahuilla include the fieldnotes of German linguist Hansjakob Seiler, who worked with speakers of both the Desert and Mountain dialects from 1955-1973, which later resulted in a collection of texts, a grammar, and a dictionary (Seiler 1970, 1977, 1979). In addition, Kojiro Hioki and Anna Fuchs,

both of whom worked with Seiler's Cahuilla consultants, produced their own theses (Fuchs on the morphology of verbs (1970) and Hioki on the behavior of clitics (1973)). Additional documentation on the Mountain dialect was later collected from Mrs. Katherine Siva Sauvel (one of Seiler's former consultants) by Pamela Munro and Eric Elliott, which resulted in a pedagogical grammar (Sauvel & Munro 1981) and a set of texts (Sauvel & Elliott 2004). Another important resource includes the recent publication of a comparative Takic grammar by Hill & Hill (2019): although most of the Cahuilla data analyzed in their grammar is taken from Seiler's and Munro's notes, it provides an invaluable resource in terms of a contemporary analysis of the phonological and morphological systems of Cahuilla within the comparative picture of the Takic languages. Although my dissertation focuses primarily on new data collected from contemporary speakers of the TMD Cahuilla dialect, the aforementioned prior documentation of Cahuilla and Takic will be periodically referred to when contextualizing various morphophonological patterns in TMD Cahuilla. Given that the bulk of Seiler's and Harrington's unpublished field notes have yet to be transcribed and analyzed, I will mainly refer to examples from published sources, wherever relevant, and leave analysis of data from unpublished sources for future research.

1.4 Research on the Torres Martinez Desert dialect

In this section, I discuss details about research conducted in the field on the Desert dialect of Cahuilla at the Torres Martinez Desert Cahuilla Indian Reservation. This includes information about the speakers, details pertaining to data collection, as well as the current status of the TMD Cahuilla corpus and information about where the materials for this study have been archived.

1.4.1 Language experts

For this study, I had the privilege of working with two very knowledgeable and dedicated language experts who learned Cahuilla as their first language and spoke it fluently. Both speakers did not speak English until they entered grade school. My primary language expert, Mrs. Christina Dominguez Morreo, grew up on the Torres Martinez Desert Cahuilla Indian (TMDCI) Reservation with her parents and siblings, all of whom spoke Desert Cahuilla as well. Ms. Morreo is the niece of Seiler's oldest monolingual consultant, Ms. Chona Dominguez, who was also lived on the TMDCI Reservation. Mrs. Morreo's husband, Phillip Morreo, also spoke Desert Cahuilla. During the latter part of my documentation project, I also worked with Mrs. Morreo's daughter Faith Morreo, who commented that she recalled"only Cahuilla" spoken in her household as a child. There was also a small speech community that existed up until 10 years ago on the TMDCI Reservation made up of a dozen or so speakers between the ages of 50-80 years old, many of whom are named by my language experts in conversational recordings. Given these circumstances, Mrs. Morreo was able to maintain her Cahuilla to a great degree of fluency.

The second language expert consulted in this study was Mr. Gilbert Torro. Mr. Torro also grew up on the TMDCI Reservation where both his parents and grandparents spoke Desert Cahuilla fluently but lived off the Reservation for most of his adult life. Mr. Torro also knew Mrs. Morreo's husband and noted, that he often visited with friends and relatives on the TMDCI Reservation who also spoke Desert Cahuilla. This likely provided him opportunities to use and maintain his Desert Cahuilla as well. While Mrs. Morreo was more confident in the language to a degree, Mr. Torro provided additional insight from a male perspective and also some vocabulary having to do with animal husbandry and sports. In terms of age, both speakers were

in their 70's at the time when the recordings were made and were very competent in the language.

1.4.2 Fieldwork and data sources

Most of the data included in this study comes from my own data, which was collected during the summers of 2013 and 2014, and from various trips to the Torres Martinez Reservation during the period of 2018-2020. Supplemental materials from archival recordings were also used in this study to fill gaps in verbal paradigms, as well as missing forms from other lexical categories. These materials included data from published texts (Sauvel & Munro 1981; Sauvel & Elliott 2004; Seiler 1970, 1977, 1979), as well as unpublished field notes (Seiler 1955-1973; Hioki 1972-1973). All the Mountain dialect examples are from the same speaker, Ms. Katherine Sauvel, who worked with Seiler and Hioki from 1955 to 1973 and also published the previously cited set of texts in 2004. The Desert dialect examples are from various consultants from the Augustine Indian Reservation, as well as the Torres Martinez Indian Reservation. Data from my field work is from two Desert dialect speakers, Ms. Christina Dominguez Morreo and Mr. Gilbert Torro.

In total, a list of 97 verbal lexemes and 441 reduplicated and unreduplicated forms were compiled from the published and unpublished sources listed above. Data from my field work on the Torres Martinez Desert Cahuilla dialect, which I shall refer to as the 'TMD Cahuilla' corpus, accounts for an additional 24 verbal lexemes and 360 inflected forms, that include both reduplicated and unreduplicated forms. Each verbal paradigm in the TMD Cahuilla corpus consists of 15 different forms, inflected for both singular and plural subjects, as well as five separate tense/aspectual distinctions. Three tokens of each entry in the paradigm were elicited

from my consultant in a sound-attenuated portable sound booth. In addition to the verb paradigms, I collected 6 texts, a 200-word Swadesh list, a 100-word list of neologisms, and approximately 3 hours of conversations. Crucially, examples from the TMD Cahuilla corpus include forms inflected in a wide variety of tense/aspect/mood contexts, which are under-represented in the archival data of other varieties.

A great bulk of the TMD Cahuilla recordings (Huaute 2020) have already been archived at the Endangered Language Archive (ELAR),[1] one of the largest online digital repositories for the world's languages. Most of the materials are open access with the exception of the conversational materials, which have restricted access due to the sensitive nature of the content. At the moment there are a few additional recordings that have not been transcribed yet. These materials and any future recordings will be added to the collection at ELAR as well as the California Language Archive (CLA). Of utmost importance and priority to the author is that Cahuilla community members are able to easily access the archived TMD Cahuilla materials for use in teaching and learning the language.

1.5 Conventions used in the transcription of linguistic examples

Throughout this dissertation, the following standard linguistic glossing conventions will be used to distinguish between Cahuilla phones and phonemes, as well as written/orthographic representations of words and sounds that have been used in previous documentation of the language by various researchers.

[1] This collection is available online at: http://hdl.handle.net/2196/5bc077b7-71a2-4f82-8ae9-909ac89eaf7a.

Table 2. Orthographic conventions

Representation type	Convention	Description
Phonemic	Forward slashes: /x/, /y/	Used to represent distinct units of sound that convey meaning
Phonetic	Square brackets: [x], [y]	Used to represent distinct units of sound
Written/orthographic	Angled brackets: <x>, <y>	Used for written representations of words and sounds recorded by previous researchers
	Italics: *x*, *y*	Used for written representations of words in community-preferred practical orthography

For all linguistic examples included in this dissertation, I follow the standard Leipzig interlinear glossing rules for linguistic transcriptions, with the exception of a few additions. First, wherever possible, all examples will include an additional line above the phonetic transcription where the words or phrases will be presented whole, unsegmented, and in an orthography preferred by the community (which I am calling Tribal Community Preferred (TCP)) to represent the language. This line will be italicized to set it apart from the other lines and will represent a strictly phonemic transcription. Since stress is predictable in Cahuilla, aligning to the left-edge or root/stem initial syllable, I do not transcribe stress in the TCP orthography unless it deviates from this stress pattern. The purpose of this convention is to make all of the linguistic data and examples accessible to Cahuilla tribal community members and researchers, as well as other interested researchers and non-linguists.

Second, if known and wherever possible, I will include the name of the language expert who provided the example by typing their initials to the left of the cited source, just outside the

parentheses (see source abbreviations page for a full list of speaker and source codes). In some sections, I also include a code to indicate the context in which the example was collected (EL = elicitation, TX = text, CO = conversation, which will appear to the right of the speaker initials (e.g., CM.TX(SOURCE)). This convention is added with the intention of making all examples more transparent to other researchers, who may be interested in various aspects of the grammar, that may be dependent upon the linguistic context. Examples showing full interlinear glosses, as discussed above, are shown in (1).

(1)	a.	*awal*	b.	*pasukat*
		[ˈʔawɐl]		[ˈpasukɐt]
		/awa-l/		/pa-suk-at/
		dog-ABS		water-deer-ABS
		‘dog’ CM.EL(TMDC001.WAV)		‘horse’ CM(TMDC001.WAV)

In order to maintain consistency across the examples presented, all data from previous documentation on Cahuilla (both published manuscripts and unpublished archival sources) is converted to IPA from the original transcription, paying careful attention to preserving the phonetic detail to the extent possible. Where original orthographic representations are warranted, I use angled brackets, as shown in Table 2 above. Examples from previous documentation from both published and unpublished sources are also formatted as shown in (1) above. These examples also include the initials of the speaker, if known or indicated by the researcher. Data from published sources follow standard citation formatting (Author, year and page number). Source referencing for unpublished materials (collected between 1955-1973) varies, depending on the author.

For examples taken from Hansjakob Seiler's unpublished fieldnotes, I cite these with his initials followed by the letters 'fn' in superscript, which stands for fieldnotes. This is followed by the notebook or 'manuscript' (M) number or name and the page or entry number where the source can be found (e.g., (HS^{FN}M6:1234)). For the examples taken from Kojiro Hioki's fieldnotes, I follow the same convention (e.g., (KH^{FN}M4:1234)). For notebooks that are lacking page numbers or have sporadic or inconsistent pagination, I simply cite the page number of the PDF document followed by the letters 'pdf' (e.g., HS^{FN}M6:12PDF)). I use this convention given that most of Seiler and Hioki's materials have not been assigned a catalogue number. As for examples taken from the fieldnotes of John Peabody Harrington, I use the same convention described above, followed by microfilm number, the reel number, and page number, which is indicated as the preferred format for citation in the finding aid (e.g., (JPH^{FN}_MF3_R109_0146)). Finally, all data from the TMD corpus is referenced by its audio file number enclosed in parentheses (ex. (TMDC0000.WAV)).

1.6 Cahuilla language revitalization and reclamation

Before discussing the current state of Cahuilla language revitalization and reclamation efforts, I would like to preface the conversation with some key points and definitions. First, I would like to define the terms *language revitalization* and *language reclamation* as they are used in this dissertation. As discussed in Leonard (2012), scholars (particularly linguists) have often used the term 'language reclamation' to refer to a process of bringing a 'dormant' (or no longer spoken) language back into use, as opposed to language 'revitalization,' which refers to a similar process for languages that have never ceased to be spoken. Throughout this section and the remainder of the dissertation, I instead adopt Leonard's definition of language reclamation as "a

larger effort by a community to claim its right to speak a language and to set associated goals in response to community needs and perspectives" (Leonard 2012:359) and Hinton's definition of language revitalization as "the development of programs that result in re-establishing a language which has ceased being the language of communication in the speech community and bringing it back to use in all walks of life" (Hinton 2001:5).

The second point I would like to make is that, as with many other small languages and language communities, the Cahuilla language and its community of speakers have withstood tremendous colonial pressure to assimilate to "American" culture by learning and speaking English as a first language. Also problematic is the rhetoric around language endangerment, particularly when it is framed using terms like "dying," "vanishing," and "extinction," as pointed out by Leonard (2018:61) and Davis (2017:45-47). Such terms contribute to what Davis refers to as the 'erasure of colonial agency' or minimizing the ongoing (and underlying) causes of language endangerment (Davis 2017:39). Furthermore, using rhetoric that includes agentless verbs like "vanishing" seek to take away agency from communities, as if language death is some inevitable process that is beyond their control. Indeed many linguists (Krauss 1992, 1998; Hale et. al 1992) have knelled the bell on the issue of language endangerment with stark predictions. Most famous was the Krauss' "The world's languages in crisis" (1992) speech which warned that 50% of world's 6,000 languages were moribund and the other 50% would also be moribund by the end of the twentieth century. In terms of North America, Krauss later reported that nearly half of the 210 languages surveyed were spoken only by the grandparent generation (Krauss 1998). Even the German linguist Hansjakob Seiler, who spent a considerable part of his career researching and documenting Cahuilla had provided a dismal outlook on the language predicting in the 1970's that it would be "gone within the next 30-40 years" (Seiler 1977:21).

Third, in terms of measuring endangerment, there has been a great focus on language vitality being quantified, in terms of the number, age, and competency of "fluent" speakers. This approach is problematic in that it is often linguists or other outside researchers who get to determine who the "fluent" speakers are. This approach has also resulted in numerous publications that have attempted to formulate a scale for determining levels of endangerment such as the widely used 'Graded Intergenerational Disruption Scale' (GIDS) developed by Fishman (1991). Rather than using these qualitative means to measure vitality, I instead prefer to use a more holistic approach that includes broadening the definition of a speaker, as well as considering qualitative outcomes of language learners when discussing language vitality. Leonard (2008:27) also proposes a reevaluation of how languages are categorized in terms of their vitality. As shown in Figure 3 below, this scale includes "sleeping" languages in the scale of endangerment.

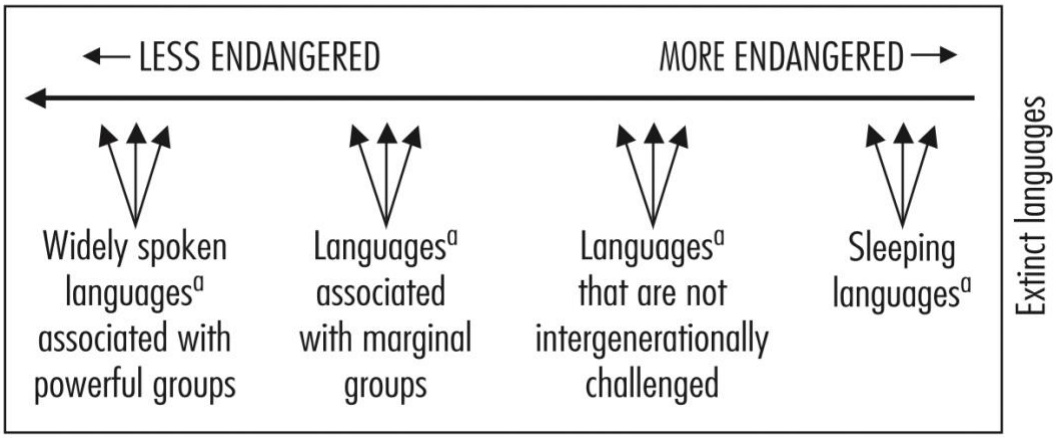


Figure 3. Proposed expanded language endangerment scale (Leonard 2008:27)

I would propose adding additional levels to this scale, since Cahuilla currently falls somewhere in between 'not intergenerationally challenged' and 'sleeping.' However, a single measurement such as this, ultimately falls short in that it does not capture other determining factors such as community support and learner attitudes.

It is worth pointing out however that, even in the face of such harmful rhetoric and predictions, Cahuilla has continued to be spoken in the community years after it was projected to become extinct. In terms of language reclamation, many of the nine federally recognized Cahuilla[2] communities continue to exercise self-determination by claiming their right to speak the language, set language goals and priorities to in response to their individual community needs. With regard to language revitalization, there are several Cahuilla communities that have active language programs that include community language classes, apprenticeships, and other community events where the language is used. In addition, most of the nine Cahuilla bands are using conducting research on the language and displaying it in their tribal communities, as well as on their tribal websites.

At the grassroots level there have also been efforts to create opportunities for interested Cahuilla tribal community members to hear and use the language by bringing in fluent language speakers. For example, in 2014 a summer language camp was organized by a non-profit group, which the author is part of, called *páayish néken*, in which an elder fluent speaker and other younger second language speakers were invited to come and share the language in an

[2] According to the 2010 US Census, there are nine federally recognized tribes under the Cahuilla tribal grouping : Agua Caliente Band of Cahuilla Indians, Augustine Band of Mission Indians, Cabazon Band of Mission Indians, Cahuilla, Los Coyotes Band of Cahuilla and Cupeño Indians, Morongo Band of Mission Indians, Santa Rosa Band of Cahuilla Indians, Torres Martinez Desert Cahuilla Indians, and Ramona Band of Cahuilla.

'immersion' style of teaching. Participants spent a whole weekend attempting to stay immersed in the Cahuilla language. This event and others like it have continued to spark interest in the language that continues today. This renewed interest in the language has resulted in the development of programs designed to create new speakers and teachers of the language using various methodologies such as language nesting, or the Master-Apprentice model developed by Leanne Hinton and members of the Advocates for Indigenous California Language Survival (AICLS) (Hinton 2018:452-53). In addition to these programs and events, the Cahuilla language is also being taught at institutions of higher education, including Palomar Community College, California Indian Nations College (CINC), as well as at the University of California Riverside (UCR), which offers a four-course series on Cahuilla,[3] the first Indigenous language series to be offered at a UC campus. Although the development of such classes has bolstered revitalization efforts, increasing interest by Cahuilla tribal community members to learn Cahuilla by taking classes at various institutions has also brought to attention the need for updated pedagogical materials. Though there is a wealth of documentation on the language, there is still little pedagogical materials that have been developed by leveraging these and other recent documentation sources.

To address this issue, I plan to develop a manuscript for a contemporary pedagogical grammar that will incorporate parts of this dissertation, as well as other unpublished materials from the TMD Cahuilla corpus and other archival records. This effort is part of a project that has been awarded a fellowship through the University of California President's Postdoctoral

[3] Since 2020 I have been the instructor on record for the fourth course in this series CAH 100: Cahuilla Literature and Linguistics, an upper division course offered through the Department of Comparative Literature and Languages at UC Riverside.

Fellowship, to be undertaken at the UC Riverside campus. The pedagogical grammar will be the second developed for Cahuilla, with the first being authored by Katherine Sauvel and Pamela Munro, which focuses on the Mountain dialect. In the new pedagogical grammar, I plan to address the two major dialects (Desert and Mountain), and to the extent possible, the Wanakik or Pass dialect, in order to provide learners with a well-rounded knowledge of dialects they may hear spoken in the various Cahuilla communities. The pedagogical grammar will provide a comprehensive discussion of several salient topics of the language, such as verbal reduplication, intonation, discourse markers, speaker and dialect variation, as well as other phenomena related to naturally-occurring speech that have not been previously addressed in Cahuilla grammatical descriptions. My pedagogical grammar, based in part on the work in this dissertation, will provide carefully selected examples that illustrate the complex morphological patterns and morphophonological processes and patterns of pronunciation in the language not covered extensively in the previous literature.

In summary, Cahuilla language revitalization and reclamation is an ongoing process that will require a concerted effort by both tribal governments, in the form of support, as well as buy-in from the Cahuilla community members themselves. As mentioned earlier, rather than discussing Cahuilla language revitalization and reclamation in the established framework of 'language endangerment,' in terms of speaker population and competence, I seek to shift the conversation to focus on the vitality of the community and quality of the outcomes of community-led revitalization efforts. Today, elders and 'fluent rememberers' of the language are working beside community language teachers, in an effort to expand the 'domains' or places in the community where Cahuilla is spoken in an effort to re-establish the intergenerational transmission of the language in the home.

1.7 Overview of Dissertation

The remaining structure of this dissertation is as follows. In Chapter 2, I present a description of the phonemic inventory of TMD Cahuilla, and where relevant, provide acoustic illustrations of salient contrasts. I also compare the phonemic inventory of TMD Cahuilla, with that of previously documented varieties of Cahuilla, discussing any notable differences. Chapter 3 provides a brief discussion of the phonotactics of the language, which are relevant for subsequent chapters. In Chapter 4, I discuss the suprasegmental phonology of TMD Cahuilla. Specifically, I address the stress and intonational systems, providing an overview of stress patterns previously proposed for Cahuilla. I then provide a description of stress and intonational patterns in TMD Cahuilla, based on phonological criteria for diagnosing each of these prosodic phenomena. Chapter 5 provides an overview of the morphology, discussing two major word classes, nouns and verbs, that exhibit complex morphophonological exponence. I also provide morphological templates for nouns and verbs in TMD Cahuilla, and discuss relevant division of stems into morphological classes. Chapter 6 provides a description of verbal reduplication, specifically in verbs that encode distributive and durative aspect, illustrating the complex morphophonological patterns associated with these forms. Finally, in Chapter 7 I conclude with a discussion of the implications of this research, particularly with regard to its relevance or application to language revitalization and reclamation efforts currently underway in the local Cahuilla communities, as well other research topics that warrant further investigation.

Chapter 2 Segmental Phonology

2.1 Introduction

This chapter presents an overview of the segmental phonological inventory of the Desert Dialect of Cahuilla, as spoken on the Torres Martinez Indian Reservation (henceforth TMD Cahuilla), which includes a description of the frequency and distribution for each phoneme and allophone attested in the language. While the focus of this chapter is on the segmental phonology of TMD Cahuilla, this description is contextualized with respect to previous documentation of the sound systems of other varieties of Cahuilla carried out during the 20th century, as well as that of other closely related Takic and Uto-Aztecan languages. For this purpose, this chapter presents an overview of proposed phone inventories and orthographic representations of Cahuilla varieties and contextualizes TMD Cahuilla sound patterns in terms of the areal and genealogical picture.

The phonemic inventory of TMD Cahuilla includes a series of plain voiceless stops and fricatives, some of which have a labialized version (which Hinton (1991) and Hill & Hill (2019:55) attribute to Yuman influence), as well as a voiceless postalveolar affricate. Voiced consonants include the voiced labiodental fricative, alveolar lateral approximant, labiovelar approximant and palatal approximant, as well as a series of nasals and several palatalized consonants. TMD Cahuilla has a vowel inventory that includes four phonemic vowel qualities /a, e, i, u/. This four-vowel system resembles that of the five-vowel inventory (/i, a, o, u, ɨ/) reconstructed for Proto-Uto-Aztecan (PUA), with Cahuilla departing from the PUA inventory by lacking /o/ and having a mid-front unrounded vowel /e/, which is proposed to correspond to PUA fronted /ɨ/ (Langacker 1970; Campbell & Langacker 1978). Contrastive vowel length is relatively marginal and does not carry a high functional load in the language, as attested in other,

previously documented varieties of Cahuilla (Hill & Hill 2019:58). In terms of areal features, TMD Cahuilla consonants lack a phonemic contrast in laryngeal features, that distinguishes for example, plain voiceless stops from aspirated, glottalized and voiced stops. Although this three-way distinction is common in many languages and language families of central and northern California, all three branches of Uto-Aztecan languages in California (Takic, Numic, and Tubatalabal) lack this feature (Golla 2011:204).

This chapter is laid out as follows. §2.2 presents a comparison of phone inventories and orthographies of Cahuilla language varieties. §2.3 provides a brief overview of the phonemic inventory of TMD Cahuilla. In §2.4 and §2.5, a description is provided for each of the consonant and vowel phonemes, respectively, discussing their frequency and distribution within words and illustrating their phonemic status by providing minimal pairs. The chapter concludes in §2.6 with a description of patterns of phonetic reduction of consonants. Other chapters which cover topics not discussed in this chapter but may cross-reference back to relevant sections in this chapter include: Chapter 3, which discusses the canonical syllable structure and phonotactic patterns of TMD Cahuilla and Chapter 4, which addresses the prosodic system of the language, encompassing stress and intonation.

2.2 Comparison of Phone Inventories and Orthographies

To date there has been a considerable amount of documentation on Cahuilla that spans several centuries, beginning with a short list of words and phrases obtained by early missionaries during the early 19th century (Caballeria 1902).[4] Between the late 19th century and early part of the

[4] In his book entitled *History of San Bernardino Valley: From the Padres to the Pioneers 1810-1851,* Father Francisco Caballero provides a word list and a translation of the Lord's prayer in the language of Guachama Indians,

20th century, additional documentation in the form of basic word lists and comparative vocabularies were collected by early settlers and anthropologists (Corbusier 1927; Davis 1917; Gatschet 1875a, 1875b; Henshaw 1893; Hewitt 1906; Powers 1875; Whipple 1893), as part of an initial survey of California's Indigenous languages. However, no extensive documentation of Cahuilla was undertaken until American ethnographer John Peabody Harrington began documenting the Mountain dialect of Cahuilla around 1911 (Mills and Brickfield 1986:76). Following Harrington, several other linguists have produced extensive documentation, resulting in a variety of writing systems, each reflecting various differences in both the representation of phones, as well as their inventories (Bright 1965; Seiler 1977; Munro 1981; Elliott 2004).

In this section, I provide a side-by-side comparison of various phone inventories for Cahuilla and their orthographic representations taken from linguistic documentation carried out during the 20th century and onward, including the TMD Cahuilla sound inventory (labeled TMD), which this study is based upon. Also included in this comparison is a developing orthography labeled TCP (Tribal Community Preferred), which represents a common writing system that is preferred by a majority of the tribal community teachers, educators, and language practitioners currently working to revitalize and reclaim the Cahuilla language. While this list is not exhaustive, it does provide the reader a key for identifying correspondences and/or differences between the various phone inventories and writing systems.

The following tables provide a side-by-side comparison of the various ways in which the phone inventories of the Mountain and Desert dialects of Cahuilla have been represented in

whose village was located in present-day San Bernardino Valley in California. Although his account has been disputed by some historians, the nouns and verb paradigms taken from now missing missionary records are clearly of Mountain Cahuilla origin.

different descriptive and documentary materials, as well as how they correspond to each other and that of the TMD Cahuilla inventory. The varieties represented include Mountain: 'Harrington' = Harrington 1922-57; 'Bright' = Bright 1965; 'Munro' = Munro 1981; 'Elliott' = Elliott 2004; and Desert: 'Seiler' = Seiler 1977,1979; 'TMD' = Huaute 2013-20.

Table 3. Symbols used to represent Cahuilla consonants in descriptive materials.

IPA	TCP	TMD	Elliott	Munro	Seiler	Bright	Harrington
p	p	p	p	p	p	p	p
t	t	t	t	t	t	t	t
k	k	k	k	k	k	k	k
k^w	<kw>	k^w	kw	–	k^w	–	kw, k^w
q	q	q	q	q	q	q	&, q
q^w	–	–	qw	qw	–	qw	&w, q^w
ʔ	’	ʔ	’	’	ʔ	ʔ	’
t͡ʃ	<ch>	t͡ʃ	ch	ch	č	č	tc, tš
m	m	m	m	m	m	m	m
n	n	n	n	n	n	n	n
ɲ	<ñ>	ɲ	ñ	ñ	ñ	ñ	n^y
ŋ	<ng>	ŋ	ng	ng	ŋ	ŋ	ŋ
v	v	v	v	v	v	v	v
s	s	s	s	s	s	s	ş, s
ʃ	<sh>	ʃ	sh	sh	š	š	c, š, ʃ
x	x	x	x	x	x	x	x
x^w	<xw>	x^w	xw	xw	x^w	xw	xw, x^w
h	h	h	h	h	h	h	h
w	w	w	w	w	w	w	w
j	y	j	y	y	y	y	y
l	l	l	l	l	l	l	l
ʎ	l	ʎ	ll	ll	l̃	ly	–
ɭ	l	ɭ	–	–	–	–	–

Table 4. Symbols used to represent Cahuilla vowels in descriptive materials.

IPA	TCP[5]	TMD	Elliott	Munro	Seiler	Bright	Harrington
a	a	a	a	a	a	a	a
ã	–	–	–	–	–	–	a̰
aː	aa	aː	aa	aa	aa	aa	aa
ãː	aa	ãː	–	–	–	–	a̰a̰
ɛ	e	ɛ	e	e	e	e	e
ɛ̃	–	–	–	–	–	–	ḛ
ɛː	ee	ɛː	ee	ee	ee	ee	ee
ɛ̃ː	ee	ɛ̃ː	–	–	–	–	ḛḛ
i	i	i	i	i	i	i	i
iː	ii	iː	ii	ii	ii	ii	ii
u	u	u	u	u	u	u	u
uː	uu	uː	uu	uu	uu	uu	uu

As shown in Tables 3 and 4, differences between systems not only include divergent orthographic conventions for the same segments (e.g., <ch>, <č>, <tš> or <tc> for [t͡ʃ]), but also different surface consonant and vowel inventories recorded. Some notable differences include the lack of a labialized velar stop [kʷ] in the Munro and Bright inventories (Mountain dialect), as well as the lack of a labialized uvular stop [qʷ] in Seiler's inventory (Desert dialect). Conversely, Harrington and Elliott (who also present data of the Mountain Cahuilla dialect) document the presence of both of these labialized stops. Interestingly, although all five of these sources (Elliott, Munro, Seiler, Bright, and Harrington) worked with the same Mountain Cahuilla speaker, Mrs. Katherine Sauvel, there is a discrepancy among them as to whether Cahuilla has one or two labialized stops. Given that none of these sources present minimal pairs and that they lack high quality recordings for instrumental analyses, it would be difficult to determine the

[5] The two nasalized long vowels [ãː] and [ɛ̃ː] are not differentiated from their non-nasalized counterparts in the TCP orthography.

source of this inconsistency amongst the various phone inventories (i.e., whether it can be attributed to interspeaker variation, intraspeaker variation, or variation in auditory perception across researchers).

Another discrepancy across these inventories is the lack of the palatalized lateral approximant [ʎ] in Harrington's documentation of Mountain Cahuilla, which is recorded in all other sources. In his notes, Harrington asserts that "neither Cahuilla nor Reyano has <λ>" (JPH[FN]:MF3_ R109_0350). Given that his primary Mountain Cahuilla consultant, Adan[6] Castillo, also spoke Luiseño (Mills and Brickfield 1986:76), which has only a plain alveolar lateral (Bright 1965b), it could be that the palatalized lateral had become neutralized in Mr. Castillo's idiolect, particularly word-finally and before [i], where it usually is realized as a palatalized lateral in all other documented sources. Another key difference amongst these inventories is that only the TMD Cahuilla inventory includes the retroflex lateral [ɭ], whereas none of the previously documented sources make mention of or record it in their inventories (for a further discussion of the allophonic distribution of laterals in TMD Cahuilla, see §2.4.2.5 below). Finally, there is one other difference regarding the vowel quality of previously documented varieties of Cahuilla: of all the sources surveyed, only Harrington transcribes nasalization on certain vowels found in limited contexts. These vowels are short or long nasal [ɛ̃] and [ã] and are found only in a few interjections, e.g., <ą̇hą̇ą̇> [provide IPA] 'exclamation of surprise,' <hą̇> [IPA] 'exclamation of agreement,' and <hę̇ę̇'/hę̇hę̇> [IPA] 'yes' (JPH[FN]: r109_0171-174). In TMD Cahuilla, the nasalized vowels are clearly perceivable on these same lexical items. Though marginal, I include these Table 4 above but exclude them from the phonemic vowel inventory in

[6] Although Harrington writes Adam Castillo's name as Adan (a Spanish equivalent of Adam), he went by the name Adam while serving as president of the California Mission Indian Federation during the early 1900's.

Table 6 below. Finally, The digraphs shown in angled brackets in the TCP orthography represent the preferred representation for sounds taken from consultation with a group of tribal community teachers, educators, and language. All other sounds are written the same across sources with the exception of the glottal stop, which is represented as an apostrophe <’> in the TCP orthography. In addition, the retroflex lateral [l̩] is not differentiated from the alveolar lateral [l] in the TCP orthography, though it is documented as an allophone in the TMD inventory (see discussion in §2.4.2.4).

2.3 Overview of TMD Cahuilla Phoneme Inventory

The phoneme inventory of TMD Cahuilla includes 20 consonants (/p, t, k, kʷ, q, ʔ, v, s, x, xʷ, h, t͡ʃ, m, n, ɲ, ŋ, w, j, l, ʎ/), as well as four vowels (/a, e, i, u/). All four vowels contrast in length. There are also four additional consonants /f, ð, g, ɾ/ and one vowel /o/, which also contrasts in length, that are found exclusively in loanwords. Given their marginal distribution, all loanword phonemes are given in parentheses in the phonemic inventory charts in Tables 3 and 4. Table 5 presents the Cahuilla consonant phoneme inventory.

Table 5. Cahuilla consonant phonemes

		Labial		Coronal			Dorsal			
		Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Palatal	Velar	Uvular	Glottal
Obstruents	Plosive	p			t			k	q	ʔ
	+labialized							kʷ		
	+voice							(g)		
	Fricative		(f)		s			x		h
	+labialized							xʷ		
	+voice		v	(ð)						
	Affricate					t͡ʃ				
Sonorants	Lateral				l		ʎ			
	Nasal	m			n		ɲ	ŋ		
	Approx.	w					j			
	Tap				(ɾ)					

As Table 5 shows, TMD Cahuilla contrasts seven stops, one affricate, four nasals, seven fricatives, four approximants and one tap. As mentioned above, voicing is not contrastive. Like other documented Cahuilla varieties, TMD has two labialized sounds, namely the labialized

voiceless velar plosive and labialized velar fricative,[7] and two palatalized sounds, the palatal nasal and palatal lateral approximant. The TMD consonant phoneme inventory differs only slightly from those previously described for other Cahuilla varieties: specifically, the TMD Cahuilla inventory features a voiceless labiodental fricative [f] introduced by loanwords, which is absent in the consonant inventories in Seiler's and Bright's descriptions. TMD Cahuilla also has a voiced labiodental fricative [v], which does not show allophonic variation. In Bright's inventory, he includes the voiced labiodental fricative but notes that it gets realized as a voiced bilabial fricative [β] when it is adjacent to [u] and transcribes both of these sounds as <v> (1965:242). Seiler also transcribes the voiced bilabial fricative [β] as <v> but makes no mention of a labiodental fricative in his inventory. Another difference is that TMD Cahuilla has a voiced alveolar lateral /l/ that gets realized as a voiced retroflex lateral [l] when it appears in the coda position of a syllable (this allophonic process is described in detail below in §2.4.2.5. To the best of my knowledge, no other documented sources mention this allophone or any other allophonic variation with regard to the voiced alveolar lateral in Cahuilla.

In terms of its vocalic system, TMD Cahuilla has four contrastive vowel qualities, /a, e, i, u/, that contrast in length, plus a fifth vowel /o/ (and its long counterpart) only found in loanwords. The vowels /a, e, i, u/ vary in quality depending on whether they appear in stressed or unstressed syllables. The quality of the mid-back rounded vowel /o/ does not change regardless of the presence/absence of stress. Vowel phonemes and allophones are discussed in more detail in §2.5 below. Table 6 presents the vowel inventory.

[7] Some sources (Harrington 1922-57; Bright 1965; Munro 1981; Elliott 2004) include a labialized uvular plosive [q^w] in their phoneme inventories for the Mountain dialect, however, not all of these sources report all three labial consonants ([k^w], [q^w], and [x^w]). For further discussion on the labialized stops see §2.2 above.

Table 6. TMD Cahuilla vowel phonemes

	Front	Central	Back
High	i, iː		u, uː
Mid	ɛ, ɛː		(o, oː)
Low	a, aː		

Having provided an overview of the TMD Cahuilla phoneme inventory, I now present each of the consonant and vowel phonemes with minimal or near minimal pairs and discuss their relative frequency, distribution, and allophonic variation in §2.4 and §2.5 below.

2.4 Consonants

This section provides an overview of the consonant inventory of TMD Cahuilla, as well as a description of the general frequency and distribution for each of the consonant phonemes and their allophones organized by natural classes. Given that certain allophonic processes involving consonants are restricted to coronal sounds, I organize them first by place of articulation, starting with the most anterior region of the vocal tract and moving towards the back. Within each of these groupings, consonant phonemes are further divided by manner of articulation. As with other varieties of Cahuilla, TMD Cahuilla does not exhibit a contrast in voicing, as nearly all of the obstruents are voiceless, except for the voiced labiodental fricative /v/. Other voiced consonants include the voiced velar plosive /g/ and the voiced dental fricative /ð/; however, they

are only marginally attested in a few Spanish loanwords. As discussed in §2.6 below, voiceless plosives may surface as voiced as part of a phonetic reduction process.

In terms of manner of articulation, TMD Cahuilla has a series of plosives (/p, t, k, g, q, ʔ/), fricatives (/f, v, s, x, h/), and labialized velars /kʷ, xʷ/. There is also a single affricate /t͡ʃ/, four nasals /m, n, ɲ, ŋ/, a pair of laterals /l, ʎ/, two glides /j, w/, and a tap /ɾ/. With regard to place of articulation, alveolar and velar sounds comprise the majority of the consonant phoneme inventory, each having 5 members. Finally, there are four marginally attested sounds /f, g, ð, ɾ/ that occur in limited contexts, as part of Spanish loanwords introduced during the early colonial period in California. In the following sections, I provide a description of the relative frequency and distribution for each of the consonant phonemes and their allophones, as well as phonetic illustrations of relevant phonemic contrasts.

2.4.1 Labial consonants

The labial consonants in TMD Cahuilla consist of a series of bilabial consonants, namely /p, m, w/, as well as a voiced labiodental fricative (/v/). Also included in this section is the voiceless labiodental fricative /f/, although its distribution is extremely marginal, appearing in only a single Spanish loanword in the TMD Cahuilla corpus. Examples of each of these phonemes in word-initial, post-vocalic, post-consonantal, and word-final positions are provided below.

2.4.1.1 Voiceless bilabial plosive /p/

Voiceless bilabial plosives occur in all positions of the word where they can serve as syllable onsets or codas. They are unaspirated in word-initial (1a-d) and word-medial (1e-j) position, and unreleased word-finally (1k-l). Examples of /p/ in all word positions are shown in (1).

(1) Word-initial

a. *pal*
[ˈ**p**a[]
/ˈ**p**a-l/
‘water’ CM(TMDC0028.WAV)

c. *pelema*
[ˈ**p**ɛlʌmɐ]
/**p**ɛlɛma/
‘heavy’ CM(TMDC0028.WAV)

b. *pipisiw*
[ˈ**p**ipɪsɪw]
/ˈ**p**ipɪsiw/
‘vomit’ CM(TMDC0028.WAV)

d. *puli’*
[ˈ**p**ulɪʔ]
/ˈ**p**uliʔ/
‘to fall’ CM(TMDC0028.WAV)

Post-vocalic

e. *hepi’*
[ˈhɛ**p**iʔ]
/ˈhɛ**p**iʔ/
‘breast’ CM(TMDC0028.WAV)

g. *pepi*
[ˈpɛ**p**i]
/ˈpɛ**p**i/
‘far’ CM(TMDC0028.WAV)

f. *mavipish*
[ˈmavi**p**ɪʃ]
/ˈmavi**p**iʃ/
‘night’ CM(TMDC0028.WAV)

h. *suplyi’*
[ˈsu**p**ʌiʔ]
/ˈsu**p**ʌiʔ/
‘one’ CM(TMDC0028.WAV)

Post-consonantal

i. *hespen*
[ˈhɛs**p**ɛn]
/ˈhɛs**p**ɛn/
‘very’ CM(TMCONVO2.WAV)

j. *kuspi*
[ˈkus**p**i]
/ˈkus**p**i/
‘throat’ CM(TMCONVO2.WAV)

Word-final

k. *amulawap*

l. *hempisap*

[ˈʔamulowɐ**p̄**]	[hɛmˈpisɐ**p̄**]
/ˈʔamu-lu-a**p**/	/hɛm-ˈpis-a**p**/
3SG-hunt-MOTP-IRR.SUB	3PL-enter-IRR.SUB
‘for her to hunt’ CM(TMDC0031.WAV)	‘that they enter’ CM(TMCONVO2.WAV)

As the examples above show, /p/ is unrestricted in its distribution both within words and syllables; however, its appearance at the end of words is less frequent, occurring only words that end in the vowel-initial allomorph /-ap/ of the relativizing suffix /-pi/. Spectrograms of word-medial [p̄] and word-final unreleased [p] are provided in Figures 4 and 5, respectively.

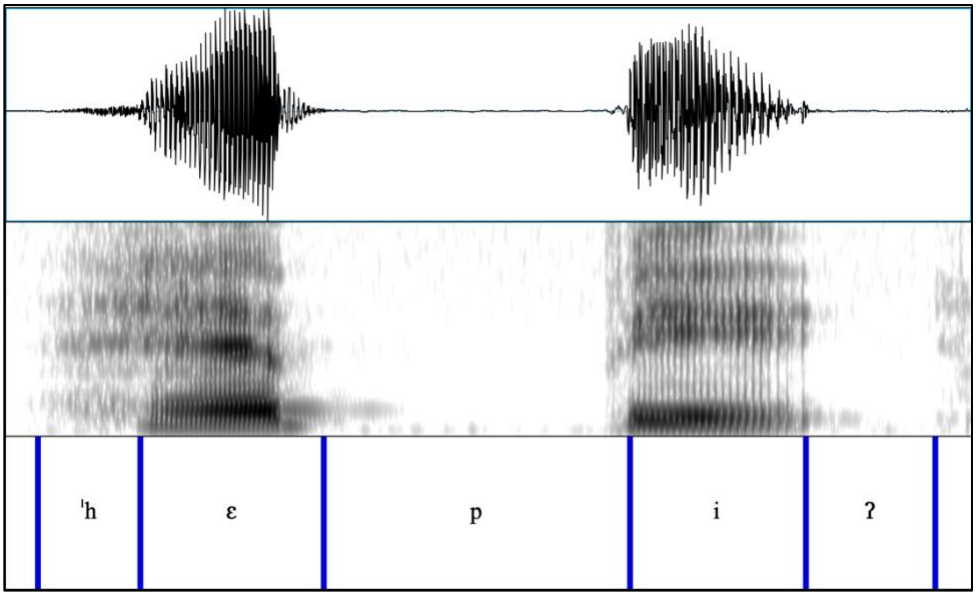


Figure 4. Spectrogram of word-medial, post-vocalic /p/ in [ˈhɛpiʔ] ‘breast’

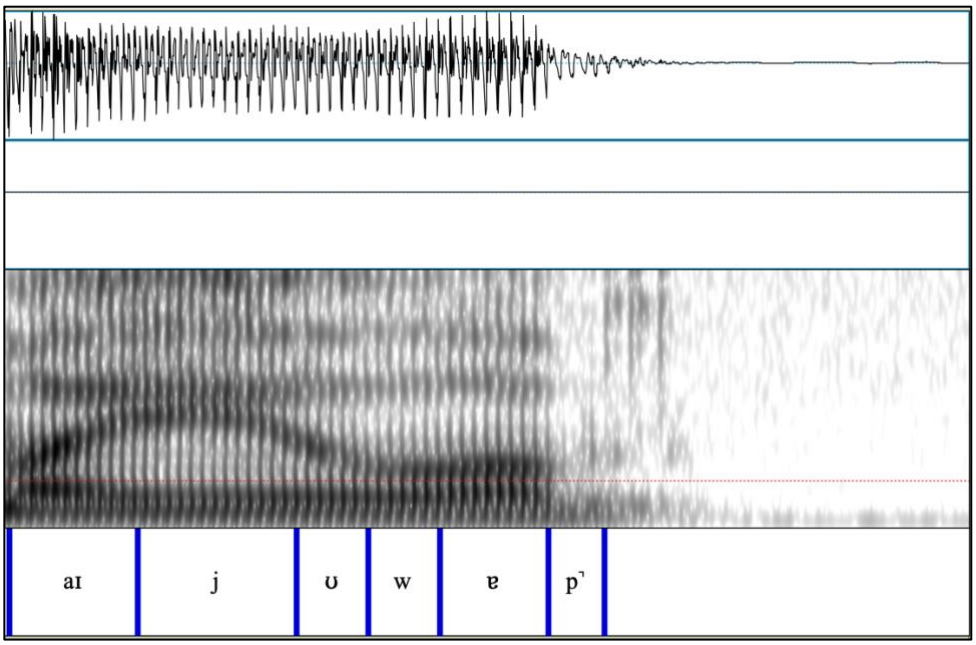


Figure 5. Spectrogram of word-final /p/ in [mɛmˈmamaɪjʊwɐp̄] ‘they help them’

As illustrated in Figure 4, word-medial /p/ is characterized by a closure, following the termination of voicing on the preceding vowel segment, followed by a short burst before the onset of voicing on the following vowel. Word-final /p/ (Figure 5) also shows a closure following the termination of voicing on the preceding vowel segment but does not show a burst or release at the end. Several irregular pitch pulses can be seen following the closure in Figure 5; however, I attribute these to creakiness or glottalization caused by a barely perceptible nasal release (this phenomenon is also attested in Korean (Lee 2006:4-5) and English (Kahn 2015:79) in word-final voiceless bilabial stops). Thus, /p/ is transcribed as [p̄] at the end of words. /p/ is also the only voiceless plosive that is unreleased word-finally (see §2.4.3.2, §2.4.4.4, and §2.4.4.9 for discussions on the realization of /t/, /k/, and /q/). Some minimal or near-minimal pairs that illustrate the phonemic status of /p/ are provided in (2).

(2) /p/ vs. /t/

a. *puku*
[ˈ**p**uku]
/ˈ**p**uku/
‘root’ CM(TMDC0028.WAV)

b. *tuku*
[ˈ**t**uku]
/ˈ**t**uku/
‘yesterday’ CM(TMDC0007-002.WAV)

/p/ vs. /k/

c. *pepi*
[ˈ**p**ɛpi]
/ˈ**p**ɛpi/
‘far’ CM(TMDC0028.WAV)

d. *kepi*
[ˈ**k**ɛpi]
/ˈ**k**ɛpi/
‘float’ CM(TMDC0029.WAV)

/p/ vs. /m/

e. *paxa*
[ˈpa**x**ɐ]
/ˈpa**x**a/
enter.IMP
‘enter’ CM(CM_VERBS2.WAV)

f. *maxa*
[ˈma**x**ɐ]
/ˈma**x**a/
give.IMP
‘give’ CM(TMDC0029.WAV)

2.4.1.2 Voiced bilabial nasal /m/

Voiced bilabial nasals occur in all positions of the word as well. They can occur as either a syllable onset or coda. Examples of /m/ in all word positions are shown in (3).

(3) <u>Word-initial</u>

a. *melkish*
[ˈ**m**ɛɬkɪʃ]
/ˈ**m**ɛɬk-i-ʃ/
noise-V-ABS
‘white man’ CM(TMDC0030.WAV)

c. *mipa*
[ˈ**m**ipɐʔ]
/ˈ**m**ipaʔ/
‘when’ CM(TMDC0028.WAV)

b. *mavipish*
[ˈ**m**avipɪʃ]
/ˈ**m**avipiʃ/
‘night’ CM(TMDC0028.WAV)

d. *muti*
[ˈ**m**uti]
/ˈ**m**uti/
‘short’ CM(TMDC0029.WAV)

Post-vocalic

e. *hemu’*
[ˈhɛ**m**uʔ]
/ˈhɛ-**m**uʔ/
3SG-nose
‘nose’ CM(TMDC0028.WAV)

g. *mumut*
[ˈmu**m**ʊt]
/ˈmu**m**u-t/
pile-ABS
‘ocean’ CM(TMDC0028.WAV)

f. *tamyat*
[ˈta**m**jɛt]
/ˈta**m**ja-t/
sun-ABS
‘sun’ CM(TMDC0028.WAV)

kimayka
h. [ˈki**m**aɪkɐ]
/ˈki**m**a-ɪkɐ/
door-towards
‘outside’ CM(TMCONVO2.WAV)

Post-consonantal

i. *wikikmal*
[ˈwikɪk**m**ɐ[]
/ˈwikik**m**a-l/
bird-ABS
‘bird’ CM(TMDC0028.WAV)

k. *naqma’*
[ˈnaq**m**ɐʔ]
/ˈnaq**m**aʔ/
listen.IMP
‘listen!’ CM(TMDC0028.WAV)

j. *nawishmal*
[ˈnawɪʃ**m**ɐ[]
/ˈnawiʃ**m**al/
‘girl’ CM(TMCONVO1.WAV)

l. *kenma*
[ˈkɛn**m**a]
/ˈkɛn-**m**a/
delicious-ADJ
‘delicious, tasty’ CM(TMCONVO1.WAV)

Word-final

m.	*sesem*	o.	*qalxalem*
	[ˈsɛsɛ**m**]		[ˈqaxalɛ**m**]
	/ˈsɛsɛ**m**/		/ˈqaxa-l-ɛ-**m**/
	laugh.IMP		quail-ABS-V-PL
	‘smile, laugh!’ CM(TMDC0028.WAV)		‘quails’ CM(TMDC0031.WAV)
n.	*silyaxam*	p.	*nem*
	[sɪˈʎaxɐ**m**]		[ˈnɛ**m**]
	/siˈʎaxa**m**/		/0-ˈnɛ**m**/
	‘dirty’ CM(TMDC0028.WAV)		3SG-walk.around.PRS
			‘he walks around’ CM(TMDC0028.WAV)

As the examples in (3) show, the distribution of /m/ is unrestricted both within the word and at the margins of syllables and does not exhibit any allophonic variation. Some (near-) minimal pairs that show a phonemic contrast between /m/ and other phonemes are given in (4).

(4) /m/ vs. /n/

a.	*hema*	c.	*hena*
	[ˈhɛ**m**aʔ]		[ˈhɛ**n**aʔ]
	/ˈhɛ-**m**aʔ/		/ˈhɛ-**n**aʔ/
	3S-hand		3S-father
	‘his/her hand’ CM(TMDC0028.WAV)		‘his/her father’ CM(TMDC0028.WAV)

/m/ vs. /j/

b.	*maxa*	d.	*jaxa*
	[ˈ**m**axɐ]		[ˈ**j**axɐ]
	/ˈ**m**axa/		/ˈ**j**axa/
	enter.IMP		‘to say’ CM(TMDC0028.WAV)
	‘enter’ CM(CM_VERBS2.WAV)		

2.4.1.3 Voiced labiovelar approximant /w/

Voiced labiovelar approximants occur in all positions of the word where they can serve as the syllable onset or coda. Examples of /w/ in all word positions are shown in (5).

(5) Word-initial

a. *wewnish*
[ˈ**w**ɛwnɪʃ]
/ˈ**w**ɛwn-ɪ-ʃ/
rain-V-ABS
'cloud, rain' CM(TMDC0028.WAV)

b. *wavuwet*
[ˈ**w**avʊwɛtʰ]
/ˈ**w**avu-wɛt/
long-AUG
'tall' CM(TMDC0028.WAV)

c. *wichiw*
[ˈ**w**it͡ʃuw]
/ˈ**w**it͡ʃiw/
'four' CM(TMDC0028.WAV)

d. *wipis*
[ˈ**w**ipɪs]
/ˈ**w**ipɪs/
pull.IMP
'pull!' CM(TMDC0028.WAV)

Post-vocalic

e. *aw'a*
[ˈʔa**w**ʔa]
/ˈʔa**w**-ʔa/
0-horn-POSS
'(its) horn' CM(TMDC0028.WAV)

f. *ewel*
[ˈʔɛ**w**ɛl]
/ˈʔɛ**w**ɛ-l/
bleed-ABS
'blood' CM(TMCONVO2.WAV)

g. *hiwen*
[ˈhi**w**ɛn]
/0-ˈhi**w**ɛn/
3SG-stand.upright
'he was there' CM(TMDC0016.WAV)

h. *a'avuwet*
[ˈʔaʔavʊ**w**ɛt]
/ˈʔaʔavu-**w**ɛt /
be.old-AUG
'elder' CM(TMCONVO1.WAV)

Post-consonantal

i.	*waxwen*	j.	*tayulwen*
	[ˈwax**w**ɛn]		[ˈtaju⌊**w**ɛn]
	/ˈwax-**w**ɛn/		/ˈtajul-**w**ɛn/
	dry-STAT		smooth-STAT
	‘to be dry’ CM(TMDC0028.WAV)		‘to be slippery’ CM(TMDC0028.WAV)

Word-final

k.	*hetew*	l.	*wel’isew*
	[ˈhɛtɛ**w**]		[ˈwɛlʔɪsɪ**w**]
	/ˈhɛ-tɛ**w**/		/ˈwɛlʔisɛ**w**/
	3SG-name		‘husband’ CM(TMDC0028.WAV)
	‘name’ CM(TMDC0030.WAV)		

As shown in (5), /w/ is also not restricted in its distribution and has no allophones. Several minimal or (near-)minimal pairs are given in (6) to illustrate that /w/ is a phonemically contrastive sound.

(6) /w/ vs. /j/

a.	*wa’ish*	b.	*ya’i*
	[ˈ**w**aʔɪʃ]		[ˈ**j**aʔi]
	/ˈ**w**aʔ-iʃ/		/ˈ**j**aʔi/
	roast-ABS		‘wind’ CM(TMDC0028.WAV)
	‘meat’ CM(TMDC0028.WAV)		

/w/ vs. /n/

c.	*wak’a*	d.	*naq’a*
	[ˈ**w**akʔɐ]		[ˈ**n**aqʔa]
	/ˈ**w**akʔɐ/		/ˈ**n**aqʔa/
	‘wing’ CM(TMDC0028.WAV)		‘ear’ CM(TMDC0028.WAV)

/w/ vs. /x/

e.	*qawal*	f.	*qaxal*
	[ˈqa**w**ɐ]		[ˈqa**x**ɐ]
	/ˈqa**w**al/		/ˈqa**x**al/
	‘woodrat’ CM(TMDC0020.WAV)		‘quail’ CM(TMDC0031.WAV)

2.4.1.4 Voiced labiodental fricative /v/

Voiced labiodental fricatives can occur in any position in the word, though they rarely occur word-initially, except in loanwords as exemplified in (7b). Word-finally /v/ is also rare, occurring only in one function word (7k) and an inflected verb stem (an imperative form) (7l). The distribution of /v/ within the syllable is unrestricted as it can occur in both the onset and coda positions. Examples of /v/ in all word positions are shown in (7).

(7) Word-initial

a.	*vuksekay*	b.	*verxuulem*
	[**v**ʊkˈsɛskaɪjɛʔ]		[**v**ɛrˈxuːlɛm]
	/**v**uk-ˈsɛ~skaɪj-ɛʔ/		/**v**ɛrˈxuːl-ɛ-m/
	throw-whip-IMP		bean-V-PL
	‘whip!’CM(TMDC0008.WAV)		‘beans’ GT(TMCONVO2.WAV)

Post-vocalic

c.	*tevishnek*	e.	*qivish*
	[ˈtɛ**v**ɪʃnɪk]		[ˈqi**v**ɪʃ]
	/ˈtɛ**v**iʃ-nɛk/		/ˈqi**v**iʃ /
	white-ADJ		cut.IMP
	‘white’ CM(TMDC0028.WAV)		‘cut!’ CM(TMDC0028.WAV)

d. *tavut*
[ˈta**v**ʊtʰ]
/ˈta**v**u-t/
rabbit-ABS
‘cottontail rabbit’
CM(TMDC0020.WAV)

f. *yuvishyu’*
[ˈju**v**ɪʃju?]
/ˈju**v**iʃju?/
wash.hair.IMP
‘wash hair!’ CM(TMDC0028.WAV)

Post-consonantal

g. *tukvash*
[ˈtuk**v**aʃ]
/ˈtuk**v**a-ʃ/
sky-ABS
‘sky’ CM(TMDC0028.WAV)

i. *ipaxvish*
[ˈʔipax**v**ɪʃ]
/ˈʔipa-x-**v**iʃ/
here-ABL-AGT
‘local inhabitant’ CM(TMCONVO1.WAV)

h. *ishvayka*
[ˈʔiʃ**v**aɪkɐ]
/ˈʔiʃ**v**a-ika/
left-towards
‘to the left’ CM(TMDC0028.WAV)

j. *menvaxik*
[ˈmɛn**v**axɪk]
/0-ˈmɛn**v**ax-ik/
3SG-come-IF
‘s/he’s going to come’ CM(TMDC0028.WAV)

Word-final

k. *huuv*
[ˈhuː**v**]
/ˈhuː**v**/
smell.IMP
‘smell!’ CM(TMDC0028.WAV)

l. *chepev*
[t͡ʃʌˈpɛ**v**]
/t͡ʃɛˈpɛ**v**/
INTJ
‘true’ CM(TMDC0028.WAV)

As the examples in (7) show, /v/ does not exhibit any restrictions in terms of its distribution within words and syllables, although is less frequently attested at the edges of words. /v/ does not exhibit any allophonic variation in TMD Cahuilla, although previous documentation

has reported that /v/ can realized as a voiced bilabial fricative [β] when it occurs before a high back rounded vowel [u] in some speakers of the Mountain dialect (Bright 1965). It should be noted however, that /v/ can lenite to [β] in fast speech in TMD through a process of post-lexical phonetic reduction. This process is discussed in further detail in §2.6. A set of (near-)minimal pairs is provided in (8) to show the contrastiveness of /v/.

(8) /v/ vs. /s/

a.	*qivish*	b.	*kisish*
	[ˈqi**v**ɪʃ]		[ˈki**s**ɪʃ]
	/ˈqi**v**iʃ/		/ˈki**s**-iʃ/
	cut.IMP		shade-ABS
	‘cut!’ CM(TMDC0028.WAV)		‘shade’ CM(TMDC0028.WAV)

/v/ vs. /p/

c.	*iva’*	d.	*ipa’*
	[ˈʔi**v**aʔ]		[ˈʔi**p**aʔ]
	/ˈʔi**v**aʔ/		/ˈʔi**p**aʔ/
	‘run!’ CM(CM_VERBS2.WAV)		‘here’ CM(TMDC0028.WAV)

/v/ vs. /m/

e.	*tav’a*	e.	*tam’a*
	[ˈta**v**ʔa]		[ˈta**m**ʔa]
	/ˈta**v**ʔa/		/ˈta**m**ʔa/
	‘to place’ CM(LANG_SURVEY.WAV)		‘mouth’ CM(TMDC0028.WAV)

2.4.1.5 Voiceless labiodental fricative /f/

The voiceless labiodental fricative is a loanword sound that has an extremely low frequency in TMD Cahuilla, appearing in only a single Spanish loanword in the TMD Cahuilla corpus, in the

onset position as shown in (9). There are no minimal or near-minimal pairs of /f/ in the TMD corpus.

(9) *elefaanti*
[ʔɛlʌˈ**f**aːnti]
/ʔɛlɛˈ**f**aːnti/
'elephant' CM(TMDC0035.WAV)

2.4.2 Coronal consonants

The coronal consonants /t, s, t͡ʃ, l, n/ comprise one of the largest sounds classes in the native lexicon of TMD Cahuilla. Also discussed in this section are the phonemes /ð, ɾ/ (found exclusively in Spanish loanwords), whose frequency and distribution are extremely marginal in the language.

2.4.2.1 Voiceless alveolar plosive /t/

Voiceless alveolar plosives occur in all positions of the word, where they can function as an onset or coda of syllables. Examples of /t/ in all word positions are shown in (10) and spectrograms of aspirated and unaspirated /t/ are provided in Figures 6 and 7.

(10) <u>Word-initial</u>

a. *tami*
[ˈ**t**ami]
/ˈ**t**ami/
'knee' CM(TMDC0028.WAV)

c. *temal*
[ˈ**t**ɛmɐl]
/ˈ**t**ɛma-l/
earth-ABS
'dirt' CM(TMDC0028.WAV)

b. *ti'i*
[ˈ**t**iʔi]
/ˈ**t**iʔi/
'stomach' CM(TMDC0028.WAV)

d. *tuchi*
[ˈ**t**ut͡ʃi]
/ˈ**t**ut͡ʃi/
'tie!' CM(TMDC0028.WAV)

Post-vocalic

e. *piita*
[ˈpiː**t**a]
/ˈpiː**t**a/
'string' CM(TMDC0012.WAV)

g. *muti*
[ˈmu**t**i]
/ˈmu**t**i/
'short' CM(TMDC0029.WAV)

f. *meten*
[ˈmɛ**t**ɛn]
/ˈmɛ**t**ɛn/
'many' CM(TMDC0028.WAV)

h. *hatiwenet*
[ˈha**t**iwʌnɛt]
/ˈha**t**i-wɛn-ɛ-t/
shine-STAT-V-ABS
'light' (TMDC0017.WAV)

Post-consonantal

i. *suktem*
[ˈsuk**t**ɛm]
/ˈsuk-**t**-ɛm/
deer-ABS-PL
'deer (pl.)' CM(TMDC0020.WAV)

j. *tavtem*
[ˈtav**t**ɛm]
/ˈtav-**t**-ɛm/
cottontail.rabbit-ABS-PL
'cottontail rabbit' CM(TMDC0020.WAV)

Word-final

k. *samat*
[ˈsamɐ**t**]
/ˈsama-**t**/
grass-ABS
'grass' CM(TMDC0028.WAV)

m. *sewet*
[ˈsɛwɛ**t**]
/ˈsɛwɛ-**t**/
snake-ABS
'snake' CM(TMDC0028.WAV)

l.	*pit*	n.	*kut*
	[ˈpi**t**]		[ˈku**t**]
	/ˈpi**t**/		/ˈku**t**/
	road-ABS		fire-ABS
	‘road’ CM(TMDC0028.WAV)		‘fire’ CM(TMDC0028.WAV)

As the examples above in (10) show, /t/ occurs in all word positions and in the onset and coda positions of syllables. /t/ is unaspirated in word-initial (10a-d) and word-medial (10e-j) positions. The phoneme /t/ also occurs at the end of words, where it functions as a nominalizing suffix (/-t/) (10k-n). In this position, it is followed by a breathy release of air. This phenomena is discussed further is §2.5.7. Spectrograms of unaspirated /t/ and word-final /t/ with a breathy release are shown in Figures 6 and 7, respectively.

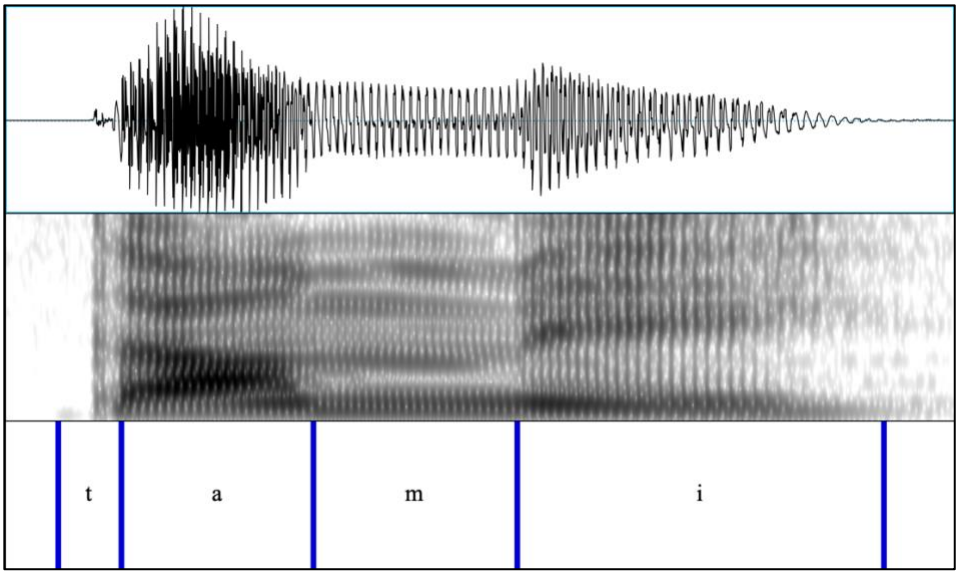


Figure 6. Spectrogram of unaspirated /t/ in word-initial [ˈtami] ‘knee’

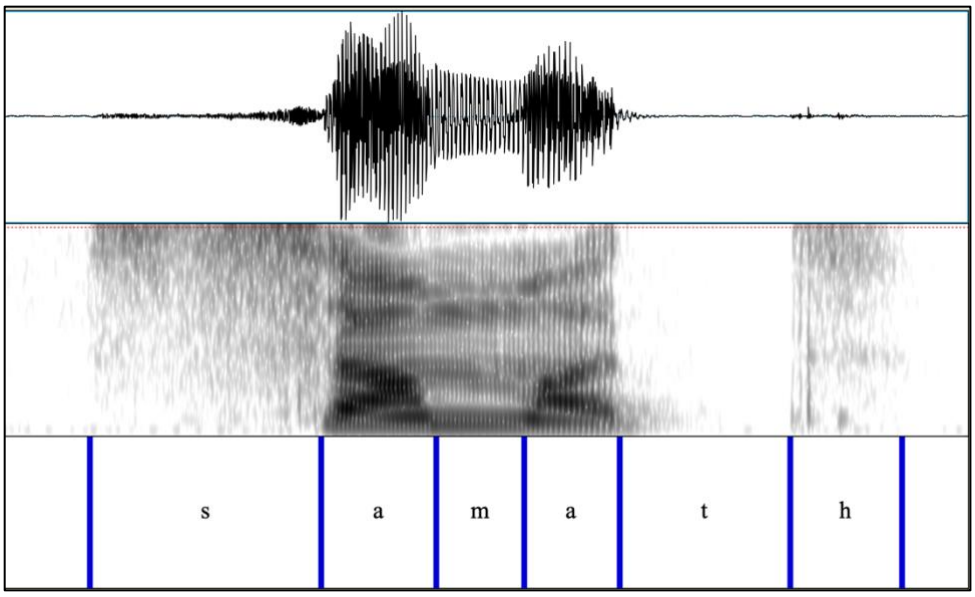


Figure 7. Spectrogram of breathiness following word-final /t/ in [ˈsamat] ‘grass’

In Figure 6, the spectrogram image shows that /t/ is unaspirated word-initially, exhibiting a short burst before the start of voicing on the following vowel segment. Conversely, word-final /t/ is characterized by a closure followed by a breathy release that is almost nearing a glottal fricative.

Following a previous analysis for Cahuilla (Seiler 1977), glottal fricatives following word-final /t/ are analyzed in TMD Cahuilla as voiceless vowels. Voiceless vowels have been documented in other varieties of Cahuilla (Seiler 1965,1977), as well as other Uto-Aztecan languages, particularly the Numic branch (Chemehuevi (Press 1979), Comanche (Canonge 1957; Armagost 1985; Charney 1993; Armagost and Miller 2000), Kawaiisu (Zigmond M., Curtis G., Munro P. 1990), Southern Paiute (Sapir 1930; Harms, 1966), Southern Ute (Givon 1979; Charney 1996; Oberly 2008, Oberly & Kharlamov 2015)), as well as Hopi (Whorf, 1934; Manaster-Ramer, 1986)) in Northern Uto-Aztecan. Voiceless vowels have also been documented in the Tepiman branch (Tohono O’odham; Miyashita 1998) and the Aztecan branch (Huastec

Nahuatl; Aguilar 2020) of Southern Uto-Aztecan (for further discussion on voiceless vowels, see §2.5.7). Some (near-)minimal pairs are presented in (11) to show the phonemic contrast between /t/ and other phonemes.

(11) /t/ vs. /p/

a.	*tuku*	b.	*puku*
	[ˈ**t**uku]		[ˈ**p**uku]
	/ˈ**t**uku/		/ˈ**p**uku/
	‘root’ CM(TMDC0028.WAV)		‘yesterday’ CM(TMDC0007-002.WAV)

/t/ vs. /k/

c.	*ti’i*	d.	*ki’i*
	[ˈ**t**iʔi]		[ˈ**k**iʔi]
	/ˈ**t**iʔi/		/ˈ**k**iʔi/
	‘stomach’ CM(TMDC0028.WAV)		‘no’ CM(TMDC0034.WAV)

/t/ vs. /j/

e.	*tulaka*	f.	*julaka*
	[ˈ**t**ulɐkɐ]		[ˈ**j**ulʊkɐ]
	/ˈ**t**ulaka/		/ˈ**j**ulukɐ/
	‘tomorrow’ GT(TMCONVO1.WAV)		‘head, hair’ CM(TMDC0028.WAV)

2.4.2.2 Voiceless alveolar fricative /s/

Voiceless alveolar fricatives occur in all positions of the word, as well as in the onset and coda positions of the syllable. Examples of /s/ in all word positions are shown in (12).

(12) Word-initial

a. *se'ish*
[ˈ**s**ɛʔɪʃ]
/ˈ**s**ɛʔ-i-ʃ/
bloom-V-ABS
'flower' CM(TMDC0028.WAV)

b. *sa'i*
[ˈ**s**aʔi]
/ˈ**s**aʔi/
'intestines' CM(TMDC0028.WAV)

c. *sivuyal*
[ˈ**s**ivʊjɐl]
/ˈ**s**ivuja-l/
worm-ABS
'worm' CM(TMDC0028.WAV)

d. *sutiwen*
[ˈ**s**utiwen]
/ˈ**s**uti-wen/
tied.around-STAT
'tied around' CM(TMCONVO2.WAV)

Post-vocalic

e. *kesiwen*
[ˈkɛ**s**iwɛn]
/ˈkɛ**s**i-wɛn/
wet-STAT
'wet' CM(TMDC0028.WAV)

g. *kisish*
[ˈki**s**ɪʃ]
/ˈki**s**-i-ʃ/
shade-V-ABS
'shade' CM(TMDC0028.WAV)

f. *taxliswet*
[ˈtaxlɪ**s**wɛt]
/ˈtaxli**s**-wɛt/
human-AUG
'Indian person' CM(TMDC0028.WAV)

h. *nepasem*
[ˈnɛpɐ**s**ɛm]
/ˈnɛ-pa**s**-ɛm/
1SG-older.brother-PL
'my older brothers' CM(TMDC0034.WAV)

Post-consonantal

i. *kiksuval*
[ˈkik**s**uva[]
/ˈkik**s**uva-l/
intoxicated-ABS
'drunk' GT(TMCONVO1.WAV)

j. *awsun*
[ˈʔaw**s**un]
/ˈʔaw**s**un/
'up, above' CM(TMDC0034.WAV)

Word-final

k.	*neqas*	l.	*hekwas*
	[ˈnɛqɐ**s**]		[ˈhɛkʷɐ**s**]
	/ˈnɛ-qa**s**/		/ˈhɛkʷa**s**/
	1sg-older.sister		3sg-tail
	‘my older sister’		'its tail’ CM(TMDC0028.WAV)
	CM(TMDC0003.WAV)		

As the examples in (12) show, /s/ does not exhibit any allophonic variation based on its position in the word or syllable. Some (near-)minimal pairs provided in (13) illustrate the phonemic status of /s/.

(13) /s/ vs. /t͡ʃ/

a.	*sukat*	b.	*chuka*
	[ˈ**s**ukɐt]		[ˈ**t͡ʃ**ukɐ]
	/ˈ**s**uka-t/		/ˈ**t͡ʃ**uka/
	deer-ABS		scratch.IMP
	‘deer’ CM(TMDC00.WAV)		‘scratch!’ CM(TMDC0029.WAV)

/s/ vs. /v/

c.	*kisish*	d.	*qivish*
	[ˈki**s**ɪʃ]		[ˈqi**v**ɪʃ]
	/ˈki**s**-iʃ/		/ˈqi**v**iʃ/
	shade-ABS		cut.IMP
	‘shade’ CM(TMDC0028.WAV)		‘cut!’ CM(TMDC0028.WAV)

/s/ vs. /j/

e.	*sa'i*	f.	*ja'i*
	[ˈ**s**aʔi]		[ˈ**j**aʔi]
	/ˈ**s**aʔi/		/ˈ**j**aʔi/
	'guts' CM(TMDC0028.WAV)		'wind' CM(TMDC0028.WAV)

2.4.2.3 Voiceless postalveolar affricate /t͡ʃ/

Voiceless postalveolar affricates occur in word-initial and medial positions but do not occur word-finally. Examples of /t͡ʃ/ in word-initial (14a-d) and medial (post-vocalic (14e-h) and post-consonantal (14i-j)) positions are shown next.

(14) Word-initial

a.	*chexiwen*	c.	*chikima*
	[ˈ**t͡ʃ**ɛxiwɛn]		[ˈ**t͡ʃ**ɪkimɐ]
	/ ˈ**t͡ʃ**ɛxiwɛn /		/ˈ**t͡ʃ**ikima/
	'clear' CM(TMDC0021.WAV)		'thick' CM(TMDC0028.WAV)
b.	*chachap*	d.	*chu'an*
	[ˈ**t͡ʃ**at͡ʃap]		[ˈ**t͡ʃ**uʔʌn]
	/ˈ**t͡ʃ**a~t͡ʃap/		/ˈ**t͡ʃ**uʔan/
	RED-chop.IMP		spit.IMP
	'chop (wood)!' CM(TMDC0028.WAV)		'spit!' CM(TMDC0028.WAV)

Post-vocalic

e.	*metechem*	g.	*qicham*
	[ˈmɛtʌ**t͡ʃ**ɛm]		[ˈqɪ**t͡ʃ**ɐm]
	/ˈmɛtɛ-**t͡ʃ**-ɛ-m/		/ˈqi**t͡ʃ**a-m/
	many-ABS-V-PL		thing-PL
	'many (anim.)' CM(TMDC0028.WAV)		'things' CM(TMDC0028.WAV)

f. *qachi*
[ˈqa**t͡ʃ**i]
/ˈqa**t͡ʃ**i/
‘strike, poke!’ CM(TMDC0028.WAV)

h. *hepuchily*
[ˈhɛpʊ**t͡ʃ**ɪʎ]
/ˈhɛpu**t͡ʃ**-l/
eye-ABS
‘seed’ CM(TMDC0028.WAV)

Post-consonantal

i. *sunchi*
[ˈsun**t͡ʃ**i]
/ˈsun**t͡ʃ**i/
‘nearby’ CM(TMDC0028.WAV)

j. *selhiischi*
[sɪʎˈhiːs**t͡ʃ**i]
/sɛʎˈhiːs**t͡ʃ**i/
tell.story.IMP
‘tell a story!’ CM(TMDC0005.WAV)

As shown in (14), the phoneme /t͡ʃ/ can occur as a syllable onset but not as a coda. In the coda position, a fricative allophone [ʃ] surfaces instead, accounting for the absence of word-final /t͡ʃ/. This allophonic alternation is exemplified in (15a-d).

(15) a. *qawish*
/ˈqaw-i-**t͡ʃ**/ → [ˈqa.wɪ**ʃ**]
rock-v-ABS
‘rock’ CM(TMDC0016.WAV)

b. *qawichi*
/ˈqaw-i-**t͡ʃ**-i/ → [ˈqa.wɪ.**t͡ʃ**i]
rock-v-ABS-ACC
‘rock (obj.)’ CM(TMDC0016.WAV)

c. *chipatmal*

/ˈ**t͡ʃ**ipatma-l̩/ → [ˈ**t͡ʃ**i.pɐt.mɐl̩]

winnowing.basket-ABS

'winnowing basket' CM(TMDC0019.WAV)

d. *chishpatmal*

/ˈt͡ʃi~**t͡ʃ**ipatma-l̩/ → [ˈt͡ʃi**ʃ**.pɐt.mɐl̩]

RED~winnowing.basket-ABS

'winnowing baskets' CM(TMDC0019.WAV)

As shown in these examples, when /t͡ʃ/ is syllabified as an onset, its surface form remains unchanged (15b,c). However, when it is syllabified as a coda /t͡ʃ/ surfaces as [ʃ] (15a,d). The ʃ-coda rule is applied post-lexically, after all morphemes have been attached and after vowel epenthesis and syncope rules (morphologically conditioned vowel syncope and epenthesis in nouns will be discussed in Chapter 5, §5.4.2) have applied, as shown in Table 7.

Table 7. Phonological derivation of /ʃ/ allophone

Word	*qawish* 'rock'	*qawichi* 'rock (obj.)'	*chipatmal* 'winnowing basket'	*chishpatmal* 'winnowing basket (pl.)'
Underlying representation	/ˈqaw-t͡ʃ/ rock-ABS	/ˈqaw-t͡ʃ-i/ rock-ABS-ACC	/ˈt͡ʃipatma-l/ w.basket-ABS	/ˈt͡ʃi~t͡ʃipatma-l/ RED~w.basket-ABS
Epenthesis	ˈqaw**i**-t͡ʃ	ˈqaw**i**-t͡ʃ-i	–	–
Syncope	–	–	–	ˈt͡ʃit͡ʃ_patmal
ʃ-coda rule	ˈqa.wi**ʃ**	–	–	ˈt͡ʃi**ʃ**.pat.mal
Surface form	[ˈqa.wɪ**ʃ**]	[ˈqa.wɪ.**t͡ʃ**i]	[ˈ**t͡ʃ**i.pɐt.mɐl̩]	[ˈt͡ʃi**ʃ**.pɐt.mɐl̩]

Syllable-based alternations of [t͡ʃ] and [ʃ] are also reported in other varieties of Cahuilla, as well as in other Takic languages, Cupeño and Luiseño (see Hill & Hill (2019:76)), where their complementary distribution is nearly exceptionless. This phonological process is discussed in further detail in Chapter 4. Several (near-)minimal pairs are shown in (16) demonstrating that /t͡ʃ/ contrasts with other phonemes in TMD Cahuilla.

(16) / t͡ʃ/ vs. /k/

a.	*chiyul*	b.	*kiyul*
	[ˈ**t͡ʃ**iju̥l]		[ˈ**k**iju̥l]
	/ˈ**t͡ʃ**ijul/		/ˈ**k**ijul/
	‘feathers’ CM(TMDC0028.WAV)		‘fish’ CM(TMDC0028.WAV)

/ t͡ʃ/ vs. /t/

c.	*muchi*	d.	*muti*
	[ˈmu**t͡ʃ**i]		[ˈmu**t**i]
	/ˈmu**t͡ʃ**i/		/ˈmu**t**i/
	‘in front’ GT(TMDC0034.WAV)		‘short’ CM(TMDC0029.WAV)

2.4.2.4 Voiced alveolar lateral approximant /l/

Voiced alveolar lateral approximants occur in all word positions, but their occurrence at the beginning of words is less frequent than in word-medial or word-final positions. Since /l/ also is an exponent (the absolutive suffix /-l/) or is part of a productive suffix (singular durative suffix /-qal/), it frequently occurs word-finally (17h-k). Examples of /l/ in all word positions are shown in (17).

(17) Word-initial

a. *lepeqi*
[ˈ**l**ɛpɛqi]
/ˈlɛpɛqi/
kneel.IMP
‘kneel down!’ CM(TMDC0028.WAV)

Post-vocalic

b. *selnek*
[ˈsɛ**l̩**nɛk]
/ˈsɛ**l**-nɛk/
red-ADJ
‘red’ CM(TMDC0028.WAV)

c. *mulish*
[ˈmu**l**ɪʃ]
/ˈmu**l**i-ʃ/
dust-ABS
‘dust’ CM(TMDC0029.WAV)

d. *palnik*
[ˈpa**l̩**nɪk]
/ˈpa**l**-nɛk/
water-ADJ
‘wet, soaked’ CM(TMDC0028.WAV)

e. *naxaluvel*
[ˈnaxɐ**l**ʊvɛl̩]
/ˈnaxa-**l**u-vɛ-l/
man-TRNSF-REAL.SUB-ABS
‘old man’ GT(TMCONVO2.WAV)

Post-consonantal

f. *suplish*
[ˈsup**l**ɪʃ]
/ˈsup**l**i-ʃ/
one-MULT
‘once’ CM(TMDC0030.WAV)

g. *tekluvel*
[ˈtɛk**l**uvɛl̩]
/ˈtɛk**l**u-vɛ-l/
still-REAL.SUB-ABS
‘midday, noon’ CM(TMCONVO2.WAV)

Word-final

h.	*ewel*	i.	*malmal*
	[ˈʔɛwɛ**ɭ**]		[ˈmaɻma**ɭ**]
	/ˈʔɛwɛ-**l**/		/ˈmalma-**l**/
	blood-ABS		butterfly-ABS
	‘blood’ CM(TMDC0028.WAV)		‘butterfly’ CM(TMDC0033.WAV)
j.	*chiyul*	k.	*taxmuqal*
	[ˈt͡ʃiju**ɭ**]		[ˈtaxmu-qɐ**ɭ**]
	/ˈt͡ʃiju-**l**/		/0-ˈtaxmu-qɐ**l** /
	feathers-ABS		3SG-sing-DUR.SG
	‘feathers’ CM(TMDC0028.WAV)		‘he sings’ CM(TMDC0034.WAV)

Like /t͡ʃ/, and as shown in these examples, the phoneme /l/ exhibits an allophonic pattern that is conditioned by its position within the syllable: an alveolar lateral allophone of /l/ occurs only in the onset position of the syllable (17a), (17c), (17e-g); otherwise, a retroflex allophone [ɭ] occurs in the coda position (17b), (17d) (17h-k). The rule for retroflexion of laterals, which was not previously described for any Cahuilla variety, can thus be formalized as shown in (18).

(18) Rule for retroflexion of laterals

$l \rightarrow ɭ \ / \ \sigma \ CV\_\_ \ ] _{\sigma}$

Examples of this allophonic alternation are shown in (19).

(19) a. *temal*

/ˈtɛma-l/ → [ˈtɛ.ma**ɭ**]

earth-ABS

‘earth’ CM(TMD_SWADESH_001.WAV)

b. *temali*

/ˈtɛma-l-i/ → [ˈtɛ.ma.**ɭ**i]

earth-ABS-ACC

‘earth (obj.)’ CM(TM_CONVO2.WAV)

c. *selnik*

/ˈsɛl-nik/ → [ˈsɛ**ɭ**.nɪk]

red-ADJ

‘red’ CM(TMDC0021.WAV)

d. *se’lik*

/ˈsɛʔl-ik/ → [ˈsɛʔ. **ɭɪk**]

red.INT-ADJ

‘very red’ CM(TMDC0021.WAV)

As shown in (19) above, /l/ surfaces as an alveolar lateral when it is syllabified as an onset. Otherwise, the retroflexed lateral allophone surfaces when it is syllabified as a coda. Like the allophonic alternation pattern described for the alveopalatal affricate, this allophonic rule is applied post-lexically after all morphemes have been attached, as shown in Table 8.

Table 8. Phonological derivation of the [ɭ] allophone

Word	*temal* ‘earth’	*temali* ‘earth (obj.)’	*selnik* ‘red’	*se’lik* ‘very red’
Underlying representation	ˈtɛma-l earth-ABS	ˈtɛma-l-i earth-ABS-ACC	ˈsɛl-nik red-ADJ	ˈsɛʔl-ik red.INT-ADJ
ɭ-coda rule	ˈtɛ.ma**ɭ**	–	ˈsɛ**ɭ**.nik	–
Surface form	[ˈtɛ.mɐ**ɭ**]	[ˈtɛ.mɐ.**ɭ**i]	[sɛ**ɭ**.nɪk]	[ˈsɛʔ.**ɭ**ɪk]

In addition to the retroflex lateral, the alveolar lateral approximant has another allophone, the palatal lateral approximant [ʎ]. This allophone surfaces when preceded by a high front unrounded vowel (a single vowel or where /i/ is the latter portion of a falling diphthong (e.g., /ɛi/, /ai/)), regardless of whether it occurs as the onset or coda of a syllable. Elsewhere, the lateral approximant is realized as either an alveolar or retroflex, depending on position within the syllable as described above. The rule for palatalization of laterals can thus be stated as shown in (20).

(20) Rule for palatalization of laterals

$l \rightarrow ʎ \; / \; i \_\_$

Examples of this allophonic pattern are shown in (21).

(21) a. *isily*

/ˈʔisi-l/ → [ˈʔi.siʎ]

coyote-ABS

‘coyote’ CM(TMDC0016.WAV)

b. *isilyi*

/ˈʔisi-l-i/ → [ʔi.sɪ.ʎi]

coyote- ABS-ACC

‘coyote (obj.)’ CM(TMDC0016.WAV)

c. *kilye*

/kilɛ/ → [kɪ.ʎɛ]

‘not’ (full form)

d. *kily*

/kilɛ/ → [kɪʎ]

‘not’ (truncated form)

As the examples in (21) show, the palatal lateral occurs predictably in surface forms whenever it is preceded by /i/, regardless of whether it is in the onset or coda position of the syllable. This is true for both derived (21a-b) and non-derived forms (21c-d). As with the other allophones of /l/, the palatalizing rule is applied post-lexically after all morphemes have been attached, and vowel epenthesis and truncation have been applied, as shown in Table 9 below.

Table 9. Phonological derivation of the [ʎ] allophone

Word	*isily* ‘coyote’	*isilyi* ‘coyote (obj.)’	*kilye* ‘not’	*kily* ‘not’
Underlying representation	/ˈʔis-l/ coyote-ABS	/ˈʔis-l-i/ coyote-ABS-ACC	/ˈkilɛ/ NEG	/ˈkilɛ/ NEG
Epenthesis	ˈʔis**i**-l	ˈʔis**i**-l-i	–	–
Truncation	–	–	–	ˈkil
Palatalization	ˈʔi.si**ʎ**	ˈʔi.si.**ʎ**i	ˈki.**ʎ**ɛ	ˈki**ʎ**
l-coda rule	blocked	–	–	blocked
Surface form	[ˈʔi.si**ʎ**]	[ˈʔi.si.**ʎ**i]	[ˈki.**ʎ**ɛ]	[ˈki**ʎ**]

The derivation table in Table 9 above shows that palatalization of a lateral approximant occurs in both derived (e.g., [ˈʔisiʎ] /ˈʔis-l/ ‘coyote (absolutive)’) and non-derived

monomorphemic forms (e.g. [ˈkiʎɛ] /ˈkilɛ/ ‘not’), whenever it is preceded by /i/ or a falling diphthong containing /i/ as the second member. In the case of the non-derived negation word [ˈkiʎɛ] /ˈkilɛ/ ‘not’, loss of word-final /ɛ/ (truncation) results in a shortened form that occurs frequently before prefixed verbs. This process yields a form where the final lateral is syllabified as a coda, where we would normally expect the retroflex lateral rule to apply. Instead, the retroflex rule is blocked and the lateral remains palatalized. This process is also exemplified in the derived forms [ˈʔisiʎ] ‘coyote’ and [ˈʔisiʎi] ‘coyote (ACC)’, where the lateral remains palatalized regardless of whether it gets syllabified as an onset or coda, suggesting that the rule of lateral palatalization is ordered before the rule of lateral retroflexion. Examples of all three lateral approximants and their distributions by word and syllable position are shown in Table 10 below.

Table 10. Distribution of lateral approximants in TMD Cahuilla

	ONSET		CODA	
	WORD-INITIAL	WORD-MEDIAL	WORD-INITIAL	WORD-FINAL
[l]	[ˈ**l**ɛ.pɛ.qi] 'kneel' (TMDC0024.WAV) [ˈ**l**aʔ.**l**aʔ] 'goose' (S&H 1979:96)	[ˈhu.**l**u.**l**u] 'back' (TMDC0028.WAV) [mʌ.ˈtu.**l**a.ka] /mu-tulaka/ nose-tomorrow 'early' (TMDC31.WAV)	unattested	unattested
[l̥]	unattested	unattested	[ˈmɛ**l̥**.kɪʃ] /mɛlki–ʃ/ make.noise-ABS 'American' (TMDC30.WAV) [ˈtu**l̥**.nɪk] /tul-nik/ coal-ADJ 'black' (TMDC0022.WAV)	[ˈku.ʔa**l̥**] /kuʔa-l/ worm-ABS 'worm' (TMDC0028.WAV) [ˈpa**l̥**] /pa-l/ water-ABS 'water' (TMDC0028.WAV)
[ʎ]	unattested	[ˈxɛɪ.**ʎ**a] /xɛɪla-l/ clothe-ABS 'clothes' (TMDC0003.WAV) [ˈmaɪ.**ʎ**ɐ] /0-maɪla/ 3SG-son 'her son (TMDC0002.WAV)	[kɪ**ʎ**.ˈha.xi] /kil=ˈhaxi/ neg=who 'no one' (TMDC0034.WAV) [ˈwɪ**ʎ**.pa] /ˈwil-pa/ lard-LOC 'in lard.'(TM_CONVO1.WAV)	[ˈhɛ.pu.t͡ʃɪ**ʎ**] /hɛ-put͡ʃi-l/ 3SG-eye-ABS 'seed' (TMDC28.WAV) [ˈmɛ.ɲi**ʎ**] /mɛni-l/ moon-ABS 'moon' (TMDC28.WAV)

As Table 10 shows, the plain alveolar lateral and the retroflex lateral are in complementary distribution with each other in terms of their position within the syllable. The palatal lateral, however, occurs freely as both an onset and coda within the syllable, as long as it is preceded by /i/ or a falling diphthong containing /i/ as its second member. The palatalization rule then accounts for the palatal lateral being unattested at the beginning of words in TMD Cahuilla.

Although the distribution of palatal laterals across syllable margins in various positions of the word fits the expected pattern of an allophone conditioned by a preceding /i/, there are some examples (though marginal) where lateral palatalization is not conditioned by /i/. For example, the noun /juːʎ/ 'younger brother' has a word-final palatal lateral that is preceded by a high back rounded vowel [u] instead of the expected high front unrounded vowel [i]. The noun /juːʎ/ also forms a (near-)minimal pair with the noun /ˈpuːl/ 'shaman', providing additional evidence in favor of treating the palatal lateral as a distinct phoneme.[8] Thus, the palatal lateral is included as a part of the phoneme inventory of TMD Cahuilla (see §2.4.3.1). Spectrogram images of the plain alveolar lateral and its retroflex and palatal allophones are provided in Figures 8, 9, and 10, respectively.

[8] It is possible to assume that the phonemic palatal lateral in /juːʎ/ may encode a diminutive meaning as part of sound symbolism: it has been noted that palatal consonants are found frequently in words with diminutive meaning in many languages of California (Golla 2011:223). Hinton (1991:147) also notes that this feature is productive in all Yuman languages, as well as some Uto-Aztecan languages (Cahuilla, Luiseño, and Cupeño), as evidenced by words such as in the Cahuilla word [ˈʔiŋiʃiʎ] 'little' and the diminutive suffix /-maʎ/. It is possible to assume this to be true also of /juːʎ/ 'younger brother', which also has a diminutive connotation.

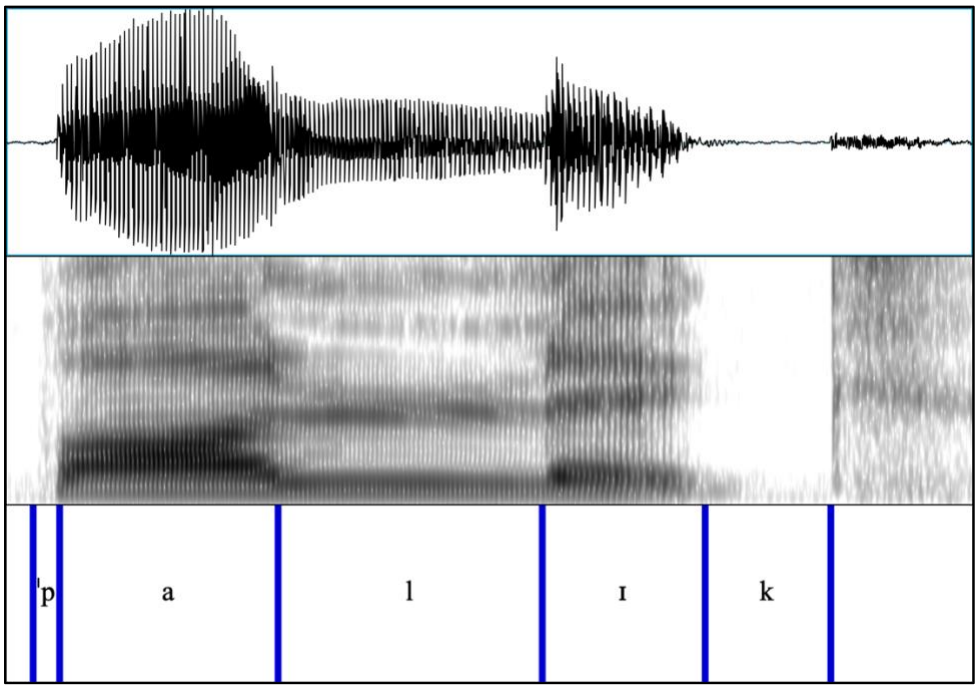


Figure 8. Spectrogram image of plain alveolar lateral [l] in /ˈpalik/ ‘wet’

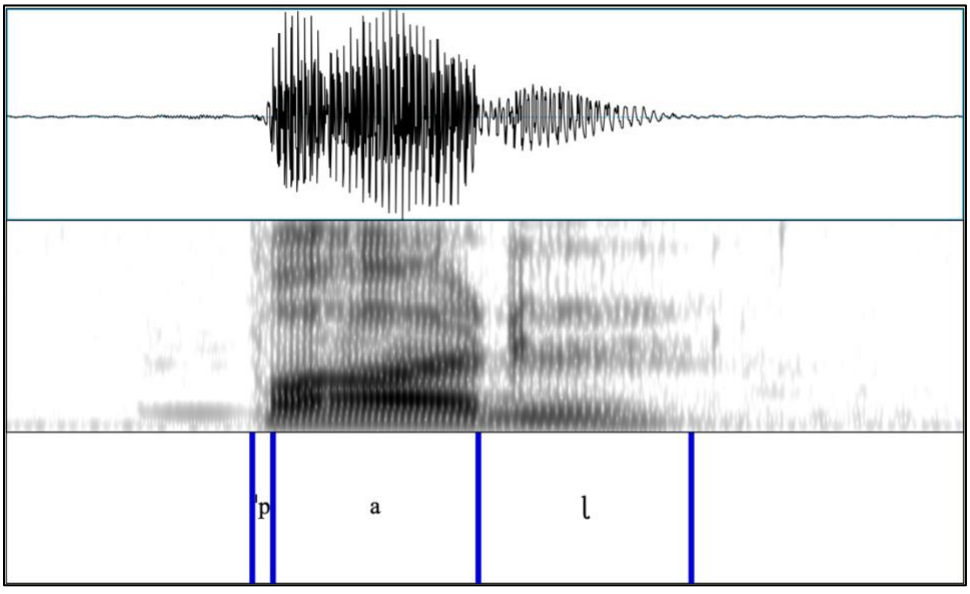


Figure 9. Spectrogram image of retroflex alveolar lateral [ɭ] in /ˈpal/ ‘water’

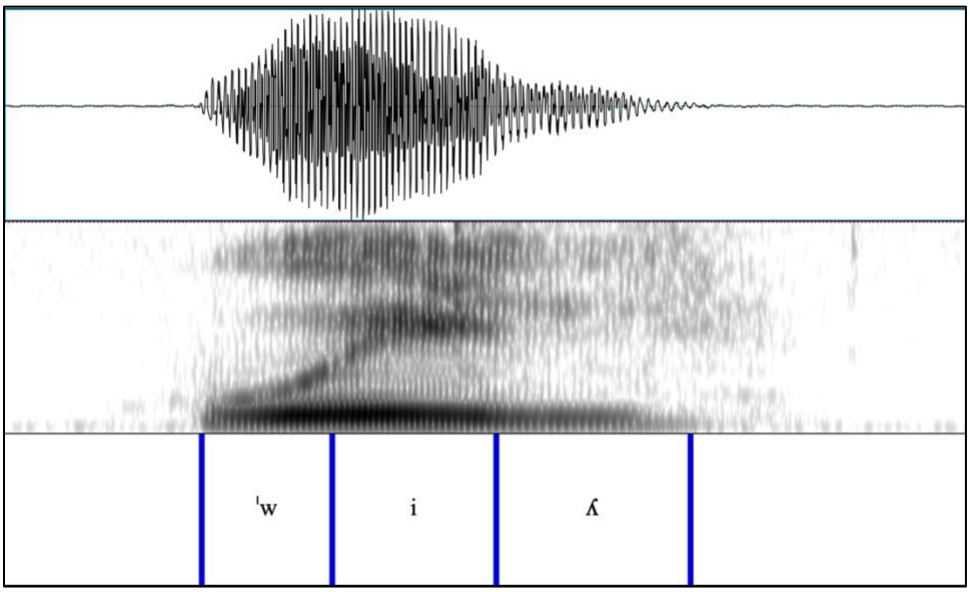


Figure 10. Spectrogram image of palatal alveolar lateral [ʎ] in [ˈwiʎ] ‘lard’

As the spectrogram images above show, there are three laterals in TMD Cahuilla, all of which can be distinguished in terms of the second formant (F2). F2 is highest for the palatal lateral, followed by the alveolar lateral, and lowest for the retroflex lateral. F2 rises steeply towards the palatal lateral (Figure 10) up to a frequency of about 2500 kHz. Conversely, F2 in the plain alveolar lateral (Figure 8) reaches a maximum frequency of approximately 1750 kHz, while F2 in the retroflex lateral (Figure 9) has a mean frequency of about 1500 kHz across the duration of the segment. Figure 9 also shows that the third and fourth formants (F3 and F4) begin to fall just prior to articulation of [l] providing further evidence of retroflexion. The spectrogram of the retroflex lateral also shows a tap-like articulation prior to the voicing as shown by the brief interruption of voicing followed by a dark voicing bar. Furthermore, the spectrogram for the palatal lateral (Figure 10) shows increased frication and high frequency intensity indicative of a lateral release of air at the sides of the tongue.

Finally, several minimal or (near-)minimal pairs are provided in (22) below to show that /l/ is a contrastive sound in the language.

(22) /l/ vs. /ʎ/

puul	*yuul*
[ˈpuː**l**]	[ˈjuː**ʎ**]
/ˈpuː**-l**/	/ˈjuː**-ʎ**/
shaman-ABS	younger.brother-ABS
‘shaman’ GT(GT002.WAV)	‘younger brother’ CM(TMDC0003.WAV)

/l/ vs. /n/

wali	*wani*
[ˈwa**l**i]	[ˈwa**n**i]
/ˈwa**l**i/	/ˈwa**n**i/
dig.IMP	‘to flow’ CM(TMDC0028.WAV)
‘dig!’ CM(TMDC0008.WAV)	

/l/ vs. /s/

pal	*pas*
[ˈpa**l**]	[ˈpa**s**]
/ˈpa-**l**/	/ˈpa-**s**]
water-ABS	three-MULT
‘water’ CM(TMDC0034.WAV)	‘three times’ CM(TMDC0034.WAV)

2.4.2.5 Voiced alveolar nasal /n/

Voiced alveolar nasals occur in all positions of the word where it functions as either a syllable onset or coda. Examples of /n/ in all word positions are shown in (23).

(23) Word-initial

a. *nena*
[ˈ**n**ɛnɐʔ]
/ˈ**n**ɛ-naʔ/
1SG-father
‘my father’ CM(TMDC0028.WAV)

b. *navet*
[ˈ**n**avʌt]
/ˈ**n**avɛ-t/
cactus-ABS
‘cactus’ CM(TMDC0020.WAV)

c. *ninily*
[ˈ**n**inɪʎ]
/ˈ**n**ini-l/
banana-ABS
‘banana’ CM(TMDC0033.WAV)

d. *nukat*
[ˈ**n**ukɐt]
/ˈ**n**uk-a-t/
create-V-ABS
‘doll’ CM(TMDC0020.WAV)

Post-vocalic

e. *wanish*
[ˈwa**n**ɪʃ]
/ˈwa**n**i-ʃ/
flow-ABS
‘river’ CM(TMDC0028.WAV)

g. *kinanga’*
[ˈki**n**ɐŋɐʔ]
/ˈki**n**aŋaʔ/
‘wife’ CM(TMDC0028.WAV)

Post-consonantal

f. *tavishnɛk*
[ˈtavɪʃ**n**ʊk]
/ˈtaviʃ-**n**ɛk/
straight-ADJ
‘straight’ CM(TMDC0028.WAV)

h. *wewnik*
[ˈwɛw**n**ɪk]
/ˈwɛw**n**-ik/
stand-IF
‘he’s going to stand’ CM(TMDC0028.WAV)

Word-final

i. *tuyvawen*
[ˈtujvɐwɛ**n**]
/ˈtujva-wɛ**n**/
circular-STAT
‘round’ CM(TMDC0028.WAV)

k. *umun*
[ˈʔumʊ**n**]
/ˈʔumu**n**/
‘all’ CM(TMDC0028.WAV)

j. *nu’uqan*
[ˈnuʔʊqɐ**n**]
/ˈnuʔuqɐ**n**/
push.IMP
‘push!’ CM(TMDC0028.WAV)

l. *hesun*
[ˈhɛsʊ**n**]
/ˈhɛ-su**n**/
3SG-heart
‘(its) heart’ CM(TMDC0028.WAV)

As the examples in (23) show, there are no restrictions of the distribution of /n/ both within the word and at syllable margins, and it does not exhibit any allophonic variation in the various positions shown. The examples in (24) show (near-)minimal pairs that illustrate the contrast between /n/ and other consonantal phonemes.

(24) /n/ vs. /m/

a. *hena*
[ˈhɛ**n**aʔ]
/ˈhɛ-**n**aʔ/
3S-father
‘his/her father’ CM(TMDC0028.WAV)

b. *hema*
[ˈhɛ**m**aʔ]
/ˈhɛ-**m**aʔ/
3S-hand
‘his/her hand’ CM(TMDC0028.WAV)

/n/ vs. /q/

c.	*wanish*	d.	*waqish*
	[ˈwa**n**ɪʃ]		[ˈwa**q**ɪʃ]
	/ˈwa**n**i-ʃ/		/ˈwa**q**iʃ/
	flow-ABS		‘go’ CM(CM_LANG_SURVEY.WAV)
	‘river’ CM(TMDC0028.WAV)		
e.	*na’qal*	f.	*pa’qal*
	[ˈ**n**aʔqɐɬ]		[ˈ**p**aʔqɐɬ]
	/0-ˈ**n**aʔ-qal/		/0-ˈ**p**aʔqal/
	3SG[9]-burn-DUR.SG		3SG-drink-DUR.SG
	‘it burns’ CM(TMDC0034.WAV)		‘he/she drinks’ CM(TMDC0029.WAV)

2.4.2.6 Voiced dental fricative /ð/

The voiced dental fricative is another loanword sound that occurs only as a syllable onset in word-initial and word-medial positions, as shown in (25a) and (25b), respectively. There are no words with word-final /ð/ in TMD Cahuilla.

(25) <u>Word-initial</u>

a. *duulsi*
[ˈ**ð**uːɬsi]
/ˈ**ð**uːlsi/
‘candy’ CM(TMDC0035.WAV)

[9] I gloss the verb with the third-person singular zero morpheme here since ‘burn’ does take an agent, which in this case is ‘the fire,’ according to the speaker. This is also indicated in the English gloss ‘it burns.’

Post-vocalic

b. *meedes*

[ˈmɛː**ð**ɛs]

/ˈmɛː**ð**ɛs/

‘socks’ CM(TMDC0035.WAV)

Although there are no allophones of /ð/, it can occur in fast speech as a lenited form of the voiceless alveolar plosive. This is further discussed in §2.6, where I address post-lexical phonetic reduction processes.

2.4.2.7 Voiced alveolar tap /ɾ/

Voiced alveolar taps occur in all positions of the word where it can function as either a syllable onset or coda. Although /ɾ/ is the only loanword sound that occurs in all positions with the word and syllable, its distribution is still relatively marginal in the language. The following examples in (26) show the distribution of this phoneme.

(26) Word-initial

a. *riiko*

[ˈ**ɾ**iːko]

/ˈ**ɾ**iːko/

‘rich’ CM(TMDC0021.WAV)

Post-vocalic

b. *arkiiyo*

[ʔa**ɾ**ˈkiːjo]

/ʔa**ɾ**ˈkiːjo/

‘pitchfork’ GT(TMDC0035.WAV)

d. *kartiiyu*

[ka**ɾ**ˈtiːju]

/ka**ɾ**ˈtiːju/

‘hammer’ GT(TMDC0035.WAV)

c. *seroochi*
[sʌˈɾoːtʃi]
/sʌˈɾoːtʃi/
'saw' CM(TMDC0035.WAV)

e. *naraangxa*
[nɐˈɾaːŋxɐ]
/nɐˈɾaːŋxɐ/
'orange' CM(TMDC0035.WAV)

Post-consonantal

f. *paagri*
[ˈpaːgɾi]
/ˈpaːgɾi/
'priest' CM(TMDC0006.WAV)

g. *kruus*
[ˈkɾuːs]
/ˈkɾuːs/
'cross' CM(TMDC0006.WAV)

Word-final

h. *taxeer*
[tɐˈxɛːɾ]
/taˈxɛːɾ/
'scissors' CM(TMDC0035.WAV)

i. *meestor*
[ˈmɛːstoɾ]
/ˈmɛːstoɾ/
'teacher' CM(TMDC0035.WAV)

As the examples above in (26) show, there are no restrictions with respect to the distribution of /ɾ/ either within the word or at syllable margins. /ɾ/ occurs frequently word-medially (26b-e) but it is only marginally attested at both the beginning and end of words. For example, there is only one word attested with word-initial /ɾ/ (26a), and two words with word-final /ɾ/ (26h-i) in the entire TMD Cahuilla corpus. /ɾ/ is also attested in tautosyllabic consonant clusters (26f-g), though tautosyllabic consonant clusters are generally not tolerated in the

language (see Chapter 3 for discussion on illicit consonant sequences). Finally, /ɾ/ also exhibits variation across speakers in terms of its phonetic realization.[10]

2.4.3 Dorsal consonants

Dorsal consonants in TMD Cahuilla encompass three places or articulation: palatal, velar, and uvular. The palatal series includes a nasal, lateral and approximant, while the velar consonants include a series of labial and non-labial voiceless velar plosives and fricatives, as well as a velar nasal. There is only one uvular sound, the voiceless uvular plosive.

2.4.3.1 Voiced palatal lateral approximant /ʎ/

As discussed in §2.4.2.5, there are only a few Cahuilla words in which the voiced palatal lateral approximant occurs where it is not preceded by /i/ or diphthong containing /i/ as the second member. Below in (27) are two such examples found in the TMD Cahuilla corpus where /ʎ/ occurs in post-consonantal and word final positions.

(27) Post-consonantal

a. *suplyi'*
[ˈsupʎiʔ]
/ˈsupʎiʔ/
'one' CM(TMDC0028.WAV)

[10] Specifically, language expert Mrs. Morreo produced a voiced alveolar approximant [ɹ] whereas language expert Mr. Toro produced the expected voiced alveolar tap [ɾ], e.g., 'hammer' is realized as [kaɾˈtiːju] or [kɐ.ɹˈtiːju].

Word-final

b. *yuuly*

[ˈjuːʎ]

/ˈjuːʎ/

‘younger brother’ CM(TMSTORY1.WAV)

The two examples in (27) above show that /ʎ/ can occur as both a syllable onset and coda, mirroring the distribution of palatal lateral allophone of /l/. The examples in (27), along with the (near-)minimal pair shown below in (28) provide evidence of the phonemic status /ʎ/ alongside the allophone /ʎ/.

(28) /ʎ/ vs. /l/

a. *puul*

[ˈpuːl]

/ˈpuː-l/

shaman-ABS

‘shaman’ GT(GT002.WAV)

b. *yuuly*

[ˈjuːʎ]

/ˈjuː-ʎ/

y.brother-ABS

‘younger brother’ CM(TMDC0003.WAV)

Although the phonemic status of /ʎ/ is well established in previous documentation of Cahuilla (Bright 1965; Seiler 1977, 1979), it differs from other phonemes in that there are few minimal pairs and its distribution is restricted, for the most part, to occurring after a high front unrounded vowel. A full minimal pair <yúuĺ> ‘younger brother’ and <ˈyúul> ‘little field mouse’) can be found in Seiler (1979:255). Given the role of palatal sounds in marking diminutive terms, such lexical items appear to have provided another source for the voiced palatal lateral to occur alongside the allophonic palatal lateral.

2.4.3.2 Voiced palatal nasal /ɲ/

Voiced palatal nasals occur in word-initial and medial positions as a syllable onset. There are no words that end in /ɲ/ or where /ɲ/ is in the coda position of a syllable. Examples of /ɲ/ in word-initial and medial positions are shown in (29).

(29) Word-initial

a. *ñashka*
[ˈ**ɲ**aʃka]
/0-ˈ**ɲ**aʃ-ka/
3SG-sit-IF
'he's going to sit'
CM(TMDC0028.WAV)

b. *ñavaxish*
[ˈ**ɲ**avɐxɪʃ]
/ˈ**ɲ**avaxiʃ/
'old' CM(TMDC0028.WAV)

c. *ñichily*
[ˈ**ɲ**it͡ʃɪʎ]
/ˈ**ɲ**it͡ʃi-l/
woman-ABS
'woman' CM(TMDC0028.WAV)

d. *ñuku*
[ˈ**ɲ**uku]
/ˈ**ɲ**uku/
'cousin' CM(TMDC0030.WAV)

Post-vocalic

e. *meñily*
[ˈmɛ**ɲ**ɪʎ]
/ˈmɛ**ɲ**i-l/
moon-ABS
'moon' CM(TMDC0028.WAV)

f. *hañal*
[ˈha**ɲ**al]
/ˈha**ɲ**a-l/
saliva-ABS
'saliva' CM(TMDC0028.WAV)

g. *iñishily*
[ˈʔi**ɲ**ɪʃɪʎ]
/ˈʔi**ɲ**iʃ-i-l/
small-V-ABS
'little' CM(TMDC0028.WAV)

h. *ñuñushqal*
[ˈɲu**ɲ**ʊʃqal]
/0-ˈɲu~**ɲ**uʃ-qal/
3SG-RED~knead.dough-DUR.SG
'he's kneading dough' CM(TMCONVO1.WAV)

Post-consonantal

i.	*hiwña*	j.	*hemñashlawwen*
	[ˈhiw**ɲ**ɐ]		[hɛmˈ**ɲ**aʃʌʊwɛn]
	/ˈhiw**ɲ**ɐ/		/hɛmˈ**ɲ**aʃ-lu-wɛn/
	stay.IMP		3PL-sit-MOTP-DUR.PL
	‘stay!’ CM(TMDC0028.WAV)		‘they went to stay’ GT(TMCONVO1.WAV)

As with the palatal lateral, the palatal nasal is also restricted in its distribution since it cannot appear word-finally or as a syllable coda. The restricted nature of palatals and their absence in proto-language reconstructions could indicate that they were introduced by influence of neighboring Yuman languages, as suggested by Hinton (1991).[11] Several (near-)minimal pairs that show that /ɲ/ contrasts with other consonantal segments as a distinct phoneme in TMD Cahuilla are shown in (30).

(30) /ɲ/ vs. /ŋ/

a.	*inyish*	b.	*ingily*
	[ˈʔi**ɲ**ɪʃ]		[ˈʔi**ŋ**ɪʎ]
	/ˈʔi**ɲ**-iʃ/		/ˈʔi**ŋ**-il/
	small-ABS		salt-ABS
	‘small’ CM(TMDC0028.WAV)		‘salt’ CM(TMDC0029.WAV)

[11] Hinton (1991:146) suggests the palatal nasal [ɲ] had developed in several Cupan languages (Cahuilla and Cupeño) through contact with a Proto-Yuman (PYn) language during the time when Cahuilla and Cupeño split from Luiseño. This is postulated, she says, since *ɲ cannot be reconstructed for Proto-Uto-Aztecan (PUA), Proto-Takic (PTk), or Proto-Cupan (PCu).

/ɲ/ vs. /n/

c.	*menyily*	d.	*menily*
	[ˈmɛ**ɲ**ɪʎ]		[ˈmɛ**n**ɪʎ]
	/ˈmɛ**ɲ**i-l/		/ˈmɛ**n**i-l/
	moon-ABS		moon-ABS
	‘moon’ CM(TMDC0028.WAV)		‘month’ CM(TMDC0028.WAV)

/ɲ/ vs. /t/

e.	*nyuku*	f.	*puku*
	[ˈ**ɲ**uku]		[ˈ**p**uku]
	/ˈ**ɲ**uku/		/ˈ**p**uku/
	‘cousin’ CM(TMDC0030.WAV)		‘root’ CM(TMDC0029.WAV)

2.4.3.3 Voiced palatal approximant /j/

Voiced palatal approximants occur word-initially and word-medially serving as syllable onsets or codas. Examples of /j/ in word-initial and medial positions are shown in (31) below.

(31) Word-initial

a.	*yaxa*	c.	*yuyat*
	[ˈ**j**axɐ]		[ˈ**j**ujʌt]
	/ˈ**j**axa/		/ˈ**j**uj-a-t/
	say.IMP		cold-V-ABS
	‘say it!’ CM(TMDC0028.WAV)		‘snow’ CM(TMDC0028.WAV)
b.	*ya’i*	d.	*yewevichem*
	[ˈ**j**aʔi]		[ˈ**j**ɛwɛvɪt͡ʃʌm]
	/ˈ**j**aʔi/		/ˈ**j**ɛwɛ-vit͡ʃ-ɛm/
	‘wind’ CM(TMDC0028.WAV)		long.ago-AGT-PL
			‘ancestors’ CM(TMCONVO2.WAV)

Post-vocalic

e. *ayamal*
[ˈʔaɪ**j**ɐmɐ]
/ˈʔa**j**-a-mal/
pick-V-DIM
‘raccoon’ CM(TMDC0033.WAV)

g. *tuyvawen*
[ˈtu**j**vɐwɛn]
/ˈtu**j**va-wɛn/
round-STAT
‘round’ CM(TMDC0028.WAV)

f. *muyiwen*
[ˈmu**j**iwɛn]
/ˈmu**j**i-wɛn/
full.liquid-STAT
‘full (of liquid)’ CM(TMDC0028.WAV)

h. *hiye*
[ˈhi**j**ɛ]
/ˈhi-**j**ɛ/
3SG-mother
‘his mother’ GT(TMCONVO2.WAV)

Post-consonantal

i. *tamyat*
[ˈtam**j**ɐt]
/ˈtam**j**a-t/
sun-ABS
‘sun, day’ CM(TMDC0028.WAV)

k. *tekyaxwen*
[ˈtɛk**j**axwɛn]
/ˈtɛk**j**ax-wɛn/
still-STAT
‘quiet’ CM(TMCONVO2.WAV)

j. *penyawqal*
[pɛnˈ**j**awqɐ]
/pɛ-nˈ**j**aw-qal/
3SG-1SG-grab-DUR.SG
‘I have’ CM(TMCONVO2.WAV)

l. *hemyaxwen*
[ˈhɛm**j**axwɛn]
/ˈhɛm-**j**ax-wɛn/
3PL-say-DUR.PL
‘they say’ CM(TMCONVO2.WAV)

As seen in the examples in (31), the voiced palatal approximant exhibits a similar distribution to that of the palatal nasal in that it never occurs word-finally or in syllable codas and there are no allophones of /j/. Below in (32) are several minimal pairs that illustrate the contrastiveness of /j/.

(32) /j/ vs. /s/

a.	*ya'i*	b.	*sa'i*
	[ˈ**j**aʔi]		[ˈ**s**aʔi]
	/ˈ**j**aʔi/		/ˈ**s**aʔi/
	'wind' CM(TMDC0028.WAV)		'guts' CM(TMDC0028.WAV)

/j/ vs. /m/

c.	*jaxa*	d.	*maxa*
	[ˈ**j**axɐ]		[ˈ**m**axɐ]
	/ˈ**j**axa/		/ˈ**m**axa/
	'to say'		'to give'

2.4.4 Velar consonants

As discussed in §2.1, TMD Cahuilla (as well as other Cahuilla varieties, Takic, Yuman and California Algic languages) possesses a contrast between plain voiceless velar consonants and labialized voiceless velar consonants (Golla 2011:206). Specifically, it has a voiceless velar plosive and velar fricative which both have a labialized equivalent. Other velar consonants include a voiced velar nasal, and a voiced velar plosive, the latter of which was introduced into the inventory through contact with Spanish. Velar consonants, along with alveolar, comprise a large portion of the TMD Cahuilla inventory.

2.4.4.1 Voiceless velar plosive /k/

Voiceless velar plosives occur in word-initial and medial positions as either a syllable onset or coda. /k/ is aspirated word-finally and unaspirated in word-initial and word-medial positions. Examples of /k/ in different positions within the word are shown in (33) and a spectrogram of aspirated and unaspirated /k/ illustrates its realization in Figures 11 and 12, respectively.

(33) Word-initial

a. *kavamal*
[ˈ**k**avɐmaɭ]
/ˈ**k**av-a-mal/
hole-V-DIM
‘cup’ CM(TMDC0019.WAV)

b. *kiyul*
[ˈ**k**^{h}ijuɭ]
/ˈ**k**iju-l/
fish-ABS
‘fish’ CM(TMDC0028.WAV)

c. *kesiwen*
[ˈ**k**ɛsiwɛn]
/ˈ**k**ɛsi-wɛn/
damp-STAT
‘damp’ CM(TMDC0028.WAV)

d. *ku’al*
[ˈ**k**uʔɐɭ]
/ˈ**k**uʔa-l/
louse-ABS
‘louse’ CM(TMDC0028.WAV)

Post-vocalic

e. *tulaka*
[ˈtulɐ**k**ɐʔ]
/ˈtula**k**aʔ/
‘tomorrow’ CM(TMCONVO2.WAV)

f. *piklyam*
[ˈpi**k**ʌɐm]
/ˈpi**k**-l-am/
berry-ABS-PL
‘berries’ CM(TMDC0013.WAV)

g. *keklawet*
[ˈ**k**ɛklɐwɛt]
/ **k**ɛ~klaw-ɛ-t/
RED~wood-V-ABS
‘sticks’ CM(TMDC0019.WAV)

h. *sukat*
[ˈsu**k**ɐt]
/ˈsu**k**-a-t/
deer-V-ABS
‘deer’ CM(TMDC0020.WAV)

Post-consonantal

i.	*melkichem*	j.	*penchutka*
	[ˈmɛɭ**k**ɪt͡ʃɛm]		[pɛnˈt͡ʃut**k**ɐ]
	/ˈmɛl**k**-i-t͡ʃ-ɛm/		/pɛ-n-ˈt͡ʃut-**k**a/
	noise-V-ABS-PL		3SG-1SG-burn-IF
	‘Europeans’ CM(TMCONVO1.WAV)		‘I’m g. to burn it’ CM(TMCONVO2.WAV)

Word-final

k.	*palik*	m.	*petuk*
	[ˈpaɭɪ**k**ʰ]		[ˈpɛtʊ**k**ʰ]
	/ˈpal-i-**k**/		/ˈpɛtu**k**/
	water-V-ADJ		‘inside’ CM(TMDC0028.WAV)
	‘wet’ CM(TMDC0028.WAV)		
l.	*muluk*	n.	*seselnek*
	[ˈmulʊ**k**ʰ]		[ˈsɛsɛlnɛ**k**ʰ]
	/ˈmulu**k**/		/ˈsɛ~sɛl-nɛ**k**/
	‘first’ GT(TMCONVO2.WAV)		RED~red-ADJ
			‘many objects are red’ CM(TMDC0019.WAV)

As shown in (33), /k/ does not exhibit a restricted distribution with respect to its position in the word or at the margins of syllables. Word-initial and word-medial /k/ is unaspirated whereas word-final /k/ is followed by a breathy release. As with the voiceless alveolar stop /t/, this breathy release is analyzed as a voiceless vowel that is realized as a glottal fricative (see §2.5.7 for discussion on voiceless vowels). A spectrogram showing the difference in phonetic realization between word-medial unaspirated /k/ and word-final /k/ followed by a glottal fricative is shown in Figures 11 and 12 below, respectively.

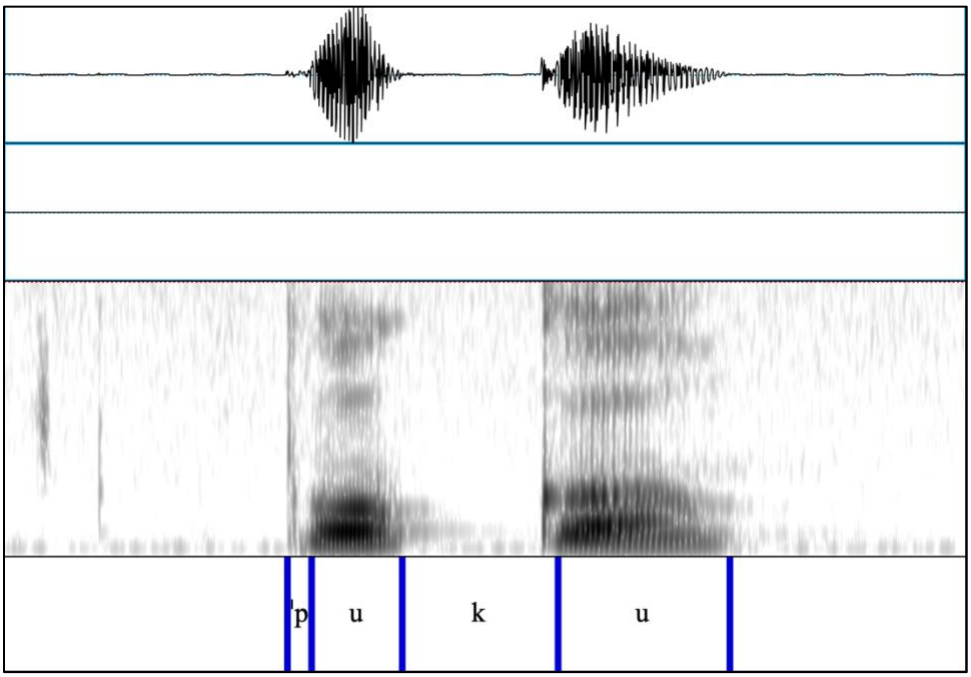


Figure 11. Spectrogram image of word-medial [k] in [ˈpuku] /ˈpuku/ ‘root’

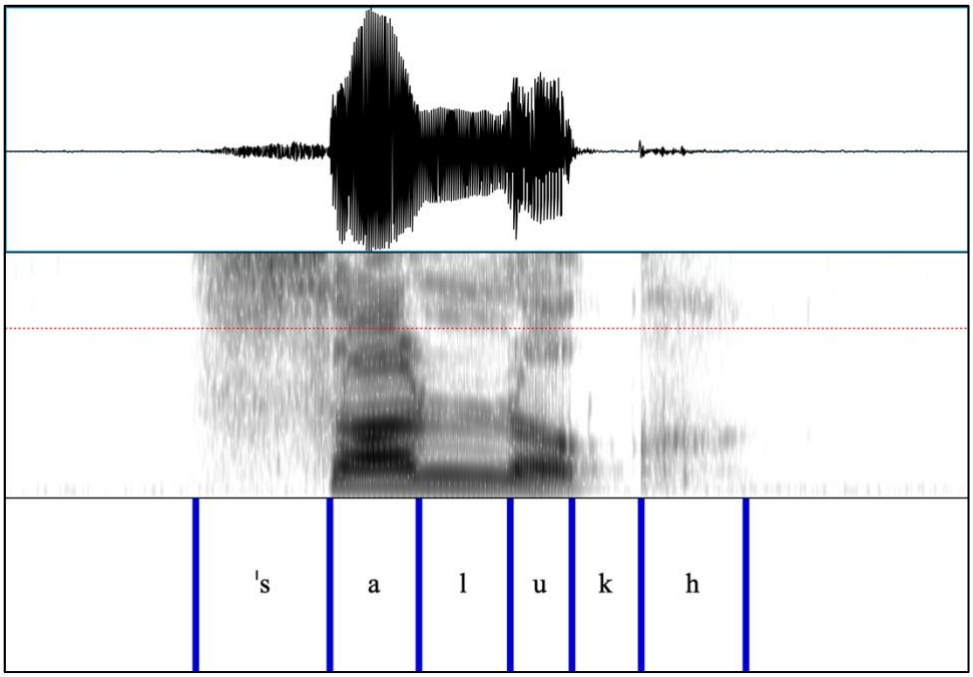


Figure 12. Spectrogram image of word-final [kh] in [ˈsalukh] /ˈsaluk/ ‘to scratch’

As shown above in Figure 11, word-medial /k/ is unaspirated, showing a period of closure before a short burst preceding the beginning of voicing on the following vowel. Word-final /k/ also shows a closure and burst, which is then followed by a considerable period of frication (Figure 12). Vowel formants matching the preceding vowel can be seen in the period of frication following the release of /k/. Several minimal pairs are provided in (34) to illustrate the phonemic status of /k/.

(34) /k/ vs. /q/

a.	*neki*	b.	*neqi*
	[ˈnɛ**k**i]		[ˈnɛ**q**i]
	/ˈne-**k**i/		/ˈnɛ-**q**i/
	1SG-house		1SG-just
	‘my house’ GT(TMDC0034.WAV)		‘me alone’ CM(TMDC0029.WAV)

/k/ vs. /t͡ʃ/

c.	*kiyul*	d.	*chiyul*
	[ˈ**k**iju[]		[ˈ**t͡ʃ**iju[]
	/ˈ**k**iju-l/		/ˈ**t͡ʃ**iju-l/
	fish-abs		feather-abs
	‘fish’ CM(TMDC0028.WAV)		‘feather’ CM(TMDC0028.WAV)

2.4.4.2 Voiceless labiovelar plosive /kʷ/

Voiceless labialized velar plosives occur as onsets in word-initial and word-medial positions. /kʷ/ does not occur word-finally or as a syllable coda. Examples of /kʷ/ in word-initial and word-medial positions are shown in (35).

(35) Word-initial

a.	*kwa'a*	b.	*kwinily*
	[ˈ**kʷ**aʔa]		[ˈ**kʷ**inɪɬ][12]
	/ˈ**kʷ**a-ʔa/		/ˈ**kʷ**ini-l/
	eat-IMP		black.oak-ABS
	'eat!' CM(TMDC0028.WAV)		'black oak acorns' CM(TMDC0014.WAV)

Post-vocalic

c.	*nemakwanang*	d.	*hekwas*
	[nɛmɐˈ**kʷ**anɐŋ]		[ˈhɛ**kʷ**ɐs]
	/nɛma-ˈ**kʷ**anaŋ/		/ˈhɛ-**kʷ**as/
	1SG.hand-half		3SG-tail
	'five' CM(TMDC0028.WAV)		'tail' CM(TMDC0028.WAV)

Post-consonantal

e.	*elelkwen*	f.	*wihkwal*
	[ʔɛˈlɛl̥**kʷ**ɛn]		[ˈwih**kʷ**ɐl̥]
	/ʔɛˈlɛl**kʷ**ɛn/		/ˈwih-**kʷ**al/
	'in a bad way' GT(TMCONVO2.WAV)		two-become.DUR
			'the two together' GT(TMCONVO2.WAV)

As shown in (35), /kʷ/ has no allophones. That /kʷ/ does not occur word-finally is not surprising, however, since it is rare for labialized sounds to occur in this position cross-linguistically (Ladefoged and Maddieson 1996:357). A similar distribution is found for the other labialized velar consonant, /xʷ/, which also does not occur word-finally. Spectrogram images of the plain and labialized velar stop are shown in Figures 13 and 14, respectively.

[12] In previously documented sources there is a palatalized nasal in the word for black oak acorns /ˈkʷiɲɪɬ/, however, in Mrs. Morreo's dialect she consistently produces the same word with a plain alveolar nasal.

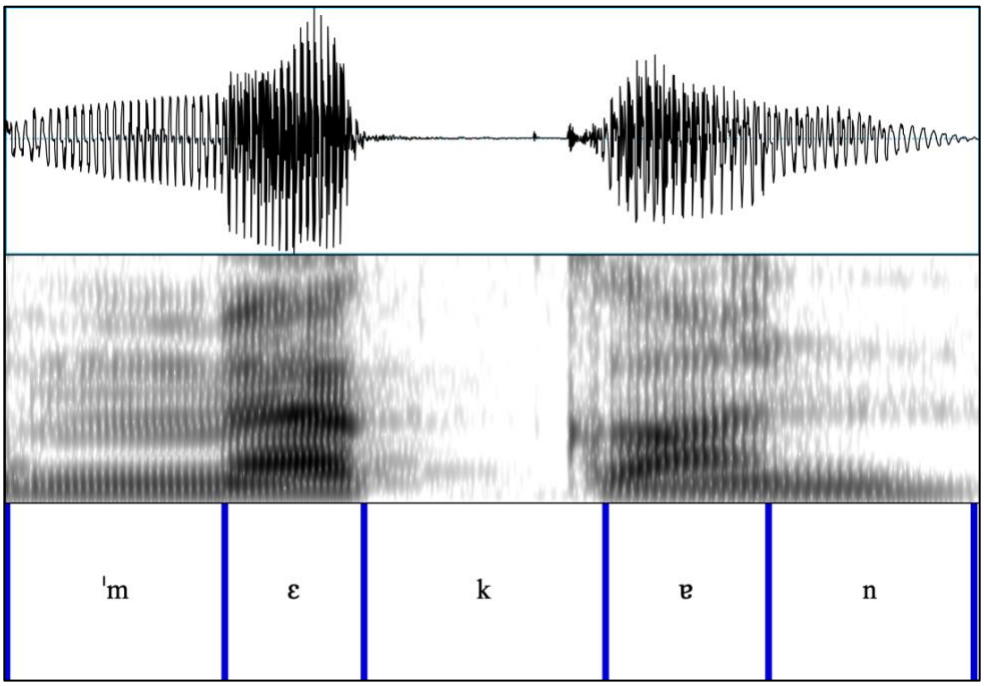


Figure 13. Spectrogram image of [k] in [ˈmɛkɐn] /ˈmɛkan/ ‘to kill’

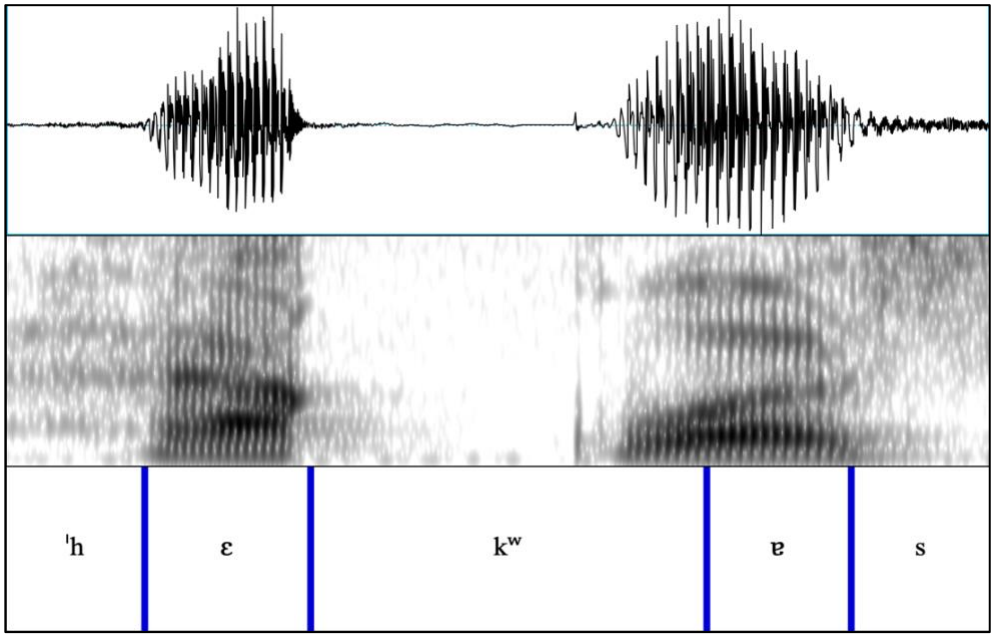


Figure 14. Spectrogram image of [kʷ] in [ˈhɛkʷɐs] /ˈhɛkʷas/ ‘tail’

As these spectrogram images show, the plain voiceless velar plosive has a period of closure before a short burst that precedes the following vowel (Figure 13). The voiceless labiovelar plosive looks similar except that the burst is followed by a vowel-like portion that shows a steady rise in F2, signaling the labial secondary articulation (Figure 14). The examples in (36) involve a near-minimal pair that show that /kʷ/ is a distinct phonemic segment.

(36) /kʷ/ vs. /k/

a.	*elelkwish*	b.	*melkish*
	[ʔɛˈlɛl**k**ʷɪʃ]		[ˈmɛ⌊**k**ɪʃ]
	/ʔɛˈlɛl**k**ʷ-iʃ/		/ˈmɛl**k**-iʃ/
	bad-ABS		make.noise-ABS
	‘bad thing’ CM(TMDC0028.WAV)		‘European/white person’ CM(TMDC0030.WAV)

2.4.4.3 Voiced velar plosive /g/

The voiced velar plosive is a loanword sound that occurs word-initially, as well as word-medially (post-vocalically) in the onset position of the syllable, as part of a tautosyllabic consonant cluster. There are no words in which /g/ occurs word-finally or as a syllable coda. Examples of the distribution of /g/ are shown in (37).

(37) <u>Word-initial</u>

a.	*gaato*	b.	*gaayo*
	[ˈ**g**aːto]		[ˈ**g**aɪːjo]
	/ˈ**g**aːto/		/ˈ**g**aɪːjo/
	‘cat’ CM(TMDC0035.WAV)		‘rooster’ CM(TMDC0035.WAV)

Post-vocalic

c. *paagri*
[ˈpa:**g**ɾi]
/ˈpa:**g**ɾi/
‘priest’ CM(TMDC0006.WAV)

As shown in these examples, the distribution and frequency of /g/ is quite limited, and unlike the other velar consonants, /g/ does not have a labialized equivalent. There are also no allophonic processes targeting /g/. However, in fast speech the voiceless velar stop /k/ can optionally lenite to /g/ (see §2.6.2 for discussion on voicing of voiceless consonants). Thus, the phoneme /g/ shown in the examples above should be distinguished from [g] derived from the lenition of /k/ in fast speech. The phonemic status of /g/ is exemplified in the near-minimal pair shown in (38).

(38) /g/ vs. /k/

a. *gaatu*
[ˈ**g**a:tu]
/ˈ**g**a:tu/
‘cat’ CM(TMDC035.WAV)

b. *kaaru*
[ˈ**k**a:ɾu]
/ˈ**k**a:ɾu/
‘cart, automobile’ CM(TMDC0035.WAV)

2.4.4.4 Voiceless velar fricative /x/

Voiceless velar fricatives occur in all positions of the word where it serves as a syllable onset or coda. Examples of /x/ in word-initial and medial positions are shown in (39).

(39) Word-initial

a. *xelyal*
[ˈ**x**ɛɪʎɐl̥]
/ˈ**x**ɛɪʎa-l/
clothes-ABS
‘clothes’ CM(TMDC0003.WAV)

b. *xuul*
[ˈ**x**uːl̥]
/ˈ**x**uːl/
‘beans’ CM(TMDC0031.WAV)

Post-vocalic

c. *chexiwen*
[ˈt͡ʃɛ**x**iwɛn]
/ˈt͡ʃɛ**x**i-wɛn/
clear-STAT
‘to be clear’ CM(TMDC0021.WAV)

e. *tawpaxish*
[ˈtaʊpa**x**ɪʃ]
/ˈtaʊpa**x**-i-ʃ/
summer-V-ABS
‘year’ CM(TMDC0028.WAV)

d. *naxañish*
[ˈna**x**ɐɲɪʃ]
/ˈna**x**aɲ-i-ʃ/
man-V-ABS
‘man’ ‘year’ CM(TMDC0028.WAV)

f. *i’ixingaxvish*
[ˈʔiʔɪxɪŋa**x**vɪʃ]
/ˈʔiʔixi-ŋa**x**-viʃ/
desert-ABL-AGT
‘wild animal’ CM(TMDC0029.WAV)

Post-consonantal

g. *chemxely’a*
[t͡ʃɛmˈ**x**ɛɪʎʔa]
/t͡ʃɛm-ˈ**x**ɛɪʎʔa/
1PL-clothes
‘our clothes’ CM(TMDC0011.WAV)

Word-final

h. *iv'ax*
[ˈʔivʔa**x**]
/ˈʔivʔa**x**/
'today' CM(TMDC0031.WAV)

j. *muchingax*
[ˈmutʃiŋa**x**]
/ˈmutʃi-ŋa**x**/
in.front-ABL
'from the front' CM(TMDC0006.WAV)

i. *tesax*
[ˈtɛsa**x**]
/ˈtɛsa**x**/
'too, also' CM(TMCONVO1.WAV)

k. *nesunax*
[ˈnɛsuna**x**]
/ˈnɛ-sun-ax/
1sg-heart-ABL
'I think' CM(TMDC0003.WAV)

As shown in (39), /x/ has no allophones and there are no restrictions on its distribution within both the word and syllable margins. However, it is only marginally attested at the beginning of words, and in word-medial post-consonantal environments, where it occurs only in derived forms (39g). /x/ does occur frequently at the end of words, where it is part of a productive ablative suffix (/-ŋax/ ~ /-ax/ ~ /-x/) denoting motion away from a certain point of reference in time or space. The phonemic status of /x/ is exemplified in the near-minimal shown in (40).

(40) /x/ vs. /h/

a. *paxa*
[ˈpa**x**ɐ]
/ˈpa**x**a/
enter.IMP
'enter' CM(CM_VERBS2.WAV)

b. *pah*
[ˈpa**h**]
/ˈpa**h**/
'three' CM(TMDC0028.WAV)

2.4.4.5 Voiceless labiovelar fricative /xʷ/

The voiceless labiovelar fricative is the most marginal phoneme in the TMD Cahuilla inventory, occurring only in a single word in the TMD Cahuilla corpus, shown in (41). Spectrogram images of the plain and labialized voiceless velar fricatives are provided in Figures 15 and 16, respectively.

(41) *tuxwa'luqal*
[tuˈ**xʷ**aʔlʊqɐ̬]
/0-tuˈxʷaʔ-lu-qal/
3SG-work-MOTP-DUR.SG
'she went to work' CM(TMDC0031.WAV)

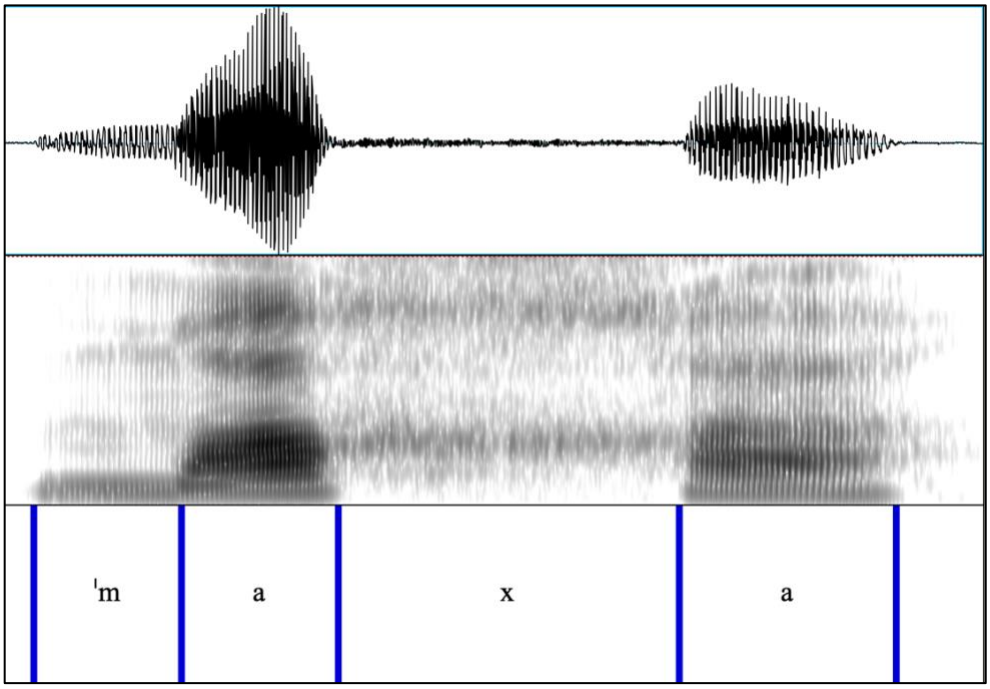


Figure 15. Spectrogram image of [x] in /ˈmaxa/ 'to give'

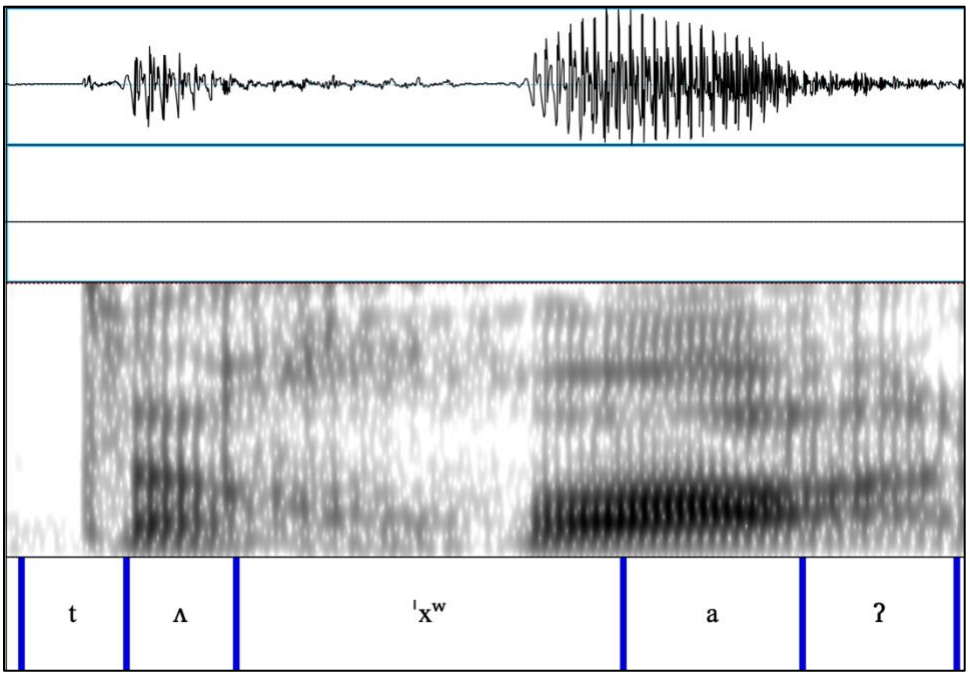


Figure 16. Spectrogram image of [xʷ] in /tuˈxʷaʔlawqal/ ‘s/he goes to work’

The spectrogram images above illustrate the difference between a plain and labialized velar fricative. In Figure (15) the plain voiceless velar fricative is seen as a period frication with moderate intensity, while the voiceless labialized velar fricative (Figure 16) has a shorter period of frication with less intensity followed by a secondary articulation that has a vowel-like quality. As with the voiceless labial velar plosive, a rise in F2 can be seen in the portion where the bilabial gesture is articulated just before the transition into the vowel that follows /xʷ/.

The voiceless labiovelar fricative is also extremely marginal in other documented varieties of Desert and Mountain Cahuilla. For example, the Cahuilla dictionary lists only a single entry for this phoneme where it occurs both word-initially and word-medially (post-consonantally) in a reduplicated form, <**x**ʷál**x**ʷal> ‘spider’ (Seiler and Hioki 1979:247). As with the other labialized consonants, there are no words in which /xʷ/ occurs word-finally.

2.4.4.6 Voiceless uvular plosive /q/

Voiceless uvular plosives occur in all word positions where it serves as either a syllable onset or coda. Like the voiceless plosives /t/ and /k/, /q/ is unaspirated in word-initial and word-medial positions and is followed by a breathy release word-finally. Word-finally, /q/ only occurs in a few verb roots that end in /q/. Examples of /q/ in all word positions are shown in (42).

(42) <u>Word-initial</u>

a *qily'i*
[ˈ**q**ɛɪʎʔi]
/ˈ**q**ilʔi/
'neck' CM(TMDC0028.WAV)

c. *qawish*
[ˈ**q**awɪʃ]
/ˈ**q**aw-i-ʃ/
rock-V-ABS
'rock' CM(TMDC0028.WAV)

b. *qichily*
[ˈ**q**ɪt͡ʃɪʎ]
/ˈ**q**it͡ʃ-i-l/
shell-V-ABS
'money' CM(TMCONVO1.WAV)

d. *qivish*
[ˈ**q**ivɪʃ]
/ˈ**q**iviʃ/
'slice' CM(TMDC0028.WAV)

<u>Post-vocalic</u>

e. *peqe*
[ˈpɛ**q**ɛ]
/ˈpɛ-**q**ɛ/
3SG-alone
's/he alone' GT(TMCONVO1.WAV)

g. *maqily*
[ˈma**q**ɪʎ]
/ˈma**q**i-l/
meet-ABS
'a meeting' GT(TMCONVO1.WAV)

f.	*chemsiyaqiwene*	h.	*naqma'*
	[t͡ʃɛmˈsiya**q**ɪwɛnɛ]		[ˈna**q**mɐʔ]
	/t͡ʃɛm-ˈsiya**q**i-wɛn-ɛ/		/ˈna**q**maʔ/
	1PL-move-DUR.PL-PRET		listen.IMP
	'we moved' CM(CMSTORY.WAV)		'listen!' CM(TMDC0028.WAV)

Post-consonantal

i.	*pemqayinwen*	k.	*pishqal*
	[pɛmˈ**q**aɪjɪnwɛn]		[ˈpiʃ**q**ɐ[]
	/ pɛ-m-ˈ**q**aji-n-wɛn/		/0-ˈpiʃ-**q**al/
	3SG-3PL-clean-TRANS-DUR.PL		3SG-arrive-DUR.SG
	'they cleaned it' CM(TMDC0006.WAV)		's/he's arriving' CM(TMDC0029.WAV)

j.	*menchachapqal*	l.	*penvukqal*
	[mɛnˈtʃatʃap**q**ɐ[]		[pɛnˈvuʔ**q**ɐ[]
	/mɛ-nˈtʃa~tʃap-**q**al/		/pɛ-n-ˈvuk-**q**al/
	3PL-1SG-RED~split-DUR.SG		3SG-1SG-hit-DUR.SG
	'I split them' CM(TMDC0001.WAV)		'I hit him' CM(TMDC0029.WAV)

Word-final

i.	*sichaq*	j.	*pepuchaq*
	[ˈsit͡ʃɐ**q**]		[pʌˈpʊt͡ʃa**q**]
	/ˈsit͡ʃa**q**/		/pɛ-ˈput͡ʃa**q**/
	squeeze.IMP		3SG-jump.IMP
	'squeeze!' CM(TMDC0028.WAV)		'jump it!' CM(TMDC0028.WAV)

As the examples in (42) show, the distribution of /q/ is quite robust as it occurs in all positions in both derived and non-derived forms. /q/ occurs frequently in derived forms root-initially or as part of the singular durative suffix /-qal/. Like the other voiceless plosives, word-finally /q/ is followed by a breathy release. I also analyze this word-final release as a voiceless

vowel (see §2.5.7 for discussion on voiceless vowels). The phonemic status of /q/ is exemplified in the minimal pairs shown in (43).

(43) /q/ vs. /k/

a.	*neqi*	b.	*neki*
	[ˈnɛ**q**i]		[ˈnɛ**k**i]
	/ˈnɛ-**q**i/		/ˈnɛ-**k**i/
	1SG-just		1SG-house
	‘me alone’ CT(TMDC0029.WAV)		‘my house’ GT(TMDC0034.WAV)

/q/ vs. /ʔ/

c.	*waqish*	d.	*wa’ish*
	[ˈwa**q**ɪʃ]		[ˈwa**ʔ**ɪʃ]
	/ˈwa**q**iʃ/		/ˈwa**ʔ**-ʧ/
	go.way.IMP		meat-ABS
	‘go away!’ CM(CM_verbs1.WAV)		‘meat’ CM(TMDC0028.WAV)

/q/ vs. /s/

e.	*qawish*	f.	*sawish*
	[ˈ**q**awɪʃ]		[ˈ**s**awɪʃ]
	/ˈ**q**aw-ʧ/		/ˈ**s**aw-ʧ/
	hard-abs		make.tortilla-abs
	‘rock’ CM(TMDC0001.WAV)		‘tortilla’ CM(TMDC0001.WAV)

2.4.5 Glottal segments

TMD Cahuilla has two glottal segments, a voiceless glottal plosive /ʔ/ and a voiceless glottal fricative /h/. Glottal/laryngeal consonants are notorious in many Uto-Aztecan languages, as well as other languages of the Americas, for being challenging to analyze in terms of their

phonological status both in the synchronic systems of individual languages, as well as in the diachronic reconstructions of proto-languages (Haugen 2014, Avelino 2016). In this regard TMD Cahuilla is no exception, as glottal consonants exhibit variable production and are often realized non-canonically, differing from other consonants in the inventory in terms of their distribution and behavior.

Despite their restricted distribution and variable occurrence, there is still strong evidence to justify treating the two glottal articulations, /ʔ/and /h/, as phonemic consonants rather than suprasegmental features. First, both /ʔ/ and /h/ have minimal or near-minimal pairs that show that they are phonemically contrastive (which is shown in the sections below). Second, when glottal segments occur root-initially, they are copied as the consonant portion of the CV reduplicant prefix (as discussed in more detail in Chapter 6 on reduplication). In addition, /ʔ/ and /h/ are treated as consonant phonemes in other documented varieties of Cahuilla, as well as in closely related Cupan languages Luiseño and Cupeño, and many other Uto-Aztecan languages. Given these facts, voiceless glottal plosives and fricatives are treated here as phonemes and part of the consonant inventory of TMD Cahuilla, as will be described in the following sections.

2.4.5.1 Voiceless glottal plosive /ʔ/

Voiceless glottal plosives occur in all positions in the word where they can serve as a syllable onsets or codas. Word-internally, /ʔ/ occurs as the onset of a syllable in post-vocalic and post-consonantal environments (44e-g, i-j), and as a coda in a heterosyllabic consonant cluster when it precedes another consonant (44h). Examples of /ʔ/ in all word positions is shown in (44).

(44) Word-initial

a. *ewel*
[ˈʔɛwɛ̞l]
/ˈʔɛwɛ-l/
bleed-ABS
‘blood’ CM(TMDC0028.WAV)

c. *awal*
[ˈʔawɐ̞l]
/ˈʔawa-l/
dog-ABS
‘dog’ CM(TMDC0028.WAV)

b. *inishily*
[ˈʔiɲɪʃɪʎ]
/ˈʔiɲɪʃ-ɪ-l/
small-V-ABS
‘little’ CM(TMDC0028.WAV)

d. *ulan*
[ˈʔulɐ̞n]
/ˈʔulan/
sew.IMP
‘sew’ CM(TMDC0028.WAV)

Post-vocalic

e. *me’at*
[ˈmɛʔɐ̞t]
/ˈmɛʔa-t/
‘smoke’ CM(TMDC0028.WAV)

g. *i’ixish*
[ˈʔiʔʌxɪʃ]
/ˈʔiʔixi-tʃ/
‘desert’ CM(TMDC0029.WAV)

f. *wa’ish*
[ˈwaʔɪʃ]
/ˈwaʔ-tʃ/
roast-V-ABS
‘meat’ CM(TMDC0028.WAV)

h. *su’wet*
[ˈsuʔwɛt]
/ˈsuʔwɛ-t/
star-ABS
‘star’ CM(TMDC0028.WAV)

Post-consonantal

i. *naq’a*
[ˈnaqʔa]
/ˈnaqʔa/
‘ear’ CM(TMDC0028.WAV)

k. *tam’i*
[ˈtamʔi]
/ ˈtamʔi/
‘knee’ CM(TMDC0028.WAV)

j.	*sal'u*	l.	*wak'a*
	[ˈsal**ʔ**o]		[ˈwak**ʔ**ɐ]
	/ˈsal**ʔ**u/		/ˈwak**ʔ**a/
	'fingernail' CM(TMDC0028.WAV)		'wing' CM(TMDC0028.WAV)

Word-final

m.	*ke'*	o.	*nena'*
	[ˈkɛ**ʔ**]		[ˈnɛnɐ**ʔ**]
	/ˈkɛ**ʔ**/		/ˈnɛ-na**ʔ**/
	bite.IMP		1SG-father
	'bite!' CM(TMDC0028.WAV)		'my father' CM(TMDC0028.WAV)

n.	*tuxwa'*	p.	*hemu'*
	[tuˈx^{w}a**ʔ**]		[ˈhɛmu**ʔ**]
	/ tuˈx^{w}a**ʔ**/		/ˈhɛ-mu**ʔ**/
	work.IMP		3SG-nose
	'work!' CM(CMVERBS2.WAV)		'his nose' CM(TMDC0028.WAV)

As shown in these examples, /ʔ/ is fairly unrestricted in its distribution, though it is never attested either before or after a long vowel in any position of the word. The following examples in (45) present minimal pairs that show the contrastiveness of /ʔ/ in TMD Cahuilla.

(45) /ʔ/ vs. /q/

a.	*wa'ish*	b.	*waqish*
	[ˈwa**ʔ**ɪʃ]		[ˈwa**q**ɪʃ]
	/ˈwa**ʔ**-tʃ/		/ˈwa**q**iʃ/
	meat-ABS		go.away.IMP
	'meat' CM(TMDC0028.WAV)		'go away!' CM(CM_verbs1.WAV)

/ʔ/ vs. /w/

c.	*se'ish*	d.	*sawish*
	[sɛ**ʔ**ɪʃ]		[ˈsa**w**ɪʃ]
	/sɛ**ʔ**-tʃ/		/ˈsa**w**-tʃ/
	bloom-ABS		make.tortilla-ABS
	'flower' CM(TMDC0006.WAV)		'tortilla' CM(TMDC0001.WAV)

Glottal stops in TMD Cahuilla also exhibit gradience with respect to their phonetic realization depending on the degree of glottal constriction. Such gradience is expected given the properties of laryngeal sounds (Garellek et al. 2023). The following spectrogram images illustrate several tokens of the independent pronoun /ˈpɛʔɛm/ 'them' where the glottal stop is realized differently depending upon the degree of glottal stricture: complete closure with creaky phonation on the second half of the preceding vowel (Figure 17), partial closure with creaky phonation on both of the adjacent vowels (Figure 18), and mostly open with creaky phonation throughout both vowels (Figure 19).

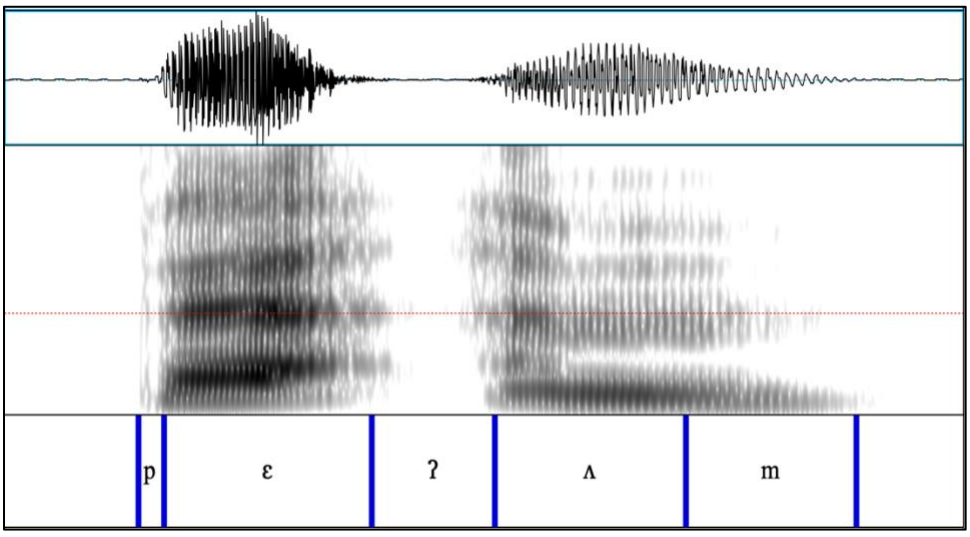


Figure 17. Spectrogram of [ˈpɛʔʌm] 'them' with complete glottal closure

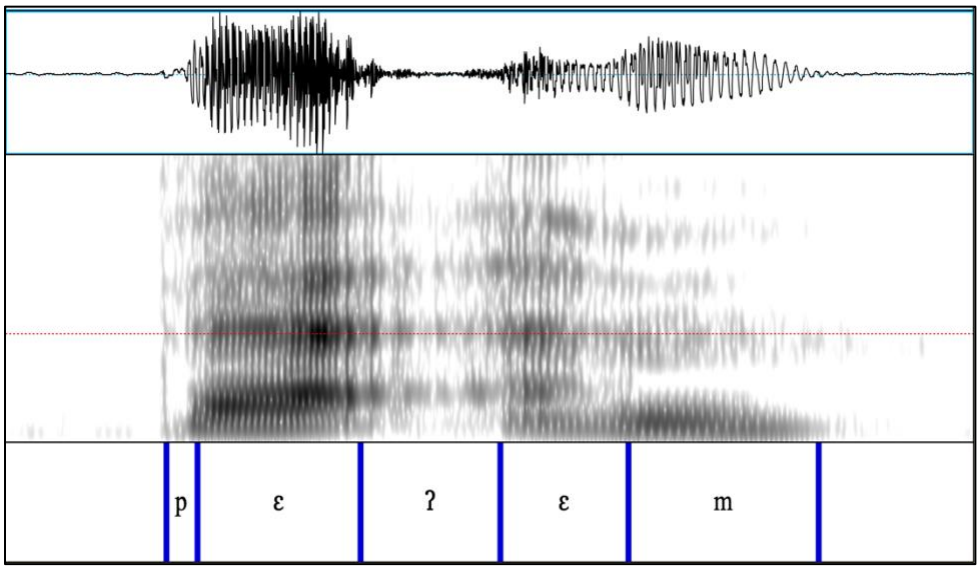


Figure 18. Spectrogram of [ˈpɛʔɛm] ‘them’ with partial glottal closure

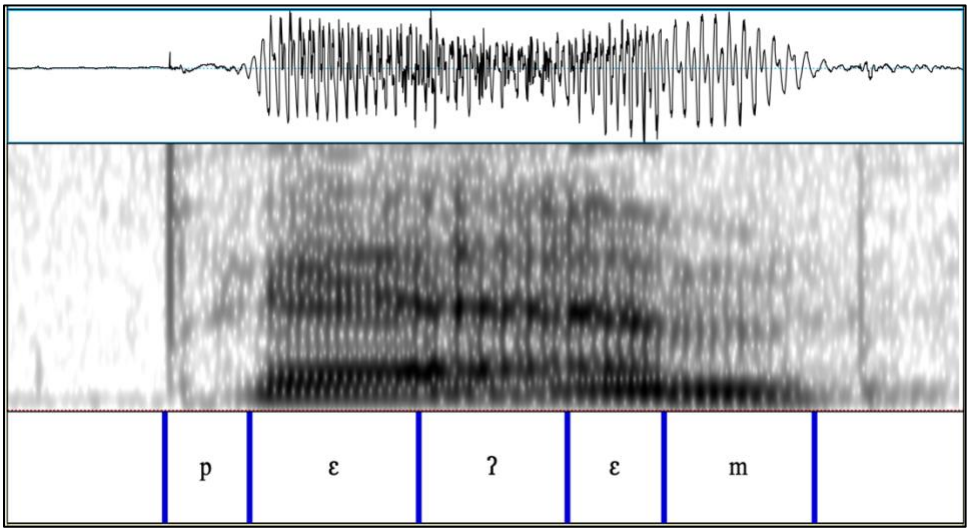


Figure 19. Spectrogram of [ˈpɛʔɛm] ‘them’ with no glottal closure

As these examples show, the voiceless glottal plosive can vary in its phonetic realization in TMD Cahuilla, which can range from a canonical stop with complete occlusion of the

airstream (Figure 17), to partial occlusion with some glottalization of adjacent vowels (Figure 18), to fully voiced with no occlusion and glottalization of both adjacent vowels (Figure 19).

2.4.5.2 Voiceless glottal fricative /h/

Voiceless glottal fricatives occur in all word positions where it serves as either a syllable onset or coda, occurring more frequently at the beginning of words than in word-medial and word-final positions. In word-medial positions, it occurs only as a root-initial consonant, and word-finally it is even more marginal with only two instances in the entire TMD Cahuilla corpus. Examples of /h/ in all word positions are provided in (46).

(46) Word-initial

a. *hepush*
[ˈ**h**ɛpʊʃ]
/ˈ**h**ɛ-pu-tʃ/
3SG-face-ABS
'face' CM(TMDC0028.WAV)

b. *havun*
[ˈ**h**avun]
/ˈ**h**avun/
'hurry' CM(TMDC0030.WAV)

c. *hilyewet*
[ˈ**h**iʎʌwɛtʰ]
/ˈ**h**iʎɛ-wɛt/
wide-AUG
'wide' CM(TMDC0028.WAV)

d. *hunal*
[ˈ**h**una[]
/ˈ**h**una-l/
badger-ABS
'badger' CM(TMDC0020.WAV)

Post-vocalic

f. *hahtimwenet*
[ˈha**h**tɪmwɛnɛt]
/ˈha~**h**ati-m-wɛn-ɛ-t/
RED~shine-DISTR-STAT-V-ABS
'lights' CM(TMDC0019.WAV)

h. *penhuhviqal*
[pɛnˈhu**h**vɪqɐ[]
/pɛ-n-ˈhu~**h**uvi-qal/
3SG-1SG-RED~smell-DUR.SG
'I smell it' CM(TMDC0029.WAV)

Post-consonantal

i. *pemhivinkatem*
[pɛmˈ**h**ivɪnkɐtɛm]
/ pɛ-m-ˈ**h**ivin-katɛm/
3SG-3PL-take-IF.PL
‘they’re g. to take it’
CM(TMCONVO1.WAV)

j. *henhiwnishka*
[hɛnˈ**h**iwnɪʃka]
/hɛn-ˈ**h**iwniʃ-ka/
1SG-stay-IF
‘I’m g. to stay’ CM(TMCONVO2.WAV)

Word-final

k. *pah*
[ˈpa**h**]
/ˈpah/
‘three’ CM(TMDC0028.WAV)

l. *wih*
[ˈwɪ**h**]
/ˈwih/
‘two’ CM(TMDC0028.WAV)

As the examples in (46) show, /h/ is not restricted in terms of its distribution both within words and at syllable margins, however, it does not frequently occur word-finally.[13] The phonemic status of /h/ is evidenced by the minimal pairs provided in (47).

(47) /h/ vs. /p/

a. *hepi*
[ˈ**h**ɛpiʔ]
/ˈ**h**ɛ-pi/
3sg-breast
‘breast’ CM(TMDC0028.WAV)

b. *pepi*
[ˈ**p**ɛpi]
/ˈ**p**ɛpi/
‘far’ CM(TMDC0028.WAV)

[13] The two examples in (46k) are the only words with word-final [h] in the TMD Cahuilla corpus, as well as in the Cahuilla dictionary by Seiler (1977).

/h/ vs. /x/

c. *pah*

[ˈpa**h**]

/ˈpa**h/**

‘three’ CM(TMDC0028.WAV)

d. *pax*

[ˈpa**x**]

/ˈp-a**x**/

3sg-ABL

‘from it’ CM(TMDC0016.WAV)

The following spectrogram images (Figures 20-21) illustrate the contrast between word-final /h/ and word-final /ʔ/, as shown in the minimal pair /ˈpah/ ‘three’ and /ˈpaʔ/ ‘drink!’

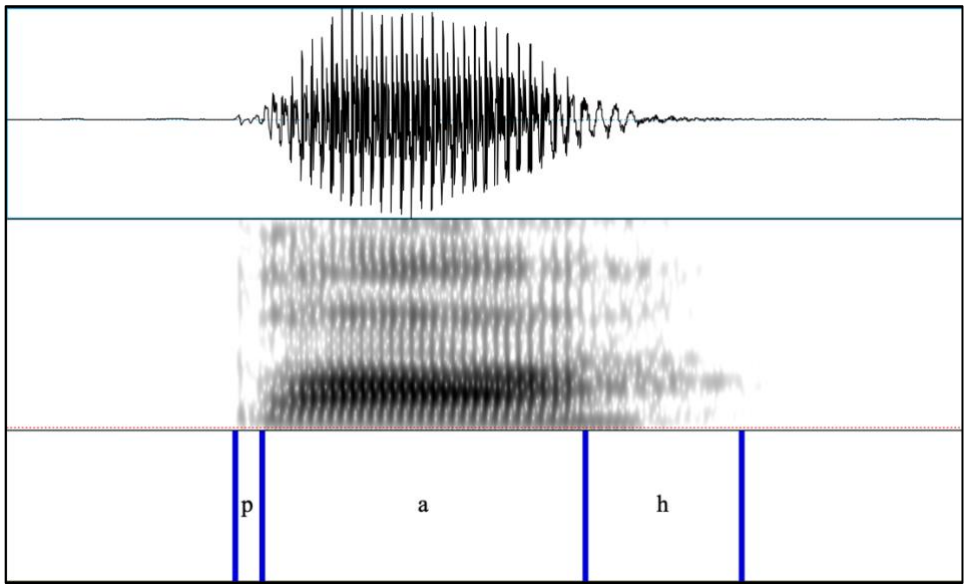


Figure 20. Spectrogram of /ˈpah/ ‘three’

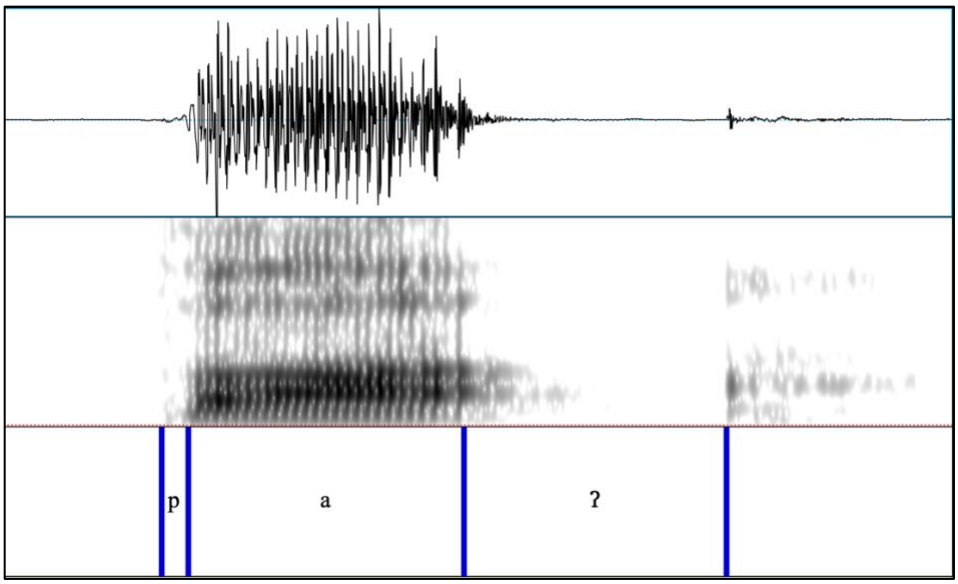


Figure 21. Spectrogram of /ˈpaʔ/ ‘drink!’

As seen in these examples, word-final /ʔ/ can be characterized by a period of complete glottal closure accompanied by creakiness on a preceding vowel and followed by a period of frication. This contrasts with word-final /h/, which shows glottal spreading as evidenced by a period of aspiration which is preceded by a non-creaky, modal vowel. Having presented the consonant inventory of TMD Cahuilla, a discussion on distribution and frequency of the vocalic segments will now be provided in the following section.

2.5 Vowels

There are four phonemic vowel qualities (/i, ɛ, u, a/) attested in the TMD Cahuilla native lexicon, which mirrors that of previous documentation on other varieties of Cahuilla. Overall, four-vowel systems are somewhat rare amongst Indigenous California languages, with the majority having five or more vowels (Golla 2011). The Cahuilla vowel system is also unusual within Takic, as it is the only language that has a four-vowel system (Golla 2011, Hill & Hill

2019), with the system reconstructed for Proto-Takic being /*a, * i, *o, *u, *y/ (Hill & Hill 2019:56).

There are no restrictions on the distribution of all vowel qualities in TMD Cahuilla in word-medial or word-final position. Cross-linguistically, stressed vowels tend to display fortition effects (i.e., be more open and peripheral), while unstressed vowels tend to show correlates of lenition (i.e., be more closed and centralized) (Bauer 1988:388; Gordon 2016:155-157). This trend is also observed in Cahuilla with stressed syllables being more peripheral and unstressed more centralized. Prosodic conditioning on vowel quality is discussed in further length in §4.4.2. As mentioned above, although marginally attested, vowel length is contrastive in TMD Cahuilla, as evidenced by minimal pairs. This pattern is consistent with other varieties of Cahuilla, as well as Cupeño, where vowel length does not carry a high functional load (Hill & Hill 2019:58). In the following sections, examples of each vowel in both word-medial and word-final positions, as well as stressed and unstressed environments.

2.5.1 High front unrounded vowel /i/

High front unrounded vowels occur in both word-medial and word-final positions. When /i/ occurs word-medially, its vowel quality varies dependent upon two factors: (1) its position in the word, and (2) the presence/absence of stress. In stressed syllables it is realized as a high front unrounded vowel [i] (48a-b), while in word-medial unstressed syllables it is realized as a near-high front unrounded vowel [ɪ] (48e-d). Word-final /i/ is always unstressed but its quality can vary depending upon syllable shape. In open syllables, it is realized as [i] (48g-j) and in closed syllables it is realized as [ɪ] (48a,b,d). Examples of /i/ in word-medial and word-final positions are shown in (48a-f) and (48g-j), respectively.

(48) Word-medial, tonic

a.	*nichily*	b.	*ingily*
	[ˈn**i**t͡ʃɪʎ]		[ˈʔ**i**ŋɪʎ]
	/ˈn**i**t͡ʃ-l/		/ˈʔ**i**ŋ-l/
	woman-ABS		salt-ABS
	‘woman’ CM(TMDC0028.WAV)		‘salt’ CM(TMDC0028.WAV)

Word-medial, pre-tonic

c.	*pishaywiktem*	d.	*michemmukni’i*
	[p**ɪ**ʃˈʔajwɪktɛm]		[m**ɪ**t͡ʃɛmˈmukniʔi]
	/p**i**-ʃ-ˈʔajw-iktɛm/		/m**i**-t͡ʃɛm-ˈmukni-ʔi/
	3SG-1PL-want-IF.PL		3PL-1PL-win-PRET
	‘we’ll need it’ CM(TMDC0002.WAV)		‘we won them’ CM(TMDC0015.WAV)

Word-medial, post-tonic

e.	*kikitem*	f.	*se’ish*
	[ˈkik**ɪ**tɛm]		[ˈsɛʔ**ɪ**ʃ]
	/ˈki~k**i**t-ɛ-m/		/ˈsɛʔ**i**-tʃ/
	RED~child-V-PL		bloom-ABS
	‘children’ CM(TMDC0028.WAV)		‘flower’ CM(TMDC0028.WAV)

Word-final, post-tonic

g.	*tam’i*	h.	*pepi*
	[ˈtamʔ**i**]		[ˈpɛp**i**]
	/ˈtamʔ**i**/		/ˈpɛp**i**/
	‘knee’ CM(TMDC0028.WAV)		‘far’ CM(TMDC0028.WAV)

i.	*pisni*	j.	*qily'i*
	[ˈpisn**i**]		[ˈqɛɪʎʔ**i**]
	/ˈpis-n**i**/		/ˈqilʔ**i**/
	come.out-CAUS		'neck' CM(TMDC0028.WAV)
	'breastfeed!' CM(TMDC0028.WAV)		

As the examples in (48) show, the allophone [ɪ] occurs word-medially in both pre-tonic (48c-d) and post-tonic (48e-f) unstressed syllables. Finally, the allophone [ɪ] does not occur in word-final open syllables, as shown in (48g-j). Some (near-) minimal pairs are provided in (49) to show that /i/ is a contrastive phoneme in TMD Cahuilla.

(49) /i/ vs. /a/

a.	*sawish*	b.	*siwish*
	[ˈs**a**wɪʃ]		[ˈs**i**wɪʃ]
	/ˈs**a**w-tʃ/		/s**i**w-tʃ/
	tortilla-ABS		hot-ABS
	'tortilla' CM(CM_STORY.WAV)		'hot' CM(TMDC0034.WAV)

/i/ vs. /u/

c.	*pit*	d.	*kut*
	[ˈp**i**t^{h}]		[ˈk**u**t^{h}]
	/ˈp**i**-t/		/ˈk**u**-t/
	trail-ABS		fire-ABS
	'trail, road' CM(TMDC0028.WAV)		'fire' CM(TMDC0028.WAV)

/i/ vs. /ɛ/

e.	*ti'i*	f.	*he'i*
	[ˈ**ti**ʔi]		[ˈh**ɛ**ʔi]
	/ˈ**ti**ʔi/		/ˈh**ɛ**-ʔi/
	'stomach' CM(TMDC0028.WAV)		3SG-foot
			'foot, his/her foot' CM(TMDC0028.WAV)

2.5.2 Mid front unrounded vowel /ɛ/

Mid front unrounded vowels occur in word-medial and word-final positions. The vowel /ɛ/ also varies in vocalic quality dependent upon to three factors: (1) the position in the word, (2) syllable type, and (3) the presence/absence of stress. In the word-medial position, /ɛ/ is realized as a mid-back unrounded vowel [ʌ] in unstressed open syllables (50b-f), while in unstressed closed syllables (50a-b, 50g-h) and stressed syllables (open and closed) (50a-b), it is realized as the mid front unrounded vowel [ɛ]. Word-finally, /ɛ/ is always unstressed and realized as [ɛ] in both open (50i-l) and closed (50a-b, 50f-h) syllables. Examples of /ɛ/ in all the environments discussed here are shown in (50).

(50) Word-medial, tonic

a.	*welnet*	b.	*metewet*
	[ˈw**ɛ**l̩nɛt]		[ˈm**ɛ**tʌwɛt]
	/ˈw**ɛ**lnɛt/		/ˈm**ɛ**tɛwɛt/
	'mean' CM(TMDC0021.WAV)		'many' CM(TMDC0028.WAV)

Word-medial, pre-tonic

c. *nengii'i*
[nʌˈŋiːʔi]
/nɛˈŋiː-ʔi/
1SG-go.home-PRET
'I went home' CM(TMDC0001.WAV)

e. *ekupqal*
[ʔʌˈkupqaɬ]
/ʔɛ-ˈkup-qal/
3SG-sleep-DUR.SG
'you're sleeping' CM(TMDC0029.WAV)

d. *chepehatinqal*
[t͡ʃʌpʌˈhatɪnqɐɬ]
/t͡ʃɛ-pɛ-ˈhatin-qal/
just-3SG-shine-DUR.SG
'shining bright' CM(TMDC0021.WAV)

f. *pe'u'uwinem*
[pʌˈʔuʔuwɪnɛm]
/pɛ-0-ˈʔuʔuwi-nɛm/
3SG-3SG-buy-FUT
'you'll buy it' CM(TMDC0030.WAV)

Word-medial, post-tonic

g. *kelawet*
[ˈkɛlɐwɛt]
/ˈkɛlaw-ɛ-t/
get.wood-V-ABS
'wood' CM(TMDC0001.WAV)

h. *chemem*
[ˈt͡ʃɛmɛm]
/ˈt͡ʃɛmɛm/
'we, us' CM(TMDC0028.WAV)

Word-final, post-tonic

i. *yewe*
[ˈjɛwɛ]
/ˈjɛwɛ/
'long ago' CM(TMCONVO1.WAV)

k. *yaxqale*
[ˈjaxalɛ]
/0-ˈjax-qal-ɛ/
3SG-say-DUR.SG-PRET
'she was saying' CM(TMCONVO1.WAV)

j.	*kutashve*	l.	*haxatete*
	[ˈkutɐʃvɛ]		[ˈhaxɐtɛtɛ]
	/0-ˈkutaʃ-vɛ/		/ˈhaxa-tɛtɛ/
	3SG-speak-REAL.SUB		who-various
	‘she spoke’ CM(TMCONVO1.WAV)		‘what’s-his-name’ GT(TMCONVO1.WAV)

As the examples above show, the allophone [ʌ] occurs only in unstressed open syllables word-medially (50e-h). Elsewhere, the mid front unrounded vowel [ɛ] occurs. Some (near-)minimal pairs are provided in (51) below to show that /ɛ/ is a contrastive phoneme.

(51) /ɛ/ vs. /i/

a.	*he’i*	b.	*ti’i*
	[ˈhɛʔi]		[ˈtiʔi]
	/ˈhɛ-ʔi/		/ˈtiʔi/
	3SG-foot		‘foot’ CM(TMDC0028.WAV)
	‘stomach’ CM(TMDC0028.WAV)		

/ɛ/ vs. /u/

c.	*se’ish*	d.	*su’ish*
	[ˈsɛʔɪʃ]		[ˈsuʔɪʃ]
	/ˈsɛʔ-tʃ/		/ˈsuʔ-tʃ/
	bloom-ABS		jackrabbit-ABS
	‘flower’ CM(TMDC0028.WAV)		‘jackrabbit’ CM(CM_STORY.WAV)

/ɛ/ vs. /a/

e.	*ewel*	f.	*awal*
	[ˈʔɛwɛl]		[ˈʔawɐl]
	/ˈʔɛwɛ-l/		/ˈʔawa-l/
	bleed-ABS		dog-ABS
	‘blood’ CM(TMDC0034.WAV)		‘dog’ CM(TMDC0028.WAV)

2.5.3 Low central unrounded vowel /a/

Low front unrounded vowels occur in word-medial and final positions. Unlike the vowels /i/ and /ɛ/, the vocalic quality of /a/ is dependent upon a single factor, namely the presence/absence of stress. In unstressed syllables, whether in the word-medial and word final positions, it is realized as the near-open central unrounded vowel [ɐ] (52c-i), while in stressed syllables it is realized as a low central unrounded vowel [a] (52a-b, 52e-i). Examples of /a/ in word-medial and final positions are shown in (52).

(52) Word-medial, tonic

a. *amnawet*
[ˈʔ**a**mnɐwɛt]
/ˈʔ**a**mna-wɛt/
great-AUG
'big' CM(TMDC0028.WAV)

b. *paxanivel*
[ˈp**a**xɐnɪvɛl]
/ˈp**a**xa-ni-vɛl
enter-CAUS-NOM
'pants' CM(TMDC0034.WAV)

Word-medial pre-tonic

c. *taxkwa'asnish*
[t**ɐ**xˈkʷaʔɐsnɪʃ]
/t**a**x-ˈkʷaʔas-ni-ʃ/
REFL-draw-CAUS-ABS
'picture' CM(TMDC0007-001.WAV)

Word-medial post-tonic

d. *tulaka*
[ˈtul**ɐ**kɐʔ]
/ˈtul**a**kaʔ/
'tomorrow' CM(TMDC0002.WAV)

e. *pavaswen*
[ˈpav**ɐ**swɛn]
/ˈpav**a**s-wɛn/
wet-STAT
'damp' CM(TMDC0028.WAV)

Word-final, post-tonic

f. *achama*
[ˈʔat͡ʃɐmɐ]
/ˈʔat͡ʃa-m**a**/
good-ADJ
'it is good'
CM(TMDC0028.WAV)

g. *a'aska*
[ˈʔaʔɐskɐ]
/0-ˈʔaʔas-k**a**/
3SG-bathe-IF
's/he's g. to bathe'
CM(TMDC0028.WAV)

h. *mawa*
[ˈmawɐ]
/ˈmaw**a**/
'later' CM(TMCONVO1.WAV)

i. *ishvayka*
[ˈʔiʃvaɪkɐ]
/ˈʔiʃva-ik**a**/
left-towards
'to the right' CM(TMDC0028.WAV)

As the examples in (52) show, the allophone [ɐ] occurs in all unstressed syllables both in the word-medial, as well as word-final positions in an open or closed syllable. This contrasts with /i/, /ɛ/, and /u/ whose lowered and centralized allophones never occur in word-final, open syllables. Some (near-)minimal pairs are provided in (53) to show that /a/ is a contrastive phoneme.

(53) /a/ vs. /i/

a. *sawish*
[ˈs**a**wɪʃ]
/ˈs**a**w-tʃ/
tortilla-ABS
'tortilla' CM(CM_STORY.WAV)

b. *siwish*
[ˈs**i**wɪʃ]
/s**i**w-tʃ/
hot-ABS
'hot (obj.)'CM(TM_CONVO1.WAV)

/a/ vs. /ɛ/

c.	*sa'i*	d.	*se'ish*
	[ˈs**a**ʔi]		[ˈs**ɛ**ʔɪʃ]
	/ˈs**a**ʔi/		/ˈs**ɛ**ʔ-tʃ/
	'guts' CM(TMDC0028.WAV)		flower-ABS
			'flower' CM(TMDC0028.WAV)

/a/ vs. /u/

e.	*hemu*	f.	*hema*
	[ˈhɛmuʔ]		[ˈhɛmaʔ]
	/ˈhɛ-muʔ/		/ˈhɛ-maʔ/
	3sg-nose		3sg-hand
	'nose' CM(TMDC0028.WAV)		'hand' CM(TMDC0028.WAV)

2.5.4 High back unrounded vowel /u/

Like the other high vowel /i/, the high back rounded vowels /u/ varies in vocalic quality dependent upon its position in the word, and the presence/absence of stress. In unstressed syllables it is realized as a near-high near-back unrounded vowel [ʊ] (54c-f), while in stressed syllables it is realized as a high back unrounded vowel [u] (54a-b). In word-final unstressed open syllables it is also realized as [u] (54g-j). Examples of /u/ in word-medial and final positions are shown in (54).

(54) <u>Word-medial, tonic</u>

a.	*muchingax*	b.	*tu'ish*
	[ˈm**u**t͡ʃi-ŋax]		[ˈt**u**ʔɪʃ]
	/ˈm**u**t͡ʃi-ŋax/		/ˈt**u**ʔ-tʃ/
	front-AND		bear.fruit-V-ABS
	'In the front of' CM(TMDC0031.WAV)		'fruit' CM(TMDC0028.WAV)

Word-medial pre-tonic

c. *tuwaymanish*
[tʊˈwajɐmanɪʃ]
/t**u**ˈwajamaniʃ/
‘always’ CM(TMDC0023.WAV)

d. *tuxwa’viktem*
[tʊˈxʷaʔvɪt͡ʃɛm]
/t**u**ˈxʷaʔ-vit͡ʃ-ɛ-m/
work-AGT-V-PL
‘workers’ CM(TMDC0023.WAV)

Word-medial, post-tonic

e. *navuk*
[ˈnavʊk]
/ˈnav**u**k/
‘come.IMP!’ CM(TMDC0028.WAV

f. *petuk*
[ˈpɛtʊk]
/ˈpɛt**u**k/
‘inside’ CM(TMDC0028.WAV)

Word-final, post-tonic

g. *hululu*
[ˈhulul**u**]
/ˈhulul**u**/
‘back, spine’ CM(TMDC0028.WAV)

i. *netutu*
[nʌˈtuɾ**u**]
/nɛ-ˈtut**u**/
1SG-grandmother
‘my grandmother’ GT(TMDC0034.WAV)

h. *puku*
[ˈpuk**u**]
/ˈpuk**u**/
‘root’ CM(TMDC0029.WAV)

j. *hem’ivilyu*
[hɛmˈʔiviʎ**u**]
/hɛmˈʔivil**u**/
3SG-cahuilla.language
‘their Cahuilla lang.’ CM(TMDC0034.WAV)

As shown above in (54), the high back rounded vowel is always realized as [u] in both stressed syllables, as well as word-finally in open syllables; elsewhere, it is realized as [ʊ]. Some (near-)minimal pairs are provided in (55) to show that /u/ is a contrastive phoneme.

(55) /u/ vs. /ɛ/

a.	*nukat*	b.	*nɛkat*
	[ˈn**u**kɐt]		[ˈn**ɛ**kɐt]
	/ˈn**u**k-t/		/ˈn**ɛ**k-a-t/
	doll-abs		come-PRET-ABS
	‘doll’ CM(TMDC0020.WAV)		‘one who came’ CM(TMCONVO1.WAV)

/u/ vs. /i/

c.	*yuki*	d.	*puku*
	[ˈjuk**i**]		[ˈpuk**u**]
	/ˈjuk**i**/		/ˈpuk**u**/
	‘scary’ CM(TMDC0028.WAV)		‘root’ CM(TMDC0029.WAV)

/u/ vs. /a/

e.	*puchi*	f.	*qachi*
	[ˈp**u**tʃi]		[ˈq**a**tʃi]
	/ˈp**u**tʃi/		/ˈq**a**tʃi/
	‘wow!’ CM(TMDC002I.WAV)		‘to punch’ CM(TMDC0028.WAV)

2.5.5 Mid back rounded vowel /o/

The mid back unrounded vowel is a vocalic segment whose frequency is low in the language, as it occurs only in a few loanwords adapted from Spanish. It occurs in word-medial and word-final positions where its vocalic quality remains unchanged regardless of position in the word, syllable type, and the presence/absence of stress. Examples of /o/ in word-medial and final positions are shown in (56).

(56) Word-medial, tonic

a. *koochi*
[ˈk**o**ːt͡ʃɪ]
/ˈk**o**ːt͡ʃi/
‘pig’ CM(TMDC0035.WAV)

b. *avooxa*
[ʔɐˈ**v**o**o**ːxɐ]
/ʔaˈv**o**ːxa/
‘needle’ CM(TMDC0035.WAV)

Word-medial, post-tonic

c. *meestor*
[ˈmɛːst**o**ɾ]
/ˈmɛːst**o**ɾ/
‘teacher’ CM(TMDC0035.WAV)

d. *amiiwoki*
[ʔɐˈmiːw**o**ki]
/ʔaˈmiːw**o**ki/
'friend' CM(TMDC0003.WAV)

Word-final, post-tonic

e. *xaaro*
[ˈxaːɾ**o**]
/ˈxaːɾ**o**/
‘tin can’ CM(TMDC0035.WAV)

g. *vaanko*
[ˈvaːnk**o**]
/ˈvaːnk**o**/
‘bank’ CM(TMCONVO1.WAV)

f. *chaango*
[ˈt͡ʃaːŋ**o**]
/ˈt͡ʃaːŋ**o**/
‘monkey’ CM(TMDC0035.WAV)

h. *kavaayo*
[kaˈvaːj**o**]
/kaˈvaːj**o**/
‘horse’ GT(TMCONVO1.WAV)

As the examples in (56) show, there are no allophones of /o/ and its distribution is not restricted, as it can occur word-medially and word-finally in both stressed and unstressed syllables. Long vowels are always stressed in loanwords, thus /o/ and /oː/ are in complementary distribution, with /oː/ occurring in stressed syllables and /o/ occurring in unstressed syllables.

2.5.6 Vocalic contrasts in word-final, unstressed position

As discussed in the previous sections, vowels may undergo vowel reduction in unstressed position (discussed in more detail in §2.6 below). These processes are, however, optional, The (near-) minimal pairs in (57) show that the vocalic contrasts of TMD Cahuilla are not restricted to stressed position but are also attested in unstressed syllables.

(57) /i/ vs. /u/

a.	*yuki*	b.	*puku*
	[ˈjuk**i**]		[ˈpuk**u**]
	/ˈjuk**i**/		/ˈpuk**u**/
	‘scary’ CM(TMDC0028.WAV)		‘root’ CM(TMDC0029.WAV)

/i/ vs. /ɛ/

c.	*isilyi*	d.	*kilye*
	[ˈʔisɪʎ**i**]		[ˈkɪʎ**ɛ**]
	/ˈʔisi-l-**i**/		/ˈkil**ɛ**/
	coyote-ABS-ACC		‘not’ CM(TMDC0016.WAV)
	‘coyote (obj.)’ CM(TMDC0016.WAV)		

/a/ vs. /i/

e.	*tam’a*	f.	*tam’i*
	[ˈtamʔ**a**]		[ˈtamʔ**i**]
	/ˈtamʔ**a**/		/ˈtamʔ**i**/
	‘mouth’ CM(TMDC0028.WAV)		‘knee’ CM(TMDC0028.WAV)

/ɛ/ vs. /u/

g.	*kuple*	h.	*teklu*
	[ˈkuplɛ]		[ˈtɛklu]
	/ˈkup-l-ɛ/		/ˈtɛklu/
	sleep-MOTP-IMP		‘be still’ CM(CM_LANG_SURVEY.WAV)
	‘go and sleep’ GT(GTORO1.WAV)		

2.5.7 Contrasts in vowel length

As discussed in §2.5, while marginal, vowel length is contrastive in TMD Cahuilla, and consistent with descriptions of other Cahuilla varieties (Bright 1965:243, Seiler 1977:52, Munro 1990:219, Hill & Hill 2019:58). In the examples listed in (58), the contrast between long and short vowels is illustrated with the (near-)minimal pairs taken from the TMD corpus.

(58) /a/ vs. /aː/

a.	*mentatkamiqal*	b.	*taatval*
	[mɛnˈtatkɐmɪqɐl]		[ˈtaːtvɐl]
	/ mɛ-n-ˈta~taki-mi-qal/		/ˈtaːtval/
	3PL-1SG-RED~patch-DIST-DUR.SG		‘blind’ CM(CM_STORY.WAV)
	‘I’m patching them’ CM(TMDC0011.WAV)		

/ɛ/ vs. /ɛː/

c.	*petewqale*	d.	*peteewqale*
	[pʌˈtɛwqɐlɛ]		[pʌˈtɛːwqɐlɛ]
	/pɛ-0-ˈtɛw-qal-ɛ/		/pɛ-0-ˈtɛːw-qal-ɛ/
	3SG-3SG-find-DUR.SG-PRET		3SG-3SG-see-DUR.SG-PRET
	‘he found him’ CM(TMDC0016.WAV)		‘he was looking for him’ CM(TMDC0016.WAV)

/i/ vs. /iː/

e.	*niyaxqale*	f.	*ngiiqaleve*
	[ˈn**i**jaxqɐlɛ]		[ˈŋ**i**ːqɐlʌvɛ]
	/ˈn**i**-jax-qal-ɛ/		/ˈŋ**i**ː-qal-ɛ-vɛ/
	1SG-say-DUR.SG-PRET		3SG-go.home-DUR.SG- PRET-REAL.SUB
	‘I was saying’ CM(TM_CONVO1.WAV)		‘when she came home’ CM(CM_STORY.WAV)

/u/ vs. /uː/

g.	*penyulpi*	h.	*neyuulki*
	[pɛnˈj**u**l̩pi]		[nʌˈj**u**ːʎki]
	/pɛ-n-ˈj**u**l-pi/		/nɛ-ˈj**u**ː-ʎ-ki/
	3SG-1SG-build-IR.SUB		1SG-younger.brother-ABS-POSS
	‘for me to build it’		‘my younger brother’
	CM(TMDC0034.WAV)		CM(TMDC0034.WAV)

As the examples in (58) show, contrasts between a long and short vowel are attested in both open and closed syllables in nouns, verbs, adjectives. There also a few semantically related pairs of verb stems that contrast in vowel length (e.g., /pɛˈt**ɛ**wqalɛ/ ‘find’ vs. /pɛˈt**ɛ**ːwqalɛ/ ‘see’). Vowel length may also interact with other morphological processes. For example, there is a small number of verb stems containing long vowels, which form a class that does not reduplicate in their distributive form, causing a neutralization between distributive and non-distributive forms (see Chapter 6 for further discussion on verb classes and reduplication). While most instances of long vowels occur in verbs, they are also attested in a few nouns and adjectives, as shown in (58b) and (58h).[14]

[14] Cahuilla and Cupeño lost a vowel length contrast and many of the present-day instances of long vowels in nouns derive from *VhV* sequences, as evidenced by the surfacing of [h] in some inflected forms (Hill & Hill 2019:58).

2.5.8 Voiceless vowels

In previous work by Seiler (1965, 1977), Cahuilla has been reported to have non-phonemic voiceless vowels, a feature that is well attested among other Uto-Aztecan languages, especially in the Numic branch (Chemehuevi (Press 1979), Comanche (Canonge 1957; Armagost 1985; Charney 1993; Armagost and Miller 2000), Kawaiisu (Zigmond et al. 1990), Southern Paiute (Sapir 1930; Harms, 1966), Southern Ute (Givon 1979; Charney 1996; Oberly 2008, Oberly & Kharlamov 2014)) and Hopi (Whorf, 1934; Manaster-Ramer, 1986)) in Northern Uto-Aztecan, as well as in the Tepiman (Tohono O'odham; Miyashita 1998) and Aztecan (Huastec Nahuatl; Aguilar 2020) branches of Southern Uto-Aztecan. The question I address in this section is: is there evidence of voiceless vowels in TMD Cahuilla, a contemporary variety of the language and, if so, how can these be characterized acoustically?

For Cahuilla, Seiler (1977:32) notes that these non-phonemic voiceless vowels (which he labels as 'echo vowels') are a salient feature of the language. In terms of their realization, he states that "the voiceless vowels are a breath release with tongue position corresponding to a definite vowel quality", specifically that of the preceding vowel (1965:52). He also notes that voiceless vowels may occur in two positions: (i) before or after a glottal stop, and (ii) after a word-final stop other than glottal stop (1977:32). Of the second type, Seiler notes that voiceless vowels of this type occur in the word-final position only and are accompanied by a glottal fricative [-Vh]. However, he does not provide details on whether his examples were obtained from elicited words in isolation or phrase-medially and whether their position within the utterance has any bearing on the realization of the voiceless vowel. Using Seiler's *exact* transcription conventions for both phonetic and phonemic representations, I provide examples of

voiceless vowels in the context of glottal stops and other word-final stops below in (59) and (60), respectively.

(59) Voiceless vowel preceding and following a glottal stop (Seiler 1977:32) [15]

a. *nesek'a*
[nésekaʔa]
/nésekʔa/
'my shoulder'

b. *hemu'*
[hémuʔuh]
/hémuʔ/
'his nose'

(60) Voiceless vowel following voiceless alveolar stop (Seiler 1977:32)

a. *muut*
[múwtuh]
/múwt/
'owl'

b. *net*
[nétɛh]
/nét/
'ceremonial chief'

In the case of word-final voiceless vowels, Seiler transcribes both the voiceless vowel (marked with a circumflex below the vowel), as well as a glottal fricative (i.e., Vh). This

[15] Seiler (1977:32) provides the underlying representations of these forms represented here.

transcription method is problematic since both a voiceless vowel [V̥] and a glottal fricative [h] are equal to aspiration with or without a vocal tract configuration, respectively, which is unlikely as a sequence. Thus, in the TMD words containing a voiceless vowel, I transcribe *only* a voiceless vowel matching the quality of the preceding vowel to represent that the voiceless vowel is equal to aspiration but with a specified vocal tract configuration (e.g., [ḁ], [ɛ̥], [u̥], [i̥]).

In addition, Seiler also reports that the relative perceptibility of these voiceless vowels may vary, being more perceptible in monosyllabic words than they are in polysyllabic words (1977:32). Voiceless vowels are attested for all four vowel qualities in the description by Seiler (1965, 1977). In terms of their context, Seiler does not provide details as to whether voiceless vowels are affected by speech rate or position within the utterance (medial vs. final). He does, however, discuss their relevance to the prosodic system in determining secondary stress assignment (for further discussion on stress assignment, see Chapter 5).

Given that voiceless vowels have been described as a prominent feature of the language in previous work, one important question to address is whether there is evidence of voiceless vowels in a contemporary variety of the language and, if so, whether their distribution is similar to that of voiceless vowels documented previously. In order to assess this question, I examined spectrogram images of several examples cited by Seiler that had word-final stops (both glottal and non-glottal), along with cognate forms taken from the TMD Cahuilla corpus to see whether there was any phonetic evidence of a voiceless vowel followed by a glottal fricative in both corpuses. In all of the tokens examined of both word-final voiceless stops ([t], [k]) and word-final glottal ([ʔ]) stops from the TMD corpus, there was a notable period of aspiration that resembled a glottal fricative with visible formants that match that of the preceding vowel. Similar glottal fricatives are also visible on spectrogram images taken from Seiler's Desert

Cahuilla data from recordings available in the CLA collection LA77 housed at the University of California Berkeley, allowing for comparison between TMD Cahuilla and the Desert Cahuilla recordings made nearly 70 years ago (Dominguez & Seiler 1955). Thus, I posit that Seiler's data, as well as my own TMD Cahuilla data, does appear to provide phonetic evidence of word-final voiceless vowels. Given the limited scope of this study, I set aside the matter of word-medial voiceless vowels that precede a glottal stop for future investigation, and instead focus on those that follow voiceless stops, which will be discussed in the next section.

2.5.8.1 Voiceless vowels after word-final voiceless stops

In (61), I compare a monosyllabic example ending in the voiceless alveolar plosive /t/ from Seiler's data to the cognate form taken from the TMD Cahuilla corpus, both of which were uttered in isolation and articulated in careful speech.

(61) Voiceless vowel after /t/ in word-final position

	TMD Cahuilla		Seiler's description
a.	*muut*	b.	*muut*
	[ˈmuːt**ʉ̥**]		[ˈmuwt**ɻ̥h**]
	/ˈmuːt/		/ˈmuwt/
	'owl' GT(GTVOCAB.WAV)		'owl' CD(HS_1977:32)

In the examples above in (61), I present both tokens of /ˈmuːt/ 'owl,' as they are transcribed in both the TMD Cahuilla corpus (61a) and Seiler's data (61b), respectively.[16]

[16] In the TMD Cahuilla transcription I follow Hill & Hill (2019:238), (Sauvel & Munro 1981:36), and Seiler (1979:115) analyze the syllable nucleus consisting of a long vowel, rather than a vowel followed by a semivowel

In the TMD Cahuilla example (61a), do not transcribe a voiceless vowel in the underlying representation but do transcribe one in the surface form, which is realized with a glottal fricative. (see Garellek (2019), Aguilar (2020:135) for discussion on the realization of voiceless vowels as glottal fricatives). Seiler's transcription also lacks a voiceless vowel in the underlying representation but includes it in the surface form (transcribed as a centralized copy of the stressed vowel with an upside down caron underneath it followed by a glottal fricative) Spectrogram images of (61a) and (61b) are provided below in Figures 22 and 23, respectively. In these and subsequent examples, I transcribe both the Seiler and TMD Cahuilla tokens with word-final voiceless vowels since there is no perceivable difference (other than duration) in their surface realization (i.e., all transcriptions are phonetic).

[w], as first proposed in Seiler (1977). For a discussion of the diacrony of long vowels in Cahuilla resulting from loss of intervocalic [h] see Hill & Hill (2019:238).

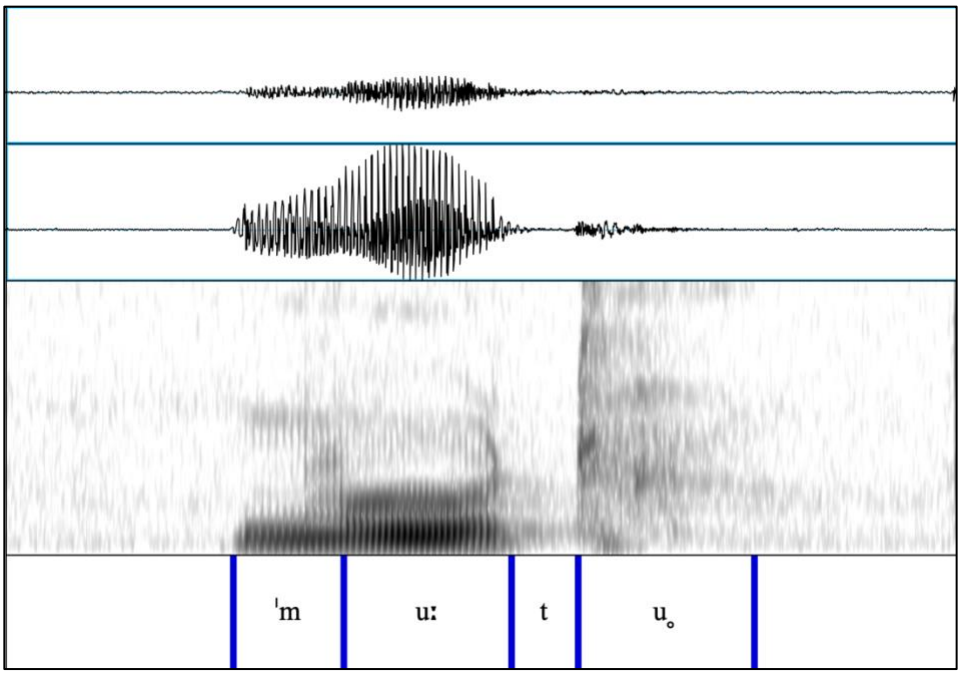


Figure 22. Spectrogram of [ˈmuːtu̥] /ˈmuːt/ from TMD corpus CM(TMDC0028.WAV).

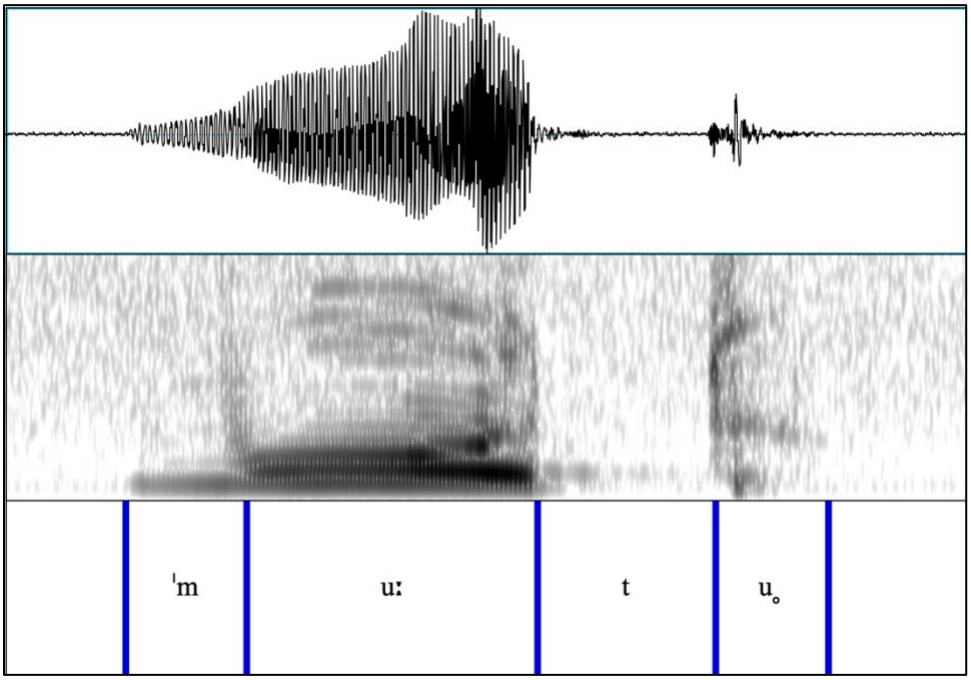


Figure 23. Spectrogram of [ˈmuːtu̥] /ˈmuːt/ from Seiler collection CD(LA77.99.001).

As can be seen clearly in examples in Figures 22 and 23, there is a very short and weak period of vowel-like phonation that show traces of formants that tend to match that of the quality of the preceding vowel. In listening to the original recordings, a [u]-like aspiration is also clearly perceivable. Although this post-plosive period of aspiration is more pronounced in Figure 23 (Seiler's recording), it is still quite perceivable in the speech of the TMD Cahuilla speaker as well, as illustrated in Figure 22. In Ladefoged's (1971) continuum of glottal states, there is a three-way contrast: the most open glottal state is represented by [h] (which can also be represented as a voiceless vowel [V̥]), modal voicing [V] is in the middle of the continuum, and [ʔ] is at the opposite end of the continuum with full closure (see Aguilar (2020) for an overview). Figures 24-27 provide additional spectrogram illustrations of voiceless vowels following word-final voiceless stops from the TMD Cahuilla corpus.

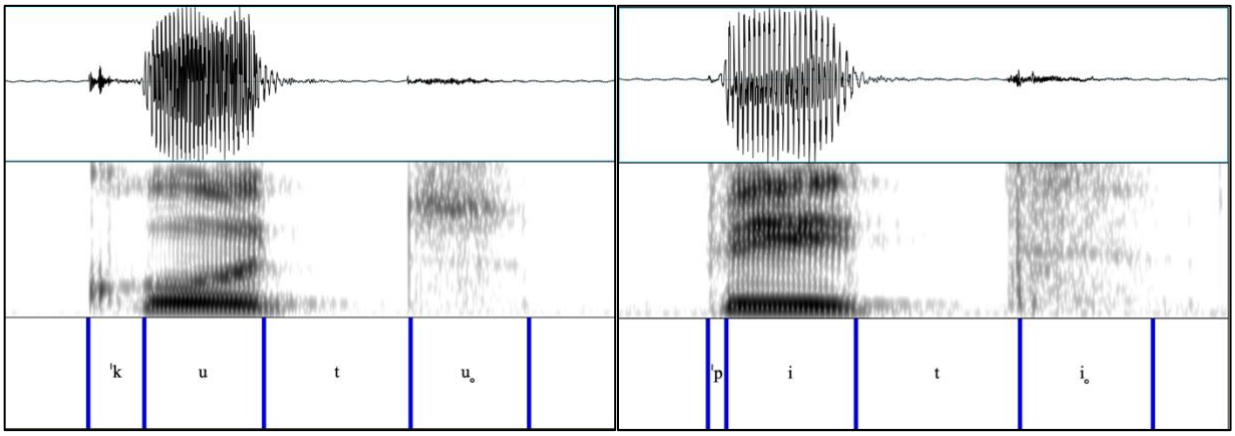


Figure 24. Spectrograms of [ˈkutʊ̥] /ˈkut/ ‘fire’ and [ˈpitɪ̥] /ˈpit/ ‘road’ CM(TMDC0028.WAV).

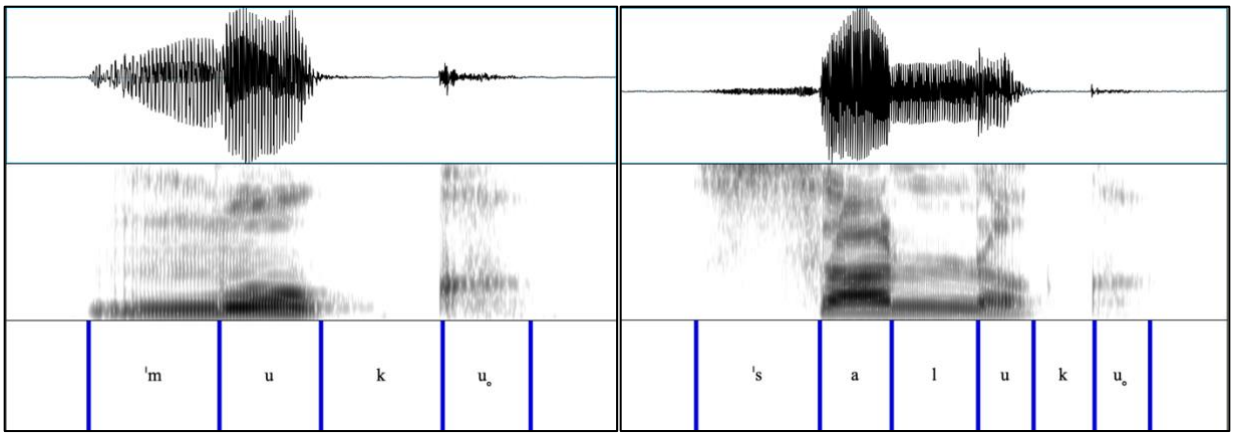


Figure 25. Spectrograms of [ˈmuk**u̥**] /ˈmuk/ ‘die’ and [ˈsaluk**u̥**] /ˈsaluk/ ‘scratch’ CM(TMDC0028.WAV).

As the spectrograms in Figures 24-27 above show, this phenomenon is consistently attested in words ending in voiceless plosives taken from the TMD Cahuilla corpus. Given the limitations of this study, however, only a small sample of tokens were analyzed. Future research on this phenomenon should include a careful study that controls for phonetic factors, such as the influence of place of articulation. For example, both the final stop and preceding vowel should differ in place of articulation (e.g., words ending in [ik], [at], [ak], [et], [ek]) to show that the aspiration is vowel-like rather than associated with the final stop. In addition, evidence from phonological or morphophonological processes would also needed to solidify a voiceless vowel analysis.

As mentioned above, voiceless vowels are documented in other Uto-Aztecan languages. Oberly & Kharlamov (2015) analyze voiceless vowels in Southern Ute (Numic), where they also occur in unstressed syllables, following voiceless stops. They note that voiceless vowels may be variable in their phonetic realization and may be pronounced as “whispered vowels” that lack a voicing bar and have limited structure (Ladefoged and Maddieson 1996) (Oberly & Kharlamov 2015:3-4).

2.5.8.2 Voiceless vowels after word-final glottal stops

In this section, I compare Seiler's examples of post-glottal voiceless vowels with cognates taken from the TMD Cahuilla corpus to assess (1) whether voiceless vowels are attested in Seiler's data, and (2) whether voiceless vowels are also attested in the TMD Cahuilla cognate data. Some relevant examples are shown in (62).

(62) Voiceless vowel after glottal stop in word-final position

	TMD Cahuilla		Seiler's description
a.	*hemu'*		*hemu'*
	[ˈhɛmuʔ**u̥**]	c.	[ˈhemuʔ**o̥h]**
	/ˈhɛmuʔ/		/ˈhémuʔ/
	'nose' CM(TMDC0028.WAV)		'nose' CD(HS_1977:32)
b.	*ipa'*		*ipa'*
	[ˈʔipaʔ**ḁ**]	d.	[ˈʔipaʔ**ḁh**]
	/ˈʔipaʔ/		/ˈʔipaʔ/
	'here' CM(TMDC0028.WAV)		'here' CD(HS_1977:32)

Shown below in Figures 28-31 are spectrogram images of the examples in (62) taken from both the audio recordings available in the TMD Cahuilla corpus and the Seiler CLA collection. The spectrogram images of both sets of data were generated using segmented audio of representative tokens elicited in isolation with careful speech.

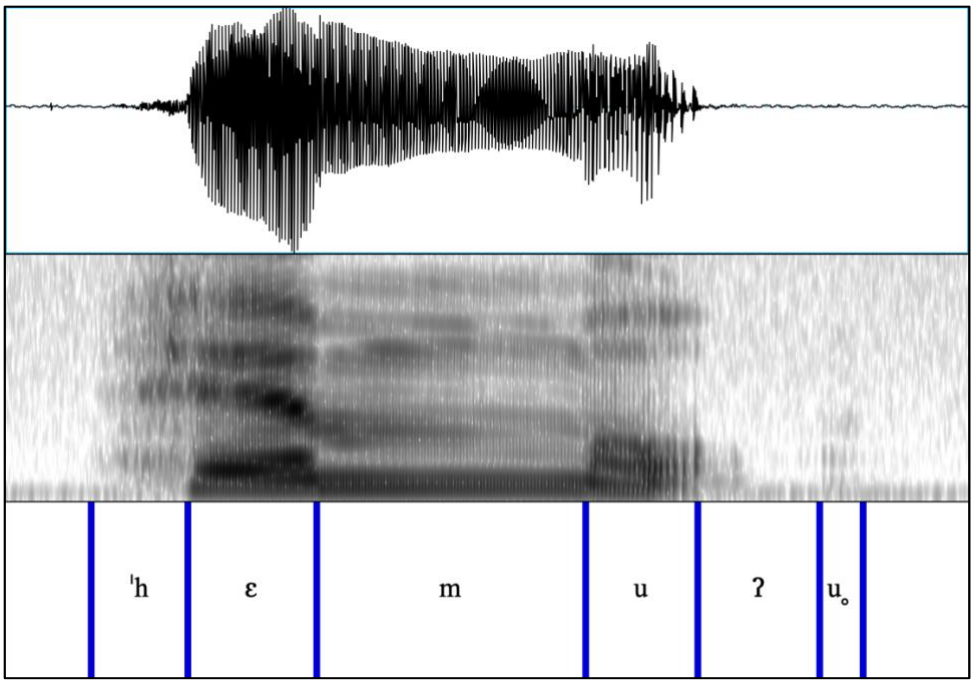


Figure 26. Spectrogram of [ˈhɛmuʔu̥] /ˈhɛmuʔ/ ‘nose’ from TMD corpus CM(TMDC0028.WAV).

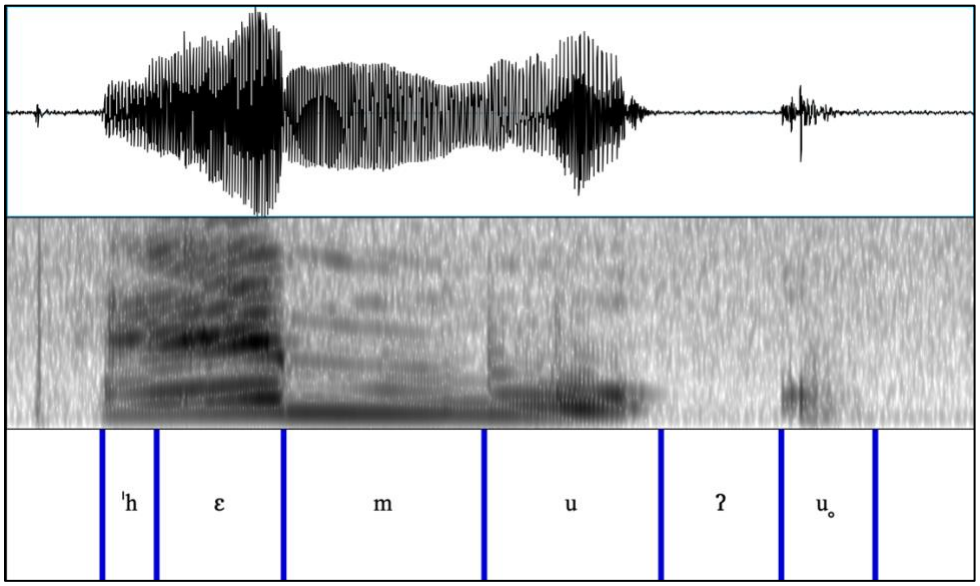


Figure 27. Spectrogram of [ˈhɛmuʔ**u̥**] /ˈhɛmuʔ/ ‘nose’ from Seiler collection CD(LA77.99.001).

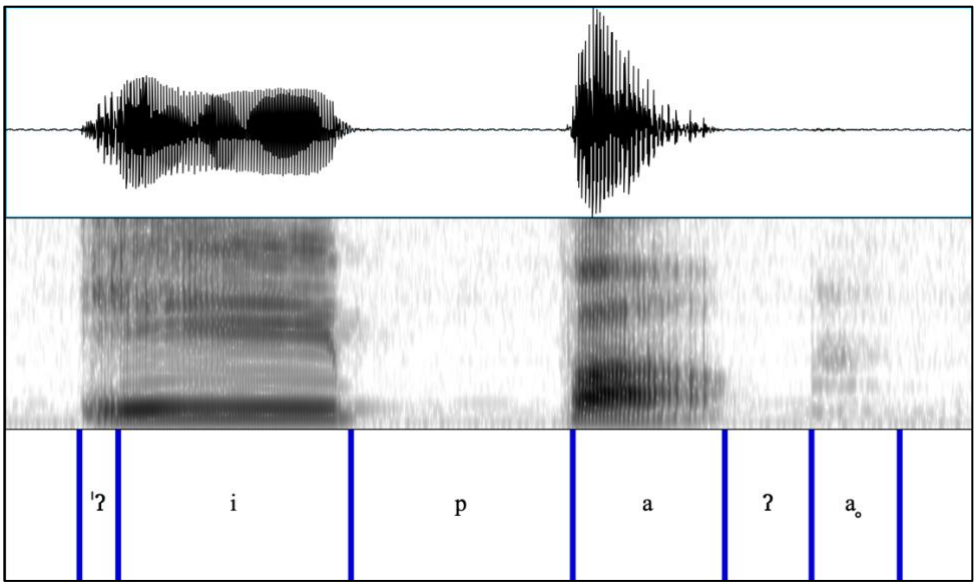


Figure 28. Spectrogram of [ˈʔipaʔḁ] /ˈʔipaʔ/ ‘here’ from the TMD Cahuilla corpus CM(TMDC0028.WAV)

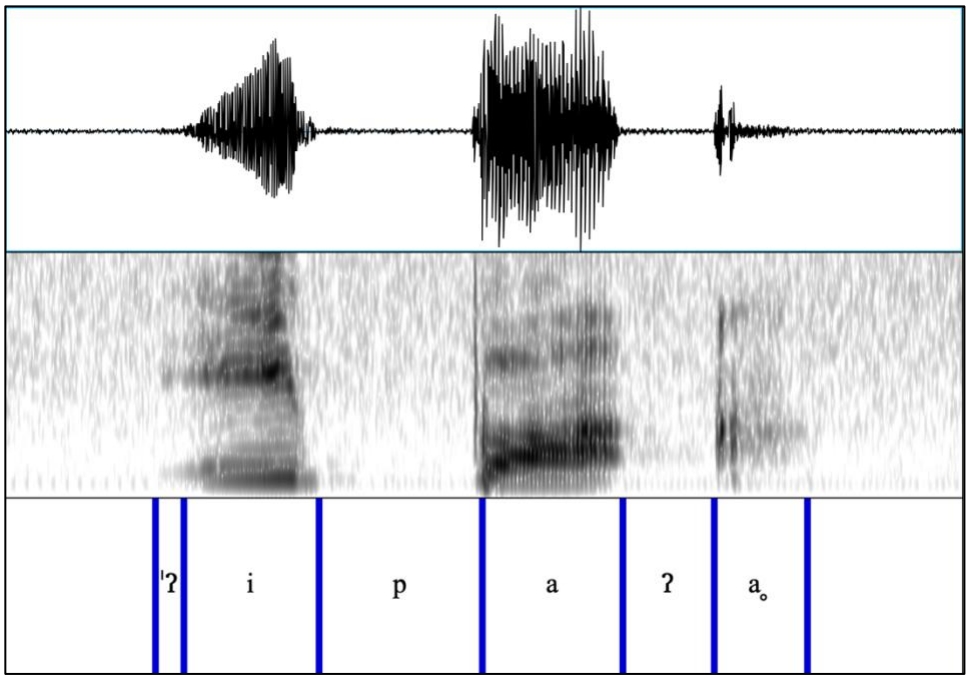


Figure 29. Spectrogram of [ˈʔipaʔḁ] /ˈʔipaʔ/ ‘here’ from Seiler collection CD(LA77.99.001)

By comparing the examples from Seiler’s CLA collection (in Figures 29 and 31) against cognates from the TMD Cahuilla corpus (in Figures 28 and 30), it can be observed that they both have a voiceless vowel-like segment following word-final /ʔ/, though they are more pronounced

in the speech of Seiler's consultant, as evidence by increased energy, duration and faint traces of vowel-like voicing. Figures 32-35 below present additional spectrogram illustrations showing voiceless vowels following word-final /ʔ/ taken from the TMD Cahuilla corpus.

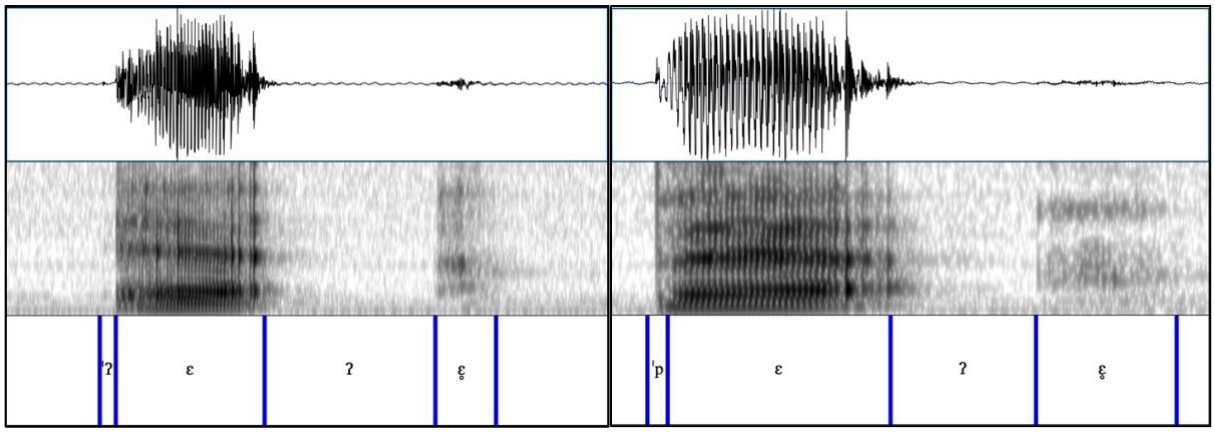


Figure 30. Spectrogram of [ʔɛʔɛ̥] /ˈʔɛʔ/ '2SG' and [ˈʔpɛʔɛ̥] /ˈʔpɛʔ/ '3SG' CM(TMDC0028.WAV)

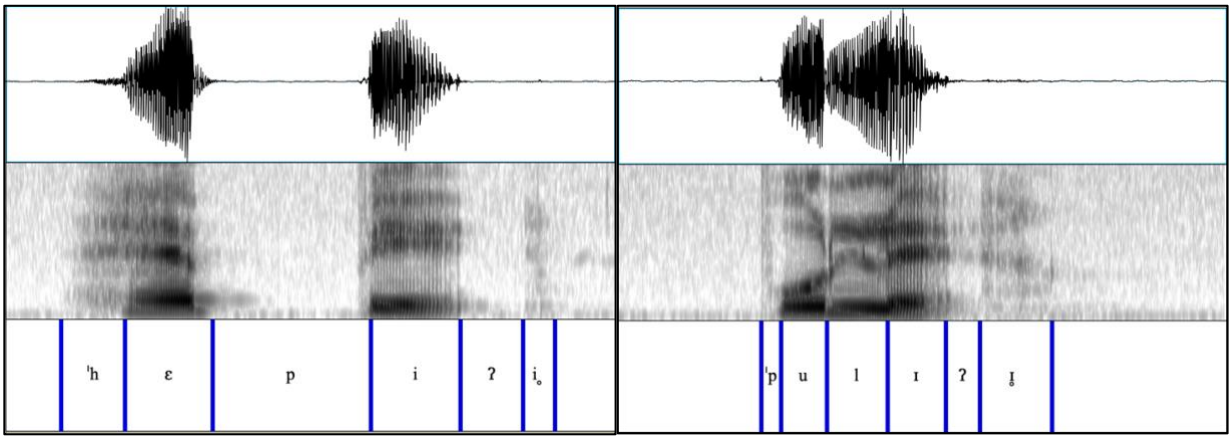


Figure 31. Spectrogram of [ˈhɛpiʔi̪] /ˈhɛpiʔ/ 'breast' and [ˈpuliʔi̪] /ˈpuliʔ/ 'fall' CM(TMDC0028.WAV)

These examples further illustrate that voiceless vowels are attested systematically following word-final glottal stops in TMD Cahuilla. Given these facts, I argue that the TMD

Cahuilla data presented here provides further evidence to support Seiler's previous description of voiceless vowels in Cahuilla.

2.6 Phonetic reduction processes

This final section addresses patterns of consonant lenition attested in the speech of contemporary TMD Cahuilla speakers, which occur only in fast or naturally-occurring speech. As shown here, this results in the variable realization of some phonemes in the language. These processes include spirantization, voicing of voiceless consonants, and elision. Since these processes do not occur in careful speech and do not interact with or feed other phonological processes, I assume that these processes are strictly phonetic in nature. These processes illustrate the gradient degree of phonetic reduction or lenition of consonant phonemes. Next, I discuss each of these processes and provide examples from conversational data recorded in the TMD Cahuilla corpus.

2.6.1. Spirantization and voicing

In fast speech, the voiceless stops /p/ and /t/ may become spirantized and voiced with the voiceless bilabial plosive being realized as a voiced bilabial fricative [β] and the voiceless alveolar stop being realized as a voiced dental fricative [ð], as exemplified in (63) and (64), respectively. Spirantization, voicing of voiceless consonants, and anterior shifts in place of articulation typically occurs word-initially (63a-c,e) (64a-c) but can also occur word medially (63d). The voiceless uvular stop /q/ can also become voiced [ɢ], as shown in (63e).

(63) Spirantization and voicing of the voiceless bilabial plosive /p/

a. *kily pen'enanqal pe'iy*

[kɪʎ pɛ-n-ˈʔɛʔnʌnqɐɭ ˈ**β**ɛ-ij]

/kil pɛ-n-ˈʔɛʔnan-qaɭ ˈ**p**ɛ-ij/

NEG 3SG-1SG-know-DUR.SG 3SG-ACC

‘I don’t know him.’ CM(TMDC0034.WAV)

b. *kily pe’ kish amnawet kily heki petuknga*

[kɪʎ ˈpɛʔ ˈkɪʃ ˈʔamnɐwɛ kɪʎ ˈhɛ-ki ˈ**β**ɛtu-ŋɐ]

/kil ˈpɛʔ ˈkiʃ ˈʔamnawɛt kil ˈhɛ-ki ˈ**p**ɛtuk-ŋa/

NEG 3SG house spirit-AUG NEG 3SG-house under-LOC

‘Not him the big was not his house inside’ CM(TMDC0034.WAV)

c. *pika pe’ acha kulat’a hangal pik*

[ˈpi-kɐ ˈpɛʔ ʔaːt͡ʃɐ ˈkula-t-a ˈhaŋɐɭ ˈ**β**ɪg]

/ˈpi-ka ˈpɛʔ ˈʔaːt͡ʃa ˈkula-t-a ˈhaŋal ˈ**p**ɪk/

DIST-LOC 3SG good make-ABS-PRET arrow weed with

‘Over there he built a nice house made of arrow weed.’ GT(TMDC0034.WAV)

d. *kily mish pemexanpi*

[kɪʎ miʃ pɛ-ˈmɛhʌn-**β**i]

/kɪʎ miʃ pɛ-ˈmɛxan-**p**i/

NEG COP? 3SG-do-SUB.IRR

‘I couldn’t do anything.’ CM(TMDC0034.WAV)

e. *Amy Lyons pe’e’nanqal*

[ˈʔɛɪmi ˈlaɪnz **β**ʌ-ˈʔɛʔnɐ-**ɢ**a]

/ˈʔɛɪmi ˈlaɪnz **p**ɛ-ˈʔɛʔnan-**q**al/

Amy Lyons 3SG-know-DUR.SG

‘Do you know Amy Lyons?’ GT(TMDC0034.WAV)

(64) Voicing and/or spirantization of voiceless alveolar plosive /t/

a. *pe’pe ivax mik niyaxal tuwaymanish pa*

[ˈpɛʔpɛ	ˈʔivɐ	m-ɪk	ˈnɪ-jaxal	**θ**ʌˈwaɪmɪʃ	βa]
/ˈpɛʔpɛ	ˈʔivax	m-ik	ˈni-jaxal	**t**uˈwaɪmanɪʃ	pa/
3SG.FOC	now	3PL-LOC	1SG-say	always	DIST

‘That’s what I always say to them now’ CM(TMDC0034.WAV)

b. *heehe, kuku sawaaqal tesa*

[ˈhɛːhɛ	ˈkuku	ˈsawaːqɐl	ˈ**ð**ɛsʌ]
/ˈhɛːhɛ	ˈkuku	ˈsawaːqal	ˈ**t**ɛsa/
yes	DM	gone-DUR.SG	also

‘Yes, isn’t that all gone too.’ CM(TMDC0034.WAV)

c. *emtewnive ta qawish*

[ʔɛmˈtɛw-ni-vɛ	**ð**a	ˈqawɪʃ]
/ʔɛm-ˈtɛw-ni-vɛ	ta	ˈqawɪʃ/
2PL-see-CAUS-SUB.REAL	DM	rock

‘You guys saw a rock.’ GT(TMDC0034.WAV)

As shown in these examples, lenition frequently occurs in words that are in the phrase-final position, but this phenomenon may also be attested in phrase-medial position (64a,c). And while lenition generally involves both spirantization and voicing, in some cases, stops may become spirantized without voicing (64a).

2.6.2. Voicing of voiceless consonants

All voiceless stops (/p/, /t/, /k/, /q/), as well as the voiceless fricative /ʃ/, may become voiced but not spirantized in the same contexts as both voicing and spirantization occur with voiceless bilabial and alveolar stops, as described above. This is shown in (65).

(65) Voicing of voiceless stops and fricatives

a. *miyaxwena kupe' qawisham*

[ˈmijahwɛn-ʌ ˈkupɛʔ ˈqawɪʒʌm]

/ˈmijaxwɛn-a ˈkupɛʔ ˈqawi-t͡ʃ-am/[17]

be-PRET DM rock-ABS-PL

'Those rocks were certainly there.' GT(TMDC0034.WAV)

b. *kinanga kupe*

[ˈkinʌŋɐ ˈ**g**u**b**ɛ]

/ˈkinaŋa ˈ**k**u**p**ɛ/

wife DM

'She is his wife.' GT(TMDC0034.WAV)

c. *nesunax taxkwa'asna papemyawwen*

[ˈnɛsunax tax-ˈkʷaʔɐsnɐ **b**ʌ-pʌ-mˈjawɛn]

/ˈnɛ-sun-ax tax-ˈkʷaʔasna **p**a-pɛ- m-ˈjaw-wɛn/

1SG-heart-LOC REFLX-draw LOC-3SG-3PL-take-DUR.PL

'I know they have a picture.' CM(TMDC0034.WAV)

d. *haxami pe'u'uwiqal ta*

[ˈhaxɐm ˈ**b**-uːwɛ-**g**ɐl **d**a]

/ˈhaxami ˈ**p**ɛ-uʔuwi-**q**ɐl **t**a/

someone 3SG-buy-DUR.SG DM

'Someone bought it though.' GT(TMDC0034.WAV)

e. *my grandma, netutu ta*

[17] As discussed in §2.4.2.3, the alveopalatal affricate surfaces as an alveopalatal fricative in coda-position. The alveopalatal fricative allophone [ʃ] undergoes voicing in fast speech.

[ˈmaɪ ˈgræmʌ nʌˈtuː**d**u ta]
/ˈmaɪ ˈgræma nɛ-ˈtuː**t**u ta/
my gramma 1SG-g.mother DM
‘My grandmother, netuutu.’ GT(TMDC0034.WAV)

As these examples show, both voiceless stops (65b-e) and voiceless fricatives (65a) can become voiced in fast speech, primarily in phrase-medial or phrase-final positions. In some cases, segments may become more anterior, in addition to becoming voiced, e.g., the voiceless uvular plosive /q/ may be realized as a voiced velar stop [g] in fast speech, as shown in (65d). Although most cases of lenition found in the TMD Cahuilla corpus tend to be phrase final, there are many examples of the deletion of vowel segments phrase-initially (e.g., /ˈhaxami/ → [ˈhaxam] in (65d)), as well as larger sequences. This is discussed in detail in the next section.

2.6.3. Elision/phonetic reduction

In the most extreme cases of lenition, some phonemes and even entire syllables in unstressed position may be completely deleted during fast speech. Since this process does not occur in careful speech and it does not interact with any phonological or morphological process in the language, I posit that this deletion it is strictly a post-lexical process, whereby some unstressed syllables may be susceptible to deletion. In (66), I show examples from conversational data where there are deleted segments. The deleted segments are shown in bold in the underlying representation and their location in the phrase is indicated by an underscore.

(66) Deletion of unstressed syllables

a. *penga pa'hemneke*

[ˈpɛŋɐ pa-__m-ˈnɛkɛ]
/ˈpɛŋa pa-**hɛ**m-ˈnɛkɛ /
LOC LOC-3PL-come
'There where they came from' CM(TMDC0034.WAV)

b. *Jesus muluk muqale wam kuku*

[qʌˈsuːs ˈmuluk ˈmuqɐlɛ wa__ gukᵾ]
/qʌˈsuːs ˈmuluk ˈmuqɐlɛ wa**m** ˈkuk**u**/
Jesus first die-DUR.SG-PRET DM DM
'Jesus died first I guess, right?' GT(TMDC0034.WAV)

c. *kily pen'e'nanqal pensichuminqal pe'iy*

[kiʎ pɛ-n-ˈʔɛnan-qɐɬ pʌ-ŋ-__ k-s__ˈt͡ʃumɪn-qɐɬ ˈpɛʔ-iːj]
/kil pɛ-n-ˈʔɛnan-qɐɬ pɛ-n-**vu**k-s**i**ˈt͡ʃumɪn-qɐɬ ˈpɛʔ-iːj/
NEG 3SG-1SG-know-DUR.SG 3SG-1SG-throw-think-DUR.SG 3SG-ACC
'I don't know or recall that.' CM(TMDC0034.WAV)

d. *Biff yewe tuwaymanishpa yaxqal pengax*

[ˈbɪf ˈjɛwʌ ˈtuwaɪ____ʃpʌ ˈjaxɐɬ ˈpɛ-ŋax]
/ˈbɪf ˈjɛwʌ ˈtuwaɪ**manɪ**ʃpa ˈjaxɐɬ ˈpɛ-ŋax/
Biff long.ago always 3SG-say loc-FROM
'Biff always used to say she was from there.' CM(TMDC0034.WAV)

e. *sunaxwenipa haxate taliya pen haxate*

[ˈsum____ ba ˈhaxatɛ ˈtalja pɛn ˈhaxatɛ]
/ sun**axweni**pa ˈhaxatɛ ˈtalja pɛn ˈhaxatɛ/
because what's.her.name Talia and what's.her.name
'Because what's-her-name, Talia and what's-her-name…' CM(TMDC0034.WAV)

f. *kily pen'e'nanqal hicha pish pemkuktash'a*

[kɪʎ	pɛ-n-ˈʔɛʔnɐn___	ˈhidʒa	pɪʃ	pɛ-m-ˈkukd_ʒ-ʌ]
/ kɪʎ	pɛ-n-ˈʔɛʔɛnɐn-**qal**[18]	ˈhit͡ʃa	pɪʃ	pɛ-m-ˈkukt**a**ʃ-a/
NEG	3SG-1SG-know-DUR.SG	what	that	3SG-3PL-talk-PRET

'I didn't know what they were talking about.' GT(TMDC0034.WAV)

As the examples in (66) show, deletion may occur in words that are in any position in the phrase. The amount of deletion can vary and may be root internal (66c-f) or root external affecting both prefixes (66a) and suffixes (66f). In certain cases, a syllable coda or final unstressed syllable may be deleted (66b). In extreme cases, up to three syllables can be affected (66e). The fact that all of the examples include deletion of either a portion of, or an entire unstressed syllable, shows that stressed syllables are protected from deletion. Both root internal deletion (66c-f) and affix deletion (66a) generally preserves the most informative morphological material. In some cases, word-final vowels may become devoiced rather than being completely deleted as in (66b). These examples show various degrees of lenition as attested in fast speech, a phenomenon not discussed in the previous literature.

[18] Since all inflected verb forms (with the exception of imperatives) must have, at minimum, one suffix (that encodes tense, aspect or mood (see §5.3), I posit the verb [ˈʔɛʔɛnɐn] 'to know' has a durative suffix in the underlying representation. In this case, the generalization applies because it is a verb in the indicative mood.

Chapter 3 Phonotactics

3.1 Introduction

In Chapter 2, the segmental inventory of the language was presented, describing in detail each of the contrastive phonemic segments, their frequency and distribution within the word, allophonic patterns, and where relevant, patterns of variation across speakers. This chapter describes the phonotactic constraints, a set of rules and restrictions that determine how contrastive segments are organized into larger phonological constituents, such as syllables and phonological words. As described in Chapter 2, there are allophonic processes that are sensitive to syllable structure in TMD Cahuilla. Phonotactic constraints also play a role in deriving the surface form of reduplicated forms and other morphologically complex forms in the language, as discussed in Chapter 5. This chapter thus establishes the basic principles that govern the phonotactic patterns of TMD Cahuilla and related varieties. This chapter begins with a discussion of syllable structure in TMD Cahuilla (§3.2), followed by a description of possible consonant (§3.3) and vowel (§3.4) sequences in the language. Phonotactic repairs for illicit consonant and vowel sequences are discussed in the latter two sections.

3.2. Syllable structure

This section provides a detailed description of the underlying structure of syllables in TMD Cahuilla, as well as the language-internal criteria for determining their sub-constituents, the nucleus, onset, and coda. Throughout this section, syllables and their sub-constituents will be represented using standard phonological notation (i.e., syllables will be represented by the sigma symbol <σ>, consonants by a <C>, and vowels by a <V>, and syllable breaks or boundaries will be represented by a period <.>, a standard convention used in the International Phonetic

Alphabet. Syllabification of the examples shown in this section was determined partly following the Maximal Onset Principle, as well as the three-rule ordering of first establishing the syllable nucleus, followed by onset formation, and finally coda formation, as outlined in Hayes (2008) and as analyzed for Cahuilla in Hayes (1995:132-140). The intuitive separation of syllables (by means of a significant pause) by TMD Cahuilla speakers in careful speech was also used as a criterion for determining syllable parsing. In addition, and as discussed in Chapter 2, some segmental allophonic processes in TMD are sensitive to syllable structure. The following subsections discuss the canonical syllable structure in TMD Cahuilla, as well as the syllable shapes attested in stems and affixes and their distribution within the word.

3.2.1. Canonical syllable structure

All syllables in TMD Cahuilla are required to have an onset, while codas are optional. Such generalizations about phonotactic constraints in the language are evidenced by the fact that there are no vowel-initial words or syllables, and that words may end in either a vowel or consonant. Furthermore, neither onsets nor codas elaborate to a cluster: there are no words that begin or end with a sequence of more than a single consonant, or that have a string of more than two adjacent consonants within a syllable. In combination with the onset requirement, these facts suggest that there is also a ban on complex syllable margins, a restriction attested more generally in the Cupan branch (Hill & Hill 2019). With respect to syllable nuclei, both long and short vowels are attested. Thus, the canonical syllable structure in TMD Cahuilla is CV(V)(C). This canonical structure yields four possible syllable shapes, exemplified in Table 11.

Table 11. Syllable shapes in TMD Cahuilla

Syllable	Example	Gloss	
CV	ˈ**sɛ**.wɛt	‘snake’	CM(TMDC0028.WAV)
CVC	ˈ**tax**.lis.wɛt	‘person, Indian’	CM(TMDC0028.WAV)
CV:	ˈ**mi**:.si.val	‘church’	CM(TMDC0003.WAV)
CV:C	ˈ**pu**:**x**.qal	‘he witch-dances’	CM(TMDC0034.WAV)

Further examples of the words containing the four possible syllable shapes in the word-initial position are shown in (1).

(1) Word-initial CV

a.	*ti’i*	ˈ**ti**.ʔi	‘stomach’	CM(TMDC0028.WAV)
b.	*sa’i*	ˈ**sa**.ʔi	‘guts’	CM(TMDC0028.WAV)
c.	*yuki*	ˈ**ju**.ki	‘to be afraid’	CM(TMDC0028.WAV)
d.	*pepi*	ˈ**pɛ**.pi	‘far’	CM(TMDC0028.WAV)

Word-initial CVC

e.	*sav’a*	ˈ**sav**.ʔa	‘tree bark’	CM(TMDC0028.WAV)
f.	*sunchi*	ˈ**sun**.tʃi	‘close’	CM(TMDC0028.WAV)
g.	*selnek*	ˈ**sɛl**.nɛk	‘red’	CM(TMDC0028.WAV)
h.	*pis’ish*	ˈ**pis**.ʔiʃ	‘something rotten’	CM(TMDC0028.WAV)

Word-initial CV:

i.	*miisival*	ˈ**mi**:.si.val	‘church’	CM(TMDC0003.WAV)
j.	*chaapu*	ˈ**tʃa**:.pu	‘short’	CM(TMDC0028.WAV)
k.	*heeñu*	ˈ**hɛ**:.ɲu	‘to fight’	CM(TMDC0028.WAV)
l.	*ngii’i*	ˈ**ŋi**:.ʔi	‘s/he left’	CM(TMDC0030.WAV)

Word-initial CV:C

m.	*puuxqal*	ˈ**pu**:**x**.qal	‘he witch-dances’	CM(TMDC0034.WAV)
n.	*ngaangqal*	ˈ**ŋa**:**ŋ**.qal	‘s/he cries’	CM(TMDC0032.WAV)

As the examples above show, both open (CV) and closed (CVC) syllables containing short vowels are well attested in the word-initial position (1a-h). Because of the marginal status of long vowels, however, syllables containing them are infrequent regardless of their position within the word and whether they occur in an open (CV:) or closed (CV:C) syllable.[19] Examples of the distribution of each syllable type in different positions in the word are shown in Table 12.

Table 12. Distribution of syllable types within the word

Syllable Shape	Distribution	Examples		
CV	word-initial	ˈ**ku**.kup.qal	‘sleepy’	CM(TMDC0021.WAV)
	word-medial	ˈki.**ki**.tɛm	‘children’	CM(TMDC0003.WAV)
	word final	ˈsiw.**ma**	‘hot’	CM(TMDC0021.WAV)
CVC	word-initial	ˈ**mɛl**.kiʃ	‘American’	CM(TMDC0030.WAV)
	word-medial	ˈwi.**kik**.mal	‘bird’	CM(TMDC0028.WAV)
	word final	ˈna.xa.**niʃ**	‘man’	CM(TMDC0028.WAV)
CVV	word-initial	ˈ**ŋi**:.ʔi	‘he went home’	CM(TMDC0030.WAV)
	word-medial	nɛ.ˈ**ta**:.tus.ʔi	‘you lied to me’	CM(TMDC0016.WAV)
	word-final	ka.ˈ**fɛ**:	‘coffee’	CM(TMDC0034.WAV)
CVVC	word-initial	ˈ**pu**:**x**.qal	‘he witch dances’	CM(TMDC0034.WAV)
	word-medial	pɛn.ˈ**tɛ**:**w**.qal	‘I see it’	CM(TMDC0016.WAV)
	word final	ʔan.ˈ**wɛ**:**s**	‘nuts, walnuts’	CM(TMDC0003.WAV)

[19] Only 8 verb stems containing a long vowel are attested out of over 100 verb stems in the TMD corpus.

As Table 12 shows, all syllable shapes are attested in all word positions. However, long vowels in word-final syllables are found exclusively in Spanish loanwords (e.g., *ka* ˈ***fɛː*** ‘coffee’, *ʔan* ˈ***wɛːs*** ‘nuts, walnuts’), where they are also stressed (the stress patterns of loanwords are addressed in Chapter 5).

Structurally, syllables exhibit few restrictions regarding which phonemes may serve as a coda or onset, though codas are more restricted than onsets. In the coda position, all phonemes are allowable except for the two labialized obstruents /kʷ/ and /xʷ/ and the palatal nasal /ɲ/. Examples of allowable codas are shown in (2).

(2) Segments allowed as syllable codas (Source: CM(TMDC0028.WAV))

a.	*kupqal*	f.	*wipis*	k.	*meñily*	o.	*sesem*
	[ˈku**p**.qɐ̞ɬ]		[ˈwi.pɪ**s**]		[ˈmɛ.ɲɪʎ]		[ˈsɛ.sɛ**m**]
	/0-kup-qal/		/wipis/		/mɛɲi-l/		/sɛsɛm/
	3SG-sleep-DUR.SG		pull.IMP		moon-ABS		laugh.IMP
	‘s/he sleeps’		‘pull!’		‘moon’		‘laugh!’
b.	*waqal*	g.	*ñashka*	l.	*supul*	p.	*hesun*
	[ˈwɐ.qa**t**]		[ˈɲa**ʃ**.ka]		[ˈsu.pʊ**ɬ**]		[ˈhɛ.sʊ**n**]
	/waqa-t/		/ɲat͡ʃ-ka/		/supul/		/hɛ-sun/
	shoe-ABS		sit-PRET		‘other’		3SG-heart
	‘shoe’		‘he’ll sit’				‘heart’
c.	*pichik*	h.	*waxwen*	m.	*aw’a*	q.	*henang*
	[ˈpi.tʃɪ**k**]		[ˈwa**x**.wɛn]		[ˈʔa**w**.ʔa]		[ˈhɛ.nɐ**ŋ**]
	/0-pit͡ʃ-ik/		/wax-wɛn/		/0-ʔaw-ʔa/		/hɛ-naŋ/

	3SG-arrive-IF		dry-STAT	3SG-horn-POSS	3SG-tongue
	‘s/he arrives’		‘dry’	‘its horn’	‘its tongue’

d.	*sichaq*	i.	*pah*	n.	*puywen*
	[ˈsi.tʃɐ**q**]		[ˈpa**h**]		[ˈpu**j**.wɛn]
	/si͡tʃaq/		/pah/		/puj-wɛn/
	squeeze.IMP		‘three’		full-STAT
	‘squeeze!’				‘full’

e.	*su’wet*	j.	*chepév*
	[ˈsu**ʔ**.wɛt]		[tʃʌ.ˈpɛ**v**][20]
	/suʔwɛ-t/		/t͡ʃepɛv/
	star-ABS		‘true’
	‘star’		

As discussed in Chapter 2 (§2.4.2.3 and §2.4.2.4), some phonemes undergo allophonic alternations depending on their position within the syllable, yielding some complementary distribution of allophones in the coda position. Thus, the voiceless alveopalatal affricate /t͡ʃ/ and voiced alveolar lateral approximant /l/ phonemes never appear in the coda position. Instead, the voiceless alveolar fricative [ʃ] and voiced retroflex lateral approximant [l] allophones always occur in the coda position, as shown in (2g) and (2l) respectively.

[20] The truth marker /tʃɛˈpɛv/ ‘true’, as well as a few other adverbial forms and discourse markers (/ʔɛˈsan/, /tuˈwajmaniʃ/ exhibit an irregular stress pattern where stress falls on the second syllable. This pattern is marginal overall, being restricted to non-major word categories (i.e., verbs and nouns).

Onsets are even less restricted in TMD Cahuilla, as nearly any consonantal phoneme can be an onset, with the exception of the palatalized lateral approximant /ʎ/. Examples of allowable onsets are shown in (3).

(3) Segments allowed as syllable onsets (Source: CM(TMDC0028.WAV))

a.	*pepi* [ˈ**p**ɛ.pi] /pɛpi/ 'far'	g.	*se'ish* [ˈ**s**ɛ.ʔɪʃ] /sɛʔ-t͡ʃ/ bloom-ABS 'flower'	m.	*puli* [ˈpu.**l**iʔ] /puliʔ/ fall.IMP 'jump!'	q.	*meten* [ˈ**m**ɛ.tɛn] /mɛtɛn/ 'many'
b.	*tu'ish* [ˈ**t**u.ʔɪʃ] /tuʔi-t͡ʃ/ fruit-ABS 'fruit'	h.	*chu'an* [ˈ**tʃ**u.ʔʌn] /t͡ʃuʔan/ spit.IMP 'spit!'	n.	*wanish* [ˈ**w**a.nɪʃ] /wani-t͡ʃ/ flow-ABS 'river'	r.	*nena'* [ˈ**n**ɛ.nɐʔ] /nɛ-naʔ/ 1SG-father 'my father'
c.	*kiyat* [ˈ**k**i.jɐt] /kija-t/[21] child-ABS 'child'	i.	*yaxa* [ˈja.**x**ɐ] /jaxa/ say.IMP 'say it!'	o.	*ya'i* [ˈ**j**a.ʔi] /jaʔi/ 'wind'	s.	*pangish* [ˈpa.**ŋ**ɪʃ] /paŋi-t͡ʃ/ new-ABS 'new thing'
d.	*kwa'a* [ˈ**k**ʷa.ʔa] /kʷaʔ-a/ eat-IMP 'eat!'	j.	*tuxwa'* [tʊ.ˈ**x**ʷaʔ] /tuxʷaʔ/ work.IMP 'work!'	p.	*hiwña* [ˈhiw.**ɲ**ɐ] /hiwɲa/ stay.IMP 'stay!'		
e.	*qily'i* [ˈ**q**ɪʎ.ʔi] /qilʔi/	k.	*hikus* [ˈ**h**i.kus] /hikus/				

[21] In this example I transcribe a glide in the underlying representation, which I syllabify as /ˈki.jat/. This transcription represents the token as it was pronounced, syllable-by-syllable, by the speaker in careful speech. Seiler (1977:35) variably transcribes the same word both with and without a glide (/ˈkiat/ and /ˈkjat/, respectively).

	‘neck’		‘breathe’	
f.	*ewel*	l.	*navuk*	
	[ˈ**ʔ**ɛ.wɛ-l̥]		[ˈna.**v**ʊk]	
	/ʔɛwɛ-l/		/navuk/	
	bleed-ABS		come.IMP	
	‘blood’		‘come!’	

3.2.2 Consonant sequences

Sequences of consonants occur frequently in TMD Cahuilla. As mentioned above, consonant clusters are always heterosyllabic, i.e., complex syllable margins are not attested. These clusters are restricted to two consonants, with clusters of more than two consonants being unattested in the language. Consonant clusters do not exhibit any sonority restrictions, as they can be of equal, falling, or rising sonority, as shown in (4).

(4) Attested consonant clusters with falling, rising and equal sonority

Rising sonority

a.	*suplyi*	ˈsu**pʎ**ɪʔ	‘one’	CM(TMDC0028.WAV)
b.	*wikikmal*	ˈwiki**km**aɭ	‘bird’	CM(TMDC0028.WAV)
c.	*taxliswet*	ˈta**xl**iswɛt	‘Indian’	CM(TMDC0028.WAV)

Falling sonority

d.	*wel’isew*	ˈwɛ**lʔ**isiw	‘husband’	CM (TMDC0028.WAV)
e.	*melkichem*	ˈmɛ**lk**itʃɛm	‘Americans’	CM(TMDC0030.WAV)
f.	*navtem*	ˈna**vt**ɛm	‘cacti’	CM(TMDC0020.WAV)

Equal sonority

g.	*amnawet*	ˈʔa**mn**awɛt	‘big’	CM(TMDC0028.WAV)
h.	*suktem*	ˈsu**kt**ɛm	‘deer (pl.)’	CM(TMDC0020.WAV)

As the examples in (4) show, consonant clusters of varying sonority occur without restriction. Some consonant clusters are underlyingly part of the root, e.g. (4a-d) and (4g), while others occur in derived forms, e.g. (4e) and (4h), where consonant clusters arise in surface forms after syncope occurs e.g., /ˈsu**kat-**ɛm/ → [ˈsu**k_t**ɛm] 'deer, pl.' (I address the morphophonological process of syncope in Chapter 5).

Sequences of identical consonants in TMD Cahuilla are prohibited and are repaired by deleting one of the two identical consonants. This rule applies frequently in inflected stems where such sequences occur in underlying forms at morpheme boundaries. This rule can be stated as follows:

(5) $C_i \rightarrow 0 / \_\_ C_i$

Several examples of the application of this phonological rule from the TMD corpus are shown in (6), where both prefixes and suffixes yield an environment where one of two adjacent identical consonants undergoes deletion.

(6) a. *taxchemmumukniwen*
[tahtʃɛˈ**m**umukniwɛn]
/tax-tʃɛ**m-**ˈ**m**u~muk-ni-wɛn/
REFL-1PL-RED~die-CAUS-DUR.PL
'We win all the time.' CM(TMDC0015.WAV)

b. *penwichaxannem*
[pɛnˈwɪtʃaxa**n**ɛm]
/pɛ-n-ˈwitʃax-a**n-n**ɛm/
3SG-1SG-throw-CAUS-FUT

‘I will throw it (money).’ CM(TMDC0011.WAV)

c. *chemtet’ayawwen*
[tʃɛmˈtɛtʔajaɯɛn]
/tʃɛm-ˈtɛtʔajaɯ-ɯɛn/
1PL-dream-DUR.PL
‘We are dreaming.’ CM(TMDC0007-001.WAV)

d. *pepuchaqqal*
[pʌˈpʊtʃaɢɑɬ]
/pɛ-ˈputʃaɢ-ɢal/
3SG-jump- DUR.SG
‘He is jumping.’ CM(TMDC0016.WAV)

As shown in these examples, whenever a sequence of two identical consonants occurs at a morpheme boundary, one of them is deleted, regardless of whether the consonants are sonorants (6a-c) or obstruents (6d). This rule also applies to sequences of identical sounds that appear at word boundaries as well, as shown in (7). In these cases, I assume the word-final phoneme of the first word is deleted, instead of the onset of the second word, given that all syllables are required to have an onset.

(7)	*leevaki*	*waavuwet*	*tuwaymanish*	*pexelyaqal*
	[ˈlɛːvaki	ˈwaːvuwɛ_	**t**uˈwajmanɪʃ	pʌˈxɛʌaqɐɬ]
	/ˈlɛːvaki	ˈwaːvu-wɛ**t**	**t**uˈwajmaniʃ	pɛˈxɛʌaqɐl/

coat long-AUG always 3SG-dress-DUR.PL
'He always wore a long coat.' CM(TMDC0030.WAV)

As the examples in (6) and (7) show, deletion is the primary means by which sequences of identical consonants are repaired in TMD Cahuilla. This repair strategy resembles a more general antigemination rule documented in other varieties of Cahuilla that operates in tandem with a more specific rule in which a consonant is debuccalized (becoming a glottal stop) whenever a sequence of two voiced bilabial nasals occurs at a morpheme boundary, e.g., /hɛ**m**-ˈ**m**iŋkim/ 'their relatives' → [hɛ**ʔ**ˈ**m**iŋkim] (Seiler 1977:53). This more specific rule, which is quite productive in other varieties of Cahuilla, seems to have been lost in TMD Cahuilla and replaced by the more general rule in (5) as shown in (6a), in an apparent case of phonotactic simplification.[22]

3.2.3 Vowel sequences

In TMD Cahuilla (and other documented in other varieties of Cahuilla), a sequence of two adjacent vowels belonging to different syllables (i.e., vowel hiatus (Casali 2011)) is not permitted. Vowel hiatus in TMD Cahuilla is resolved through several processes, including diphthongization, glide formation and glottal stop epenthesis. As discussed below, the choice of repair is largely dependent on vowel height of the vowels in the vowel sequence as well as stress, though there are cases where the choice of vowel hiatus repair does not appear to be phonologically predictable. There are a small number of verb and noun roots that contain

[22] The bilabial nasal rule provides an example of the way in which glottal stops can surface from different sources within the phonological system of different varieties of Cahuilla.

diphthongs that are attested in stressed syllables in non-derived environments. All such roots have falling diphthongs in which the first vowel is a non-high unrounded vowel (/a/ or /ɛ/) and the second member of the sequence is a high front unrounded vowel /i/. In all attested examples, these diphthongs are followed by a syllable with palatalized lateral approximant [ʎ] onset. Examples of these roots are shown in (8).

(8) a. *nekwaylya*
[nʌˈkʷ**aɪ**ʎa]
/nɛ-kʷaila/
1SG-paternal.grandparent
'my paternal grandparent' CM(TMDC0006.WAV)

b. *maylya*
[ˈm**aɪ**ʎɐ]
/0-maila/
3SG-son
'her son' CM(TMCONVO1.WAV)

c. *xeylya*
0-ˈx**ɛɪ**ʎa
/0-xɛiʎa/
3SG-clothes
'her clothes' CM(TMCONVO2.WAV)

As the examples in (8) show, diphthongs, though marginal, are attested in some non-derived verb and noun roots in TMD Cahuilla (in all cases, the underlying diphthongs are attested in stressed syllables). Diphthongs may also be derived through a phonological process that repairs vowel hiatus in derived contexts. Specifically, as in non-derived environments,

attested diphthongs are falling. This is exemplified in (9), in forms where the accusative case suffix /-i/ or the locative suffix /-ika/ are attached to vowel-final noun stems.

(9) Vowel hiatus repaired through diphthongization

a. *chemyay*
/ˈtʃɛm-ja-i/ → [ˈtʃɛm.j**aɪ**]
1PL-mother-ACC
'our mother (obj.)' CM(TMDC0031.WAV)

b. *hemay*
/ˈhɛ-ma-i/ → [ˈhe.m**aɪ**]
3SG-hand-ACC
'his hand (obj.)' CM(TMDC0016.WAV)

c. *chemhawaway*
/tʃɛm-ˈhawawa-i/ → [tʃɛm.ˈha.wa.w**aɪ**]
1PL-language-ACC
'our language (obj.)' CM(TMDC0025.WAV)

d. *tooroyka*
/ˈtoːro-ika/ → [ˈtoː.r**oɪ**.ka]
toro-LOC
'To Toro (Toro Indian Reservation).' CM(TMCONVO2.WAV)

e. *ishvayka*
/ˈʔiʃva-ika/ → [ˈʔiʃ.v**aɪ**.ka]
left-LOC

‘To the left.’ CM(TMDC0028.WAV)

As seen in these examples, the surface forms involve diphthongs where the high front unrounded vowel follows a stem-final non-high vowel /a/ (9a-c) and (9d), or /o/ (9d). In contrast, when stems that end in an unstressed high front unrounded vowel /i/ attach a suffix that has an initial low front unrounded vowel /a/ (e.g., subordinate realis /-anuk/), hiatus is repaired through glide formation, where V_1 (the unstressed stem-final high front unrounded vowel) becomes a palatal semivowel. Examples of this process are shown in (10).

(10) Vowel hiatus repaired through glide formation

a. *pechumyanuk*
/pɛ-ˈtʃumi-anuk/ → [pʌˈtʃum.**ja.**nʊk]
3SG-finish-SUB.REAL
‘After she finished’ CM(TMCONVO1.WAV)

b. *nekwapyanuk*
/nɛ-ˈkʷapi-anuk/ → [nʌ.ˈkʷap.**ja**.nʊk]
1SG-wake.up-SUB.REAL
‘After I woke up.’ CM(TM_STORY2.WAV)

In addition to diphthongization and glide formation, a third vowel hiatus resolution strategy is attested in some deverbalized nouns, where a glottal stop is epenthesized between a sequence of two vowels. This pattern is illustrated in the TMD data as shown in (11) below, where vowel-final verb stems that attaches a vowel-initial nominalizing suffix (with suppletive allomorphs [-at] ~ [-iʎ]) exhibits an epenthetic glottal stop.

(11) Variable glottal stop epenthesis with nominalizing /-at/ ~ /-iʎ/ suffix

	Vowel-final verb stems	**Deverbal forms**
a.	/-ˈʔivi-l**u**-/	*ivilyu'at*
	'speak Cahuilla'	/ʔivi-lu-at/ → [ˈʔiviʎu**ʔ**at]
		these-turn.into-ABS
		'Cahuilla language' CM(TM_STORY2.WAV)
b.	/-ˈtaxm**u**-/	*taxmu'at*
	'sing'	/taxmu-at/ → [ˈtaxmu**ʔ**at]
		sing-ABS
		'song' GT(TMDC0034.WAV)
c.	/-ˈhawaw**a**-/	*hawawa'ily*
	'speak'	/ˈhawawa-il/ → [ˈhawawa**ʔ**iʎ]
		language-ABS
		'a language' CM(TMCONVO1.WAV)

	Consonant-final verb stems	**Deverbal forms**
d.	/-ˈku**l**-/ 'to make'	*kulat*
		/kul-at/ → [ˈkulat]
		make-ABS
		'made thing' GT(TMDC0034.WAV)
e.	/-ˈnɛkɛ**n**-/ 'to come'	*nekenat*
		/nɛkɛn-at/ → [ˈnɛkɛnat]
		come-NMLZ
		'one who came' CM(TMDC0034.WAV)
f.	/-ˈjɛ**ŋ**-/ 'to pass time'	*yengily*
		/jɛŋ-il/ → [ˈjɛŋiʎ]

pass.time- NMLZ

'for a while' CM(TMCONVO1.WAV)

The examples in (11) above show that the glottal stops attested in (11a-c) are not likely part of the nominalizing suffixes underlyingly, since they are not present in verb forms containing the same suffixes (11d-f). There is also no a priori reason to assume that they are part of the nominalizing suffix but get deleted when attached to a consonant-final stem, since such a sequence would not yield an illicit sequence in the language; sequences of a consonant followed by a glottal stop are attested in non-derived stems, as shown in (4d) (ˈwɛ**lʔ**isiw/ 'husband'). Moreover, the stems in (11a-c) do not appear with a glottal stop when inflected with consonant-initial suffixes, as shown in (12), further demonstrating that the glottal stops are not likely part of the stem underlyingly either.

(12) Verb stems with no surface glottal stop

/-ˈʔivi-l**u**-/ 'speak Cahuilla'

a. *ne'ivilyuqal*

[nʌˈʔiviɭuqɐ̞]

/nɛ-ˈʔivi-lu-qal/

1SG-DEM-TRANSL-DUR.SG

'I'm speaking Cahuilla (lit. becoming those (ancestors))' CM(TMDC0025.WAV)

b. *em'ivilyuwen*

[ʔɛmˈʔiviɭuwɛn]

/ʔɛm-ˈʔivi-lu-wɛn/

2PL-DEM-TRANSL-DUR.PL

'you're speaking Cahuilla (lit. becoming those (ancestors))' CM(TMDC0025.WAV)

/-ˈtaxm**u**-/ ‘sing’

c. *hemtaxmuwen*

[hɛmˈtaxmʊwɛn]

/hɛm-ˈtaxmu-wɛn/

3PL-sing-DUR.PL

‘they are singing.’ GT(TMDC0034.WAV)

d. *taxmuwetem*

[ˈtaxmʊwɛtɛm]

/ˈtaxmu-wɛt-ɛm/

sing-AUG-PL

‘singers’ CM(TMDC0006.WAV)

/-ˈhawaw**a**-/ ‘speak’

e. *pehawawanqal*

[pʌˈhawɐwɐnqɐ̝]

/pɛ-0-ˈhawawa-n-qal/

3SG-3SG-language-CAUS-DUR.SG

‘she speaks it’ CM(TMDC0025.WAV)

This pattern is consistent with what has been previously documented for varieties of Desert Cahuilla, as illustrated in the partial noun paradigm in Table 13, compiled from Seiler & Hioki's (1979) Cahuilla dictionary.

Table 13. Partial noun paradigm

	ROOT	-vaʃ (AGT)	-iʎ (NMLZ)	-at (NMLZ)	SOURCE
a.	/ˈtaxmu/ ‘to sing’	ˈtaxmu-vaʃ ‘singer’		ˈtaxmu-ʔat ‘a song’	(S&H 1979:203)
b.	/ˈʔamu/ ‘to hunt’	ˈʔamu-vaʃ ‘hunter’	ˈʔamu-ʔiʎ ‘a hunt’	ˈʔamu-ʔat ‘a hunt’	(S&H 1979:15)
c.	/ˈpuni/ ‘to twirl’	ˈpuni-vaʃ/ ‘eagle dancer’	ˈpuni-ʔiʎ ‘eagle dance’	ˈpuni-ʔat ‘eagle dance’	(S&H 1979:161)
d.	/ˈheːŋiw/ ‘get angry’	ˈheːŋiw-vaʃ/ ‘fighter’	ˈheːŋiw-iʎ ‘war’		(S&H 1979:52)
e.	/ˈnuk/ ‘to create’		ˈnuk-iʎ ‘image ceremony’	ˈnuk-at ‘image ceremony’	(S&H 1979:129)
f.	/ˈʔulan/ ‘to sew’	ˈʔulan-vaʃ ‘sewer’	ˈʔulan-iʎ ‘a sewing’	ˈʔulan-at ‘sewn object’	(S&H 1979:225)

As the examples in Table 13 above show, when a consonant-initial suffix is attached (e.g., -vaʃ), there is no glottal stop epenthesis regardless of whether the stem ends in a vowel (a)-(c) or a consonant (d). However, if the suffix being attached is vowel-initial (e.g., -iʎ, -at), there is a split between stems that end in a vowel and those that end in a consonant in terms of their

behavior: stems ending in a vowel (a)-(c) have a glottal stop which occurs at the morpheme boundary but stems that end in a consonant (a)-(c) do not. These examples further show that glottal stops in these cases are likely epenthesized intervocalically as a repair for vowel hiatus.

So far, I have identified three phonological processes (diphthongization, glide formation and glottal epenthesis), all of which occur at morpheme boundaries to repair vowel hiatus. Cross-linguistically, it is not uncommon for a language to have two or more hiatus resolution processes in different phonological or morphosyntactic contexts (Casali 2011). One question that arises in these languages is whether the choice of repair is predictable. In the case of TMD Cahuilla, we may ask what factors condition the choice of repair of vowel hiatus in this language.

In terms of the features of the vowels themselves, there are cases where vowel height plays a role: specifically, and as shown above, diphthongization is generally attested in cases where the vowel sequence involves a non-high V1 followed by a high front unrounded V2 (e.g., [ai], [oi]). Relevant examples from (9) are repeated in (13).

(13) Diphthongization for /ai/, /oi/ sequences

a. *tooroyka*
/ˈtoːro-ika/ → [ˈtoː.r**oɪ**.ka]
toro-LOC
'To Toro (A historic Cahuilla village).' CM(TMCONVO2.WAV)

b. *ishvayka*
/ˈʔiʃva-ika/ → [ˈʔiʃ.v**aɪ**.ka]
left-LOC
'To the left.' CM(TMDC0028.WAV)

Conversely, in forms where the vowel sequence involves a high front unrounded vowel followed by a low front unrounded vowel (e.g., [ia]), the repair involves either glide formation or glottal stop epenthesis. This is shown in (14).

(14) Two repair processes for /ia/ sequences

Glide formation

a. *chumyanuk*
/0-ˈtʃumi-anuk/ → [ˈtʃum.**ja.**nʊk]
3SG-finish-SUB.REAL
'After she finished' CM(TMCONVO1.WAV)

b. *huviyam*
/ˈhuvi-am/ → [ˈhu.vi.**j**am]
smell- IMP.PL
'smell (you pl.)' (KH^{FN}_NB5272)

Glottal stop epenthesis

c. *puni'at*
/ˈpuni-at/ → [ˈpu.ni.**ʔ**at]
twirl-NMLZ
'an eagle dance' (S&H 1979:161)

d. *yuki'at* → [ˈju.ki.**ʔ**at]
/juki-at/
scare-NMLZ
'scary thing' (S&H 1979:253)

As the examples above show, the choice of which processes will be leveraged to repair vowel hiatus can be partially predictable. For example, a non-high vowel followed by a high vowel predictably results in diphthongization as shown in (13). However when this sequence order is reversed (a high vowel followed by a non-high vowel) equivalent phonological sequences may exhibit different repair strategies, hence hiatus repairs are not phonologically predictable for all vowel sequences.

Vowel sonority is also not a strong determining factor in predicting which process will occur. In the examples below in (15), various hiatus repair processes occur across the three types of sonority sequences, however like vowel height, sonority is only able predict some but not all repair processes.

(15) Rising sonority

a. *huviyam*

/ˈhuvi-am/ → [ˈhu.vi.**j**am]

smell- IMP.PL

'smell (you pl.)' (KH^{FN}_NB5272)

b. *puni'at*

/ˈpuni-at/ → [ˈpu.ni.**ʔ**at]

twirl-NMLZ

'an eagle dance' (S&H 1979:161)

Equal sonority

c. *pichemkwa'anuk*

/pi-tʃɛm-k^{w}a-anuk/ → [pɪtʃʌmk^{w}a**ʔ**ɐnʊk]

3SG-1PL-eat-SUB.REALIS

'If we eat it' CM(TMDC0018.WAV)

Falling sonority

d. *tooroyka*

/ˈtoːro-ika/ → [ˈtoː.r**oɪ**.kɐ]

toro-LOC

‘To Toro (Toro Indian Reservation).’ CM(TMCONVO2.WAV)

e. *ishvayka*

/ˈʔiʃva-ika/ → [ˈʔiʃ.v**aɪ**.kɐ]

left-LOC

‘To the left.’ CM(TMDC0028.WAV)

f. *amu’ily*

/ˈʔamu-il/ → [ˈʔamu-**ʔ**iʎ]

hunt-NMLZ

‘a hunt’ (S&H 1979:15)

As can be seen in the examples in (15) above, there are forms with vowel sequences of rising sonority where glide formation occurs (15a-b), and others with vowel sequences of falling sonority where diphthongization occurs (15d-f). However, glottalization also occurs in both rising sequences and falling sequences, as well as sequences with equal sonority (15c). Thus, both vowel height and sonority predict two of the three vowel hiatus repairs but do not account for the distribution of glottal epenthesis. Thus the behavior and distribution of glottal stops warrants further investigation, though it is currently out of the scope of this dissertation.

3.3 Glottal stops: phonotactic distribution and phonological sources

As has been documented in other varieties of Cahuilla, as well as neighboring Takic languages, glottal stops in TMD Cahuilla show variability in terms of their patterning and distribution in a

variety of contexts, prompting the question of whether this phenomenon results from processes of glottal stop epenthesis (as analyzed in Seiler (1977)), glottal stop deletion (as suggested by Hill & Hill (2019:255)) or both. Data from the TMD Cahuilla corpus shows that: (i) there is glottal stop epenthesis that is used to repair phonotactically illicit sequences (as described in §3.2.4 above); and (ii) the glottal stop serves as a lexically contrastive phoneme /ʔ/ that may be reduced post-lexically in fast speech (as shown in Chapter 2) or that may be deleted in some phonological environments, as described in this section.

3.3.1 Glottal stop epenthesis and deletion

In some instances, glottal stops may be analyzed as resulting from an active alternation or as a static restriction on the shape of morphemes: given that onsetless syllables are not permitted in the language and that there are no lexical contrasts that are distinguished by the presence or absence of glottal stops word-initially, word-initial glottal stops could be analyzed as being epenthetic or underlying present in these contexts (see Hill & Hill (2019) for a discussion of this pattern across Takic languages). In TMD Cahuilla, evidence from prefixing patterns suggest that glottal stops are underlyingly associated with some roots. This is illustrated in (16), where verbs roots inflected with the first-person singular and first-person plural pronominal prefixes show different patterns: in consonant-initial roots (16e-h), these prefixes do not surface with glottal stops but with what would otherwise be vowel-initial roots (16a-d), a glottal stop is present regardless of whether the prefix ends in a consonant or a vowel. This suggests that the glottal stops in (16a-d) are not part of the prefix, nor are they the same epenthetic stops used for vowel hiatus, but rather that they appear to be either part of the root or epenthesized to vowel-initial roots to satisfy phonotactic requirements pertaining to syllable shape.

(16)

a.	*ne'ivilyuqale*		b.	*chem'ivilyu*
	[nʌʔiviʎuqɐlɛ]			[tʃɛmˈʔiviʎu]
	/nɛ-ʔivilu-qal-ɛ/			/tʃɛm-ˈʔivilu/
	1SG-cahuilla.language-DUR.SG-PRET			1PL-cahuilla.language
	'My friends'			'Our language'
	CM(TMDC0025.WAV)			CM(TMCONVO1.WAV)
c.	*ne'amiqal*		d.	*chem'amiwen*
	[nʌˈʔamiqɐl]			[tʃɛmˈʔamiwɛn]
	/nɛ-ˈʔami-qal/			/tʃɛm-ˈʔami-wɛn/
	1SG-get.down-DUR.SG			1PL-get.down-DUR.PL
	'I'm getting down'			'We're getting down'
	CM(TMDC0001.WAV)			CM(TMDC0001.WAV)
e.	*nepivaqal*		f.	*chempivawen*
	[nʌˈpivɐqɐl]			[tʃɛmˈpivɐwɛn]
	/nɛ-ˈpiva-qal/			/tʃɛm-ˈpiva-wɛn/
	1SG-smoke-DUR.SG			1PL-smoke-DUR.PL
	'I am smoking'			'We're smoking'
	CM(CMVERBS2.WAV)			CM(CMVERBS2.WAV)
g.	*nemexana*		h.	*hemmexana*
	[nʌˈmɛxɐnɐ]			[hɛmˈmexɐnɐ]
	/nɛ-ˈmɛxana/			/hɛm-ˈmexana/
	1SG-property			3PL-property
	'My property'			'Their property'
	CM(TMDC0034.WAV)			CM(TMDC0034.WAV)

Further evidence to support an analysis for glottal stop-initial roots comes from reduplication. The examples in (17a) and (17b) show that the glottal stop is part of the stem-

initial CV syllable that is copied and prefixed to the stem (see Chapter 6 for discussion of reduplication in TMD Cahuilla).

(17) a. *hen'amika*
[hɛnˈ**ʔa**mikɐ]
/hɛn-ˈ**ʔa**mi-ka/
1SG-drop-IF
'I'm going to drop' CM(TMDC0001.WAV)

b. *taxchem'a'amiwen*
[taxtʃʌmˈ**ʔa**ʔamiwɛn]
/tax-tʃɛm-ˈ**ʔa**~ʔami-wɛn/
RFLX-1PL-RED~drop-DUR.PL
'We're going to drop each other' CM(TMDC0017.WAV)

In Cahuilla, verbal reduplication involves copying the root-initial CV sequence and prefixing it to the left edge of the root (see Chapter 6). Thus, in (17b), the initial CV sequence of the root is copied and prefixed to the left edge of the root. If the root did not underlyingly have an initial glottal stop we might expect a form like [tax-tʃɛm-ˈ**am**~ami-wɛn], which is unattested. Instead, the initial CV sequence of the reduplicated stem is a syllable with a glottal stop onset, /ʔa/. In addition to occurring root-initially, glottal stops also occur intervocalically in roots, as shown in (18).

(18) a. *ku'al*

[ˈku**ʔ**ɐl]

/ku**ʔ**a-l/

worm-ABS

‘worm’ CM(TMDC0028.WAV)

b. *tu’ish*

[ˈtu**ʔ**ɪʃ]

/tu**ʔ**i-t͡ʃ/

fruit-ABS

‘fruit’ CM(TMDC0028.WAV)

c. *pennu’uqanqale*

[pɛˈnu**ʔ**uqɐnqɐlɛ]

/pɛ-n-ˈnu**ʔ**uqan-qal-ɛ/

3SG-1SG-push-DUR.SG-PRET

‘I was pushing it’ CM(TMDC0015.WAV)

d. *pehe’anqal*

[pʌˈhɛ**ʔ**anqɐl]

/pɛ-ˈhɛ**ʔ**an-qal/

3SG-know-DUR.SG

‘S(h)e knows’ CM(TMDC0030.WAV)

e. *nekwe’eqiqal*

[nʌˈkʷɛ**ʔ**ɛqɪqɐl]

/nɛ-ˈkʷɛ**ʔ**ɛqi-qal/

1SG-get.up-DUR.SG

‘I’m getting up’ CM(CMVERBS2.WAV)

Glottal stops may appear in coda position, including in a small number of monosyllabic closed class words (independent pronouns and demonstratives) when unaffixed, as illustrated in (19) below.

(19)	a.	ˈnɛʔ	1SG	‘me’	CM(TMDC0028.WAV)
	b.	ˈʔɛʔ	2SG	‘you’	CM(TMDC0028.WAV)
	c.	ˈpɛʔ	3SG	‘he/she/it’	CM(TMDC0028.WAV)

These glottal stop codas are not present when a consonant-initial suffix is added to these morphemes, as shown in (20).

(20)	a.	ˈnɛ-ki	1SG-house	‘my house’	GT(TMDC0034.WAV)
	b.	ˈʔɛ-ki	2SG-house	‘your house’	CM(TMDC0034.WAV)
	c.	ˈhɛ-ki	3sg-house	his/her house’	GT(TMDC0034.WAV)

Thus, the glottal codas in (19) could be analyzed as epenthetic, given a phonotactic word requirement in TMD Cahuilla and other Cahuilla varieties that all words be minimally CVC (see §5.2 for further discussion). Alternatively, the glottal stop codas could be posited to be underlying and deleted before consonants in derived environments, but the behavior of other morpheme-final glottal stops suggests the glottal stops in the forms in (19) are epenthetic. Specifically, there are a small number of monosyllabic roots (-ˈkɛʔ- ‘bite,’ -ˈsɛʔ- ‘bloom,’ -ˈkwaʔ- ‘eat (tr.)’, -ˈpaʔ- ‘drink,’ -ˈtʃaʔ- ‘choke’) that are posited by Seiler and Hioki (1979) to have a root-final glottal stop underlyingly. In the TMD Cahuilla data, these roots surface with a glottal stop, except when attaching suffixes with a sonorant (glide or nasal) consonant onset, e.g.,

the durative plural /-wen/ or the future /-nem/ suffixes. This is shown in the inflected forms of the verbs /-paʔ-/ ‘drink’ and /-kʷaʔ-/ 'eat (tr.)' shown below in (21) and (22) respectively.

(21) Inflected forms of /paʔ/ 'drink

a. *pa’*
/ˈpaʔ/ → [ˈpa**ʔ**]
drink.IMP
‘drink’ CM(TMDC0028.WAV)

b. *chempawen*
/tʃɛm-ˈpaʔ-wɛn/ → [tʃɛmˈpawɛn]
3SG-1PL-drink-DUR.PL
‘We are drinking.’ CM(TMDC0001.WAV)

c. *penpanem*
/pɛ-n-ˈpaʔ-nɛm/ → [pɛnˈpanɛm]
3SG-1SG-drink-FUT
‘I will drink’ CM(TMDC0001.WAV)

d. *nepa’qal*
/nɛˈpaʔ-qal/ → [nʌˈpa**ʔ**qɐ̞l]
3SG-1SG-eat-DUR.SG
‘I am drinking’ CM(TMDC0001.WAV)

e. *hishpa’katem*
/hiʃ-ˈpaʔ-katɛm/ → [hɪʃˈpa**ʔ**kɐ̞tɛm]
1PL-drink-IF
‘We are going to drink’ CM(TMDC0001.WAV)

(22) Inflected forms of /kʷaʔ/ 'eat (tr.)'

a. *kwa'a*

/ˈkʷa-a/ → [ˈkʷa-**ʔ**a]

eat.TRANS-IMP

'eat it!' CM(TMDC0028.WAV)

b. *pichemkwawen*

/pi-ʧɛm-ˈkʷaʔ-wɛn/ → [pɪʧɛmˈkwawɛn]

3SG-1PL-eat-DUR.PL

'We are eating it.' CM(TMDC0031.WAV)

c. *penkwanem*

/pɛ-n-ˈkʷaʔ-nɛm/ → [pɛnˈkʷanɛm]

3SG-1SG-eat-FUT

'I will eat it' CM(TMDC0001.WAV)

d. *penkwa'qal*

/pɛnˈkʷaʔ-qal/ → [pɛnˈkʷa**ʔ**qɐ̬l]

3SG-1SG-eat-DUR.SG

'I am eating' CM(TMDC0001.WAV)

e. *pichemkwa'ap*

/pi-ʧɛm-ˈkʷaʔ-ap/ → [pɪʧɛmˈkʷa**ʔ**ap]

3SG-1PL-eat-SUB.IRR

'For us to eat it.' CM(TMDC0031.WAV)

f. *pemkwa'iktem*

/pɛ-m-ˈkʷaʔ-ik-t-ɛm/ → [pɛmˈkwa**ʔ**ɪktɛm]

3SG-3PL-eat-IF-NOM-PL

'They are going to eat it.' CM(TMDC0031.WAV)

As the examples in (21b-c) and (22b-c) show, glottal stop is absent before sonorant consonants but present in intervocalic position (21d-e), (22a), and (22d-f), or word-finally (21a). A similar pattern is attested with larger roots where a root-final glottal stop is attested in some inflected forms depending on the phonological context, as show in (23). These examples include forms from the TMD Cahuilla corpus (23a-c), as well as data from Seiler (1970), Seiler and Hioki (1979), and Sauvel & Elliott (2004) shown in (23e-h).

(23) Inflected forms of /-tuˈxʷaʔ/ 'work'[23]

a. tuxwa'
/tuˈxwaʔ/ → [tuˈxwa**ʔ**]
work.IMP
'work!' CM(TMVERBS2.WAV)

b. *tuxwa'qal*
/0-tuˈxʷaʔ-qal/ → [tʊˈxʷa**ʔ**qal]
3SG-work-DUR.SG
's/he is working' CM(TMCONVO1.WAV)

c. *hemtuxwa'luwen*
/hɛm-tuˈxʷaʔ-lu-wɛn/ → [hɛm-tʊˈxʷa**ʔ**lʊwɛn]
3SG-work-MOTP-DUR.PL
'they went to work' CM(TMDC0031.WAV)

d. *hemtuxwa'weneve*

[23] The cognate forms of this TMD Cahuilla root are [-tuvˈxʷaʔ] ~ [tuvˈxaʔ] in Seiler (1979) and Sauvel & Ellott (2004).

/hɛm-tuˈxʷaʔ-wɛn-ɛvɛ/ → [hɛmtʊˈxʷawɛnɛvɛ]

3SG-work-DUR.PL-SUB.IRR

‘they would work’ CM(TMDC0031.WAV)

e. *netuvxwa’qal*

<nɛ-tuvˈxʷa**ʔ**-qal>

SG-work-DUR.SG

‘I am working.’ (HS 1979:224)

f. *hemtuvxa’pi*

<hɛm-tuvˈxa**ʔ**-pi>

3PL-work-SUB.IRR

‘They had to work.’ KS(S&E 2004:774)

g. *tuvxa’ish*

< tuvˈxa**ʔ**-iʃ>

work-ABS

‘work’ KS(S&E 2004:774)

h. *pemtuvxwawen*

<pɛ-m-tuvˈxʷa-wɛn>

3SG-3PL-work-DUR.PL

‘They’re working.’ (HS 1970:149)

As seen in these examples, the root-final glottal surfaces in word-final position with the non-concatenative imperative morpheme (23a), and before vowel-initial (23g) and consonant-initial inflectional suffixes (23b-c) and (23e-f), except for the glide-initial durative plural /-wen/

suffix (23d) and (23h), suggesting that the glottal stop in these forms is underlyingly part of the root but can get deleted in certain phonological contexts. In addition, the forms in (23c) and (23h) show that it is not the mere presence/absence of the durative plural suffix /-wen/ but rather adjacency to it, since the glottal stop does not appear when there is a suffix intervening between the root and /-wen/. Alternatively, (23c) could indicate that glottal stops are morphologically conditioned with certain affixes (i.e., the purposive motion suffix /-law/).

Chapter 4 Suprasegmental Phonology

4.1 Introduction

This chapter discusses the suprasegmental phonology of TMD Cahuilla, specifically with regard to word-level stress and intonation. While the Cahuilla stress system is prominently discussed in the areal, typological and theoretical literature (Seiler 1957, 1965, 1967, 1977; Levin 1988; Hayes 1995; Blevins 2004; Gordon 2007, 2016; Ryan 2019), no prior study, to the best of my knowledge, addresses instrumental data nor intonation patterns in this language. In this chapter, I provide a description of the word-level stress system and intonation of TMD Cahuilla, and discuss three key findings of my research on the prosodic system of this language: (i) evidence for positing primary stress based on phonological criteria, as well as possible acoustic correlates; (ii) no evidence (phonological or phonetic) for positing secondary stress or quantity sensitivity in stress assignment, in contrast to what has been proposed for other Cahuilla varieties in the literature; and (iii) a preliminary characterization of the intonational patterns of the language based on declarative and interrogative sentences.

The organization of this chapter is as follows: §5.2 provides the definitions and assumptions that underlie the description and analysis presented. §5.3 discusses previous descriptions and analyses of stress in Cahuilla. §5.4 describes the prosodic system of TMD Cahuilla, describing its patterns and providing phonological evidence for primary stress in the language. §5.5 provides a brief overview of the intonation inventory and patterns of the language as presented through a preliminary study (Huaute 2022).

4.2 Prosody: definition and assumptions

In this dissertation, I employ terms from prosodic typology to provide a phonological analysis of prosodic phenomena in TMD Cahuilla. This section provides a review of typological and theoretical literature on word-level stress and phrasal pitch accent that substantiate assumptions made in this work about the prosodic system of this language.

4.2.1 Word-level stress

Recent literature on prosodic typology and stress systems (Hyman 2006, 2009; Kager 2007; Gordon 2016; Gordon & van der Hulst 2020, *inter alia*) use the term 'stress' to describe languages in which there is an increased level of prominence associated with one or more syllables in a word when compared to other syllables within that same word. Hyman (2006) notes that stress can be typologized in terms of a set of definitional characteristics or properties. I adopt the following definition of word-level stress:

(1) "A language with stress accent is one in which there is an indication of word-level metrical structure meeting the following two central criteria:

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

b. CULMINATIVITY: every lexical word has *at most* one syllable marked for the highest degree of metrical prominence." (Hyman 2006:231)

As this definition states, every lexical word must have ‘at least one’ and ‘at most one’ syllable marked for primary stress. Here, I follow Gordon and van der Hulst (2020) in interpreting the ‘lexical word’ to mean the phonological word.

Other properties of stress systems include the potential for stress to: (i) exhibit a rhythmic structure (i.e., presence of secondary stress); and (ii) exhibit quantity-sensitivity. Rhythmic structure and quantity-sensitivity is argued to play a role in the synchronic analysis of previously documented varieties of Cahuilla and several other Uto-Aztecan languages, as well as proposals for the diachronic development of word-prosodic systems in the language family (Munro 1977). Uto-Aztecan languages may exhibit both rhythmic structure and quantity-sensitivity, or only one of the two. In Tohono O’odham [Tepiman; Uto-Aztecan], for example, both primary stress and secondary stress are quantity-insensitive: primary stress is assigned to the first syllable and secondary stress is assigned to every odd syllable in an alternating pattern following the primary stress, regardless of whether it is heavy or light, e.g., /ˈñuːkuˌda/ ‘the object taken care of,’ /ˈhahaiˌwangaˌkam/ ‘one who owns cattle,’ /ˈhihiˌdoḍaˌkuḍdam/ ‘someone with a cooking instrument’ (Fitzgerald 2012). Thus, Tohono O’odham exhibits a quantity-insensitive stress system. In contrast, in Tümpisa (Panamint) Shoshone [Numic; Uto-Aztecan], both primary and secondary stress are weight-sensitive: primary stress is assigned to the second syllable if it contains a long vowel, while secondary stress is sensitive to vowel length, e.g., [kukˈkwiippüh] ‘smoke’, [ˈnattuˌsuʔungˌkantün] ‘doctor’, tsiˈtoohin ‘push’ (Dayley 1989:436-38).[24]

[24] Outside of Uto-Aztecan, Chickasaw instantiates a case of quantity-sensitive secondary stress assignment: primary stress usually falls on the final syllable of a word and secondary stress is assigned in a rhythmic alternating pattern from right to left preceding the primary stress. This pattern may be interrupted, however, if there is a heavy syllable (CVV or CVC) to the left of the primary stressed syllable, e.g., /ˌissoˈba/ ‘horse,’ ˌ/ˌokˌfokˈkol/ ‘type of snail.’ In

In this dissertation, I provide phonological evidence to establish primary stress in TMD Cahuilla. In order to do this, I assess what evidence is posited cross-linguistically to diagnose stress systems. Numerous cross-linguistic studies and typological surveys (van der Hulst and Goedemans 2009, Goedemans, Heinz, van der Hulst 2015, Gordon 2011, Gordon and Roettger 2017, Gordon and van der Hulst 2020) have shown that stress can manifest itself through various phonological and phonetic exponents, which in turn can result in the perception of certain syllables being "more prominent" than others. While descriptions of stress systems are often based on impressionistic assessments of prominence, empirically robust descriptions of stress systems cross-linguistically involve careful examination of phonological evidence and acoustic analysis (Hayes 1995, Gordon 2016). Phonological diagnostics of word-level stress in the typological literature include the following:

(2) Stress diagnostics (Hayes 1995; Crosswhite 2004; Gordon & van der Hulst 2020)

a. Unstressed vowel reduction and deletion
b. Strengthening/fortition of stressed syllables (via vowel lengthening, gemination, onset augmentation, among others)
c. Segmental phonological rules sensitive to stress
d. Static phonotactic constraints
e. Attraction of nuclear intonational tones

Unstressed vowel reduction and deletion

addition, if there is a long vowel in the word it will attract primary stress regardless of its position in the word, e.g., /ˈbaːˌtamˌbiʔ/ 'Chickasaw name,' /aˈboːkoˌʃiʔ/ 'river' (Caballero & Gordon 2020:4).

One important diagnostic of word-level stress cross-linguistically involves qualitative differences between stressed and unstressed vowels, where unstressed syllables are often shorter in duration and may vary in quality. Vowels in unstressed syllables are also typically, but not always, more centralized, when compared to vowels in stressed syllables and may undergo various levels of reduction that may include devoicing and even deletion (Gordon and van der Hulst 2020). While many languages like English commonly reduce most unstressed vowels to a more centralized vowel, whether unstressed vowels exhibit vowel centralization as part of a reduction process is a language-specific feature. For example, Crosswhite (2001:23-28) notes that in Belarusian, the mid vowels /e/ and /o/ are lowered to [a] (e.g., [n**ó**ɣi] 'legs' vs. [n**a**ɣá] 'leg'; [r**é**ki] 'rivers' vs. [r**a**ká] 'river'), while in Luiseño [Takic; Uto-Aztecan], the mid vowels /e/ and /o/ are raised to /i/ and /u/, respectively (e.g., [h**é**din] 'will open' vs. [h**i**díki] 'to uncover'; [tʃap**ó**mkat] 'liar' vs. [tʃáʃp**u**mkatum] 'liars').

<u>Strengthening/fortition of stressed syllables</u>

While the shortening of a vowel in an unstressed position may be seen as a form of lenition or weakening, the lengthening of a vowel may be viewed as a type of fortition or strengthening in stressed syllables. Chickasaw [Muskogean; United States] is an example of a language in which a short vowel is lengthened in a secondary stressed syllable (e.g., /ʧi˛pisa˛liˈtok/ → [ʧi˛pi:sa˛li:ˈtok] 'I looked at you', /a˛sabi˛kaˈtok/ → [a˛sa:bi˛ka:ˈtok] 'I was sick' (Gordon and van der Hulst 2020:3)). Consonant gemination is another way in which a stressed syllable may be fortified, which often results in the formation of a heavy syllable. In Delaware [Algonquian; United States] gemination creates a closed, heavy syllable /nəˈmə.təme:/ → [nəˈmət.təme:]

(Gordon and van der Hulst 2020:3). Both vowel lengthening and gemination involve an increase in the overall duration of the syllable under stress, leading to an overall increase in prominence.

Segmental phonological rules sensitive to stress

Other means of diagnosing stress include the identification of segmental phonological rules that make reference to stress, driven by the strengthening effects that stressed syllables have on the phonetic realization of neighboring segments. Hayes (1995:12) discusses segmental rules in English that are dependent upon either the presence or absence of an adjacent stressed syllable. Two such rules are the flapping rule for alveolar plosives and the word-medial aspiration rule for voiceless stops. Under the flapping rule, /t/ and /d/ may be realized as [ɾ] when preceded by a vowel or glide and followed by an unstressed vowel (e.g., 'data' [ˈdey**ɾ**ə] vs. 'attain' [əˈ**t**eyn]) and under the word-medial aspiration rule, stops become aspirated when they are in the onset of a stressed syllable (e.g., 'append' [əˈ**pʰ**ɛ́nd] vs. 'campus' [ˈkʰæm**p**əs]). In both cases, the onset of a syllable under stress is stronger (via aspiration) than when it is in a syllable that lacks stress.

Static phonotactic constraints

Static phonotactic restrictions may also be used as a diagnostic for stress, since some languages may restrict certain phonological contrasts to stressed syllables (i.e., fewer phonological contrasts are attested in unstressed syllables). For example, in Itunyoso Trique [Oto-Manguean; Mexico], phonological contrasts such as a fortis-lenis contrast in syllable onsets, glottalized sonorants, pre-nasalized stops, final laryngeals and vowel nasalization, are licensed only in stressed syllables (DiCanio 2008: 53). Likewise, in tonal languages, certain tones may be

restricted to stressed syllables, where such contrasts do not occur in unstressed syllables. In Nieves Mixtec [Oto-Manguean; Mexico], for example, high tones are restricted to the stressed syllable in Spanish loanwords, where the stressed syllable matches that of the adapted loanword stress pattern, e.g., *computadora* [komputaˈðoɾa] → [kōpūntā (ˈðóɾá)]; *miércoles* [ˈmjeɾkoles] → [(ˈmjéɾkò)lèʃè]) (Carroll 2015:119-120). In Yoloxóchitl Mixtec, where stress falls on the final syllable of a two-syllable couplet, the initial unstressed syllable licenses only five tones, while the final stressed syllable licenses eight (DiCanio, Amith, Castillo Garcia 2012).

Attraction of nuclear intonational tones

Finally, since stressed syllables are often docking sites for intonational pitch accents, as part of larger prosodic constituents, such prosodic patterns can be used as yet another means of diagnosing stress in a given language. In English, for example, nuclear pitch accents always fall on the final lexically-stressed syllable, regardless of the intonational tune or tonal sequence applied to it. As illustrated in Hayes (1995:11), when each of four intonational tunes (M H* L, H L*H, H M* L, and L L*+H L), each associated with different meanings, are applied to a given intonational phrase, the nuclear or starred pitch accent consistently docks to the word-level stressed syllable (e.g., *assimi**lá**tion, pre**lí**minary* and *pon**tóon***). Given the fact that in many languages a higher-level prosodic phrase (e.g., an accentual phrase or an intonational phrase) can include only one word, one must also consider the effects of phrase-level prominence on words uttered in isolation, where word-level stress and phrase-level prominence may be confounded (see Gordon 2014). For example, prominent syllables at the edges of words may be perceived as stressed on the initial or final syllable, which may instead be associated with phrase-level

prominence (accentual phrase tones and boundary tones). I discuss this matter in further detail in the next section.

4.2.2 Word-level stress vs. phrase-level pitch accents

Intonation refers to the fundamental frequency patterns, as well as non-tonal effects such as voice quality, and duration, associated with prosodic units larger than the word that may serve a wide range of functions, including the encoding of distinctions between statements and questions, highlighting novel or relevant information, signaling syntactic boundaries, among others (Gordon 2016: 243). In this dissertation, I adopt the following definition of intonational pitch accents following Bolinger (1982) (cited in van der Hulst (2011:7)):

(3) Intonational events that associate with *phrasal* accents (usually called phrasal stresses) are called *pitch-accents*.

In most stress languages, pitch accents are "assigned in bottom-up fashion by promoting one of the primary word-level stresses to pitch accent status" (Gordon 2014:3). He also provides the following definitional characteristics of intonational pitch accents:

(4) Definitional characteristics of intonational pitch accents (Gordon 2014:3)

a. Intonational pitch accents involve utterance or phrase-level prominence (vs. word-level prominence).

b. Pitch accents can be broadly defined as a tonal prominence that is distinct from tones associated with the boundaries of intonational constituents.
c. Pitch accents characteristically impart semantic information such as focus or other pragmatic content that the speaker wishes to convey. A syllable that carries stress at the word level thus may be promoted to pitch accent status by virtue of being in a certain position in a phrase or being associated with special semantic or pragmatic focus.
d. Pitch accents are definitionally associated with certain pitch properties phonetically, whereas stress does not need to be (i.e., it can be cued by increases in duration or intensity).

A major confound in prior studies on word prosody is analyzing stress in words occurring in a focal position of an utterance, a position that was later shown to conflate word-level stress with phrase-level prominence (Gordon 2014). Another potential confound is that most studies on stress patterns have been based on words uttered in isolation. In languages such as TMD Cahuilla, where an intonational phrase may be equivalent to a single phonological word, this may also cause a conflation between word-level stress and phrase-level prominence. Given these facts, any adequate description of the stress patterns of TMD Cahuilla must consider the factors just mentioned in order to avoid conflating phrase-level prominence with word-level stress.

4.3 Previous descriptions and analyses of stress in Cahuilla

In this section, I discuss previous descriptions and analyses with respect to the stress system of Cahuilla, which has been cited frequently in the typological and theoretical literature given it's cross-linguistically unusual properties. The first comprehensive description and analysis of the

Cahuilla stress system was developed by German linguist Hansjakob Seiler (Seiler 1957, 1965, 1967, 1977). Although most of the literature on Cahuilla prosody cites Seiler's description, impressionistic judgments of a basic hierarchical word-prosodic structure can be found in earlier documentation. For example, in some of the earliest transcriptions of Cahuilla (e.g., Corbusier 1927; Davis 1917; Gatschet 1875a, 1875b; Henshaw 1893; Hewitt 1906; Powers 1875; Whipple 1893) recorders consistently marked the most prominent syllable in each word (i.e., primary stress) with an acute accent symbol (´).

Evidence for such perceived judgements on stress can be found in the fieldnotes of famed American ethnographer and linguist J.P. Harrington, who worked extensively with Mountain Cahuilla speaker Adan (Adam) Castillo between 1911-1952 (Mills and Brickfield 1986), compiling thousands of pages of transcribed materials. In his fieldnotes, Harrington consistently draws an acute accent symbol over the vowel of the most prominent syllable in each word. Harrington's convention for transcribing primary stress is illustrated in his transcription of [ˈsuʔwɛt] 'star' shown in Figure 36 below.

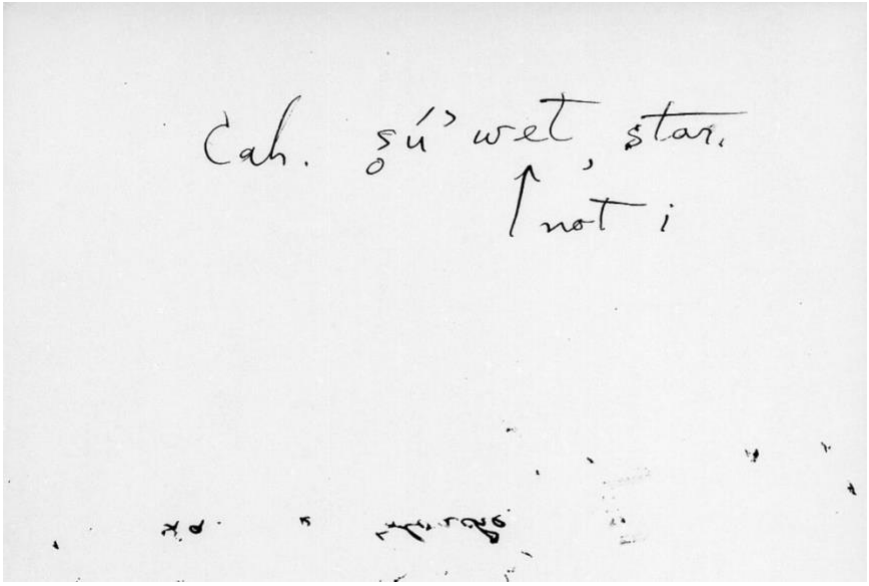
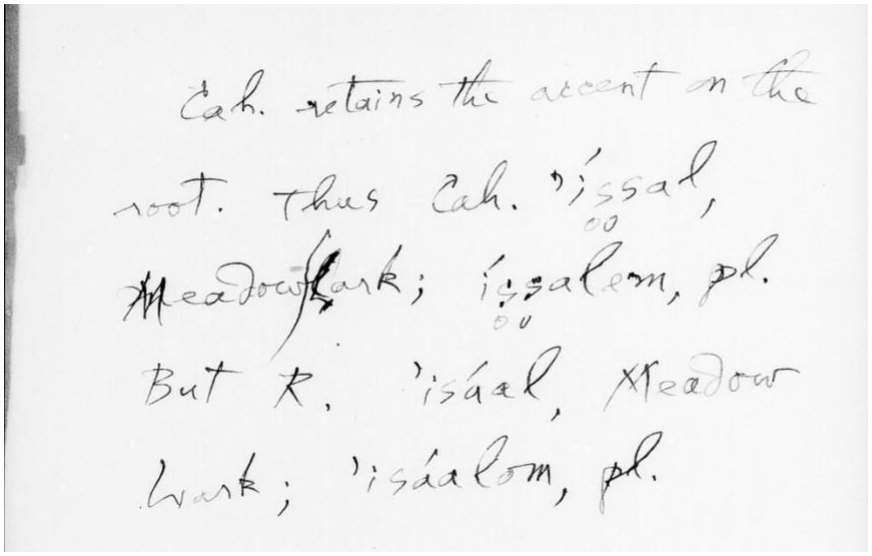


Figure 32. Transcription of primary stress in [ˈsuʔwɛt] ‘star’ (JPH[FN]: r109_0146)

Harrington also explicitly discusses stress in his field notes (which he terms “accent,” or “*accento*” (sic) in Spanish), where he distinguishes only between stress and lack of stress (i.e., primary stressed and unstressed syllables). Regarding stress, he notes: “Cahuilla, like Spanish, has two accents: prominent and not prominent” (JPH[FN]: r109_0020). Harrington also noted that primary stress in Cahuilla is fixed or “retained on the root,” in contrast with Luiseño, where the placement of stress is more variable.[25] In Figure (37), Harrington shows an example of this contrast using [ˈʔisal] ‘meadowlark,’ where primary stress is both root and stem initial in Cahuilla, as opposed to the Luiseño cognate, in which has stress falls on the second syllable of the stem.



[25] The placement of primary stress in Luiseño varies according to the following rules, as stated by Munro (1990:224): (1) if there is a long vowel in either the first or second syllable, stress it; (2) if not, stress the second syllable in nouns, or stress the first syllable in verbs.

Figure 33. Transcription of stress in Cahuilla and Luiseño cognates (JPH^{FN}: r109_0020).

Following Harrington's research, the stress system of Cahuilla was described in greater detail by German linguist Hansjakob Seiler (1957, 1965, 1967, 1977), who noted a pattern of alternating secondary stress, both preceding and following the main primary stress. Given the typological and theoretical implications of Seiler's research, Cahuilla has been cited extensively in the typological and theoretical literature on prosody (Levin 1988, Hayes 1995; see also Blevins (2004), Gordon (2007, 2016), Ryan (2019), *inter alia*).

Based on Seiler's data and original description, the Cahuilla stress system has been analyzed as combining weight-sensitive, bidirectional secondary stress assignment with fixed (directionally-determined), weight-insensitive primary stress assignment. This analysis was first proposed Levin (1988) and further articulated in a featured case study in *Metrical Stress Theory* by Hayes (1995). A summary of some basic properties of Hayes' analysis of the system are listed in (5):

(5) Stress assignment in Cahuilla (Hayes 1995:132-134)

a. Primary stress is assigned to the first syllable or left edge of the "stem" domain (the domain encompassing both the root and suffixes).
b. Secondary stress is assigned in the stem domain by building moraic trochees from left to right. Degenerate feet are not allowed except in strong positions (e.g., stressed syllables).
c. Secondary stress is assigned to prefixes by building moraic trochees from right to left. Degenerate feet are not allowed except in strong positions (e.g., stressed syllables).

d. Syllables with long vowels or diphthongs (CVV) and those closed by a glottal stop (CVʔ) or a geminate consonant (CVG) (where G = the first half of a geminate or a geminate coda) are counted as heavy. All other CVC syllables are light, with no mora being assigned to the postvocalic consonant.

e. If a stem contains a heavy syllable, secondary stress is assigned to the syllable immediately following the heavy syllable, and the alternating count resumes.

In his analysis, feet in Cahuilla are parsed into moraic trochees: a foot can consist of two light or monomoraic syllables or a single heavy or bimoraic one, with stress assigned to the leftmost element of the foot.

(6)

FOOT	(x .)	(x)
SYLLABLE	σ σ | |	σ /\
MORA	(μ μ)	(μ μ)

In the case of stems containing all light, monomoraic syllables, each syllable is associated with a single mora in a one-to-one mapping and secondary stress is assigned from left to right to every odd mora/syllable in the stem, using the primary stress as a starting point. This pattern is illustrated in (7) where every odd syllable is stressed and every even syllable is unstressed. (These examples are provided by Hayes and reflect Seiler's original stress transcriptions as indicated in the citation information for each form).

(7) All light syllables (Hayes 1995:133):

a.	*bisyllabic*	(ˈtu.ʔat)	'flour'	(HS 1977:33)
b.	*trisyllabic*	(ˈtax.mu)(ˌʔat)	'song'	(HS 1965:57)

c. *quadrisyllabic* (ˈta.ka)(ˌli.tʃ͡em) ‘one-eyed ones’ (HS 1977:27)

In stems containing heavy syllables, however, the alternating stress pattern described above is not followed due to the rule stated in (5e), in which an extra secondary stress is assigned to the syllable immediately following the heavy syllable. After the extra secondary stress is assigned, however, the alternating pattern resumes. Examples of this alternate pattern are shown in (8).

(8) Stress patterns of forms with mixed light and heavy syllables (Hayes 1995:133-135)

a.	(ˈsu)(ˌkaʔ)(ˌti)	‘the deer (ACC)’	(HS 1977:28)
b.	(ˈtax.mu)(ˌʔaʔ)(ˌti)	‘the song (ACC)’	(HS 1977:33)
c.	(ˈqaːn)(ˌki.tʃ͡em)	‘palo verde trees’	(HS 1977:27)
d.	(ˈhaʔ)(ˌtis.qal)	‘he is sneezing’	(HS 1965:52)

In the examples in (8), secondary stress is assigned to all syllables that come after a heavy syllable (a syllable with a glottal coda (8a-b) and (8d), or a long vowel (8c)). In (8a), a heavy syllable with secondary stress immediately follows an initial light syllable baring primary stress.[26] This contrasts with the alternating stress pattern shown in (7) where every other syllable is unstressed.

[26] In Hayes’ metrical analysis, Cahuilla exhibits a ban on weak degenerate feet, meaning that degenerate feet are allowed in primary stressed syllables (in strong position), but deleted in word-final, unstressed syllables (in weak positions). In (8a) (*ˈsu.ˌkaʔ.ˌti* 'the deer, accusative'), the primary stressed syllable is light, followed by a heavy syllable and another light syllable, resulting in two degenerate feet. Following this analysis, a degenerate foot may be built on the initial syllable but not on the final light syllable, e.g. (*ˈsu)(ˌkaʔ)ti*. If degenerate feet are banned in word-final position, the final syllable should be unstressed (this principle could be applied also to (7b) and (8b)).

In words containing prefixes (all of which involve light syllables), secondary stress is assigned to the syllables of all prefixes from right to left to every odd syllable building moraic trochees. Since this cycle of stress assignment also uses the primary stressed syllable as a starting point, prefix syllables at the prefix-stem boundary are always unstressed. This pattern is shown in (9a-c) below, where I follow Hayes' convention of using the (#) symbol to indicate the left edge of the stem or 'prefix-stem' boundary. Since Cahuilla does not have any prefixes that contain heavy syllables, the prefix domain exhibits only an alternating stress pattern. Thus, when a word has only a single prefix as in (9a) and (9b), that prefix is always unstressed (i.e., degenerate feet are not allowed in the prefix domain and thus remain unfooted).

(9) Stress patterns in words containing prefixes (Seiler 1979)

a.	pen#(ˈpe)(ˌni)(ˌtʃini)(ˌqa)	'I translate.'	(HS 1979:148)
b.	tax#(ˈki.ʎiw)(ˌka.tem)	'companions'	(HS 1979:79)
c.	(ˌpa.pen)#(ˈtu.le)(ˌqa.le)(ˌveh)	'where I was grinding it'	(HS 1965:52)

Given these facts, the stress system of Cahuilla, as described by Seiler, follows a rhythmic alternating pattern of secondary stress assignment, similar to that attested in several other related Uto-Aztecan languages such as Tohono O'odham (Yu 2000; Fitzgerald 2012); Southern Paiute (Sapir 1930); and Tubatalabal (Voegelin 1935), but which involves "a mixed system with alternation based partly on the mora, partly on the syllable" (Seiler 1977:29). What makes Cahuilla's putative stress pattern remarkable typologically, however, is that it requires bidirectional assignment of secondary stress, which must be applied in cycles, as discussed

Hayes departs from Seiler's proposal that final light syllables bear stress in these cases, instead attributing their perceptual prominence to phonetic final lengthening (Hayes 1995:137).

above. In addition, glottal stop codas, but no other coda consonants, add moraic weight to syllables, a phenomenon also not present in other Uto-Aztecan languages and not common cross-linguistically. These two features combine to create a unique stress pattern that diverges from other closely related languages.

Although Seiler did not conduct an instrumental analysis of stress, he did describe certain phonological and phonetic criteria that he used to diagnose for the presence or absence of stress. In terms of phonological criterion, Seiler describes patterns of vowel allophony as a way to diagnose presence of stress in the language. Specifically, Seiler notes that high vowels (/i/, /u/) may be closed, half-open, or open, and that these patterns are determined by stress on the one hand, and the quality of the onset consonant of syllables on the other: if the onset of a primary stressed syllable is a coronal consonant, the vowel will be closed; if the onset is a non-coronal consonant, it will be open. Examples of these patterns from Seiler (1977) are provided in (10).

(10) Variation in vowel quality of stressed high vowels (HS 1977:29-32)

Vowel	Coronal onset	Non-Coronal onset
/i/	*pesisiqal*	*kikitam*
	/pe-sisi-qal/ → [pɪˈ**si**sɪqal]	/ki~kit-am/ → [ˈ**kɪ**kitam]
	3SG-urinate-DUR.SG	RED-child-PL
	‘He urinates.’	‘children’
/u/	*tutumish*	*nekukukpqal*
	/tutumi-ʃ/ → [ˈ**tu**tʊmiʃ]	/ne-ku~kup-qal/ → [neˈ**kʊ**kupqal]
	stink.bug-ABS	1SG-RED-sleep-DUR.SG
	‘stink bug’	‘I am sleepy.’

As these examples show, when a word has more than one high vowel, primary and secondary stress can be diagnosed by the alternating pattern of vowel quality, which is determined by the place of articulation for the onset of the primary stressed syllable. With regard to the mid vowel, Seiler (1977:31) provides only a single example, noting that the behavior [ɛ] is "not exactly parallel to (to high vowels) and is altogether not too clear," with only some examples conforming to the patterns shown in (10). His description of the low vowel is also unclear since he notes that [a] is fronted in words with only one instance, yet does not reveal if stress is a factor in those cases. In words with more than one instance of [a], however, he notes that the mid and back allophones are conditioned by alternation between stressed and unstressed syllables: back [ɒ] occurs in stressed syllables, and mid [a] in unstressed syllables. Finally, Seiler notes that all word-final vowels in open syllables are open (i.e., are (mid-) centralized) if the word is not monosyllabic. Interestingly, the opposite patterns are attested in TMD Cahuilla with respect to both the high vowel pattern described above, as well as the quality of word-final vowels. Stress patterns conditioning vowel allophony are discussed further in §4.4.2 below.

In terms of its phonetic exponents, Seiler identifies loudness and pitch patterns in polysyllabic words as acoustic cues for stress in Cahuilla (Seiler 1965:52). Specifically, when discussing primary and secondary stress Seiler (1977:26) notes:

> "primary stress is distinguished from unstressed by loudness and by elevation of pitch at about a fifth..." and "secondary stress carries less volume than primary, and the pitch is elevated at about a third above the unstressed level."

Seiler's characterization is thus consistent with cross-linguistic studies on stress that identify that stress is generally encoded through f0 and intensity (corresponding to Seiler's characterization of pitch and loudness patterns, respectively), as well as vowel duration (Gordon and Roettger 2017:4).

Finally, one source of discrepancy between Seiler and Hayes in terms of the description and analysis of Cahuilla stress is the prosodic status of final light syllables: while Seiler transcribes stress in these syllables in certain contexts, Hayes posits these syllables are in fact unstressed and not part of a prosodic foot, despite their perceptual prominence. Hayes argues that this perceptual prominence can be attributed to phonetic final lengthening rather than metrical prominence (Hayes 1995:137). As discussed in the following sections, it is possible that this final lengthening is also attested in TMD Cahuilla.

4.4 A phonological characterization of stress in TMD Cahuilla

In the previous section, I addressed phonological criteria that are cited in the typological and theoretical literature as diagnostics of stress. In this section, I present data from my own language work conducted on the TMD Cahuilla dialect that provides phonological evidence of word level (primary) stress in this language variety. All examples provided in this section will include a code outside the citation parentheses, following the speaker initials, to clarify whether particular examples were obtained through elicitation (forms in isolation), or were extracted from conversations or texts.[27] The citation codes for these will be EL = elicitation (form in isolation),

[27] One issue with regard to Seiler's data is that, for many of the examples he provides, there is often no citation of who the speaker is, what dialect they spoke, and in what context the example was taken from (i.e., elicitation of single words in isolation, words from texts or conversation, etc.). Since at least some of Seiler's examples may have

CO = conversation, and TX = text. A preliminary qualitative assessment reveals that there are no detectable effect tied to the phrasal position. In an instrumental analysis of the acoustic correlates of stress, such factors would normally be accounted for.

As discussed in §4.2 above, languages with word-level stress are those that meet the two essential criteria of obligatoriness and culminativity. This is borne out in TMD Cahuilla: all lexical words have at least one and only one syllable bearing the highest degree of metrical prominence (i.e., no content words lack this prominence), thereby satisfying the criteria of obligatoriness and culminativity. The domain of stress in TMD Cahuilla is thus the phonological word, which contrasts from grammatical words which crucially lack stress. In addition to being the domain of word-level stress, phonological words in TMD are independently diagnosed by being minimally CVC (see also Seiler (1957, 1965, 1977) and Hayes (1995)) (for further discussion on the phonological/prosodic words in TMD Cahuilla, see Chapter 5 (§5.2).

4.4.1 Stress distribution

In terms of its distribution, primary stress in TMD Cahuilla is assigned to the first syllable of the morphological root, regardless of the prosodic size of the word, or the presence or number of prefixes, as shown in (11).

(11) Primary stress distribution

a. *iva'*

been taken from conversations or text, it is unclear if the words he used in his examples occurred in different positions within phrases or whether an example of a morphologically complex word would constitute an utterance on its own. Given the possible confounds between word-level prosody and intonation, it remains uncertain whether this could have affected the perception of prominence and vowel quality in at least some of his examples.

ˈʔiva-ʔ

run-IMP

‘Run!’ CM.EL(CM_VERBS1.WAV)

b. *pe’ivaqal*

pɛ-0-ˈʔivɐ-qɐɬ[28]

3SG-3SG-run-DUR.SG

‘s/he’s running.’ CM.EL(CM_VERBS1.WAV)

c. *pem’ivakatem*

pɛ-m-ˈʔivɐ-kɐ-t-ɛm

3SG-3PL-run-IF-ABS-PL

‘They’re going to run.’ CM.EL(CM_VERBS1.WAV)

d. *hichiqale*

0-ˈhitʃɪ-qɐl-ɛ

3SG-go-DUR.SG-PRET

‘He was going.’ CM.TX(TMDC0030.WAV)

e. *hemhichiwen*

hɛm-ˈhitʃi-wɛn

3PL-go-DUR.PL

‘They went.’ CM.TX(TMDC0030.WAV)

[28] Certain Cahuilla intransitive verbs such as ‘run’ take a dummy third-person object prefix (pɛ-) (lit. ‘X runs it’) even though there is no syntactic argument for it to agree with, as shown in (11b) and (11c). This dummy prefix is required as evidenced by the ungrammatical forms *0-ˈʔiva-qaɬ (3SG-RUN-DUR.SG) ‘s/he is running’ and *hɛm-ˈʔiva-ka-t-ɛm (3PL-GO-IF-ABS-PL) ‘they are going to run.’

As shown in (11), primary stress always aligns with root-initial syllable (i.e., the left edge of the stem) in the various inflected forms of /ˈʔiva-ʔ/ ‘run’ and /hitʃi/ ‘go.’ regardless of the presence/number of prefixes. Additional examples of stress patterns in words of different prosodic sizes are shown in (12):

(12) Word-level prominence in TMD words of varying prosodic size

	Disyllabic			
a.	*suplyi’*	/ˈsupʌiʔ/	one	‘one’ CM.EL(TMDC0028.WAV)
b.	*awal*	/ˈʔawa-l/	dog-ABS	‘dog’ CM.EL(TMDC0028.WAV)
c.	*ku’al*	/ˈkuʔa-l/	worm-ABS	‘worm’ CM.EL(TMDC0028.WAV)
d.	*pepi*	/ˈpɛpi/	far	‘far’ CM.EL(TMDC0028.WAV)
	Trisyllabic			
e.	*wel’isew*	/ˈwɛlʔisɛw/	husband	‘husband’ CM.EL(TMDC0028.WAV)
f.	*kuyival*	/ˈkuji-va-l/	dig-LOC-ABS	‘grave’ CM.TX(TMDC0006.WAV)
g.	*amnawet*	/ˈʔamna-wɛt/	great-AUG	‘large, big’ CM.EL(TMDC0028.WAV)
h.	*peteewqal*	/pɛ-0-ˈtɛːw-qal/	3SG-3SG-see-DUR.SG	‘he sees it.’ CM.TX(TMDC0016.WAV)
	Tetrasyllabic			
i.	*chemhawaway*	/tʃɛm-ˈhawawa-i/	1PL-language-ACC	‘our language (obj.)’ CM.TX(TMDC0025.WAV)
j.	*taxteewpulu*	/tax-0-ˈtɛːw-pulu/	REFL-3SG-see-POSS`	‘he can see himself.’ CM.EL(TMDC0029.WAV)

These examples further demonstrate that primary stress is predictable on morphological grounds rather than on phonological ones: stress may be assigned on root-initial syllables with a long vowel (12h) and (12j) or root-initial short vowel syllables (12a-g). In addition, syllables with diphthongs are also attested in unstressed, final syllables, as shown in (12d) and (12i) (in

contrast, languages with quantity-sensitive stress may make distinctions between open syllables and other types of syllables, including syllables with diphthongs).

Thus, primary stress in TMD, as described for other Cahuilla varieties, is fixed, since its location is predictable, as well as morphological, since stress serves to elucidate the morphological structure of a word (vs. systems where stress is assigned solely in terms of phonological factors) (see also Hayes (1995:31-32) for discussion of this distinction).

4.4.2 Unstressed vowel reduction and deletion

As discussed in §4.2.1 above, stressed and unstressed vowels may exhibit qualitative differences cross-linguistically. This is borne out in TMD Cahuilla, where patterns of vocalic reduction are an important diagnostic of stress in the language. As described in §2.5, TMD Cahuilla contrasts four vowel qualities in the native lexicon ([i, ɛ, u, a]) in stressed syllables. These contrasts are attested in stressed syllables, but vowel quality contrasts are often neutralized in unstressed syllables. Specifically, the vowel quality of stressed vowels is typically more peripheral than that of unstressed syllables, which tend to be more centralized. There are three patterns of vowel reduction in TMD Cahuilla, which are summarized in (13).

(13) Unstressed vowel reduction/centralization patterns in TMD Cahuilla

a. In pre-tonic position, unstressed vowels are often reduced iff they occur in an open syllable, otherwise they are not reduced.

b. In post-tonic position, unstressed vowels are systematically reduced in word-medial positions.

c. In word-final position, unstressed vowels are unreduced in open syllables.

The alternation between the quality of vowels in stressed versus unstressed syllables are shown for each of the four TMD Cahuilla phonemic vowels in the examples in (14).

(14) Stress-based vowel reduction

	Stressed		*Unstressed*	
a.	*puli*	b.	*hepuchily*	/u/
	[ˈ**pu**.li]		[ˈhɛ.**pʊ**.t͡ʃɪʎ]	
	/ˈpuli/		/ˈhɛput͡ʃ-l/	
	fall.IMP		3SG-eye-ABS	
	‘fall!’		‘seed’	
	CM.EL(TMDC0016.WAV)		CM.EL(TMDC0028.WAV)	
c.	*chempishwen*	d.	*memyawpishweneve*	/i/
	[tʃɛm.ˈ**piʃ**.wɛn]		[mɛm.ˈjaw.**pɪʃ**.wɛ.nʌ.vɛ]	
	/tʃɛm-ˈpiʃ-wɛn/		/mɛm-ˈjawpiʃ-wɛn-ɛvɛ/	
	1PL-arrive-DUR.PL		3PL-3PL-bring-DUR.PL-REAL.SUB	
	‘We are arriving’		‘They would bring them.’	
	CM.EL(TMDC0029.WAV)		CM.EL(TMDC0029.WAV)	
e.	*pishpmalisval*	f.	*hemtaxmawen*	/a/
	[pɪʃ.ˈ**ma**.lɪs.vɐ]		[hɛm.ˈtax.**mɐ**.wɛn]	
	/piʃ-ˈmalis-val/		/hɛm-ˈtaxma-wɛn/	
	with-play-INS		3PL-sing-DUR.PL	
	‘plaything (toy)’		‘They were singing’	
	CM.TX(TMDC0003.WAV)		CM.EL(TMDC0006.WAV)	
g.	*lepeqi*	h.	*nelelepeqiqal*	/ɛ/
	[ˈ**lɛ**.pʌ.qi]		[nʌ.ˈlɛ.**lʌ**.pɛ.qɪ.qɐ]	
	/ˈlɛpɛqi/		/nɛ-ˈlɛ~lɛpɛqi-qal/	

kneel.IMP	1SG-RED~kneel-DUR.SG
'kneel!'	'I'm kneeling repeatedly'
CM.EL(TMDC0024.WAV)	CM.EL(TMDC0024.WAV)

As these examples demonstrate, the surface quality of unstressed vowels in TMD Cahuilla is more centralized than their stressed counterparts, which is interpreted here to be a result of stress-determined vowel reduction. This process depends on several factors (stated in (13) above). As shown in (14b) and (14e-h), immediately post-tonic, non-final vowels are systematically reduced, while unstressed vowels in other positions may be unreduced, especially those in word-final open syllables (14a), (14d), and (14g). Of all the vowels, [ɛ] is the most unpredictable, but is usually reduced in open syllables in pretonic (14h) and posttonic positions (14d) and (14g-h). The tendency for vowels to resist reduction in unstressed word-final syllables may be attributed to a process of final phonetic lengthening, as proposed to be attested in Cahuilla (Hayes 1995). I return to this issue in §5.5.

The stress-dependent vowel allophony patterns attested in TMD Cahuilla contrast with earlier descriptions by Seiler (discussed in §4.3 above), who proposed a pattern of allophonic variation in which vowel quality is determined partly on the presence/absence of stress (both primary and secondary), and partly on the quality of the onset consonant in the case of stressed syllables. In TMD Cahuilla, however, vowels are peripheral in stressed syllables and centralized in unstressed syllables (i.e., in post-tonic syllables), regardless of the place or manner of articulation of the onset. For example, in the word for 'children' /ˈkikitam/, which Seiler cites as having an open vowel [ɪ] in the stressed syllable, followed by a closed vowel [i] in the post-tonic syllable, we find the opposite pattern in TMD Cahuilla. This is shown in (15):

(15) *kikitem*

/ˈkikitɛm/ → [ˈ**ki**kɪtɛm]

‘children’ CM.TX(TMDC0003.WAV)

Looking at primary stressed syllables with coronal versus non-coronal onsets in TMD Cahuilla, we can see that the onset type does not condition the quality of the vowel that surfaces, as shown in (16).

(16) Invariance in vowel quality under primary stress

		Vowel Coronal onset	Non-Coronal onset
a.	/i/	*nichily*	*wikikmal*
		/ˈnitʃ-il/ → [ˈ**ni**tʃɪʎ]	/ˈwikikma-l/ → [ˈ**wi**kɪkmɐ̞ɭ]
		woman-ABS	bird-ABS
		‘woman’ CM.EL(TMDC0028.WAV)	‘bird’ CM.EL(TMDC0028.WAV)
b.	/u/	*supul*	*kukupqal*
		/ˈsupul/ → [ˈ**su**pʊɭ]	/0-ˈku~kup-qal/ → [ˈ**ku**kʊpqɐ̞ɭ]
		‘another’ CM.EL(TMDC0028.WAV)	3SG-RED~sleep-DUR.SG
			‘He is sleepy.’ CM.EL(TMDC0021.WAV)
c.	/e/	*hemseselnik*	*pelyen*
		/hɛm-ˈsɛ~sɛlni-k/ → [hɛmˈ**sɛ**sɛlnɪk]	/ˈpɛʎɛn/ → [ˈ**pɛ**ʎɛn]
		3PL-RED~red-ADJ	‘slowly’ CM.TX(TMDC0016.WAV)
		‘They are red.’CM.EL(TMDC0019.WAV)	
d.	/a/	*tapamal*	*penkakvalanqal*
		/ˈtapa-mal/ → [ˈ**ta**pɐ̞mɐ̞ɭ]	/pɛ-nˈka~kval-an-qaɭ/ → [pɛnˈ**ka**kvɐ̞lɐ̞nqɐ̞ɭ]
		pot-DIM	3SG-1SG-RED~hole-CAUS-DUR.SG

‘pot’	‘I made many holes.’
CM.EL(TMDC0019.WAV)	CM.EL(TMDC0008.WAV)

As seen in these examples, stressed vowels are peripheral and unstressed vowels are centralized in TMD Cahuilla, regardless of whether the onset of that syllable is coronal or non-coronal, in contrast to Seiler’s description. These generalizations also hold regardless of phrasal position, as shown in the example sentences in (17).

(17) Invariance in vowel quality under primary stress

a. *penteewqale suplyi hichite iswet hichite meedis pish kulat*

[pɛnˈtɛːwqɐ̞ɭɛ ˈsupʎi ˈhitʃitɛ ˈʔiswɛt ˈhitʃitɛ ˈ**mɛːðɛs pɪʃ** ˈ**kulɐ̞t**]

/pɛ-n-ˈtɛːw-qal-ɛ ˈsupʎi ˈhitʃitɛ ˈʔiswɛt ˈhitʃitɛ ˈmɛːðɛs piʃ-ˈkul-at/

3SG-1SG-see-DUR.SG-PRET one DM wolf DM socks with-made

‘I saw a wolf made out of socks’ CM.TX(TMDC0003.WAV)

b. *pe’ meedis pish kulat iswet ne’ penkusqale*

[ˈpɛʔ ˈ**mɛ**ːð**ɛs pɪʃ** ˈ**kulɐ̞t** ˈʔiswɛt ˈnɛʔ pɛnˈkusqɐ̞ɭɛ]

/ˈpɛʔ ˈmɛːðɛs piʃ-ˈkulat ˈʔiswɛt ˈnɛʔ pɛ-n-ˈkus-qal-ɛ/

3SG socks with-made wolf 1SG 3SG-1SG-take-DUR.SG-PRET

‘That wolf made out of socks; I took it’ CM.TX(TMDC0003.WAV)

4.4.3. Static phonotactic constraints

Evidence for word-level stress in TMD Cahuilla can also be found in static phonotactic patterns in the language: contrastive vowel length only surfaces in stressed syllables, a generalization also documented in closely related Cupeño [Cupan; Uto-Aztecan] (Hill 2005:19). An inventory of nouns and verbs containing long vowels is shown below in (18).

(18) Phonological distribution of long vowels in stressed syllables

	Verbs	Nouns
a.	*penkiinqal*	*nesaanatki*
	/pɛ-0-ˈkiːn-qal/	/nɛ-ˈsaːnat-ki/
	3SG-3SG-follow-DUR.SG	1SG-gum-POSS
	‘He was following him.’	‘my chewing gum’
	CM.TX(TMDC0016.WAV)	CM.EL(TMDC0002.WAV)
b.	*pehaalqal*	*yuulki*
	/pɛ-ˈhaːl-qal/	/0-ˈyuː-ʎ-ki/
	3SG-search-DUR.SG	3SG-y.brother-ABS-POSS
	‘He was searching for him.’	‘his/her younger brother’
	CM.TX(TMDC0016.WAV)	CM.EL(TMDC0003.WAV)
c.	*penteew’i*	*chemeteewwenetem*
	/pɛ-n-ˈtɛːw-ʔi/	/tʃɛm-ɛ-ˈtɛːw-wɛn-ɛt-ɛm/
	3SG-1SG-see-PRET	1PL-3PL-see-STAT-NOM-PL
	‘I saw it.’	‘our supervisors’
	CM.EL(TMDC0001.WAV)	CM.TX(TMDC0031.WAV)
d.	*neheenyuqal*	
	/nɛ-ˈhɛːɲu-qal/	
	1SG-be.angry-DUR.SG	
	‘I am fighting.’ CM.EL(TMDC0002.WAV)	

As the examples in (18) show, long vowels always occur in the root-initial stressed syllable regardless of whether it is an open or closed syllable (e.g., *nɛ. ˈ**hɛːˌɲu.qal*** ‘I am fighting’ (18d) and *pɛ. ˈ**haːl.qal*** ‘he was searching for him' (18b)).

The examples in (18) involve forms in isolation obtained through elicitation, but long vowels in stressed position are also attested in texts, where they may be found in phrase-initial (19a), and phrase-medial positions (19b). As shown in (19), the stress patterns of these complex words remain unchanged across phrasal contexts.

(19) Phonological distribution of long vowels in stressed syllables

a. *peteewqale tavut kupqaleve temash petuk*

[**pʌˈtɛːwqɐlɛ**	ˈtavʊt	ˈkupqalɛvɛ	ˈtɛmɐʃ	ˈpɛtʊk]
/pɛ-ˈtɛːw-qal-ɛ	ˈtavu-t	0-ˈkup-qal-ɛvɛ	ˈtɛma-ʃ	ˈpɛtuk/
3SG-see-DUR.SG-PRET	rabbit-ABS	3SG-sleep-DUR.SG-PRET	ground-ABS	under

‘He saw rabbit while he was sleeping in the bushes’ CM.TX(TMDC0016.WAV)

b. *pe’ isily peteewqale pen haa yaxale*

[ˈpɛʔ	ˈʔisɪʎ	**pʌˈtɛːwqɐlɛ**	pɛn	ˈhaː	ˈjaxɐlɛ]
/ˈpɛʔ	ˈʔisi-l	pɛ-ˈtɛːw-qal-ɛ	pɛn	ˈhaː	0-ˈjax-al-ɛ/
3SG	coyote-ABS	3SG-see-DUR.SG-PRET	and	okay	3SG-say-DUR.SG-PRET

‘That coyote looked at him (rabbit) and said okay’ CM.TX(TMDC0016.WAV)

Spanish loanwords in TMD Cahuilla also have a long vowel in the primary stressed syllable of the word, which is the same as the location of stress in the originally source Spanish word. This pattern is exceptionless, regardless of the location of the stressed syllable in the word, and whether or not the adapted loanword has undergone additional segmental adaptation processes (such as glottal stop epenthesis word-initially in (20k) or deletion of root-intial vowel

as in (20i) and (20j)[29]). A list of Spanish loanwords is shown in (20) (stressed syllables in source words are shown in bold and underlined).

(20) Distribution of vowel length in Spanish loanwords

		Cahuilla	*English*	*Spanish*	
a.	*ventaana*	vɛnˈtaːna	‘window’	ven**ta**na	CM.EL(TMD_NEOLOGISMS.WAV)
b.	*tumaati*	tuˈmaːti	‘tomatoes’	to**ma**te	CM.EL(TMD_NEOLOGISMS.WAV)
c.	*meedes*	ˈmɛːðɪs	‘socks’	**me**dias	CM.EL(TMDC0003.WAV)
d.	*liivru*	ˈliːvɾu	‘book’	**li**bro	CM.EL(TMD_NEOLOGISMS.WAV)
e.	*haspitaal*	haspiˈtaːl	‘hospital’	hospi**tal**	CM.EL(TMD_NEOLOGISMS.WAV)
f.	*seteen*	sɛˈtɛːn	‘frying pan’	sar**tén**	CM.EL(TMD_NEOLOGISMS.WAV)
g.	*taxeer*	taˈxɛːɾ	‘scissors’	ti**je**ras	CM.EL(TMD_NEOLOGISMS.WAV)
h.	*skuuva*	ˈskuːva	‘broom’	es**co**ba	CM.EL(TMD_NEOLOGISMS.WAV)
i.	*speexa*	ˈspɛːxa	‘mirror’	es**pe**jo	CM.EL(TMD_NEOLOGISMS.WAV)
j.	*saavna*	ˈsaːvna	‘sheets’	**sá**bana	CM.EL(TMD_NEOLOGISMS.WAV)
k.	*amiiwoki*	ʔaˈmiːwoki	‘friend’	a**mi**go	CM.EL(TMDC0003.WAV)
l.	*lameesa*	laˈmɛːsa	‘table’	la **me**sa	CM.EL(TMD_NEOLOGISMS.WAV)

As the examples in (20) show, primary stressed syllables in TMD Cahuilla loanwords contain a long vowel. The restriction of vowel length contrasts to stressed syllables in both native vocabulary and loanwords is taken here as a diagnostic of stress.

[29] Deletion of root-initial vowel in (20i) and (20j) results in a complex onset. Although such onsets are not allowed in the native grammar, this rule does not appear to apply to loanwords.

4.4.4 Stress-sensitive morphophonological processes in TMD

As discussed above, vowel quality differences and static phonotactic patterns involving vowel length are diagnostic for stress in TMD. In addition, there are morphophonological processes that are sensitive to the location of the stressed syllable in this language. I address these next.

4.4.4.1 Vowel lengthening as morphological intensification

The first process involves vowel lengthening in a process of intensification, primarily found in adjectives. Vowel lengthening encoding intensification targets the stem-initial, stressed syllable. Examples of intensified forms, along with their non-derived base forms are shown in (21) below.

(21) Vowel lengthening as morphological intensification

	Base		*Intensified forms*		
a.	/ˈpɛʌɛn/	‘slow’	[ˈpɛːʌɛn]	‘real slow’	CM.EL(TMDC0016.WAV)
b.	/ˈwavuwɛt/	‘long, tall’	[ˈwaːvuwɛt]	‘real long, tall’	CM.EL(TMDC0030.WAV)
c.	/ˈʔiɲiʃil/	‘small’	[ˈʔiːɲɪʃɪʌ]	‘real small’	CM.EL(TMDC0031.WAV)
d.	/ˈmɛtɛtʃɛm/	‘a bunch’	[ˈmɛːtɛtʃɛm]	‘a whole bunch’	CM.TX(TMDC0003.WAV)
e.	/ˈpalawɛn/	‘pretty’	[hɛmˈpaːlɐwɛn]	‘real pretty (pl.)’	CM.EL(TMDC0006.WAV)
f.	/ˈtʃɛxiwɛn/	‘clear’	[ˈtʃɛːxiwɛn]	‘real clear’	CM.EL(TMDC0021.WAV)
g.	/ˈwɛlnɛt/	‘mean	[ˈwɛːɭnɛt]	‘real mean	CM.EL(TMDC0021.WAV)
h.	/ˈsɛlnɛk/	‘red’	[ˈsɛːɭnɛk]	‘real red’	CM.EL(TMDC0021.WAV)
i.	/ˈtulnɛk/	‘black’	[ˈtuːɭnɛk]	‘real black’	CM.EL(TMDC0022.WAV)
j.	/ˈʔamnawɛt/	‘big’	[ˈʔaːmnɐwɛt]	‘real big’	CM.EL(TMDC0021.WAV)
k.	/ˈjawiʃ/	‘skinny’	[ˈjaːwɪʃ]	‘real skinny’	CM.EL(TMDC0021.WAV)
l.	/ˈjujma/	‘cold’	[ˈjuːjmɐ]	‘real cold’	CM.EL(TMDC0021.WAV)
m.	/ˈsiwma/	‘hot’	[ˈsɪːwmɐ]	‘real hot’	CM.EL(TMDC0021.WAV)
n.	/ˈriko/	‘rich’	[ˈriːko]	‘really rich’	CM.EL(TMDC0021.WAV)
o.	/ˈkukupqal/	‘sleepy’	[ˈkuːkʊpqɐ[]	‘really sleepy’	CM.EL(TMDC0021.WAV)
p.	/ˈtulakam/	‘early’	[ˈtuːlɐkam]	‘really early’	CM.TX(TMDC0003.WAV)

q. /ˈʔika/ ‘over there’ [ˈʔiːkɐ] ‘way over there’ CM.EL(TMDC0016.WAV)

Although in most of the examples in (21) the left edge of the stem and word are coextensive, (21e) shows that in prefixed stems, vowel lengthening targets the stressed stem syllable. Vowel lengthening can occur in open CV syllables (21a-f), (21k), (21n-q) and closed CVC stressed syllables (21g-j), (21l-m), as well as words where the initial stressed syllable is closed in a glottal (CVʔ). This is evidenced by an alternate form of (2c) ([ˈʔiːʔɲiʃiʎ] ‘real small’ CM(TMDC0021.WAV)), which is also attested in the TMD Cahuilla corpus.

4.4.4.2 Vowel lengthening and reduplication

Vowel lengthening is also attested in distributive verb forms, either as a concomitant phonological effect of reduplication, or as an allomorph of the distributive construction. In stems that encode distributivity through both prefixation and vowel lengthening, lengthening targets the stem-initial stressed syllable (in this case a reduplicant CV prefix), as shown in (22a) and (22c). The stem-initial stressed syllable is also targeted in verb stems that encode distributivity through vowel lengthening only, as shown in (23a) below. For comparison, verb stems both with and without reduplication and lengthening are shown in (22).

(22) Reduplicated distributive verb forms with morphologically conditioned vowel lengthening

a. *chemkusmeemtiwen*
[tʃɛmkuʃˈ**mɛ**ː~mtiwɛn]
/tʃɛm-kuʃ-ˈmɛ~mɛti-wɛn/[30]
1PL-throat-RED~close-DUR.PL
'We are choking (each person is choking).' CM.EL(TMDC0029.WAV)

b. *kusmetiqal*
[kuʃˈmɛtɪqɐ̯]
/0-kuʃ-ˈmɛti-qal/
3SG-throat-close-DUR.SG
'He is choking.' CM.EL(TMDC0029.WAV)

c. *chempaapaxwene*
[tʃɛmˈ**pa**ː~paxwɛnɛ]
/tʃɛm-ˈpa~pax-wɛn-ɛ/
1PL-RED~enter-DUR.PL-PRET
'We were entering (in different places).' CM.EL(TMDC0017.WAV)

d. *henpaxik*
[hɛnˈpaxɪk]
/hɛn-ˈpax-ik/
1SG-enter-IF.SG
'I am going to enter.' CM.EL(TMDC0017.WAV)

[30] This verb has a compound stem composed of a noun kus- (c.f. kuspi 'throat') and verb -mɛt (c.f. temi 'close' with metathesis). Another stem -kuʃ-tɛmi- has been documented with a slight difference in meaning. Compound stems in Cahuilla show variable stress patterns, with stress sometimes falling on the second member of the compound (for a further discussion of stress patterns in compound verbs see Seiler (1977:41-42)).

As shown in (22a) ad (22c) the reduplicative prefix is lengthened, rather than the root-initial syllable, since it receives the primary stress. Reduplicant morphemes are the only prefixes allowed in the stem domain, thus it is assumed that primary stress simply targets the left-edge of the stem. In (22a) there is also syncope of the root-initial vowel, which is blocked in (22c) due to a phonotactic ban on complex syllable margins (see Chapter 6 for further discussion on morphophonological processes associated with reduplication). To show that the roots themselves do not have a long vowel underlyingly, I also provide non-distributive forms of the same roots in (22b) and (22d).

In addition to verbs of this type, there are other verbs that encode distributivity through stem-initial vowel lengthening only. Such verbs use lengthening as an exponent of the distributive morpheme in lieu of a reduplicative prefix, contrasting with the examples in (22) above, where prefixation and vowel lengthening occur concomitantly in distributive forms. Distributive stems with morphological vowel lengthening are shown below in (23).

(23) Distributive verb forms with morphological vowel lengthening

a. *chemtaachakunem*
[tʃɛmˈ**ta**ːtʃɐkʊnɛm]
/tʃɛm-ˈtatʃa-kaw-nɛm/
1PL-lie.down-DISTR.MOT-FUT
‘We will lie down (in different places)’[31] CM.EL(TMDC0018.WAV)

[31] In this form, the distributive morpheme /-kaw-/ [kʊ] appears to be a truncated form of the distributive morpheme /-ikaw-/, which encodes a meaning of an action being ‘in various places’ (Hill & Hill 2019:829).

b. *netachanem*

[nʌˈtatʃɐnɛm]

/nɛ-ˈtatʃa-nɛm/

1SG-lie.down-FUT

'I am going to lie down' CM.EL(TMDC0017.WAV)

As the examples in (23a) shows, the stem-initial stressed syllable is targeted for lengthening. This long vowel is not underlyingly part of the stem, since it does not occur in the non-distributive form (23 b). Although vowel lengthening like the type shown in distributive forms above is not phonologically predictable, it can be used to diagnose stress since it targets the primary stressed syllable. These forms thus present additional evidence of another morphophonological processes that may be used to diagnose for the presence/absences of stress.

4.5 Summary

In this section, I have argued that TMD Cahuilla can be characterized as having a word-level metrical structure where lexical prominence is both obligatory and culminative, thus meeting the definitional criteria of a 'stress' (or 'stress-accent') language. Vowel quality differences and static phonotactic patterns provide diagnostics for stress in the language. In addition, there are morphophonological processes that refer to the primary stressed syllable in this language. The characterization offered here of primary stress assignment matches previous descriptions of Cahuilla as having weight-insensitive primary stress assigned in the first syllable of the stem, a domain that includes the morphological root and suffixes, and that may include reduplicative prefixes. I have also shown differences in terms of the stress-based vowel reduction processes previously documented for Cahuilla where vowel reduction is predicted by both stress and the place of articulation (coronal vs. non-coronal) of the syllable onset. Instead, in TMD Cahuilla

patterns of vowel reduction vary by vowel and are determined by a combination of the presence/absence of stress, position in the word, and syllable type (open or closed), with stress being the most reliable predictor. Although these factors can predict vowel reduction in most cases, a primary stressed vowel may sometimes surface as the reduced or centralized allophone, particularly with the front high unrounded vowel [i], such as in the phrase [ˈʔɪŋɪʃ ˈʔajɐxwɛn] meaning 'some' or 'a little bit' (TMDC0028.WAV). Such examples show that vowel reduction can optionally occur in the primary stressed position.

Crucially, stress-based vowel reduction patterns have been claimed to diagnose rhythmic secondary stress in previously described varieties of Cahuilla. In the next section, I discuss whether there is any phonological evidence (and associated phonetic exponents) to posit secondary stress in TMD Cahuilla.

4.6 Comparison of stress patterns: TMD Cahuilla vs. Seiler's archival recordings

While an instrumental examination of archival audio recordings of Cahuilla has yet to be undertaken, in this section, I illustrate the acoustic profile of several words elicited in isolation taken from Seiler's audio collection housed at the California Language Archive (CLA) and compare these to the acoustic profile of cognate forms attested in the TMD Cahuilla corpus. These recordings are part of a bundle labeled "secondary stress" (LA77.096.001.wav) and all forms illustrated below are posited by Seiler to exhibit an alternating secondary stress pattern. In (24) below, I provide a re-transcription in IPA of two examples from Seiler's unpublished fieldnotes. In the first column, I provide the underlying representation with interlinear glosses, followed by Seiler's original transcription (shown in angled brackets) in the second column, and in the third column an IPA transcription of the audio from (LA77.096.001.wav).

(24)		**UR (IPA)**	**Seiler's transcription**	**IPA transcription**
	a.	*hichiqale*		
		/0-hitʃi-qal-ɛ/	<ˈhitʃeqaʔle>	[ˈhitʃɪˌqaʔlɛ]
		3SG-go-DUR.SG-PRET	(hi.tʃe)(qaʔ)(le)	
		'S/he went.'		
		CD(HS^{FN}SKONICA-MIN150:57PDF)		
	b.	*kinanga'*		
		/0-ˈkinaŋa-ʔ/	<ˈkinaŋeʔah>	(i.) [ˈkinɐŋɪʔah]
		3SG-wife-POSS	(ki.na)(ŋe.ʔa)	(ii.) [ˈkinɐŋɐʔa̰]
		'his wife'		
		CD(HS^{FN}SKONICA-MIN150:57PDF)		

In these examples, I show first the underlying representations for the two words with a morpheme-by-morpheme gloss first. In the second column, I show Seiler's (as written in his fieldnotes) converted to IPA. Below his transcriptions, I show the metrical structure based on previous analyses by Seiler (1977) and Hayes (1995). In his fieldnotes, Seiler only transcribes primary stress in his transcriptions for the two forms, as shown (24a) and (24b). In the third and final column I shown my own phonemic transcription, based upon listening to the original archival audio recordings. In (24b), Seiler's language expert Mrs. Chona Dominguez repeats several versions of the word for *wife*. Thus, I include one that corresponds to his transcription from the fieldnotes (24b-i) and a second (24b-ii), which I use to compare to the TMD Cahuilla recordings, since it more closely matches the word as produced by my language expert Mrs. Christina Dominguez Morreo.

In the spectrogram images shown in Figures 38-41 below, I contrast the two words from (24) against the cognate forms taken from the TMD Cahuilla corpus. In both the Seiler data and

the TMD Cahuilla recordings, the words are uttered in isolation. As mentioned in §4.3, Seiler describes that two prominent indicators of stress are loudness and elevation of pitch (corresponding to intensity and f0, respectively, as phonetic exponents). Thus, in the spectrogram images below, both the f0 pitch track (in blue), as well as the intensity contour (in yellow), are shown for both the Seiler and TMD Cahuilla audio samples.

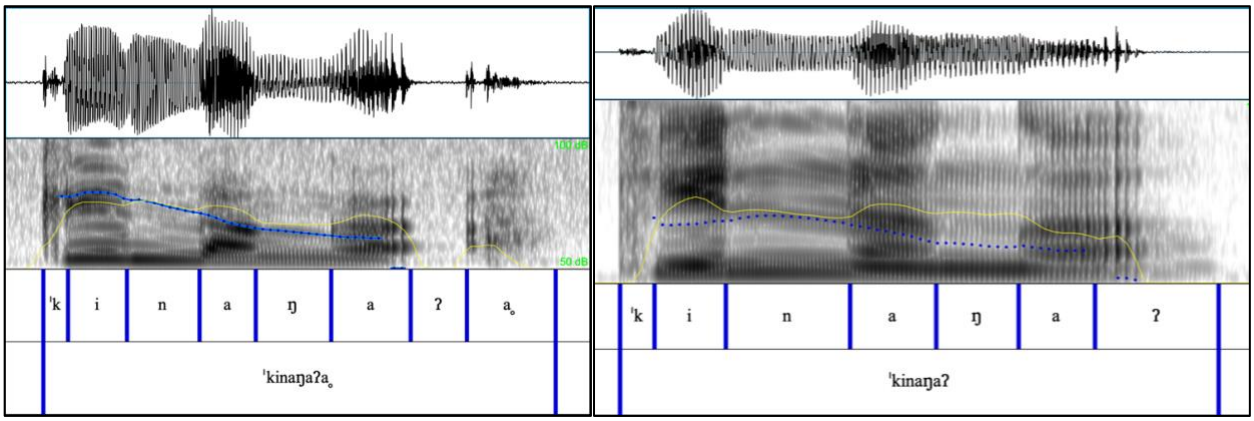


Figure 34. Spectrograms of [ˈkinɐŋaʔa̤] ‘wife’: Seiler CD(LA77.096.001.wav) (left) and TMD Cahuilla CM(TMDC0028.WAV) (right)

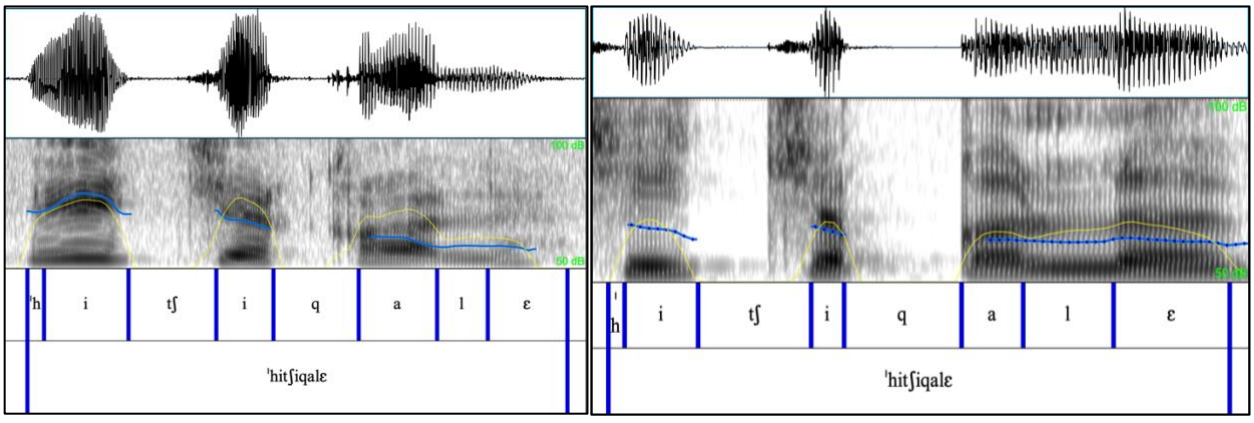


Figure 35. Spectrograms of [ˈhitʃɪqalɛ] ‘s/he went’: Seiler CD(LA77.096.001.wav) (left) and TMD Cahuilla CM(TMDC0030.WAV) (right)

In comparing the spectrograms of the two sources, we can see that there are similarities but also some notable differences. First, with respect to f0 contours, the maximal f0 peak is attested in the first syllable, predicted to have primary stress in all cases; this pitch peak is followed by a gradual fall toward the vowel of the final syllable. The f0 contour for /ˈkinaŋaʔ/ 'wife' in both Figures 38 and 39, as well as for /ˈhitʃiqalɛ/ 's/he went,' shown in the Seiler data in Figure 40, also shows a pattern of descending pitch. However, in the corresponding TMD Cahuilla example for 's/he went' shown in Figure 41, the f0 trajectory involves a steady-state as peak f0 levels are nearly the same across all four syllables.

Second, with respect to intensity, there are successive intensity peaks that align with the vocalic segment of each syllable in Seiler's data shown in Figures 38 and 40, starting high and progressively declining; a similar pattern is observed in TMD Cahuilla in Figure 39.[32] In Figure 41, on the other hand, we can see that the intensity contour of the TMD Cahuilla form closely matches the relatively steady contour of the f0 with the peaks across all vowels reaching nearly the same level.

Finally, with respect to vowel duration, a notable pattern is that the primary stressed syllable is longer than the immediately post-tonic syllable in both the Seiler data and the TMD Cahuilla data, though it should be noted that the examples shown here may exhibit a confound by the effects of potential phrase-final lengthening, as well as intrinsic vowel duration. The forms in Figures 40 and 41, however, are predicted to have a rhythmic pattern in Seiler's analysis, e.g., (ˈhitʃi)(ˌqalɛ). Seiler's example in Figure 40 appears to show a pattern consistent with two levels of stress, since the post-tonic syllable is significantly shorter than the primary stressed syllable, and the penultimate syllable is both longer than the post-tonic syllable but

[32] Lower intensity is attested in the final creaky vowel in Figure 39.

shorter than the primary stressed syllable. In contrast, in the TMD Cahuilla example in Figure 41, the final vowel exhibits a significant vowel duration, but no alternating pattern is observed with respect to this parameter.

An in-depth and careful study of the phonological properties and acoustic correlates of stress, which is out of the scope of this dissertation, is thus warranted in order to investigate what are the properties of stress in the speech of the TMD Cahuilla L1 speakers, as well as the speech of the language experts recorded by Seiler earlier in the 20th century.

4.7 TMD Cahuilla intonation

In the previous sections I discussed the suprasegmental phonology or prosodic patterns of TMD Cahuilla with respect to word-level prominence. In this section, I discuss other prosodic patterns having to do with phrasal prominence. I do so by presenting a description of the intonation system of Cahuilla, based on a novel study by Huaute (2022). In this section I seek to address the following main goals:

a. To present a description of phrase-level pitch events in simple declarative and polar interrogative sentences.
b. To discuss how this novel study can be used to create pedagogical materials for second-language learners of TMD Cahuilla.

While previous work on Cahuilla provides extensive description and analysis of its stress system (as discussed in §4.3 above), minimal attention has been given to the prosodic structure of the language at the phrase-level. Seiler (1977:25-26) briefly discusses the intonational patterns of interrogatives, where he analyzes word-final prominence as word-level stress, rather than

phrase-level intonation. The intonation patterns of interrogatives are also briefly discussed in Sauvel & Munro (1981:21). However, to date, no detailed descriptions of Cahuilla intonation have been undertaken. Furthermore, given that most of Seiler's examples are of single words uttered in isolation, word-level stress and phrase-level prominence may have been conflated. The study described here, therefore, represents the first preliminary phonological description of the intonational patterns of TMD Cahuilla.

This section provides a preliminary analysis of the intonational patterns and phrasal domains in simple declaratives in TMD Cahuilla, based on the analysis of controlled elicited data. I also address some preliminary interrogative intonation data from the TMD Cahuilla documentary corpus.

4.7.1 TMD Cahuilla declarative intonation

In this section, I provide an autosegmental-metrical (AM) analysis of the intonational patterns in simple declaratives in TMD Cahuilla. The AM theory seeks to provide a phonological account of intonational phenomena using instrumentally measured acoustic data (Liberman 1975, Bruce 1977, Pierrehumbert 1980). Specifically, it has the phonological goal of describing intonational contours in terms of a string of "categorically distinct elements," and the phonetic goal of "mapping phonological elements to continuous acoustic parameters" (Ladd 2008:43). Thus, this approach seeks to describe intonational contours in terms of a string of underlying phonological targets, rather than merely a phonetic description of movements or perturbations in f0.

In this framework, sequences of level tonal targets (T) (either high (H) or low (L)) on an autosegmental tier yield intonational contours. The segments in between tonal events are otherwise unspecified and the transition between such events can be viewed as interpolation

between them. There are two kinds of tonal targets: (i) **pitch accents** (T*), or tones associating with stressed syllables usually marking focal information; and (ii) **boundary tones** (T%), or tones associating with the edges of phrasal constituents. As described in §4.2.2 above, pitch accent is an intonational feature in some languages associated with lexically prominent syllables, which should be distinguished from stress, which signals metrically strong syllables that have different phonetic cues. In this framework tonal sequences are licensed by different phonological domains which are structured within a prosodic hierarchy (Selkirk 1980, 1986; Nespor & Vogel 1986). Word order in TMD Cahuilla is flexible, but a canonical SOV word order can be identified, as described for other Cahuilla varieties and languages of the Cupan language family (Jacobs 1975, Seiler 1977). Examples of this canonical word order in TMD Cahuilla are provided in (25), with a clause headed by a transitive predicate with subject and object full NP arguments (25a) and a clause headed by an intransitive predicate with a full NP subject (25b):

(25) Canonical verb final word order in TMD Cahuilla

a. *ayamalyem ninilyem memhivinwen* SOV
[ˈʔaɪjɐmɐʌɛm ˈninɪʌɛm mɛmˈhivɪnwɛn]
/ˈʔaɪjamaʌ-ɛm ˈninil-ɛm mɛ-m-ˈhivin-wɛn/
racoon-PL banana-PL 3PL-3PL-take-DUR.PL
‘Raccoons are picking up bananas.’ CM(TMDC0033.WAV)

b. *hemmaylyam hemngaangwen* SV
[hɛˈmaɪʌɐm hɛmˈŋaːŋwɛn]
/hɛm-ˈmaɪʌa-m hɛm-ˈŋaːŋ-wɛn/
3PL-baby-PL 3PL-cry-DUR.SG
‘Their babies are crying.’ CM(TMDC0032.WAV)

While subjects generally precede objects, the opposite order is also attested, as shown below in (26).

(26) *ninilyemi ayamalyem memhivinwen* OSV

[ˈninɪʎɛmi ˈʔaɪjɐmɐʎɛm mɛmˈhivɪnwɛn]

/ˈninil-ɛm-i ˈʔaɪjamal-ɛm mɛ-m-ˈhivin-wɛn/

banana-PL-ACC racoon-PL 3PL-3PL-take-DUR.PL

'Raccoons are picking up bananas.' CM(TMDC0033.WAV)

In sentences with non-canonical word order such as (26) where the object precedes the verb, objects are usually marked with the accusative case suffix /-i/. When the object follows the verb (27b) or when it is in SOV word order (25a) however, it is usually not marked with the accusative suffix. Whether word ordering affects grouping of intonational constituents is not clear and is out of the scope of this dissertation. Further studies on Cahuilla intonation based on a larger data set are warranted to investigate this matter. To the best of my knowledge, these word order permutations do not convey differences in pragmatic meaning, though a careful examination of textual data may reveal patterns in terms of word order and information structure.

Subject and object arguments may also appear post-verbally, which Seiler (1977:228) describes as a pragmatically marked order that may be used to convey additional or explanatory information. The following examples show clauses with a post-verbal subject (27a) and a post-verbal object (27b) in TMD Cahuilla.

(27) a. *hemngaangwen hemmaylyam* VS

[hɛmˈŋaːŋwɛn hɛˈmaɪʎɐm]

/hɛm-ˈŋaːŋ-wɛn hɛm-ˈmaɪʎa-m/

3PL-cry-DUR.SG 3PL-baby-PL

'Their babies are crying.' CM(TMDC0032.WAV)

b. *ayamalyem memhivinwen ninilyem* SVO

[ˈʔaɪjɐmɐʎ-ɛm mɛmˈhivɪnwɛn ˈninɪʎɛm]

/ˈʔaɪjamal-ɛm mɛ-m-ˈhivin-wɛn ˈninil-ɛm/

racoon-PL 3PL-3PL-take-DUR.SG banana-PL

'Raccoons are picking up bananas.' CM(TMDC0033.WAV)

Both (27b) and (27a) were obtained through elicitation and deemed grammatical, but differences in meaning were not probed. I leave this question for future research. The declarative sentences examined in this study had canonical word order with intended broad focus, as well as the alternative possible orders attested in TMD Cahuilla.

4.7.1.1. Methods

All the data in the study came from Mrs. Christina Dominguez Morreo. A total of 24 sentences were elicited over several sessions. Following Jun and Fletcher (2014: 494-519), several factors were considered when designing the elicitation materials. To probe for possible ordering effects on the intonational patterns, word order was varied for each sentence such that they appeared in both the canonical SOV order, as well as alternate word orders where either the subject or object appeared post-verbally. However, manipulating the word order did not result in any observable changes to the phrasing or f0 contours, as both the verb and object maintained similar pitch contours but were simply switched around, as shown in Figures 42 and 43.

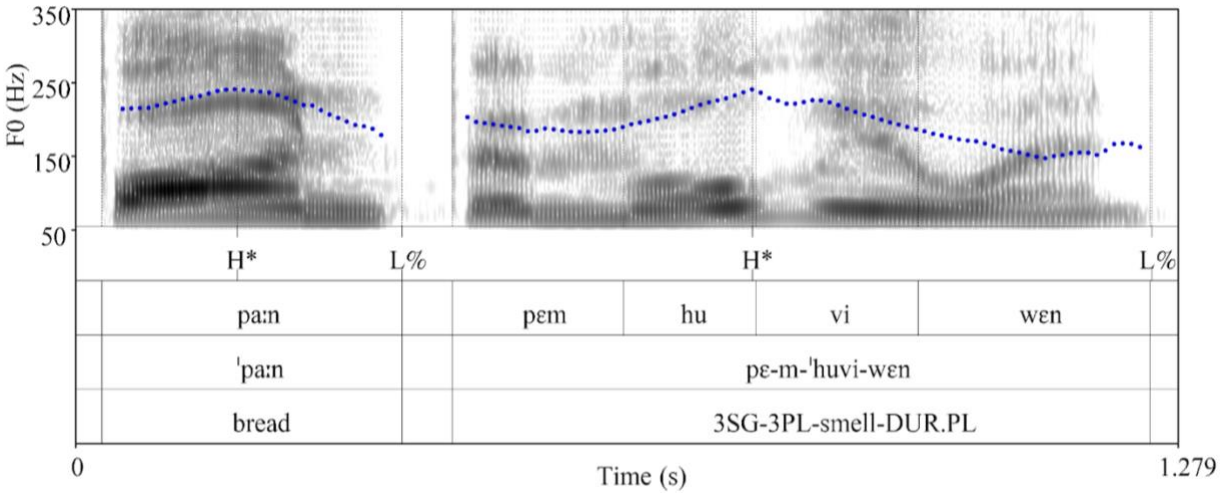


Figure 36. ˈpaːn pɛmˈhuviwɛn ‘They are eating bread (OV word order).’

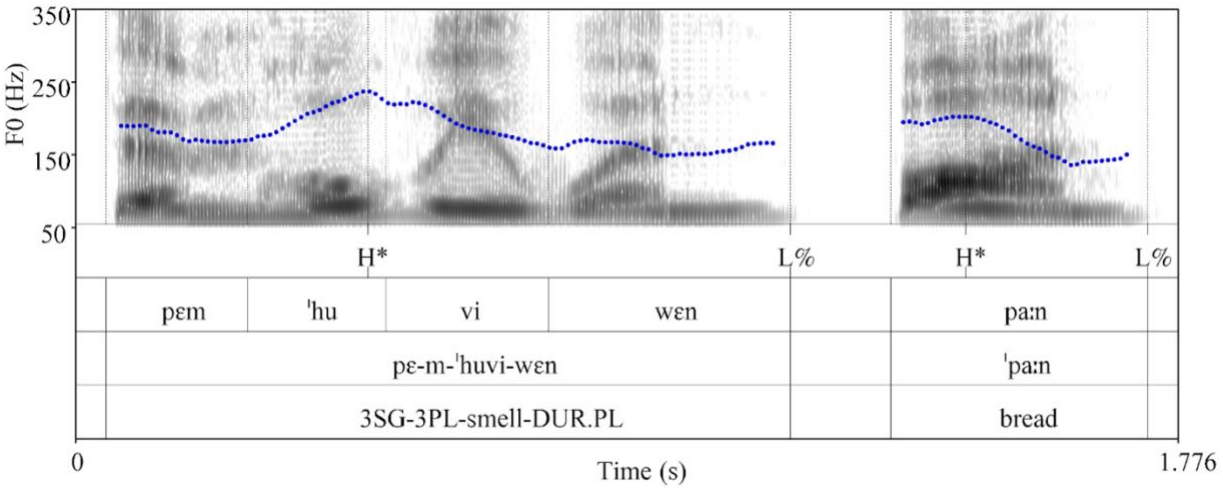


Figure 37. pɛmˈhuviwɛnˈpaːn ‘They are eating bread (VO word order).’

As shown in Figures 42 and 43 above, the VO and OV sentences are similar in terms of their intonational patterns. Both the VO and OV sentences are made up of two Intonational Phrases (IPs) (each IP contains a single word) that have a pitch accent H* that aligns with the

primary stressed syllable followed by a L% boundary tone.[33] This (high-low)-(high-low) pattern does not change when the word order is switched. Thus word order was not further considered a factor in this study.

Since Cahuilla has fixed primary stress that aligns to the left edge of the stem, words with a varying number of prefixes were selected in order to vary the position of stress across words. All elicited utterances contained words a maximum number of sonorant consonants to ensure a mostly continuous pitch contour. A sample of some of the sentences elicited is shown in Table 14.

[33] The sentences in Figures 42 and 43 also show a slight rise in f0 at the end of the utterance. Given that this slight perturbation in f0 occurs in other sentences phrase-finally, and that there is no other examples to contrast this melody, nor is a rise in pitch auditorily perceivable, I do not transcribe an additional H pitch target or bitonal boundary tone. Instead, I attribute such perturbations to microprosody, in the absence of evidence to the contrary. This convention is also consistent with keeping to strictly phonological transcriptions in AM, as suggested by Arvaniti (2011, 2016).

Table 14. Sample of elicited sentences

Word order	**Cahuilla**	**English**
SV	hɛm-ˈmaɪʎa-m hɛm-ˈŋaːŋ-wɛn 3PL-baby-PL 3PL-cry-DUR.PL	'Their babies are crying.
VS	hɛm-ˈŋaːŋ-wɛn hɛm-ˈmaɪʎa-m 3PL-cry- DUR.PL 3PL-baby-PL	'Their babies are crying.'
SOV	ˈʔaɪjamaʎ-ɛm ˈniniʎ-ɛm mɛ-m-ˈhivin-wɛn racoon-PL banana-PL 3PL-3PL-take-DUR.PL	'Raccoons are picking up bananas.'
OSV	ˈniniʎ-ɛm-i ˈʔaɪjamaʎ-ɛm mɛ-m-ˈhivin-wɛn banana-PL-ACC racoon-PL 3PL-3PL-take-DUR.PL	'Raccoons are picking up bananas.'
SVO	ˈʔaɪjamaʎ-ɛm mɛ-m-ˈhivin-wɛn ˈniniʎ-ɛm racoon-PL 3PL-3PL-take-DUR.PL banana-PL	'Raccoons are picking up bananas.'

4.7.1.2 Proposed intonational model and tonal inventory

Based on the evidence from the f0 contours, which I present below, I propose that TMD Cahuilla minimally has two distinct levels of prosodic constituency above the word: an intonational phrase (IP) and an accentual phrase (AP). The IP and AP are characterized by tone patterns derived from the following inventory of all posited intonational tones in TMD Cahuilla (provided in Table 15).

Table 15. Inventory of TMD Cahuilla intonational tones.

Pitch Accents	
H*	Nuclear pitch accent: docks to the primary stressed syllable of every accentual phrase.
Phrase Accent Tones	
La	Accentual phrase tone: aligns with the right edge of accentual phrases.
Boundary Tones	
L%	Low boundary tone: occurs at the end of declarative statements

The intonational model I propose is schematized in Figure 44 below taken from Huaute (2022).

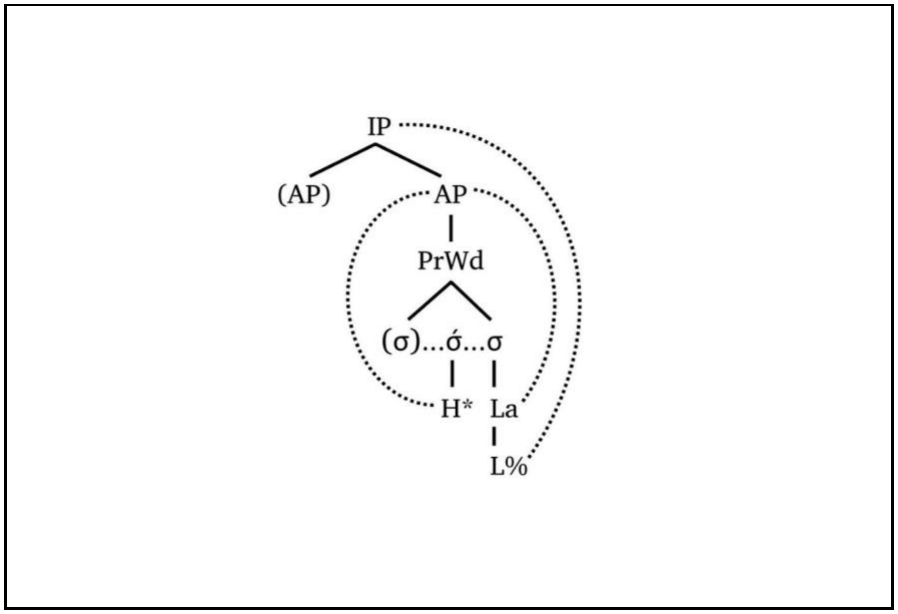


Figure 38. Proposed hierarchical intonational model for TMD Cahuilla. Tones associated with higher prosodic constituents overwrite tones associated with lower ones (i.e., L% > La).

As the hierarchical intonational model in Figure 44 shows, the IP is the largest intonational constituent, followed by the AP, and then the prosodic word (PrWd). An IP may consist of one or more APs but an AP cannot consist of multiple PrWds. The PrWd has at least one lexically-stressed syllable that is aligned with a H* pitch accent and an La edge tone that is aligned with the final syllable of the word. The dotted lines represent associations between tones and intonational levels. As noted in Figure 44, I assume that tones associated with higher prosodic constituents overwrite tones associated with lower ones (i.e., L% > La). In the following sections, I motivate these constituents and intonational tones.

4.7.1.3 The Accentual Phrase

The smallest intonational level in TMD Cahuilla is the AP, which is the domain of pitch accentuation. Every prosodic word forms an AP, which is characterized by the presence of a H* pitch accent that associates with the lexically stressed syllable (the first syllable of the stem, as described in (5) in §4.3 above), followed by a low-toned target at the right edge of the AP, which I transcribe as La. For single words uttered in isolation or with a significant pause in between words, it is assumed that the low-toned La target of the AP is either not realized phonetically or is overwritten due to overlap by the competing low tone of the L% boundary tone associated with the IP. Thus, in Figure 45 below, the low-toned AP edge tone is not transcribed in the predicate or noun belonging to the NP, since both are followed by significant pauses indicating an IP boundary. In contrast, the right edge of the independent pronoun /ˈpɛʔɛm/ ‘them’ is marked with an La, to illustrate that it is the first of two APs that form an IP comprised of the NP. I posit a low pitch target in these cases since there is a steep fall in f0 following the H* pitch accent,

which is inconsistent with a smaller dip in f0 that would normally be attributed to pitch sag between two H* pitch accent targets.

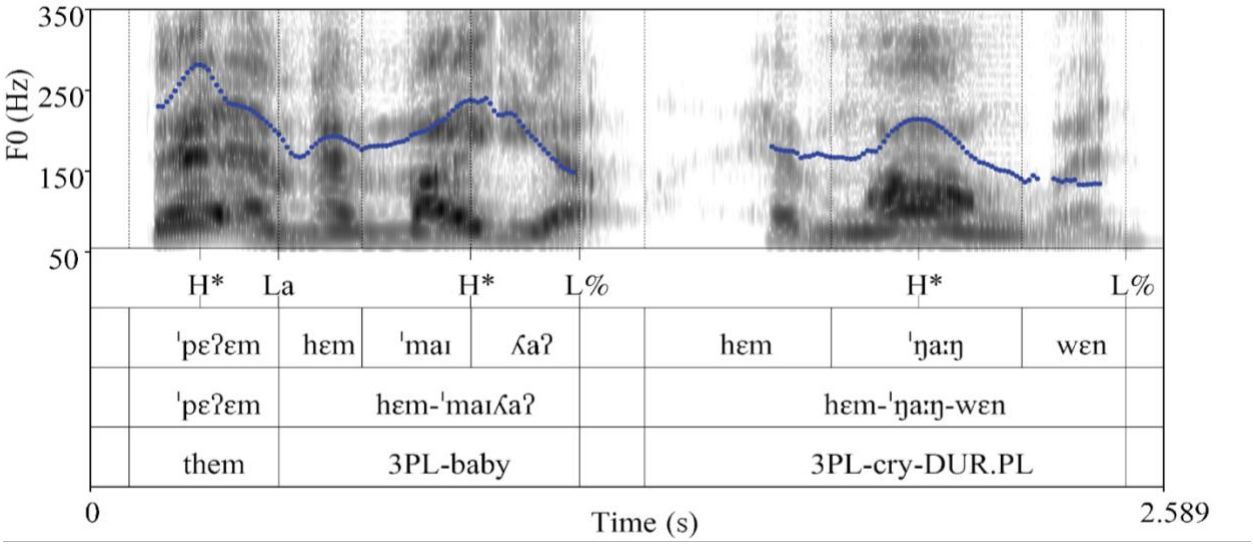


Figure 39. Pitch track for 'Them, their babies are crying.'

Furthermore, I post that this low pitch target is associated with an AP that is nested withing the larger IP. Thus, I transcribe the low tonal target as La rather than L%. The second rationale for transcribing the low tonal target as La is that boundary tones such as L% usually mark the edge of an IP and thus occur either at the end of an utterance or preceding a significant period of silence. In Figure 45, there is no pause or significant period of silence between the pronoun /ˈpɛʔɛm/ 'they' and the noun /hɛm-ˈmaɪʎaʔ/ 'their babies.' It should also be noted that in the sentence shown in Figure 45, as well as the other illustrations in this section, the first H* is much higher than the subsequent H* targets. This pattern can be attributed to declination or the tendency of f0 to decline gradually during the course of an utterance (Ladd 1984). In Figure 46

below we find a similar intonational pattern where an IP containing both the noun and the predicate show an La edge tone that marks the left edge of the AP /hɛmˈmaɪʎu-m/.

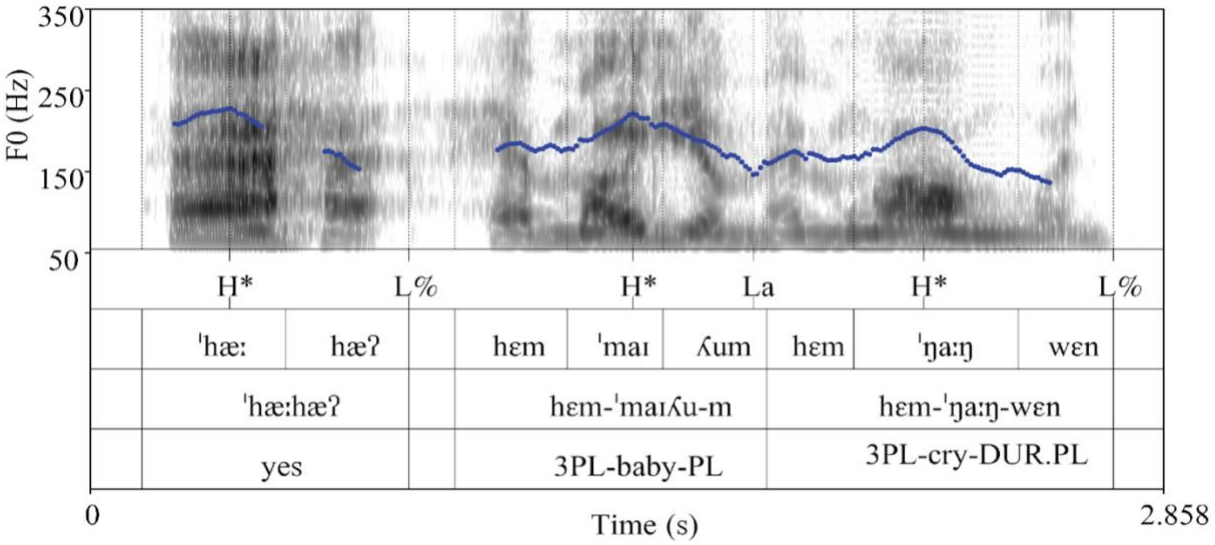


Figure 40. Pitch track for ‘Yes, their babies are crying.’

4.7.1.4 The Intonational Phrase

IPs in TMD Cahuilla declaratives are marked by a L% boundary tone on the final syllable, which is often also followed by a pause. An IP minimally has one AP, but may contain more than one, as shown in Figures 45 and 46 above. In Figure 47 below, the pitch track of a single prosodic word uttered in isolation is analyzed as being associated with both an AP, which contains a H* pitch accent, and an IP, which is marked by a L% boundary tone. As mentioned previously, since the La of the AP co-occurs with the competing low-toned boundary tone at the right edge of the word, it is not distinguishable in the f0 track.

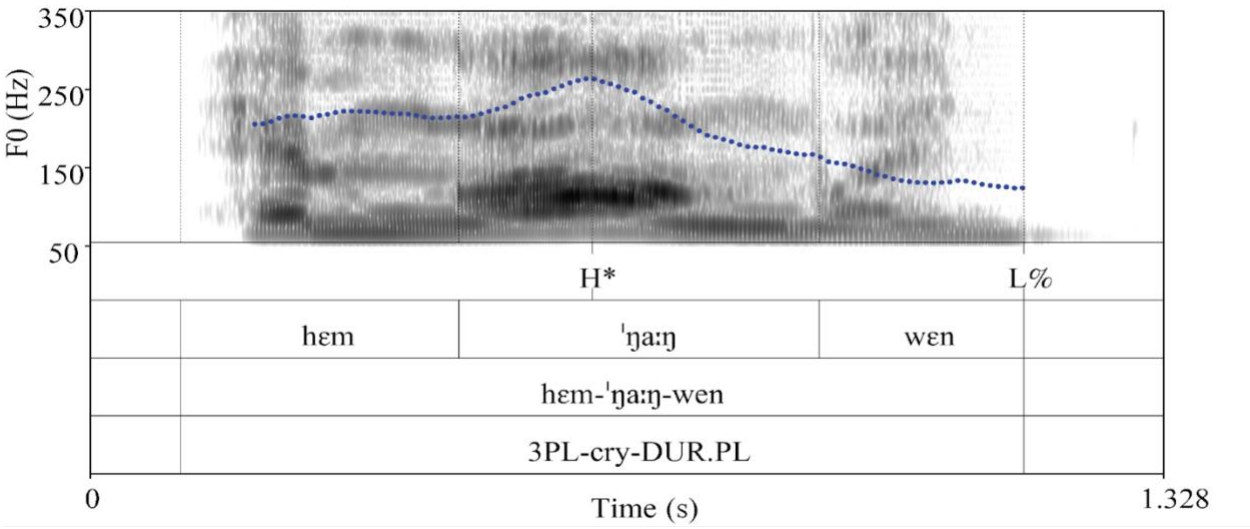


Figure 41. Pitch track for ‘They are crying.’

Although APs may be composed of a single content word, they can also be composed of a prosodic word consisting of a content word plus a function word, such as the negation particle [kɪʎ], as shown in Figure 48 below.

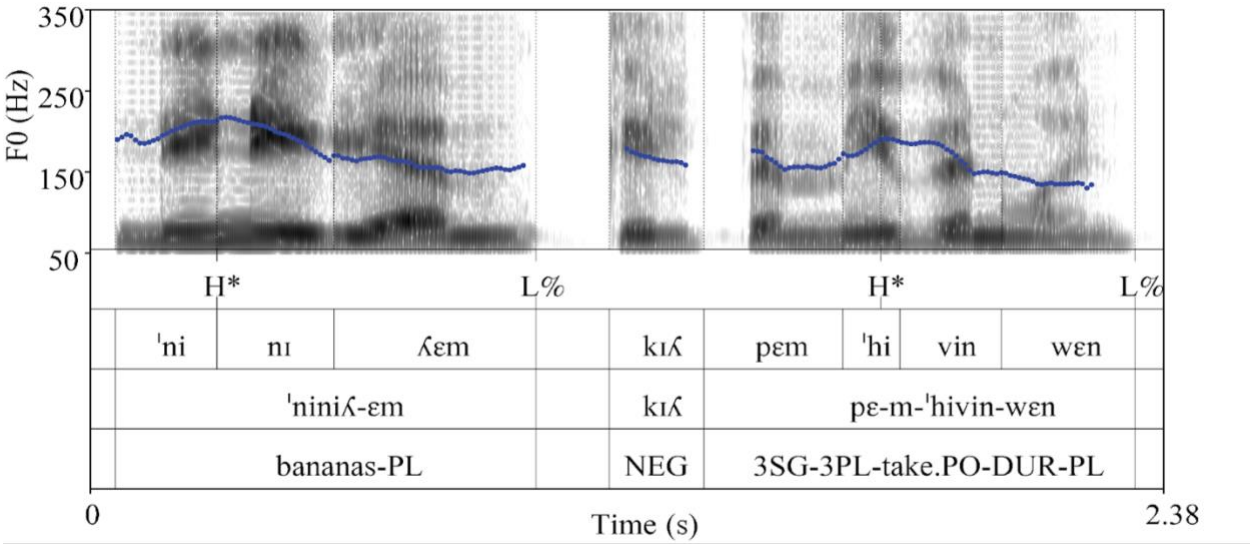


Figure 42. Pitch track for ‘They are not picking up bananas.’

In Figure 48, since the f0 remains low though the negation particle /kɪɬ/ and the prefix of the verb /pɛm-/, I argue that stressless monosyllabic function words do not appear to be eligible to receive a pitch accent, particularly in sentences with broad focus.

This study represents the first attempt to analyze the intonational patterns of any variety of Cahuilla, using novel acoustic data from contemporary speakers. Given the results of this study, more data is needed in order to resolve several pending questions. With respect to the AM analysis, the data presented here, which contains all La phrase accents, makes it difficult to show evidence of other intonational features, such as overwriting of AP edge tones by boundary tones or the possibility of another intonational layer, namely an intermediate phrase, between the AP and IP. Further investigation of the interaction between AP edge tones and IP boundary tones in future work may reveal whether they involve hierarchical tone deletion or tone displacement: analysis of other sentence types (besides declaratives) may reveal evidence for a larger tonal inventory that could include other edge tones, such as an Ha or H%, which would be necessary to determine, for example, if a (hypothetical) Ha is able to be overwritten by a L% boundary tone, or likewise if La can be overridden by a (hypothetical) H%. Crucially, this study provides a baseline with which to investigate the intonation patterns of non-declarative sentences in TMD Cahuilla. In the next section, I address preliminary data on the intonation of interrogative sentences.

4.7.2 Interrogative intonation

While a comprehensive study on the intonation of non-declarative sentences in TMD Cahuilla and other Cahuilla varieties has yet to be undertaken, in this section I address preliminary data that illustrate intonation patterns in polar interrogatives. Polar interrogatives in TMD Cahuilla

are morphosyntactically equivalent to declaratives. This is shown in the minimal-pair in (28) below.

(28) a. *ayamalyem paan pemhuviwen.* *Declarative*

ˈʔaɪjamaʎ-ɛm ˈpaːn pɛm-ˈhuvi-wɛn

raccon-PL bread 3PL-smell-DUR.PL

'The raccoons smell the bread. ' CM(TMDC0033.WAV)

b. *ayamalyem paan pemhuviwen?* *Interrogative*

ˈʔaɪjamaʎ-ɛm ˈpaːn pɛm-ˈhuvi-wɛn

raccon-PL bread 3PL-smell-DUR.PL

'Did the raccoons smell the bread?' CM(TMDC0033.WAV)

Declaratives and polar interrogatives are only distinguished from their declarative counterparts by their intonational patterns. This is shown in Figures 49 and 50, which illustrate the f0 patterns of the declarative in (28a) and its corresponding interrogative sentence (28b), respectively.

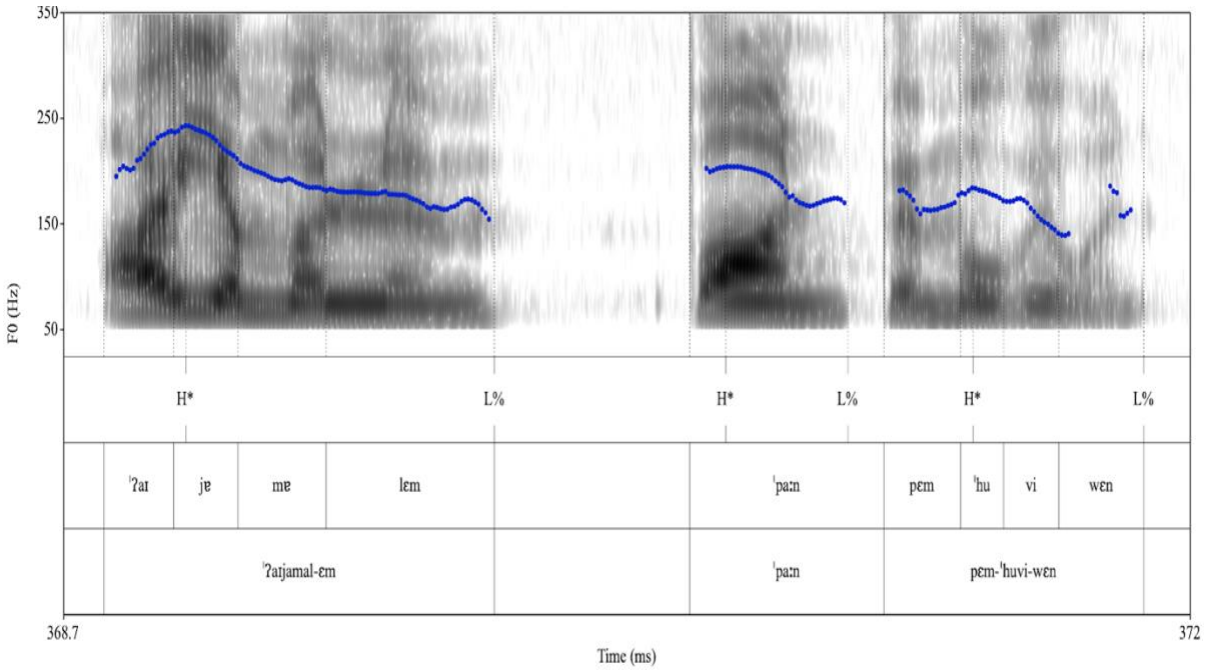


Figure 43. Pitch track for the declarative ‘The raccoons smell the bread’ (SOV)

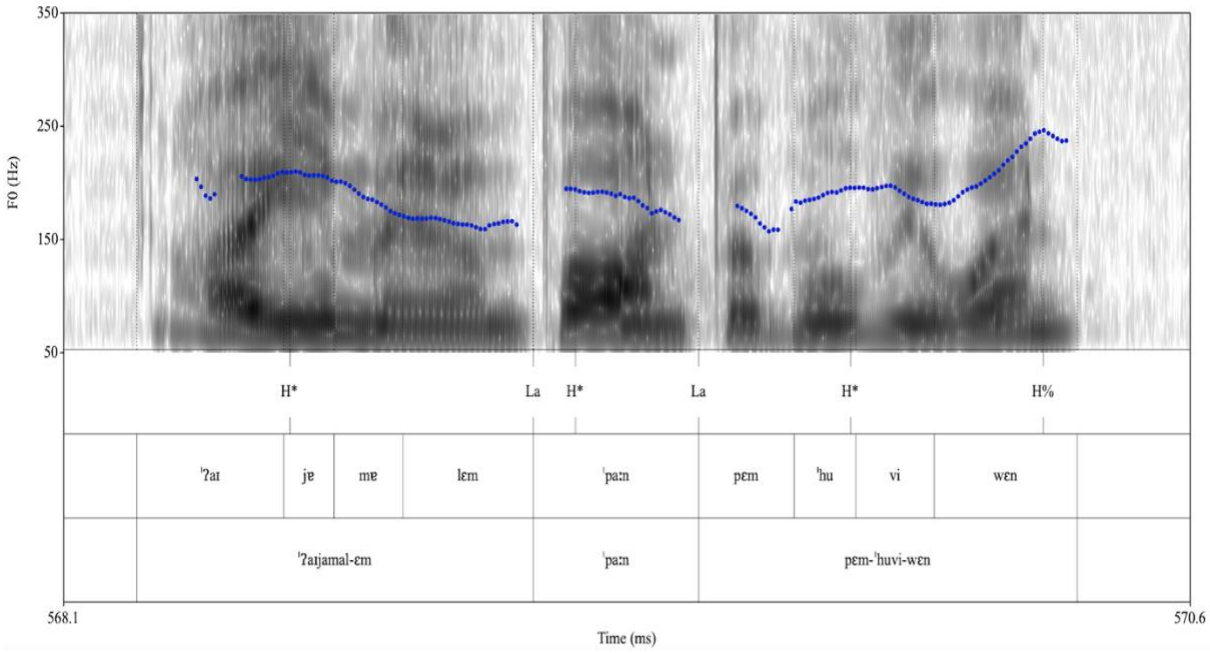


Figure 44. Pitch track for the interrogative ‘Did the raccoons smell the bread?’ (SOV)

As shown in Figure 49, each IP consists of a single word that has a H* pitch accent, followed by a L% boundary tone and concomitant creak, as generally attested in declarative sentences with broad focus (as seen in previous examples of declaratives, the first H* pitch accent is noticeable higher than the rest of the H* pitch accents in the utterance). In contrast, in Figure 50 there is the presence of a high-toned (H) pitch target that aligns with the final syllable of the verb.[34] This high-toned pitch target is often much higher than other H tonal targets (attributed to H* pitch accents). Given that the pitch target is at the end of the IP, I analyze it as a boundary tone and thus transcribe it as H%. Besides the addition of a high tone on the final syllable of the verb, these sentences are otherwise equivalent in the sense that H* pitch targets (which coincide with stressed syllables) are followed by a consistent fall towards a low-toned target (either an AP edge tone La or an IP boundary tone L%). Whether the second tonal target is transcribed as an AP edge tone or an IP boundary tone has to do with the structure of the intonational unit. If it is followed by a significant pause or falls at the end of an utterance, I assume a boundary tone; otherwise, I analyze it as an AP edge tone nested within the larger IP. This is why the low tonal targets in Figure 50 are transcribed as La, rather than L%.

The example in Figure 51 below shows the same polar question ('Did the raccoons smell the bread?') but in a different word order configuration, namely OSV. In this case, where the verb is utterance-final, the f0 contour likewise ends in a H% boundary tone. When the verb is phrase-final, f0 often rises sharply following a dip from the preceding H*. In these cases I do not

[34] The alignment of a high tonal target to the final syllable of the verb is also reported for polar questions in Mountain Cahuilla (see Sauvel & Munro 1981:21).

transcribe H% instead of LH or MH since there are no examples where H% and LH% are contrastive.

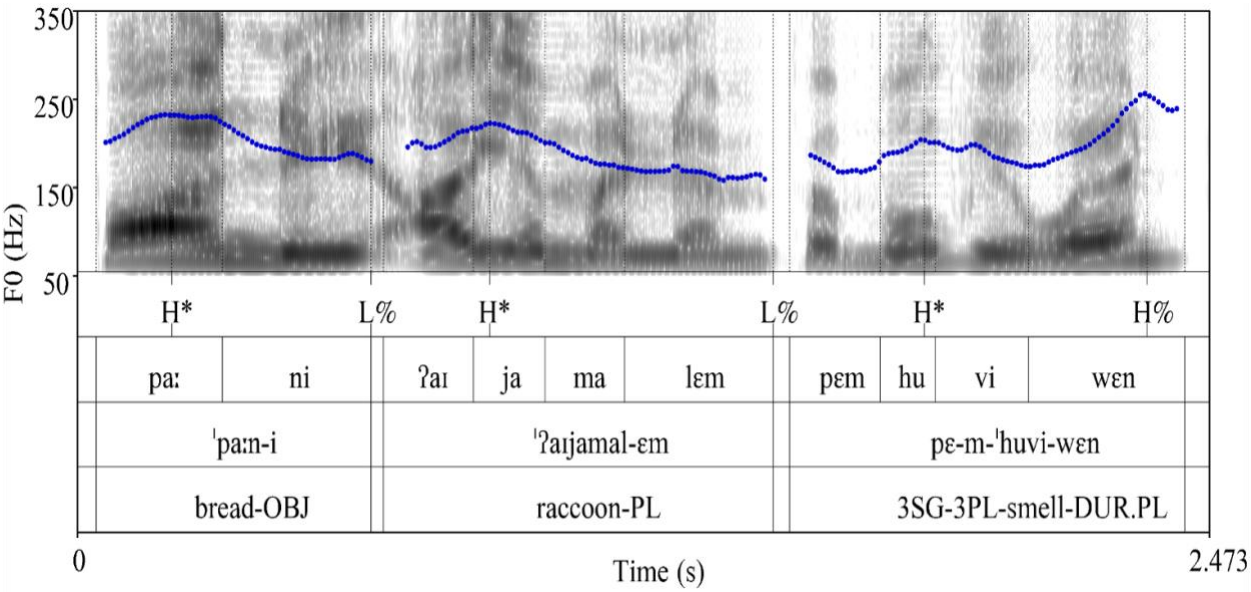


Figure 45. Pitch track for 'Did the raccoons smell the bread?' (OSV)

Thus, polar questions in TMD Cahuilla can be characterized intonationally by the presence of an obligatory H tone that docks to the final syllable of the verb. When the verb is phrase-final, the sentence ends in a H% boundary tone, rather than the L% seen at the end of declarative sentences. Given the small number of examples examined in this study, more data would be needed to assess the full extent of intonational patterns in interrogative constructions in TMD Cahuilla.

4.8 Summary

In addition to filling an important gap in our understanding of the prosodic structure of TMD Cahuilla, investigating the intonational structure of TMD Cahuilla contributes to the

development of prosodic typology and the prosodic documentation of Uto-Aztecan and other American Indian languages. The documentation of baseline sentential prosody in TMD Cahuilla presented in this dissertation will also allow eventual investigation of information structure effects. Crucially, this description and analysis will aid in the development of future pedagogical materials and form the basis for developing tools that enhance language learners' awareness of prosodic patterns and helps them to develop their perception and production skills (see pitch art used to teach word-internal pitch trajectories or "word melodies" in Blackfoot (Bird & Miyashita 2018). In my experience as a language instructor, the role of intonation is significant in the development of fluency of L2 speakers, who seek to attain pronunciation patterns close to that of our elders fluent first-language speakers.

Chapter 4 (this chapter) includes some of the material as it appears in: Huaute, R. 2022. *A Preliminary Intonation Model of Torres-Martinez Desert Cahuilla*. Proc. Speech Prosody 2022, 254-258, doi: 10.21437/SpeechProsody.2022-52. The dissertation author was the primary investigator and author of this paper.

Chapter 5 Morphology

5.1 Introduction

This chapter provides an overview of the complex morphological structure of TMD Cahuilla, with an emphasis on two major word classes, nouns and verbs, which display the highest level of morphological complexity in the language. Like other varieties of Cahuilla, TMD Cahuilla exhibits a high degree of synthesis in morphological exponence, a system of inflectional classes in both nouns and verbs, as well as forms with complex morphophonology, primarily in inflectional exponence. This chapter describes the morphological structure and patterns of TMD Cahuilla and notes some of the differences in morphological marking in this language variety with respect to previously described varieties. In particular, there are a number of affixes described in the previous literature that are not yet attested in the TMD Cahuilla corpus. In this chapter, I address the morphological structure as attested in both TMD Cahuilla and as documented in previous research, as the entirety of the existing documentation will inform the development of pedagogical materials for language reclamation. I note where relevant the changes in the patterns attested in the contemporary variety.

The chapter is organized as follows. First, in §5.2, I discuss word-hood and constituency and the distinction between the phonological word and grammatical word in TMD Cahuilla. The rest of the chapter is divided into two parts, which address verbal and nominal morphology. In the first part, I provide an overview of the verbal morphology (§5.3), which includes a description of the verbal template and morphological domains (in §5.3.1) and the properties that characterize inflectional verb classes (in §5.3.2). The second part is concerned with a description of the nominal morphology. I begin with a discussion of the defining properties and characteristics of nouns as a lexical class (§5.4.1). I then discuss affix ordering, providing a

template of nominal prefixes and suffixes (§5.4.2), followed by a description of declension classes (§5.4.3). Next, I describe several morphological mechanisms to derive noun stems (§5.4.4), and then provide a description of the morphological and morphophonological properties of plural nouns (§5.4.5).

5.2 Defining the word in TMD Cahuilla

In order to describe the highly synthetic morphological system of TMD Cahuilla, it is necessary to first identify what a word is in this language with respect to grammatical considerations. In this section, I define the grammatical word in TMD Cahuilla and distinguish it from the phonological (or prosodic) word, which are diagnosed by two different sets of language-internal criteria.

With respect to the phonological word, Hall (1999:3) notes that it can be identified using three types of evidence, namely whether this unit: (i) is the domain of phonotactic patterns; (ii) is the domain of some phonological processes; and (iii) is the domain for minimality constraints. The phonological word in TMD Cahuilla can be identified as the domain of application of stress assignment, minimality requirements and as the domain of application of phonological processes, including distribution of intonational tones. These diagnostic criteria include:

(1) The phonological (prosodic) word (ω) in TMD Cahuilla

a. Each ω is assigned a single, main stress in the first syllable of the morphological root (§4.4).

b. Each ω has a H* pitch accent aligned with the stressed syllable and a L edge tone aligned with the final syllable of the word (§4.5.2).[35]

c. Each ω is minimally CVC (Seiler 1965, 1977; Munro 1990).

d. The ω is the domain of morphologically conditioned phonological processes, such as affix-induced ablaut and syncope (§5.4).[36]

On the other hand, unlike the phonological word, the *grammatical* word is defined on morphosyntactic grounds. One definition provided in Bickel & Nichols (2007) is that the grammatical word is characterized as being "the smallest unit of syntax, technically the terminal node or minimal projection (X_0) in phrase structure" (2007:22). This unit will exhibit some form of cohesion, i.e., it cannot be interrupted by phrasal constructions, and may exhibit morphological and phonological dependencies (e.g., allomorph selection and phonological fusion), but will not exhibit syntactic dependencies such as agreement or government (Bickel & Nichols 2007:22; see also Bickel & Zuñiga (2017)). Furthermore, morphologically complex grammatical words generally (though not always) have fixed morpheme order, while the ordering of grammatical words with respect to each other is generally more flexible. Finally, the grammatical word is a single unit with respect to modification by an attributive element (e.g., an adjective, a subordinate clause, etc.). Given these properties, the grammatical word in TMD

[35] In the intonational model proposed in Huaute (2022) discussed in §4.5.2, this L tone is a La edge tone which may be overridden by a L% boundary tone.

[36] I address only a subset of these effects in this dissertation, namely suffix-conditioned syncope (in §5.4.5 below) and syncope in reduplicative patterns (in Chapter 6).

Cahuilla may consist of a free root, an uninflected function word, a derived stem, or a compound stem. These are exemplified in (2).

(2) Examples of grammatical words in TMD Cahuilla

a.	*pe'em*	[ˈpɛʔɛm]	'them'	Free root
b.	*kily*	[kɪʎ]	'negation particle'	Function word
c.	*kuyival*	[ˈkuji-vɐ-l̥]	dig-LOC-ABS 'grave'	Derived stem
d.	*kusmeti*	[kuʃ-ˈmɛti]	throat-close 'choke'	Compound stem

The forms in (2) are argued to be grammatical words in TMD Cahuilla given that they can occur as basic free forms and exhibit cohesion as well as fixed order. Crucially, grammatical words may not necessarily meet the criteria for phonological wordhood, e.g., the negation particle [kiʎ] (2b) (as well as other function words in the language) is a grammatical word, but it lacks stress and other phenomena that characterize phonological words.

5.3 Verbal morphology

5.3.1. Verbal template and domains

Cahuilla is a highly agglutinative language which was originally characterized by Seiler (1977) as exhibiting a low degree of fusion between the root and affixes (Seiler 1977:127). Verbs in TMD Cahuilla, which exhibit the highest degree of morphological complexity in the language

and are head-marking, may have up to three prefix slots and four suffix slots.[37] While an in-depth investigation of the semantic properties of exponents is outside the scope of the dissertation, some generalization can nevertheless be made with respect to the meanings of the categories expressed in the verb. Specifically, the ordering of elements within the verbal morphological structure conforms to proposed principles of cognitive relevance (Bybee 1985) and derivation within inflection (Bybee 1985, Greenberg 1963). The morphological verbal structure of TMD Cahuilla (based on Seiler (1977:132, 152), which is in turn based on Fuchs (1970)) is shown in Table 16.

Table 16. TMD Cahuilla verbal template

PREFIXES			**STEM**				
-3	-2	-1	0	1	2	3	4
OBJ	SBJ[38]	DER	ROOT	DISTR	DER	INFL	INFL
1SG nɛ- 2SG ʔɛ- 3SG pɛ- 1PL tʃɛmɛ- 2PL ʔɛmɛ- 3PL mɛ- REFLX tax-	1SG nɛ- 2SG ʔɛ- 3SG 0- 1PL tʃɛm- 2PL ʔɛm- 3PL hɛm-	pɛ- vuk- tʃɛ-	RED~	DISTR: -m, -n, -an	BEN: -max ATTR: -vi STAT: -wɛn MOTG: -itʃi MOTGA: -ŋi MOTP: -law/lu CAUS: -ni,-an DISTR.MOT: -ikaw	DUR.SG: -qal DUR.PL: -wɛn IF.SG: -ka,-ik IF.PL: -katɛm,-iktɛm	FUT: -nɛm PRET: -ʔi,-ʔɛ/a IMP: -0,-ʔ,-a HORT: -na,-an POSSB: -pulu,-alu IRR.SUB: -pi,-ap REAL.SUB: -vɛ ADV.SUB: -ipa,- nuk,-anuk,

[37] This differs from Seiler's (1977) and Fuchs' (1970) proposed verbal template, which includes four prefix positions, with an outer prefix position slot involving markers encoding deontic modality (Seiler 1977;143).

[38] The fact that person markers can attach to nominal stems in possessive phrases and attach various postpositions suggests these may be clitics, however, further diagnostics are needed to determine their status in the language.

The root plus suffixes constitute a distinct domain within the TMD Cahuilla verb that is relevant for stress assignment and other morphological processes, including reduplication and syncope triggered by certain suffixes, a phenomenon attested in both Cahuilla and Cupeño (Hill & Hill 2019). (TMD Cahuilla also exhibits patterns of suffix-triggered ablaut in complex verbs, but description of this phenomenon is left out of the scope of this dissertation.) I refer to this domain as the 'Stem' as indicated in Table 16. Prefixes form a separate domain from the Stem since they do not participate in certain stem-specific morphophonological processes such as reduplication and ablaut. Prefixes also do not receive secondary stress and they are excluded from phrase-level pitch accentuation in TMD Cahuilla (as discussed in Chapter 4, §4.3).

Verbs in TMD Cahuilla must minimally have an inflectional marker that encodes tense, aspect or mood. In the case of a verb inflected for imperative mood, this may be encoded through reduplication, while a verb form in the indicative mood will have a suffix in Slot -3 (a suffix position that involves tense/aspect markers). In the indicative mood, inflected verb forms must also bear a subject prefix (Slot -3) if intransitive, and both a subject (Slot -3) and object (Slot -2) prefix if transitive. Examples of minimally inflected imperative and indicative (intransitive and transitive) verbs are shown in (1).

(3) Minimal inflection in verb forms

		Imperative
		0
a.	*kukul*	/ˈku~kul/
		IMP~cook
		'Cook!' CM(CM_VERBS1.WAV)

Intransitive

		-2	0	3
b.	*chemkupwen*	/tʃɛm-	ˈkup	-wɛn/
		1PL-sleep-DUR.PL		
		‘We are sleeping.' CM(TMDC29.WAV)		

Transitive

		-3	-2	0	3
c.	*pichemvukwen*	/pɛ-	tʃɛm-	ˈvuk	-wɛn/
		3SG-1PL-see-DUR.PL			
		‘We are seeing it.’ CM(TMDC29.WAV)			

Affix ordering in TMD Cahuilla verbs is invariant. The examples of morphologically complex verbs in TMD Cahuilla shown in (4) motivate the affix order proposed in Table 16.

(4) Morphotactic properties of morphologically complex verbs

a. OBJ (P3) - SUBJ (P2) - ROOT (0) - CAUS (S2) - DUR.PL (S3) - PRET (S4)
newewnaniwene
[nʌˈwɛwnʌniwɛnɛ]
/nɛ-0-wɛwɛn-ani-wɛn-ɛ/
1SG-3SG-stand-CAUS-DUR.PL-PRET
‘(S)he made me stand.’ CM(TMDC0025.WAV)

b. OBJ (P3) - SUBJ (P2) - ROOT (0) - CAUS (S2) - MOTG (S2) - DUR.SG (S3)
peqayinichiqal
[pʌˈqajɪnitʃʌqɐ̯l]
/pe-0-qaji-n-itʃi-qal/
3SG-3SG-clean-CAUS-MOTG-DUR.SG
‘He went and cleaned it.’ CM(TM_CONVO1.WAV)

c. SUBJ (P2) - ROOT (0) - MOTP (S2) - DUR.PL (S3)
hem'amulawen
[hɛmˈʔamʌlawɛn]
/hɛm-ʔamu-law-wɛn/
3PL-hunt-MOTP-DUR.PL
'They went to go hunting.' CM(TM_CONVO3.WAV)

d. OBJ (P3) - SUBJ (P2) - DER (P1) - RED~ROOT (0) - DISTR (S1) - DUR.PL (S3)
penpeqepaynqal
[pɛn-pʌ-ˈqɛ~qpaɪ-n-qɐ[]
/pɛ-n-pɛ-ˈqɛ~qɛpai-n-qal/
3S-1S-DER[39]-RED~throw-DISTR-DUR.PL
'I throw them (balls) here and there.' CM(TMDC0008.WAV)

As illustrated in Table 16 above, TMD Cahuilla exhibits properties of a layered or hierarchical morphological system (vs. a templatic one), including derivational affixes (in prefix position -1 and suffix positions 1 and 2) being closer to the root than inflectional affixes (located in the outer layers of the verb template), consistent with proposed cross-linguistic principles of cognitive relevance (Bybee 1985). Previous documentation of speakers of the Mountain and Desert dialects of Cahuilla describe a morphological system that exhibits variable order and doubling of derivational suffixes (Jacobs 1975:28-29; Seiler 1977:128, 153-154). In the TMD Cahuilla corpus, however, morphologically complex verbs exhibit a fixed affix order with

[39] Seiler (1977: 162) describes the prefixes occupying the (-1) Slot (/pe-/, /vuk-/, and /tʃɛ/) as 'endocentric' derivational prefixes that mark a 'dynamic' or 'intense' quality of the process. Forms with these prefixes usually denote sudden action or action with force (i.e., throwing). Given their limited description I simply gloss them as DER for derivational.

limited use of derivational suffixes in Slot 2 of the verb template. Specifically, and as mentioned above, a number of affixes relating to 'associated motion' (AM) (see Guillaume and Koch 2021 for discussion on associated motion) are only marginally productive and some are not attested in the TMD Cahuilla corpus.[40] Further research may reveal whether this gap is due to a change in the morphological grammar from that of previously documented Cahuilla varieties.

5.3.2 Verb classes

Like other Takic languages and dialects of Cahuilla, TMD Cahuilla has a complex inflection class system, as evidenced by reduplication and suffixation patterns (Seiler & Hioki 1979, Hill & Hill 2019). Reduplication in TMD Cahuilla is a phenomenon that exhibits complex semantic and morphophonological properties, addressed in Chapter 6. In this section, I describe certain reduplicative patterns as diagnostics of verb class membership in the language. There is evidence of five verb classes in the TMD Cahuilla data, matching the verb classes outlined in Hill & Hill (2019:816-824) for other Cahuilla varieties. TMD Cahuilla verb classes are summarized in (5).

(5) TMD Cahuilla inflection verb classes

a. **Class I**: verbs with 'automatic' reduplication conditioned by certain suffixes
b. **Class II**: verbs with thematic *-i* suffix; form distributives via suffixation (*-m(V)*) and reduplication
c. **Class III**: verbs that form distributives via suffixation (*-an*) and reduplication

[40] The verb template in Table 14 lists only affixes that are attested in my TMD Cahuilla corpus. Affixes not attested in TMD but attested in other documented sources include suffixes that fall under the category 'associated motion' (Guillaume and Koch 2021) /-puli/ and /-vaneken/, as well as the desiderative suffix /-vitʃu/.

d. **Class IV**: verbs that are a-thematic

e. **Class V**: verbs that are irregular or defective

While the phonological shape of some stems and/or their lexical semantic properties may provide clues as to their membership to the class they may belong to (e.g., Class I verbs tend to have a CVC or a CVCCV prosodic shape (Hill & Hill 2019:816)), membership to verb classes is for the most part unpredictable in TMD Cahuilla. I describe each of these classes next.

Class I: Verbs with 'automatic' reduplication

Class I verbs (e.g., /-kul-/ 'to make' and /-sɛm-/ 'to smile') exhibit reduplication in particular morphological contexts: a reduplicated stem surfaces when inflected for durative aspect (6a-b) or imperative mood (6c-d)), whereas a non-reduplicated stem surfaces in other inflected forms, e.g., in inceptive (6e-f) and preterite (6g-h) inflected forms.

(6) Class I verbs with 'automatic' reduplication

	/-kul-/ 'to make'		**/-sɛm-/ 'to smile'**	
	Reduplicated stems:			
a.	*pemkukulwen*	b.	*nesesemqal*	*Durative*
	/pɛ-m-ˈku~kul-wɛn/		/nɛ-ˈsɛ~sɛm-qal/	
	3SG-3PL-RED~make-DUR.PL		1SG-RED~laugh-DUR.SG	
	'They're making it.' CM(CM_VERBS1.WAV)		'I'm laughing.' CM(CM_VERBS2.WAV)	

c.	*kukul*	d.	*sesem*	*Imperative*
	/ˈku~kul/		/ˈsɛ~sɛm/	
	RED~make		RED~laugh	
	‘Cook!’ CM(CM_VERBS1.WAV)		‘Laugh!’ CM(CM_VERBS2.WAV)	

Non-reduplicated stems:

e.	*pemkukulkatem*	f.	*hensemka*	*Inceptive*
	/pɛ-m-ˈkul-katɛm/		/hɛn-ˈsɛm-ka/	
	3SG-3PL-make-IF		1SG-laugh-IF	
	‘They’re going to make it.’		‘I’m going to laugh.’	
	CM(CM_VERBS1.WAV)		CM(CM_VERBS2.WAV)	

g.	*pemkul’i*	h.	*sem’i*	*Preterite*
	/pɛ-m-ˈkul-ʔi/		/0-ˈsɛm-ʔi/	
	3SG-3PL-make-PRET		3SG-laugh-PRET	
	‘They made it.’ CM(CM_VERBS1.WAV)		‘He laughed.’ CM(TDMC30.WAV)	

This suffix induced stem alternation is referred to as ‘automatic’ reduplication in previous literature (Fuchs (1970:69-72); Seiler (1977:51)), since the reduplicated stem is conditioned by the attachment of certain inflectional or derivational suffixes.[41] Fuchs (1970:69-72) and Seiler (1977:51) describe the following suffixes in (7) as triggering stem reduplication with Class I verbs in Cahuilla:

(7) Suffixes that trigger reduplication with Class I verbs

a.	-qal	Durative singular subject	DUR.SG
b.	-wɛn	Durative plural subject	DUR.PL

[41] According to Hill & Hill (2019), the markers that trigger ‘automatic’ reduplication involve an imperfective-like interpretation, as well as motion-related suffixes that encode realis mood (Hill & Hill 2019:816-7).

b.	-nɛm	Future	FUT
c.	-0/-ɛ, -am,	Imperative	IMP
d.	-ikaw	Distributed action (‘V here and there)	DISTR.MOT
e.	-ŋi	Motion tither and hither (‘go around V-ing’)	MOTGA
f.	-itʃi	Motion with simultaneous action (‘V while going’)	MOTG
g.	-max	Benefactive	BEN
h.	-wɛn	Stative	STAT

Class I verbs can be distinguished from other verbs that do not undergo reduplication whenever a durative, imperative or other reduplication-triggering suffix is attached, such as verbs belonging to Class IV verbs, which are a-thematic. In (8), I illustrate this contrast by showing a side-by-side comparison of a verb from Class I (/kutatʃ/ ‘talk’) and a verb from Class IV (/kʷaʔ/ ‘eat’), where both verbs are inflected with similar suffixes. (As shown in the reduplicated forms of the Class I verb, there is syncope of the root-initial vowel. I address the morphophonological properties of reduplicated verbs in Chapter 6).

(8) Class I vs. Class IV verbs

	/kʷaʔ/ ‘eat’ (Class IV)	**/kutatʃ/ ‘talk’ (Class I)**	
a.	*kwa’a*	*kuktash*	*Imperative*
	<ˈkʷaʔa>	<ˈkuktaʃ>	
	/kʷaʔ-a/	/ku~kutatʃ/	
	eat-IMP	RED~talk.IMP	
	‘Eat it!’	‘Talk!’	
	(HS[FN] M6:2408)	(HS[FN] M6:2282)	

b.	*nekwa'maxqal*	*pekuktashmaxqal*	
	<neˈkʷaʔmaxqal>	<peˈkuktaʃmaxqal>	*Durative +*
	/0-nɛ-ˈkʷaʔ-max-qal	pe-ˈku~kutatʃ-max-qal	*Benefactive*
	3SG-1SG-eat-BEN-DUR.SG	3SG-RED-talk-BEN-DUR.SG	
	'He eats for me.'	'He is talking for him.'	
	(KH[FN] 1972:1166)	(HS[FN] M5:2383)	
c.	*penkwangiqal*	*kuktashngiqal*	*Durative +*
	<penˈkʷaŋiqal>	<ˈkuktaʃŋiqal>	*Going-Around*
	/pɛ-n-ˈkʷa-ŋi-qal/	/0-ˈku~kutatʃ-ŋi-qal/	*Motion*
	3SG-1sg-eat-MOTGA-DUR.SG	3SG-RED-eat-MOTGA-DUR.SG	
	'I eat it while walking.'	'He speaks all over.'	
	(HS[FN] M7:2495)	(HS[FN] M5:2382)	
d.	*penkwanem*	*nekuktashnem*	
	<penˈkʷanem>	<neˈkuktaʃnem>	*Future*
	/pɛ-n-ˈkʷa-nɛm/	/nɛ-ˈku~kutatʃ-nɛm/	
	3SG-1sg-eat-FUT	1SG-3SG-RED-talk-FUT	
	'I will eat it.'	'I will talk.'	
	(H 1972:1166)	(HS 1979:87)	
e.	*penkwa'i*	*kutashpuli'i*	*Preterite*
	<penˈkʷaʔi>	<ˈkutaʃpuliʔi>	
	/pɛ-n-ˈkʷa-ʔi/	/0-ˈkutaʃ-puli-ʔi/	
	3SG-1SG-eat-PRET	3SG-talk-MOTC-PRET	
	'I ate it.'	'He came here and talked.'	
	(HS[FN] M7:2529)	(HS[FN] M5:2382)	

f.	*penkwa'ik*	*kutashka*	*Inceptive*
	[pɛnˈkʷaʔɪk]	<ˈkutaʃka>	
	/pɛ-n-ˈkʷaʔ-ik/	/0-ˈkutatʃ-ka/	
	3SG-1SG-eat-IF	3SG-talk-IF	
	'I'm about to eat it.'	'He's about to talk.'	
	CM(TMDC0001.WAV)	(HS^{FN} M5:2381)	

As shown in these examples, the Class IV verb (/kʷaʔ/ 'eat' in the first column) shows an unreduplicated stem regardless of the type of suffixation involved. In the case of the Class I verb (/kutatʃ/ 'talk' in the second column), on the other hand, we see an alternation, where the verb is reduplicated when inflected for imperative mood (8a), durative aspect (8b-c) and future tense (8d), but there is no reduplication when attaching the preterite suffix (8e) nor the inceptive suffix (8f). This demonstrates that reduplication is a concomitant feature associated with the presence of a class of suffixes with a particular lexical class of verbs, namely Class I verbs.

Furthermore, the examples in (9) show that in Class I verbs in the TMD Cahuilla variety, an unreduplicated stem is not possible with a reduplication-triggering suffix (the durative singular *-qal* suffix) (9a), nor is a reduplicated stem possible with a non-triggering suffix (the inceptive *-ka* suffix) (9b), since these forms are both unattested and deemed ungrammatical by speakers of TMD Cahuilla.

(9) Class I: Reduplicated and unreduplicated verb stem distribution in TMD Cahuilla

	Reduplicated	**Unreduplicated**
a.	*nesawqal* [nʌ-ˈsa~saw-qɐl] /nɛ-ˈsa~saw-qal/ 1SG-RED-make.tortilla-DUR.SG 'I am making tortillas.' CM(TMDC0014.WAV)	*nɛ-ˈsaw-qal
b.	*hɛn-ˈsa~saw-ka	*hensawka* [hɛnˈsawkɐ] /hɛn-saw-ka/ 1PL-RED- make.tortilla-IF 'I am going to make tortillas.' CM(TMDC0014.WAV)

Finally, since forms that are already reduplicated may not reduplicate again, verbs belonging to Class I may encode distributivity, a category that encodes doing the same action in several places, or to several objects, or by several subjects, via a formally identical CV-reduplication pattern (described in Chapter 6). This creates a confound as to whether reduplication with these verbs is brought about by one of the suffixes that triggers reduplication in this verb class or as an exponent of distributivity.[42] I address the range of meanings encompassed by reduplicative patterns in Chapter 6.

[42] According to Hill & Hill (2019:817), a reduplicated stem of this verb class that exhibits reduplication without one of the suffixes that triggers 'automatic' reduplication is to be interpreted as involving distributive reduplication. I

Class II: Verbs with thematic *-i*

Class II verbs have a surface CVC-i shape that exhibit additional morphophonological changes not attested in other verb classes when marked as distributive. I follow Hill & Hill (2019) and analyze the final *i* in these verb stems as a thematic *-i* suffix[43] (glossed below as TS). Specifically, the distributive forms of these verbs involve attaching a *-mV* suffix, as shown in (10) below. In these forms, the thematic *-i-* vowel can be replaced with a copy vowel that matches the stressed stem-initial vowel or it may be assimilated to it in an apparent case of limited vowel harmony.

(10) Class II verbs (with thematic *-i* suffix): distributive forms

a. *memqaqyimiwen*
mɛmˈqaqj**ɪmɪ**wɛn
/mɛ-m-ˈqa~qaj-**i-mV**-wɛn/
3PL-3PL-RED-clean-**TS-DISTR**-DUR.PL
'They each cleaned one.' CM(TMDC0006.WAV)

b. *memchusvumiwen*
mɛmˈtʃuʃv**umɪ**wɛn
/mɛ-m-ˈtʃu~tʃuv-**u-mV**-wɛn/
3PL-3PL-RED~tie-TS-DISTR-DUR.PL
'They each untied them.' CM(TMDC0012.WAV)

have not yet been able to confirm either of these possibilities involving Class I verbs in the speech of contemporary speakers of the TMD Cahuilla dialect.

[43] Hill & Hill (2019:818) describe the thematic suffix /-i/ as being associated with intransitive verbs. In non-distributive forms this suffix surfaces as /-in/, both thematic suffixes originate from the causative suffix /-in/, according to Hill and Hill (818).

Class II verbs imperative forms

c. *qayi*
[ˈqaji]
/ˈqaji/
clean.IMP
'clean' GT(GTORRO1.WAV)

d. *chuvi*
[ˈʧuvi]
/ˈʧuvi/
loosen.IMP
'untie' CM(TMDC0012.WAV)

As seen in these examples, the verb forms exhibit CV- reduplication (with concomitant syncope of the root-initial vowel), plus the /-i/ theme suffix followed by the /-mV/ suffix which surfaces as [-mɪ] in both cases. In (10b), the /i/ of the theme suffix surfaces as [u] due to assimilation with the root vowel /u/ (from) /ʧuv/ 'tie'. In this example, the root vowel has undergone syncope, but it surfaces in the reduplicative prefix [ʧu-]. Class II verbs can be distinguished from Class I verbs in that they do not show stem reduplication in imperative forms, as illustrated in (10c) and (10d).

The following examples in (11) further illustrate the reduplication + suffixation pattern in this class of verbs to encode distributivity (the non-distributive forms.

(11) Class II verbs: distributive vs. non-distributive forms

	Base	Distributive	Non-distributive
b.	*chupi*	*mechushpumeqal*	*penchupinka*
	ˈtʃup-i	me-0-tʃu~ʃ_p-u-me-qal	pe-n-ˈtʃup-in-ka
	'dip in water'	3PL-3SG-RED-dip-TS-DISTR-DUR.SG	3SG-1SG-dip-TS-IF
		‘They’re diving in.’	'I’m going to dive in.’
		(HS^{FN} M6:2439)	(HS^{FN} M6:2439)
b.	*qachi*	*penqaqchimika*	*neqachinqal*
	ˈqatʃ-i	pe-n-ˈqa~q_tʃ-i-mi-ka	ne-0-ˈqatʃ-in-qal
	‘to punch, hit’	3SG-1SG-RED-hit-TS-DISTR-IF	1SG-3SG-hit-TS-DUR.SG
		‘I’m going to spar with him.’	‘He hit me (once).’
		CM(TMDC0008.WAV)	(HS 1979:164)

Class III: Verbs with distributives in *-an*

Class III verbs, consisting of consonant-final, transitive verbs, are characterized by being marked as distributive through both reduplication and suffixation of the formative *-an*, a suffix not attested in inflected form of verbs belonging to other verb classes. Examples of Class III verbs are provided in (12).

(12) Class III verbs: distributive forms with *-an* suffix vs. non-distributive forms

	Non-distributive
a.	*pewekqal*
	pɛ-0-wɛk-qɐ⌊
	3SG-3SG-cut-DUR.SG
	‘He was cutting her.’ CM(TMCONVO1.WAV)

b. *penchutqale*
pɛ-n-ˈtʃut- qal-ɛ
3SG-1SG-light-DUR.SG-PRET
'I was lighting it.' CM(TMDC0014.WAV)

Distributive

c. *taxchemwewkanwene*
tax-tʃɛm-ˈwɛ~wk-**an**-wɛn-ɛ
REFL-1PL-RED~cut-DISTR-DUR.PL-PRET
'We cut ourselves.' CM(TMDC0008.WAV)

d. *michemchuschanwene*
mi-tʃɛm-ˈtʃu~ʃtʃ-**an**-wɛn-ɛ
3PL-1PL-RED~light-DISTR-DUR.PL-PRET
'We were lighting them.' CM(TMDC0014.WAV)

Further examples of distributive forms of Class III verbs are provided in (13).

(13) Class III verbs: distributive reduplication + *-an* suffixation

a.	*ke'*	*penkek'an'i*
	/keʔ/	penˈkekʔanʔi
	'to bite'	/pɛ-n-kɛ~kɛʔ-**an**-ʔi/
		3SG-1SG-RED-bite-**DISTR**-PRET
		'I bit it many times.' (HS^{FN} M4:2258)

b.	*wichax*	*memwiwchaxannem*
	/witʃax/	mitʃemˈwiwtʃaxannem
	‘to toss’	/mi-tʃɛm-ˈwi~witʃax-**an**-nɛm/
		3PL-1PL-RED-toss-**DISTR**-FUT
		‘We will toss them.’ CM(TMDC0011.WAV)
c.	lapash	*pelalpachanka*
	/lapaʃ/	peˈlalpatʃanka
	‘to collapse’	/pɛ-ˈla~lapaʃ-an-ka/
		DER-3SG-RED~collapse-DISTR-INECP
		‘They are going to fall.’ (HS[FN] M5:2333)

As the examples in (12) and (13) show, these stems always show reduplication (with concomitant stem-initial syncope) and what Seiler (1977:164) refers to as a distributive suffix *-an*. Unlike verbs included in the ‘i-stem’ class (Class II), these stems do not appear with the distributive suffix *-an* in unreduplicated forms (e.g., *pe-n-xélew-qal* ‘I scratch once’ vs. *pe-n-xé~xlew-an-qal* ‘I scratch many times’). Thus, reduplication with concomitant suffixation is the only exponence strategy that encodes distributivity with verbs belonging to this class.

Class IV: A-thematic verbs

Class IV is a large class of verbs that are characterized by lacking thematic suffixes, both in reduplicated forms (which encode distributivity) and non-reduplicated forms (which are non-distributive). These a-thematic verbs are mostly, but not exclusively, intransitive. Relevant examples are provided in (14).

(14) Class IV: a-thematic verbs

	/-pax-/ ‘to go in, enter’		**/-tatʃa-/ ‘to lie down on back’**	
	Unreduplicated stems			
a.	*nepaxqal* /nɛ-ˈpax-qal/ 1SG-enter-DUR.SG ‘I am going in.’ CM(CM_VERBS2.WAV)	b.	*netachaqal* /nɛ-ˈtatʃa-qal/ 1SG-lie.down-DUR.SG ‘I am laying down.’ CM(TMDC0017.WAV)	*Non-distributive*
	Reduplicated stems			
c.	*chempapaxwen* /tʃɛm-ˈpa~pax-wɛn/ 1PL-RED~lie.down-DUR.PL ‘We go in (repeatedly)’ CM(TMDC0017.WAV)	d.	*chemtatachawen* /tʃɛm-ˈta~tatʃa-wɛn/ 1PL-RED~lie.down-DUR.PL ‘We’re lying down in different places’ CM(TMDC0017.WAV)	*Distributive*

As these examples in (14) show, reduplication in this verb class encodes distributivity (14c-d). Distributive verb forms involve partial stem-initial reduplication, with primary stress falling on the reduplicated prefix.

Verb stems in Class IV contrast with verbs from Classes II and III, which encode distributivity through both reduplication and suffixation (of *-mV* for Class II and *-an* for Class III). While both distributive forms of Class I verbs, with ‘automatic’ reduplication, and Class IV verbs involve only reduplication, these two verb classes are distinguished by the fact that Class I verbs also exhibit reduplication when attaching the suffixes listed in (7) above, e.g., Class I verbs have reduplicated stems when inflected for durative aspect (as shown in (8) above), while Class IV verbs are not reduplicated when inflected for durative aspect, as shown in (14a-b) above.

Class V: Irregular verbs

Finally, Class V is a class of irregular verb stems that may either lack a reduplicated form or which exhibit a non-concatenative process, such as vowel lengthening of the stressed vowel (rather than a reduplicant CV- prefix), to encode a distributive meaning. Verbs belonging to this class are exemplified in (15). Fully inflected forms, both with and without vowel lengthening are included for contrast.

(15) Class V verbs: non-distributive and distributive forms

	Verb	Non-distributive	Distributive
a.	*hing*	*hemhingwe*	*hemhiingwe*
	ˈhiŋ	hɛm-ˈhiŋ-wɛ	hɛm-ˈh**i**ːŋ-wɛ
	‘fly’	3PL-fly-DUR.PL	3PL-fly.DISTR-DUR.PL
		‘Birds flying in a group.’	‘Birds flying each in their place.’
		(HS^{FN} M6:2465)	(HS^{FN} M6:2465)
b.	*wiway*	*penwiwayqa*	*penwiiwayqa*
	ˈwiwaj	pɛ-n-ˈwiwaj-qa	pɛ-n-ˈw**i**ːwaj-qa
	‘hang’	3SG-1SG-hang-DUR.SG	3SG-1SG-hang.DISTR-DUR.SG
		‘I’m hanging it.’	‘I’m hanging more than one.’
		(HS^{FN} M6:2468)	(HS^{FN} M6:2468)
c.	*nanal*	*pennanalqa*	*pennaanalqa*
	ˈnanal	pɛ-n-ˈnanal-qa	pɛ-n-ˈn**a**ːnal-qa
	‘ask’	3SG-1SG-ask-DUR.SG	3SG-1SG-ask.DISTR-DUR.SG
		‘I ask a question.’	‘I ask many questions.’
		(HS^{FN} M6:2468)	(HS^{FN} M6:2468)

Seiler (1977:52) notes that there are fewer than a half a dozen of such verbs that undergo vowel lengthening instead of reduplication. Although there are examples of non-distributed forms of these verbs in the TMD Cahuilla corpus, there are no examples of Class V verbs inflected for distributive case. Thus, further investigation will be need to find out whether this process of distributive vowel lengthening is still active in the synchronic grammar of TMD Cahuilla, or if distributivity in Class V verbs is instead expressed in some other way by contemporary speakers.

In sum, TMD Cahuilla, like other Cahuilla varieties, possesses a complex verb inflection system, where patterns of reduplication and suffixation in different inflectional contexts characterize five distinct inflection classes. As shown here, one key diagnostic to determine class membership involves the formal properties of the distributive construction for classes II-V. In addition, the durative construction will be informative of the distinction between Class I and other verbs.

5.4 Nominal morphology

5.4.1 Nouns as a lexical class

Nouns can be distinguished from other lexical classes of words in TMD Cahuilla by means of morphological inflection. Seiler (1977:64) notes that, of the class of nouns, the defining properties can be summarized as follows:

(16) Morphosyntactic properties of nouns

a. Nouns may be inflected for plural/pluractional

b. Nouns may be inflected for object case

c. A subset of nouns may occur with non-possessed noun ('absolutive') suffixes and/or may be marked as possessed[44]

Syntactically, nouns serve as subject or object arguments for predicates.[45] Nouns can be categorized into two types: those that are derived from other lexical categories (e.g., verbs, adverbs, etc.), and those that are non-derived, with non-derived forms comprising the majority of nominal stems. Many of the non-derived stems include kinship terms, body parts, and names of insects and animals. Some examples of non-derived nouns are shown in (17).

(17) TMD Cahuilla non-derived nouns

a.	*malmalem*	b.	*henang*
	[ˈmaɭmalɛm]		[ˈhɛnɐŋ]
	/ˈmal~mal-ɛm/		/ˈhɛ-naŋ/
	RED~butterfly-PL		3SG-tongue
	‘butterflies’ CM(TMDC0033.WAV)		‘his/her tongue’ CM(TMDC0028.WAV)

[44] Seiler (1977:64) describes that nouns can take person prefixes in possessive noun phrases; these prefixes belong to Prefix Slot -2 from the template described in Table 1. Thus, these markers are not exclusively attested with a single lexical class.

[45] Seiler (1977) refers to nouns as 'substantive nouns' to differentiate this class from other lexical classes, including pronouns and adjectives, which can head noun phrases.

c. *kiyul*
[ˈkiju̯l]
/ˈkiju-l/
fish-ABS
‘fish’ CM(TMDC0028.WAV)

d. *hululu*
[ˈhululu]
/ˈhululu/
'back' CM(TMDC0028.WAV)

e. *awal*
[ˈʔawɐ̯l]
/ˈʔawa-l/
dog-ABS
‘dog’ CM(TMDC0028.WAV)

f. *yuluka*
[ˈjulʊkɐʔ]
/ˈjulukaʔ/
‘hair/head’ CM(TMDC0028.WAV)

g. *ku’al*
[ˈkuʔɐ̯l]
/ˈkuʔa-l/
worm-ABS
‘worm’ CM(TMDC0028.WAV)

h. *naq’a*
[ˈnaqʔa]]
/ˈnaq-ʔa/
ear-POSS
‘their ear’ CM(TMDC0028.WAV)

i. *kisish*
[ˈkisɪʃ]
/ˈkisi-ʃ/
shade-ABS
‘shade’ CM(TMDC0028.WAV)

j. *he’i*
[ˈhɛʔi]
/ˈhɛ-ʔi/
3SG-foot
‘leg, foot’ CM(TMDC0028.WAV)

k.	*pit*	l.	*hiya'*
	[ˈpit]		[ˈhijɐʔ]
	/ˈpi-t/		/ˈhɛ-ja/[46]
	road-ABS		3SG-mother
	'road' CM(TMDC0028.WAV)		'mother' CM(TMDC0028.WAV)
m.	*pal*	n.	*hena*
	[ˈpaɬ]		[ˈhɛnɐʔ]
	/ˈpa-l/		/ˈhɛ-na/
	water-ABS		3SG-father
	'water' (TMDC0028.WAV)		'father' (TMDC0028.WAV)

The examples in (17) show most non-derived nouns are comprised of a root plus an absolutive (or non-possessed noun) suffix. Most noun roots are one or two syllables, though larger three-syllable roots are possible (e.g., (17d) and (17f)). In many of these nouns, determining the root shape can be opaque due to processes of morphophonological processes of vowel syncope and epenthesis; however, root shapes can be determined by looking at related morphologically complex forms, including noun compound stems, where nominal roots without absolutive markers are combined into a single stem, as shown in (18).

(18)	a.	*naq'a*		*pal*
		[ˈnaqʔa]]	c.	[ˈpaɬ]
		/ˈnaq-ʔa/		/ˈpa-l/
		ear-POSS		water-ABS
		'ear' CM(TMDC0029.WAV)		'water' CM(TMDC0029.WAV)

[46] In pronominal CV prefixes ending the mid vowel /ɛ/, /ɛ/ raises to [i] before the voiced palatal approximant /j/ (e.g., hɛ- (3SG) and nɛ- (1SG) become [hi-] and [ni-]).

b. *naqtemel*
[naqˈtɛmɛl]
/naq-ˈtɛm-l/
ear-close-ABS
‘disobedient’ (S&H 1979:122)

d. *pasukat*
[ˈpasukɐt]
/ˈpa-suk-t/
water-deer-ABS
‘horse’ GT(GT_VOCAB003.WAV)

Derived nouns constitute a smaller portion of the TMD corpus. Several examples of nouns derived from verbs are shown in (19).

(19)

	Verb form		Derived noun form
a.	*wani*		*wanish*
	[ˈwani]	→	[ˈwanɪʃ]
	/ˈwani/		/ˈwani-ʃ/
	‘to flow’ CM(TMDC0029.WAV)		river-ABS
			‘river’ CM(TMDC0029.WAV)
b.	*pemkuywen*		*kuyival*
	[pɛmˈkujwɛn]	→	[ˈkujɪval]
	/pɛ-m-ˈkuj-wɛn/		/ˈkuj-va-l/
	3SG-3PL-bury-DUR.PL		bury-LOC- ABS
	‘they bury him’ CM(TMDC0034.WAV)		‘cemetery’ CM(TMDC0006.WAV)
c.	*pisqal*		*pisiva’al*
	[ˈpisqɐl]		[ˈpisivɐʔɐl]
	/ˈpis-qal/		/ˈpis-vaʔal/
	come.out-DUR.SG		come.out-INS
	‘s/he is coming out’ CM(TMDC0029.WAV)		‘toilet’ CM(TM_NEOLOGISMS.WAV)

The examples in (19) show several nouns that are formed using a verb root plus an absolutive suffix (19a), or root plus location suffix and absolutive suffix ((19b) and (19c)).[47] Deverbal nouns in TMD Cahuilla constitute the majority of derived noun forms and are quite productive, not only in lexicalized forms, but also as a synchronic process used by speakers for creating descriptive neologisms. Derived nouns formed from adverbs, quantifiers, and other lexical categories are discussed below in §5.4.3.

5.4.2 Noun classes

In TMD Cahuilla, as attested in other varieties of Cahuilla and in other Takic languages (Hill & Hill 2019), there is a system of inflectional noun classes, as evidenced by that fact that members of each of these classes show different morphological patterns in their non-possessed or 'absolutive' forms. As discussed below in §5.4.5, other morphological patterns such as noun plural formation reveal a different system of categorization of nouns, which are at least partly semantically based.

Most nouns in TMD Cahuilla (and previously documented Cahuilla varieties) appear with an obligatory absolutive (non-possessed) suffix. Nouns may take one of four suffixes:

[47] In (19a), the root /-ˈwani-/ is combined with the absolutive suffix /-ʃ/ to form the noun for river. Seiler (1977:96) describes another suffix (/-iʃ/ ~ /-ʃ/) that looks like the absolutive suffix /-ʃ/, which he says means completed action or process, which is usually translated as 'one who does/did X.' Thus, the nominal form in (19a) could be translated as something like 'one that flows' or 'one that flowed' (a.k.a. river). Similarly, the complex suffix in the nominalized forms in (19b) and (19c) could be translated as 'place where you do X' or 'where X is done.' (e.g., [ˈkujɪva[]→ 'place where you bury,' and [ˈpisivɐʔɐ[]→ 'place where it comes out').

/-t, -l, -tʃ, -ʎ/ or, as discussed below, they may be zero-marked when unpossessed. These suffixes, which may have a nominalizing function when attaching to verbal roots, are referred to as 'absolutive' in Seiler (1977)[48] and 'non-possessed' in Hill (2005) for cognate forms in Cupeño. In possessed forms, these suffixes are usually dropped when a pronominal prefix is added.[49]

The 'absolutive' suffixes (ABS), as first described by Sapir (1930:111), are well attested across other Takic and Uto-Aztecan languages (Hill and Hill 2019). A smaller group of nouns that include loanwords, as well as the names of some semantic categories (including body parts, insects, and lizards) lack this absolutive suffix. Nouns of this type are referred to by Hill and Hill (2019:265) as 'zero-class nouns' (0-class). As discussed below in §5.4.4, nouns can be derived from verb stems, as well as stems from other lexical categories via the absolutive suffix. Examples of nouns with the absolutive suffix are shown in (20).

(20)	a.	[ˈpit]	/ˈpi-t/	road-ABS	'road'	CM(TMDC0028.WAV)
	b.	[ˈkijɐt]	/ˈkija-t/	child-ABS	'child'	CM(TMDC0028.WAV)
	c.	[ˈsuʔwɛt]	/ˈsuʔwɛ-t/	star-ABS	'star'	CM(TMDC0028.WAV)
	d.	[ˈkut]	/ˈku-t/	fire-ABS	'fire'	CM(TMDC0034.WAV)
	e.	[ˈpaɭ]	/ˈpa-l/	water-ABS	'water'	CM(TMDC0028.WAV)
	f.	[ˈkijuɭ]	/ˈkiju-l/	fish-ABS	'fish'	CM(TMDC0028.WAV)
	g.	[ˈʔɛwɛɭ]	/ˈʔɛlɛ-l/	blood-ABS	'blood'	CM(TMDC0028.WAV)
	h.	[ˈkiʃ]	/ˈki-tʃ/	house-ABS	'house'	GT(TMDC0034.WAV)
	i.	[ˈhɛpʊʃ]	/ˈhɛ-pu-tʃ/	3SG-face-ABS	'face'	CM(TMDC0028.WAV)
	j.	[ˈtukvɐʃ]	/ˈtukva-tʃ/	sky-ABS	'sky'	CM(TMDC0028.WAV)
	k.	[ˈwiʎ]	/ˈwi-l/	lard-ABS	'lard'	CM(TMDC0028.WAV)

[48] This term is also used in Hill & Hill (2019) in their description of cognate forms across Takic languages.

[49] A small class of semantically-defined words retain the non-possessed suffix and take a special suffix *-ki* in possessed forms.

l.	[ˈʔiŋɪʎ]	/ˈʔiŋi-l/	salt-ABS	‘salt’	CM(TMDC0029.WAV)
m.	[ˈmɛɲɪʎ]	/ˈmɛɲi-l/	moon-ABS	‘moon’	CM(TMDC0028.WAV)

Synchronically, these suffixes are suppletive in TMD Cahuilla and other Cahuilla varieties. Choice of absolutive suffix is lexically conditioned and reveals a system of five declension classes, which resembles the noun declension systems in other Takic languages (Hill & Hill 2019), as shown in the following table (Figure 52) (the following language abbreviations are used: TV = Tongva; SE = Serrano; KI = Kitanemuk; LU = Luiseño (Reyeño); AC = Acjachemem (Juaneño); CU = Cupeño; CA= Cahuilla).

TV	*-t*	*-r*	*-j*	*-Ø*
SE	*-t*	*-t$*	*-ch*	*-Ø*
KI	*-t*	*-t$*	*-ts*	*-Ø*
LU	*-t/-ta*	*-l/-la*	*-sh/-cha*	*-Ø*
AC	*-t*	*-l*	*-ch*	*-Ø*
CU	*-t*	*-l -lj*	*-sh*	*-Ø*
CA	*-t*	*-l -lj*	*-sh*	*-Ø*

Figure 46. cognate absolutive (non-possessed) suffixes in Takic languages (Hill & Hill 2019: 265)

There are some phonological patterns in the distribution of each of the allomorphs, which reflect their diachronic development (Hill & Hill 2019:274).[50] Although absolutive suffixes do not

[50] The allomorph /-t/ occurs following all four vowels, whereas /-l/ occurs after [a], [u], [ɛ] but never the high front unrounded vowel [i]. When preceded by [i], it is realized as the palatal lateral approximant [ʎ] (see discussion on the phonemic status of /ʎ/ and allophones of the alveolar lateral approximant in Chapter 2). The allomorph /-ʧ/ (surface [-ʃ]) occurs after [a], [u], [i] but never [ɛ].

frequently cooccur with other inflectional affixes and postpositions, some forms are attested where the absolutive suffix cooccurs with either a possessive suffix, or with a locative postposition (see §5.4.3 below for further discussion).

In the next section, I provide a noun template for non-derived nouns and discuss the ordering of affixes.

5.4.3 Noun template and affix ordering

Nominal constructions in TMD Cahuilla (as in other documented varieties of Cahuilla) exhibit a smaller number of affixes in comparison to verb forms. For example, maximally inflected nouns take, at most, one prefix and four suffixes. A full noun template is shown in Table 17 below with nominal affixes shown in order of their appearance in inflected forms.

Table 17. TMD Cahuilla noun template

-1	0	1	2	3	4
SUBJECT	ROOT	ABSOLUTIVE	POSSESSIVE	PLURAL	OBJECT
nɛ-(1SG), tʃɛm-(1PL), ʔɛ-(2SG), ʔɛm-(2PL), hɛ-(3SG), hɛm-(3PL)	RED~ (PL)	-t, -l, -ʃ, -ʎ	-ki, -ʔa	-(V)m	-i

The affixes shown in Table 17 above represent only those used with non-derived nouns (suffixes that derive nouns from other lexical classes are discussed in §5.4.4). The ordering of the affixes shown is fixed with no alternate orderings possible. Since the TMD corpus lacks full

paradigms for nouns, I show several paradigms from Seiler's unpublished fieldnotes that illustrate the ordering of the affixes shown in Table 18 below.

Table 18. Paradigms of non-possessed nouns

	ROOT + ABS	**ROOT + ABS + ACC**	**ROOT + ABS + PL**	**ROOT + ABS + PL + ACC**	**SOURCE**
a.	*qaxal*	*qaxali*	*qaxalem*	*qaxalmi*	(HS^{FN} NB_7:2528)
	[ˈqaxal]	[ˈqaxaʔli]	[ˈqaxalɛm]	[ˈqaxa-l-m-i]	
	/ˈqaxa-l/	/ˈqaxa-l-i/	/ˈqaxa-l-m/	/ˈqaxa-l-m-i/	
	quail-ABS	quail-ABS-ACC	quail-ABS-PL	quail-ABS-PL-ACC	
	'quail'	'quail (obj.)	'quails'	'quails (obj.)'	
b.	*tukut*	*tuku'ti*	*tuktam*	*tuktami*	(HS^{FN} NB_1.4:251)
	[ˈtukut]	[ˈtukuʔti]	[ˈtuktam]	[ˈtuktami]	
	/ˈtuk-t/	/ˈtuk-t-i/	/ˈtuk-t-m/	/ˈtuk-t-m-i/	
	bobcat-ABS	bobcat-ABS-ACC	bobcat-ABS-PL	bobcat-ABS-PL-ACC	
	'bobcat'	'bobcat (obj.)'	'bobcats'	'bobcats (obj.)'	
	ROOT	**ROOT + ACC**	**ROOT + PL**	**ROOT + PL + ACC**	
c.	*xuul*	*xuu'li*	*xuulem*	*xuulemi*	(HS^{FN} NB_7:2529-30)
	[ˈxuːl]	[ˈxuːʔli]	[ˈxuːlɛm]	[ˈxuːlɛmi]	
	/ˈxuːl/	/ˈxuːl-i/	/ˈxuːl-m/	/ˈxuːl-m-i/	
	bean	bean-ACC	bean-PL	bean-PL-ACC	
	'beans'	'bean (obj.)'	'beans'	'beans (obj.)'	

As the examples in Table 18 show, if the root takes an absolutive suffix, as in (a-b), it retains the absolutive suffix and any additional inflectional suffixes are added to the absolutive-marked (root + ABS) stem. This ordering mirrors that of the Cahuilla verb (as discussed in 5.3.1) where derivational morphemes are located closer to the root and inflectional morphemes are more peripheral. The ordering of inflectional morphemes with respect to the root + ABS stem also conforms to the generalization by Greenberg (1963:112) that "the expression of number

almost always comes between the noun base and the expression of case." Bybee (1985:33) also discusses morpheme ordering in terms of their relevance, noting that "[i]f there is a correspondence between what can be derivational or lexical and its relevance to the root meaning, then we might also expect the degree of relevance in general to predict the order of occurrence of morphemes with respect to a root or stem... the expression of number occurs closer to the noun base because it is more relevant to the meaning of the noun." Thus, the ordering of morphemes in TMD Cahuilla nouns is concordant with the typological ordering tendencies described in previous cross-linguistic studies.

In opposition to the absolutive or non-possessed nouns shown in (20) above, are possessed nouns. Some nouns in the possessed state simply add a pronominal possessive prefix to the root and drop the absolutive suffix. In other nouns, the possessive prefix cooccurs with a possessive suffix, either /-ki/ or /-ʔa/.[51] /-ʔa/ occurs in nouns that have an absolutive suffix, replacing it, while /-ki/ is a special suffix used with loanwords, and a small number words that refer to things which are not viewed as ownable.[52] Examples of some possessed nouns are shown in (21) below.

[51] A few monosyllabic open CV syllable roots exhibit a word-final glottal stop in their possessed form. It is not clear whether these glottal stops are possessive suffixes (an allomorph of -ʔa) or not.

[52] Words in this class include cultural items (flowers, baskets, mortar and pestle, sweathouse, shell money), as well as certain plants and foods (acorns, beans, deergrass) (see Seiler 1979 pp. 47, 93, 139, 143, 179, 189, 213, 247).

(21)

	Non-possessed		Possessed
a.	*hululu*		*hemhululu*
	[ˈhululu]	→	[hɛmˈhululu]
	/ˈhululu/		/ hɛm-ˈhululu/
	‘back’ CM(TMDC0028.WAV)		3pl-back
			‘their backs’ CM(TMDC0031.WAV)
b.	*kish*		*heki*
	[ˈkiʃ]	→	[ˈhɛki]
	/ˈki-ʃ/		/ˈhɛ-ki/
	house-ABS		3sg-house
	‘house’ GT(TMDC0034.WAV)		‘his house’ GT(TMDC0034.WAV)
c.	*taxmu’at*		*taxmu’a*
	[ˈtaxmuʔat]	→	[ˈtaxmuʔa]
	/ˈtaxmu-t/		/0-ˈtaxmu-ʔa/
	sing-ABS		3SG-sing-POSS
	‘song’ GT(TMDC0034.WAV)		his song’ GT(TMDC0034.WAV)
d.	*kulat*		*hemkul’a*
	[ˈkulat]	→	[hɛmˈkuɭʔa]
	/ˈkulat /		/hɛmˈkul-ʔa/
	make-ABS		3PL-make-POSS
	‘made thing’ CM(TMDC0003.WAV)		‘their made thing’ (TMDC0006.WAV)
e.	*eseeyta*		*chem’eseeytaki*
	[ʔʌˈsɛɪːtɐ]	→	[tʃɛmʔʌˈsɛɪːtɐki]
	/ʔʌˈsɛɪːta/		/ tʃɛm-ʔʌˈsɛɪːtɐ-ki/
	‘oil’ CM(CMSTORY1.WAV)		1PL-oil-POSS
			‘our oil’ CM(CMSTORY1.WAV)

f.	*tawpaxish*			*netawpaki*
	[ˈtaʊpaxɪʃ]		→	[nʌˈtaʊpaki]
	/ˈtaʊpa-x-ʃ/			/ nɛˈtaʊpa-ki/
	SUMMER-ABL-ABS			1SG-year-POSS
	‘year’ CM(TMDC0028.WAV)			‘my years/age’ CM(CMSTORY1.WAV)

As the forms in (21) show, some nouns lack an absolutive suffix (21a) and thus simply add a possessive pronoun prefix. Nouns that have an absolutive suffix exhibit two different types of inflection: (i) they attach a prefix only and drop the absolutive suffix (21b); (ii) they attach a prefix and replace the absolutive suffix with the /-ʔa/ suffix (21c) and (21d). The first type of inflection typically occurs with non-derived nouns, while the latter type with derived nouns. A third inflection type attach a prefix plus the special suffix /-ki/ (21e) and (21f). These nouns are usually loanwords or words that represent things that are not ownable. Some of these possessed /-ki/ nouns may also cooccur with an absolutive suffix, a phenomenon noted by Hill and Hill (2019:291) as unusual given that such forms “are marked for both possession and non-possession” (also see §5.4.4.5 below for the variable occurrence of the absolutive suffix in forms that attach a locative postposition). This can, however, be interpreted as indicated that non-possessed suffices in these forms have become lexicalized. In (22) I provide two forms that exhibit this pattern taken from the TMD Cahuilla corpus.

(22)	a.	*nesaanatki*	b. *neyuulyki*
		[nʌˈsaːnatki]	[nʌjuːʎki]
		/nɛ-ˈsaːna-t-ki/	/nɛ-juːʎ-ki/
		1SG-gum-ABS-POSS	1SG-y.brother-ABS-POSS
		‘my chewing gum’	‘my younger brother’
		CM(TMDC0002.WAV)	CM(TMDC0034.WAV)

As the examples in (22) show, the possessed forms have both an absolutive suffix (non-possessed) and possessive suffix. These forms contrast with nouns like (21f) that drop the absolutive suffix when the /-ki/ suffix is attached. In Table 19 below, I present partial paradigms taken from the TMD corpus to illustrate that, like non-possessed nouns, possessed nouns can also take plural and accusative suffixes.

Table 19. Partial paradigm of possessed nouns

ROOT + POSS	**ROOT + POSS + ACC**	**ROOT + POSS + PL**	**ROOT + POSS + PL + ACC**
taxmu'a	*taxmuay*	*hemtaxmu'am*	not attested
[ˈtaxmuʔa]	[ˈtaxmuaj]	[hɛmˈtaxmɐʔam]	
/0-ˈtaxmu-ʔa/	/0-ˈtaxmu-a-j/	/hɛm-ˈtaxma-ʔa-m/	
3SG-sing-POSS	3SG-sing-POSS-ACC	3PL-sing-POSS-PL	
'his songs'	'her songs (obj.)'	'their songs'	
GT(TMDC0034.WAV)	GT(TMDC0034.WAV)	CM(TMDC0034.WAV)	

As the examples in Table 19 show, possessed nouns retain the possessive suffix /-ʔa/ when adding both the accusative suffix /-i/, as well as the plural suffix /m/. A possessed accusative form with a possessive prefix and all three suffixes (e.g., /hɛm-ˈtaxma-ʔa-m-i/) is possible as well, though it is not attested in the TMD Cahuilla corpus. In roots that either lack the absolutive suffix and/or do not take a plural suffix, forms occupying the paradigm cells in Table 19 may not be inflected with all suffixes shown in the template in Table 17. For example, the noun /ˈhululu/ 'back' (shown in 21a) does not take an absolutive or plural suffix. Thus, /ˈhululu/ (the non-possessed form of 'back' (21a)) would occupy the cell corresponding to the

first column in Table 19. A possessed accusative form /nɛ-ˈhululu-j/ ‘my back (obj.)’ is also attested in the TMD Cahuilla corpus, which would occupy the cell in the second column in Table 19. /hɛm-ˈhululu/ ‘their backs’ would occupy the cell corresponding to the third column in Table 19, and a fourth form /hɛm-ˈhululu-j/, (so far unattested in the TMD data)[53] would be expected to occupy the fourth column in Table 19. Despite these gaps in the TMD Cahuilla possessed noun paradigms, other documented sources can be referenced to illustrate affix ordering in Cahuilla. In Table 20, I compile two full paradigms and one partial paradigm of possessed nouns from Sauvel and Munro (1981).

[53] There are still untranscribed TMD Cahuilla recordings that I was unable to use for this dissertation.

Table 20. Full and partial paradigms of possessed nouns

	ROOT + POSS	ROOT + POSS + ACC	ROOT + POSS + PL	ROOT + POSS + PL + ACC
a.	*hemki*	*eki*	*chemkim*	*chemkimi*
	[hɛm-kiʔ]	[ˈʔɛkij]	[ˈtʃɛmkim]	[ˈtʃɛmkimi]
	/hɛm-ki/	/ˈʔɛ-ki-j/	/ˈtʃɛm-ki-m/	/ˈtʃɛm-ki-m-i/
	3PL.POSS-house	2SG.POSS-house-ACC	1PL.POSS-house-PL	1PL.POSS-house-PL-ACC
	(S&M 1981:71)	(S&M 1981:72)	(S&M 1981:73)	(S&M 1981:73)
b.	*chem'ash*	*chem'achi*	*chem'achem*	*chem'ashmi*
	[ˈtʃɛmʔaʃ]	[ˈtʃɛmʔatʃi]	[ˈtʃɛmʔatʃɛm]	[ˈtʃɛmʔaʃmi]
	/ˈtʃɛm-ʔatʃ/	/ˈtʃɛm-ʔatʃ-i/	/ˈtʃɛm-ʔatʃ-m/	/ˈtʃɛm-ʔatʃ-m-i/
	1PL.POSS-pet	1PL.POSS-pet-ACC	1PL.POSS-pet-PL	1PL.POSS-pet-PL-ACC
	(S&M 1981:67)	(S&M 1981:72)	(S&M 1981:73)	(S&M 1981:73)
c.	*neliivruki*		*neliivrukim*	*neliivrukimi*
	[nɛˈliːvruki]		[nɛˈliːvrukim]	[nɛˈliːvrukimi]
	/nɛ-ˈliːvru-ki/		/nɛ-ˈliːvru-ki-m/	/nɛ-ˈliːvru-ki-m-i/
	1SG.POSS-book-POSS		1SG.POSS-book-POSS-PL	1SG.POSS-book-POSS-PL-ACC
	(S&M 1981:69)		(S&M 1981:73)	(S&M 1981:73)

As Table 20 shows, possessed nouns can be fully inflected with both the plural and accusative suffixes. In TMD Cahuilla, the application of the possessive /-ki/ suffix, and other affixation has extended beyond Spanish loanwords to include English words introduced through codeswitching as well. Some examples of this phenomenon are shown in (23) below.

(23) a. *chem'accountkingax*

[tʃɛmʔɐˈkaʊntkiŋax]

/ tʃɛm-ʔɐˈkaʊnt-ki-ŋax/

1PL-account-POSS-ABL

'from our account' CM(TMCONVO1.WAV)

b. *sonskim*

[ˈsʌnzkim]

/0-ˈsʌnz-ki-m/

3SG-sons-POSS-PL

'his sons' CM(TMCONVO1.WAV)

c. *nephewski*

[ˈnɛfjuzki]

/0-ˈnɛfjuz-ki/

3SG-nephews-POSS

'her nephews' CM(TMCONVO1.WAV)

d. *grandsonki*

[ˈgrænsʌnki]

/0-ˈgrænsʌn-ki/

3SG-grandson-POSS

'her grandson' CM(TMDC0034.WAV)

e. *chemrightski*

[tʃɛmˈraɪtskɪh]

/tʃɛm-ˈraɪts-ki/

1PL-rights-POSS

'our rights' CM(TMDC0034.WAV)

Some nouns that take the possessive suffix /-ki/ have also been reported as exhibiting morpheme doubling with inflected forms having two possessive suffixes /-ki/ and /-ʔa/. Hill and Hill (2019:292) provide an example in the possessed form /nɛ-ˈqiʃ-**ki-ʔa**/[54] 'my money' where there is an apparent doubling of possessive morphemes. In (24) below, I show two different possessed nouns in the accusative case that are attested from two different speakers of TMD Cahuilla.

(24)	a.	*chemqishkay*	b.	*chemqichikay*
		[tʃɛmˈqiʃkaj]		[tʃɛmˈqitʃɐkaj]
		/tʃɛm-ˈqitʃ-**k-a**-j/		/tʃɛm-ˈqitʃ-**k-a**-j/
		1SG-money-**POSS-POSS**-ACC		1SG-money-**POSS-POSS**-ACC
		'our money' GT(TMCONVO1.WAV)		'our money' CM(TMCONVO1.WAV)

The two forms in (24) also appear to expone both possessive suffixes, with syncope of the high front vowel in /-ki/ and loss of the glottal stop onset in /-ʔa/. The example in (24b) is also interesting in that it differs from (24a) and the example by Hill & Hill in that it has an extra vowel following the root /-qitʃ-/ and it is unclear if this is a suppletive root or rather that the vowel is epenthesized. These examples further exemplify variation across speakers of the Desert dialect of Cahuilla.

[54] Hill and Hill (2019) do not cite the source for the possessed form /nɛ-ˈqiʃ-ki-ʔa/ other than labeling it (MCA) 'Mountain Cahuilla.' It is likely from a published source coauthored by language expert Mrs. Katherine Sauvel (*Chem'ivillu* (Sauvel and Munro 1981), or *Isill Hekwas Waxish* (Sauvel and Elliott 2004)).

5.4.4 Nominalized forms

In this section, I discuss various suffixation constructions that may be used to derive nouns from nouns verbs, adjectives, and adverbs.

5.4.4.1 Abstract and event suffixes (-at, -iʎ)

The abstract and event suffixes are commonly found in many deverbal nouns; I thus gloss them simply as a nominalizers (NMLZ), so as not to confuse them with the absolutive suffixes /-t/ and /-ʎ/. Nouns of this type usually refer to an abstract idea or an event. Sometimes the two are used interchangeably to refer to the same event without a change in meaning (e.g., ˈpuwax-at ~ ˈpuwax-iʎ 'witch dance' (Seiler 1979:162); ˈpuniʔat ~ ˈpuniʔiʎ 'eagle dance' (Seiler 1979:161)). Examples of deverbal TMD Cahuilla nouns with -at and -iʎ are shown in (25).

(25) a. *taxmu'at*
[ˈtaxmuʔat]
/ˈtaxmu-at/
sing-NMLZ
'song'
CM(TMDC0034.WAV)

b. *nekenat*
[ˈnɛkʌnɐt]
/ˈnɛkɛn-at/
come-NMLZ
'the one that's coming'
CM(TMDC0034.WAV)

d. *kulati*
[ˈkulati]
/ˈkul-at-i/
make-NMLZ-ACC
'thing that was made (obj.)'
CM(TMCONVO1.WAV)

e. *yengily*
[ˈjɛŋɪʎ]
/ˈjɛŋ-il/
pass.time-NMLZ
'a while'
CM(TMCONVO1.WAV)

c.	*nekat*		*silyhiischily*
	[ˈnɛkɐt]	f.	[sɪʎˈhiːstʃɪʎ]
	/ˈnɛk-at/		/sɪʎˈhiːstʃ-il/
	come-NMLZ		story-NMLZ
	‘person that comes from an area’		‘a story’
	CM(TMCONVO1.WAV)		CM(TMDC0005.WAV)

As the examples in (25) show, nouns ending in -at or -iʎ may refer to abstract ideas (25e), or events that occurred over some duration (e.g., a singing (25a), a storytelling (25f), or a making (25d)). Although Seiler (1977:89) mentions that nouns ending in -at and -iʎ tend to be used interchangeably as in ‘variants’ of one and the same word, the examples in (25b) and (25c) show that this is not the case in TMD Cahuilla, where even similar looking verb stems both ending in -at can have subtle differences in meaning. The example in (25b) is taken from a larger noun phrase sɛˈmaːna ˈnɛkɛnat ‘the coming week’, whereas the example in (25c) is a more general term referring to a person who comes or came (realis) from a specific area.

5.4.4.2 Instrumental suffixes (-vaʔal, -vɛl, piʃ)

The derivational suffixes /-vaʔal/, /-vɛl/, and /-piʃ/ are productive in TMD Cahuilla, where they are used to derive nouns from verbs. Though all the suffixes in this group may function to derive instruments, subsets of them can derive nouns of various other types. For example, /-vaʔal/ is also used to derive nouns that refer to places or locations, while /-vɛl/ and /-piʃ/ can derive abstract nouns and items used in a specific context. All three suffixes have been discussed in the previous literature (Seiler 1977:90-91; Hill and Hill 2019:1261), where they are analyzed as being comprised of the subordinating suffixes /-vɛ/ (realis), /-pi/ (irrealis), and /-va/ (used to denote a location or locale) plus a nominalizing suffix (the absolutive suffix). Cognates of these

suffixes are also found in other Cupan languages (Hill and Hill 2019:1260-62). Examples of nouns derived from these suffixes are shown below in (26).

(26)

a.	*tekluvel*		b.	*vukmenilypish*
	[ˈtɛkluvɛl]			[vʊkˈmɛnɪʎpɪʃ]
	/ˈtɛklu-vɛl/			/vuk-ˈmɛni-l-piʃ/
	be.still-INS			throw-turn.over-ABS-INS
	‘midday, noon’ CM(TMDC0034.WAV)			‘spatula’ CM(TM_MVOCAB.WAV)
b.	*paxanivel*		c.	*takinva’al*
	[ˈpaxɐnɪvɛl]			[ˈtakɪnvɐʔal]
	/ˈpaxa-ni-vɛl/			/ˈtaki-n-vaʔal/
	enter-CAUS-INS			be.pasted-CAUS-INS
	‘pants’ CM(TMDC0034.WAV)			‘bandaid’ CM(TM_MVOCAB.WAV)
c.	*kavivel*		d.	*kuyival*
	[ˈkavivɛl]			[ˈkujival]
	/ˈkavi-vɛl/			/ˈkuj-val/
	have.hole-INS			bury-INS
	‘pillow’ CM(TM_MVOCAB.WAV)			‘cemetery’ CM(TMDC0034.WAV)
d.	*tingaypish*		e.	*pisiva’al*
	[ˈtiŋajpiʃ]			[ˈpisɪvɐʔal]
	/ˈtiŋaj-piʃ/			/ˈpis-vaʔal/
	cure-INS			come.out-INS
	‘medicine’ CM(TM_MVOCAB.WAV)			‘restroom’ CM(TM_MVOCAB.WAV)

As the examples above show, the nominalized forms in (26) are primarily derived from verb stems. Nouns ending in /-vel/ can either refer to objects or something more abstract like a

time of the day, and the meaning of such nouns may be translated in English as involving a relative clause inflected for realis aspect (e.g., [ˈpaxɐnɪvɛ] lit. ‘thing that was entered’ (stepping into pants), [ˈkavivɛ] lit. ‘thing that had a hole (possibly referring to an indentation in the pillow from head). Nouns ending in /piʃ/ on the other hand, tend to have an interpretation of purpose (e.g., [ˈtiŋajpiʃ] lit. ‘thing with which to cure,’ [vʊkˈmɛnɪʎpɪʃ] lit. ‘thing with which to turn something over,’ while nouns that end in /-vaʔal/ ~ /-val/[55] tend to reference a location (e.g., [ˈkujiva] ‘cemetery,’ [ˈpisɪvɐʔa] ‘restroom.’

5.4.4.3 Agentive suffixes (-vaʃ, -wɛt)

Another class of derivational suffixes used to derive nouns from verb stems are the agentive suffixes /-vaʃ/ and /-wet/. Seiler (1977: 97-98) suggests there is a difference in meaning between the two suffixes with the /-vaʃ/ appearing in nouns denoting a person ‘performing in a special situation’ and /-wet/ in nouns where the person is a ‘habitual or competent performer.’ These suffixes are exemplified in (27).

(27) a. *tingayvash*
[ˈtiŋajvaʃ]
/ˈtiŋaj-vaʃ/
cure-AGT
‘doctor’ CM(TM_MVOCAB.WAV)

[55] The suffix /-val/ appears to be a reduced allomorph of /-vaʔal/ with loss of final vowel and preceding glottal stop.

b. *pulivash*
[ˈpulivaʃ]
/ˈpuli-vaʃ/
drop-AGT
'one that drops (drop ball)' GT(GT_VOCAB2.WAV)

In the TMD Cahuilla corpus there are few examples of nouns ending in the /-vaʃ/ suffix (see Hill and Hill (2019: 1265) and Seiler (1977:97-98) for more examples); however, the example in (27a) is consistent with previous descriptions in terms of the resulting noun referring to an agent from a specialized field. In the second example (27b), the derived noun does not refer to a person but rather an object. This shows that /-vaʃ/ can also be used to derive nouns that refer to objects as well, particularly used in a special activity (e.g., baseball). Below in (28), are several examples of nouns ending in the other agentive suffix (-wet).

(28) a. *tax'u'uniwet*
[taxˈʔuʔuniwɛt]
/tax-ˈʔu~ʔuni-wɛt/
REFL-RED~show-AGT
'teacher' CM(TM_MVOCAB.WAV)

b. *nu'inwetem*
[ˈnuʔɪnwɛtɛm]
/ˈnuʔɪn-wɛt-m/
tell.to.do-AGT-PL
'leaders' CM(TMDC0034.WAV)

d. *pe'ivaniwet*
[pʌˈʔivaniwɛt]
/pɛˈʔiva-ni-wɛt/
3SG-run-CAUS-AGT
'person in charge' GT(TMCONVO1.WAV)

e. *peyawniwet*
[pʌˈjawniwɛt]
/pɛ-ˈjaw-ni-wɛt /
3SG-grab-CAUSE-AGT
'catcher' GT(GT_VOCAB2.WAV)

c.	*ja'i pepu'anwet*		f.	*kapiwet*
	[ˈjaʔi	pɛˈpuʔanwɛt]		[ˈkapiwɛt]
	/ˈjaʔi	pɛ-ˈpuʔan-wɛt/		/ˈkapi-wɛt/
	wind	3SG-blow-AGT		break-AGT
	'fan' CM(TM_MVOCAB.WAV)			'broken one' GT(TMCONVO1.WAV)

The examples in (28) show forms ending in the agentive suffix /-wet/, which can also be used to derive deverbal nouns. In his examples, Seiler glosses /-wet/ as 'habitual or competent performer,' which seems to be characteristic for all the nouns in (28). However, (28f) seems to contradict Seiler's glossing since, in this case, the speaker is actually referring to a person who speaks Cahuilla poorly (i.e., broken Cahuilla). This example shows that a secondary meaning of 'performing X to a great degree' is also possible in nouns ending in /-wet/.

5.4.4.4 Demonym suffixes (-ŋa-x-viʃ)

Demonym suffixes are used to convey membership to a certain group or group of inhabitants that hail from a specific area. The base for such derivations are usually nouns referring to a specific location. When the demonym suffixes are added the resulting semantic interpretation would be 'one who is from X,' where X is a specific place. Some examples of nouns derived with this suffix taken from the TMD corpus are shown in (29).

(29) a.	*ipaxvish*		b.	*pengaxvichem*
	[ˈʔipɐxvɪʃ]			[ˈpɛŋaxvɪtʃɛm]
	/ˈʔipa-x-viʃ/			/ˈpɛŋa-x-viʃ-m/
	here-ABL-DMY			THERE-ABL-DMY-PL
	'person from here'			'those from over there'
	CM(TMCONVO1.WAV)			CM(TMCONVO1.WAV)

c.	*sovoovangaxvish*	d.	*yewevichem*
	[sʌˈvoːvɐ-ŋax-vɪʃ]		[ˈjɛwɛvɪtʃɛm]
	/soˈvoːva-ŋax-viʃ/		/ˈjɛwɛ-viʃ-m/
	Soboba-ABL-DMY		long.ago-ABL-PL
	‘person from Soboba’		‘those from long ago’
	CM(TMDC0034.WAV)		CM(TMDC0034.WAV)

In (29a) the speaker is referring to someone who is from the Torres Martinez Indian Reservation. Conversely, (29b) refers to an individual not from Torres Martinez but from ‘over there’ (i.e., another tribe or tribal territory). Example (29c) also refers to another Native American reservation named Soboba, thus the gloss is ‘a person from Soboba.’ In (29d) the speaker is referring to the ‘Cahuillas from long ago’ or ancestors.

5.4.4.5 Locational and directional postpositions (-(i)ka, ŋa, ŋax)

A class of postpositions relating to location or direction can be attached to nouns, as well as verb stems. Seiler (1977) isambivalent as to whether these postpositions are derivational or inflectional in nature, noting that “it remained to show how (the postpositions) differ from derivational affixes,” and whether they actually “produced adverbs out of nouns” (Seiler 1977:202). Other sources present these postpositions as being ‘inflectional’ given that they can occur on animate nouns, which “are almost never inflected for case” (Hill and Hill 2019:348). Given these conflicting accounts, and in the absence of definitive evidence to point to one analysis or the other, I remain neutral in classifying these morphemes as either inflectional or derivational and instead focus on describing their behavior, as exhibited in TMD Cahuilla. Below in (30) are several examples of nouns with deictic postpositions attached, taken from the TMD corpus.

(30) a. *etemanga*
[ʔɛˈtɛmɐŋɐ]
/ʔɛ-ˈtɛma-ŋa/
2SG-land-LOC
'on your land' CM(TMDC0034.WAV)

b. *temayka*
[ˈtɛmaɪkɐ]
/ˈtɛma-ika/
land-DAT
'to the land' CM(TMDC0034.WAV)

c. *siwishnga*
[ˈsɪwɪʃŋa]
/ˈsiw-ʃ-ŋa/
hot-abs-LOC
'in the hot' CM(TMDC0030.WAV)

d. *kuyivalka*
[ˈkujivɐɭka]
/ˈkuj-va-l-ka/
bury-LOC-ABS-DAT
'to the cemetery' CM(TMDC0006.WAV)

e. *kuyivalnga*
[ˈkujivɐɭŋaʔ]
/ˈkuj-va-l-ŋa/
bury-PLACE-ABS-LOC
'in the cemetery'
CM(TMDC0006.WAV)'

f. *qawishka*
[ˈqawɪʃkɐ]
/ˈqaw-ʃ-ka/
hard-ABS-DAT
'to the mountain' CM(TMCONVO1.WAV)

g. *maqilyka*
[ˈmaqɪʌka]
/ˈmaqi-l-ka/
meet-ABS-DAT
'to the meeting' GT(TMCONVO1.WAV)

The examples in (30) show two different patterns in nouns that attach the locational and directional postpositions. In the first pattern, the absolutive suffix is lost and replaced by one of the deictic postpositions, as shown in (30a-b). For example in (30b) the stem /ˈtɛma-l/ attaches the dative suffix /-ika/ and yields /ˈtɛma_ɪka/ (where the underscore represents the deleted

absolutive suffix). In the second pattern, the same deictic postpositions are attached but the absolutive suffix is retained, (30c-g). Conversely in (30f), the stem /ˈqawi-ʃ/ attaches the same dative suffix /-ka/ which yields /ˈqawiʃka/ but retains the absolutive suffix (as shown in bold). With regard to the local case postposition /-ŋa/, both Seiler (1977:81) and Hill & Hill (2019:346) note that two similar forms exist side by side in the lexicon, one with both the /-ŋa/ postposition and the absolutive suffix, and one with the /-ŋa/ postposition only. While Seiler seems to indicate no change in meaning between the two, Hill & Hill (2019:347) report subtle differences in the semantic interpretations between the two in Cahuilla, Luiseño, Acjachemen, and Cupeño. In the TMD corpus, two similar forms were recorded from the same speaker /ʔɛˈtɛmɐŋɐ/ (2SG-land-LOC) 'on your land' and /ˈtɛma⌊ŋɐ/ (land-ABS-LOC) 'on that land.' In these examples, the speaker appears to use the form with the absolutive suffix for non-possessed nouns and no absolutive suffix when the noun is possessed.

Also noteworthy is the fact that in (30d), (30f), and (30g), the dative case postposition /-(i)ka/ also cooccurs with the absolutive suffix. This pattern runs contrary to previous descriptions from Seiler (1977:81) and Hill and Hill (2019:346) who report that the dative suffix /-ika/ does not cooccur with the absolutive suffix in Cahuilla. The forms in (30d), (30f), and (30g) however, show that such forms are possible and are attested in the speech of TMD Cahuilla speakers, possibly representing a shift in the synchronic grammar. More research is however needed to corroborate whether this is systematically attested in the language.

5.4.5 The morphology and morphophonology of plural nouns

In this section, I describe the morphological and morphophonological properties of plural marking in TMD Cahuilla, as they exhibit a significant amount of complexity and serve to illustrate some morphologically conditioned phonological processes attested in the language. In all count nouns, plurality and plural agreement can be expressed morphologically in one of three ways: (i) reduplication, (ii) suffixation, or (iii) reduplication with concomitant suffixation, a pattern of multiple exponence. Although suffixation is the most common way in which plurality is encoded in nouns and adjectives, all exponence strategies are attested in the TMD Cahuilla corpus. In Cupeño, nouns referring to humans are marked plural via reduplication (Hill 2005:177), a pattern that Hill & Hill (2000:242) reconstruct for Proto-Uto-Aztecan as a distinction between a 'marked' noun class that is pluralized through reduplication and an 'unmarked' class that is pluralized through suffixation. Similarly, in TMD Cahuilla and other Cahuilla varieties, reduplication (with or without concomitant suffixation) is also associated with a 'marked' and semantically-defined class of nouns referring to material culture, while suffixation is the default or 'unmarked' pattern of plural exponence.

5.4.5.1 Plurality via reduplication

Plurality may be encoded via CV- reduplication of the root,[56] as exemplified in (31) below. Stress is assigned to the reduplicative prefix (which is part of the stem), and the root-initial

[56] Recall from section §5.3 that the left edge of the root and the stem are co-extensive in Cahuilla.

vowel is deleted (the locus of syncope is represented with an underscore). Monosyllabic roots like (31a), however, do not exhibit root-initial syncope as doing so would yield an illicit output.[57]

(31) Plural reduplication in Cahuilla nouns (Seiler 1977, 1979)

	Singular	**Plural**		
	X-ABS	**RED~X-ABS**		
a. *kish*	ˈki-ʃ	ˈki~ki-ʃ	‘house’	(HS 1979:80)
b. *kumal*	ˈkuma-l	ˈku~k_ma-l	‘wooden spoon’	(HS 1979:84)
c. *qawish*	ˈqawi-ʃ	ˈqa~k_wi-ʃ	‘rock’	(HS 1979:168)
d. *kava’mal*	ˈkavaʔma-l	ˈka~k_vaʔma-l	‘ceramic olla’	(HS 1977:49)
e. *tapa’mal*	ˈtapaʔma-l	ˈta~t_paʔma-l	‘ceramic pot’	(HS 1979:198)
f. *takish*	ˈtaki-ʃ	ˈta~t_ki-ʃ	‘pestle’	(HS 1977:49)
g. *chipatmal*	ˈʧìpatma-l	ˈʧì~ʃ_patma-l[58]	‘flat basket’	(HS 1977:49)
h. *tevingily*	ˈtɛviŋi-ʎ	ˈtɛ~t_viŋi-ʎ	‘trinket basket’’	(HS 1979:213)
i. *kaputily*	ˈkaputi-ʎ	ˈka~k_puti-ʎ	‘small round basket’	(HS 1979:71)

As the examples in (31) show, syncope of the stem-initial vowel is frequently attested in reduplicative forms both with (31b-j) and without (31a) stem-initial vowel syncope. Seiler (1977:49) classifies these nouns (and adjectives) exhibiting this morphophonemic process as having a ‘distributive’ meaning, and refers to them as such. In the TMD Cahuilla corpus there are several examples of reduplications in nouns of this type as show in (32) below.

[57] Syncope of the stem-initial vowel may sometimes be blocked if doing so violates a phonotactic constraint (e.g., reduplication of (31a) /ki-ʃ/ ‘house’ would yield unattested /*kik-ʃ/ creating a complex coda, which is banned in TMD Cahuilla.

[58] In this reduplicated form, syncope of the initial vowel of the base causes /ʧ/ to lenite to [ʃ], following a phonological rule responsible for the allophonic distribution of [tʃ] and [tʃ] (see discussion in Chapter 2 (§2.4.2.3)).

(32) Plural reduplication in TMD Cahuilla nouns

	Singular	**Plural**		
	X-ABS	**RED~X-ABS**		
a. *kelawat*	ˈkɛlawa-t	ˈkɛ~k_lawa-t	‘wood’	CM(TMDC0019.WAV)
b. *tapamal*	ˈtapama-l	ˈta~tapama-l	‘pot’	CM(TMDC0019.WAV)
c. *kavamal*	ˈkavama-l	ˈka~k_vama-l	‘bottle’	CM(TMDC0019.WAV)
d. *chipatmal*	ˈʧipatma-l	ˈʧi~ʃ_patma-l	‘flat basket’	CM(TMDC0019.WAV)
e. *hatiwenet*	ˈhati-wɛn-ɛ-t	ˈha~htɪ-m-wɛn-ɛ-t	‘light’	CM(TMDC0019.WAV)

The examples in (32) show a similar pattern of using reduplication to form plurals in TMD Cahuilla. Some of these forms however, do not exhibit the expected pattern of root-initial syncope, as in (32b). There are also forms that exhibit the addition of segmental material (a voiced bilabial nasal) along with syncope, as in (32e). In addition, these plural forms seem to be attested in the lexicon alongside forms that use plural suffixation. For example, Seiler cites a plural form for /ˈwajismal/ ‘dish as /ˈwa~wjismal/ ‘dishes’ (Seiler 1977:232), which is given in TMD Cahuilla as [ˈwajismal-ɛm] CM(TMDC0019.WAV). My language expert Mrs. Morreo also provided two forms for the plural of ‘rock’ [ˈqaqwɪʃ] and [ˈqaqwɪtʃɛm] CM(TMDC0019.WAV), which she said are both acceptable, though she did not indicate if there was any subtle difference in meaning. Nouns that encode plurality through reduplication appear to form a semantic class that has been previously noted as involving "implements of material culture" (Seiler 1977:49) that includes brush hut dwellings, baskets, pottery, and instruments used for processing and cooking traditional foods.

5.4.5.2 Plurality via suffixation

Both possessed and non-possessed nouns may be pluralized by adding the plural , which has three allomorphs, namely *-am, -em* and *-m*. These allomorphs exhibit phonological conditioning in their distribution as follows: (i) the plural *-am* allomorph is associated with root vowel syncope (33a-g); (ii) the plural *-em* allomorph is associated with variable syncope (33h-q)[59] and (iii) the plural *-m* allomorph is selected with vowel-final bases (33r-s). One possible analysis[60] is that non-possessed nouns that select for the *-am* plural allomorph are underlyingly monosyllabic (CVC) and epenthesize a vowel when attaching ABS suffixes to avoid a complex coda; nouns that select the *-em* plural allomorph, in contrast, would be selected by disyllabic CVCV roots, as well as roots larger than CVCV (33o-p). The hypothesized noun root forms are provided in (33).[61]

[59] Cognate plural nouns of those in (33a-e) in closely related Cupeño are analyzed as involving a plural suffix *-m*, preceded by an epenthetic vowel [a] (also [a] in Cahuilla) or [i] ([ɛ] in Cahuilla) in absolutive (non-possessed) nouns. In Cupeño, the quality of the epenthesized vowel is analyzed as being predictable based on the ABS suffixes (Hill 2005:35). This generalization does not hold for Cahuilla, except for nouns containing the ABS suffix -ʃ, which are always followed by *-ɛm* in plural forms.

[60] This analysis also involves a trend, where syncope optionally applies to [i], [ɛ] and [u], but [a] generally resists syncope. A counterexample to this generalization is *ˈtatʃika-l* 'cicada bug (sg.)' vs. *ˈtatʃik-l-am* 'cicada bug (pl.)'

[61] In roots larger than CVCV, it is difficult to determine whether the vowel preceding the NPN suffix is epenthesized or underlying. Regardless of which of these may be the case, the plural *-ɛm* suffix is always selected due to the shape of the stem.

(33) Plural suffixation

		Singular	**Plural**		
	NOUN	**X-ABS**	**X-ABS-PL**		
a. *nukat*	ˈnuk	ˈnuka-t	ˈnuk-t-am	‘created one’	(HS 1977:48)
b. *hunal*	ˈhun	ˈhuna-l	ˈhun-l-am	‘badger’	(HS 1979:60)
c. *qawal*	ˈqaw	ˈqawa-l	ˈqaw-l-am	‘woodrat’	(HS 1977:47)
d. *qichily*	ˈqitʃ	ˈqitʃi-ʌ	ˈqiʃ-ʌ-am	‘money’	(HS 1979:172)
e. *sukat*	ˈsuk	ˈsuka-t	ˈsuk-t-am	‘deer’	(HS 1979:172)
f. *tavut*	ˈtav	ˈtavu-t	ˈtav-t-ɛm	‘rabbit’	(HS 1977:47)
g. *navet*	ˈnav	ˈnavɛ-t	ˈnav-t-ɛm	‘cactus’	(HS 1977:47)
h. *nukat*	ˈnuka	ˈnuka-t	ˈnuka-t-ɛm	‘doll’	(HS 1979:129)
i. *huyal*	ˈhuja	ˈhuja-l	ˈhuja-l-ɛm	‘arrow’	(HS 1979:62)
j. *qaxal*	ˈqaxa	ˈqaxa-l	ˈqaxa-l-ɛm	‘quail’	(HS 1979:169)
k. *kiyul*	ˈkiju	ˈkiju-l	ˈkiju-l-ɛm	‘fish’	(HS 1979:82)
l. *se’ish*	ˈsɛʔi	ˈsɛʔi-ʃ	ˈsɛʔi-tʃ-ɛm	‘flower’	(S&M 1981:54-56)
m. *qingish*	ˈqiŋi	ˈqiŋi-ʃ	ˈqiŋ-tʃ-ɛm	‘squirrel’	(HS 1979:172)
n. *tuchily*	ˈtutʃi	ˈtutʃi-ʌ	ˈtuʃ-ʌ-ɛm	‘hummingbird’	(HS 1979:218)
o. *piyaxat*	ˈpijaxa	ˈpijaxa-t	ˈpijax-t-ɛm	‘rainbow’	(HS 1977:47)
p. *waxachily*	ˈwaxatʃi	ˈwaxatʃi-ʌ	ˈwaxaʃ-ʌ-ɛm	‘frog’	(HS 1979:233)
q. *kupanily*	ˈkupani	ˈkupani-ʌ	ˈkupani-ʌ-ɛm	‘woodpecker’	(HS 1979:85)
r. *ya’i*	ˈjaʔi	ˈjaʔi	ˈjaʔi-m	‘wind’	(HS 1955:1037)
s. *kaytu*	ˈkajtu	ˈkajtu	ˈkajtu-m	‘enemy’	(HS 1979:75)

Both syncope and epenthesis are also attested in plural forms that undergo further suffixation: this is observed in forms that take the plural suffix followed by the object marker *-i*, as shown in the unpossessed forms in (34) below.

(34) Plural + objective case (S M7:2528, Seiler 1977:47-49)

		Singular	**Plural**	**Plural + Obj.**	
a.	*qaxal*	ˈqaxa-l ‘quail’	ˈqaxa-l-ɛm	ˈqaxa-l-m-i	*No stem*
b.	*se’ish*	ˈsɛʔiʃ ‘flower’	ˈsɛʔi-tʃ-ɛm	ˈsɛʔi-ʃ-m-i	*syncope*
c.	*taxliswet*	ˈtaxlis-wɛ-t ‘Indian’	ˈtaxlis-we-t-ɛm	ˈtaxlis-wɛ-t-m-i	
d.	*tavut*	ˈtavu-t ‘rabbit’	ˈtav-t-ɛm	ˈtav-t-ɛm-i	*Stem syncope*
e.	*navet*	ˈnavɛ-t ‘cactus’	ˈnav-t-ɛm	ˈnav-t-ɛm-i	
f.	*sukat*	ˈsuka-t ‘deer’	ˈsuk-t-am	ˈsuk-t-am-i	

As the examples above show, root-final syncope conditioned by the plural suffix is attested in some CVCV roots but not others; this suggests syncope is lexically conditioned (compare (33f-j) vs. (33k-n) and (33p) vs. (33q)). However, when additional suffixes, such as the object case marker *-i* are attached, nouns that did not undergo stem syncope will show syncope of the plural suffix vowel instead (34a-c). On the other hand, nouns that undergo stem syncope must retain the plural suffix vowel due to phonotactic constraints: vowels are not deleted in the cases where their absence would lead to a complex syllable margin (e.g., *ˈ*ta**v**_-**t**_-**m**-i* in (34d)).[62] This assumes a cyclic analysis whereby the first round of syncope applies with the plural suffix, and then is blocked when *-i* is added. Conversely, if no syncope occurs on the first round with the plural, it can apply with the addition of *-i*. Seiler describes this pattern as involving syncope of the plural suffix vowel triggered by the object case marker (1977:49).

[62] It is not clear why some CVCV nouns such as (34a) and (34b) do not undergo stem syncope in the first place or why the vowel preceding the plural suffix is deleted when the object case marker is added, since either of the resulting forms would *not* be phonotactically illicit (e.g., *ˈ*sɛʔ.tʃɛm* and *ˈ*sɛ.ʔi.tʃɛ.mi*). Since the goal is simply to illustrate that syncope and epenthesis occur in various contexts across the grammar, I leave this analysis for future research.

Nouns that encode plurality through suffixation include a wide variety of animate and inanimate nouns that do not seem to form a coherent semantic class. Thus, as observed for Cupeño and other Uto-Aztecan languages, suffixation appears to be the default pattern of exponence that encodes plurality in Cahuilla.

5.4.5.3 Plurality via reduplication and concomitant suffixation

Plurality may also be encoded in nouns through both reduplication and suffixation, resulting in cases of multiple (extended) exponence, as shown in (35) below.

(35) Plural reduplication + suffixation

		Singular	**Plural**		
		X-ABS	**RED~X-ABS-PL**		
a.	*awal*	ˈʔawa-l	ˈʔa~ʔ_wa-l-ɛm	‘dog’	(HS 1977:48)
b.	*naxanish*	ˈnaxani-ʃ	ˈna~n_xani-tʃ-ɛm	‘man’	(HS 1977:124)
c.	*ekwashmal*	ˈʔɛkʷaʃma-l	ˈʔɛ~ʔ_kʷaʃma-l-ɛm	‘boy’	(HS 1977:48)
d.	*nawishmal*	ˈnawiʃma-l	ˈna~n_wiʃma-l-ɛm	‘girl’	(HS 1977:48)
e.	*qawilyush*	ˈqawiʎu-ʃ	ˈqa~k_wiʎu-tʃ-ɛm[63]	‘rock person’	(HS 1977:48)

Like the examples in (33), reduplication involves prefixation of a CV reduplicant that triggers syncope of the stem-initial vowel, however, in examples in (35), there are no cases where the stem-final vowel is deleted when the plural suffix is added, since this would cause illicit consonant sequences. Only the plural *-ɛm* allomorph is attested in these plural forms and it is unclear whether the failure of the plural suffix conditioned root-final syncope is due to a

[63] In this example, /q/ in the stem is realized as [k] due to the (labial-)velar consonant that follows it.

constraint on the cyclic application of syncope or a more general constraint against complex syllable margins. For example, in (35a), stem-initial syncope plus stem-final syncope conditioned by a plural suffix would yield a complex syllable margin and result in the unattested form *ˈʔa~***ʔ_w_-l-***ɛm*. In (35b), however, syncope conditioned by the plural suffix would not result in a complex syllable margin (*ˈ*na~n_xa**n_-ʧ-***ɛm*), yet this form is unattested. Instead, the attested plural form without additional syncope of the stem (ˈ*na~n_xani-ʧ-ɛm*) surfaces, suggesting that it may be due to syncope not being able to be applied more than once in the same word (as first observed in Seiler (1977)). There are also no nouns attested that show both reduplication and plural suffixation without stem-initial syncope (e.g., *ˈ*ʔa~ʔawal-ɛm*). Nouns that are pluralized in this way form a loose semantic class that primarily includes humans in a basic, non-marked status, as well as certain humans and animals that are associated with supernatural powers, such as dogs and shamans. In the next chapter I discuss the complex morphophonological patterns attested in reduplicative constructions, which can encode a variety of meanings.

Chapter 6 Reduplication

6.1 Introduction

Many Uto-Aztecan languages are documented as having complex reduplication systems with multiple phonological patterns of reduplication, each serving a variety of semantic or syntactic functions, but where a one-to-one association between meaning and reduplicative form is not always attested (Haugen 2008, 2009; see references therein). Prior descriptive work on Cahuilla has addressed its robust reduplication system, where reduplication can convey a wide variety of meanings in complex patterns of exponence (Seiler 1977; Fuchs 1970). In TMD Cahuilla, there are several ways in which the morphological process of reduplication is deployed in order to express the notion of *multiplicity* of subjects, objects or actions. Reduplication may be used to encode plurality in nouns (as discussed in Chapter 5) and distributivity in verbs. Reduplication may also be involved in the exponence of durative aspect and other morphological constructions in a particular inflection verb class. These meanings can either be encoded via reduplication, suffixation, vowel lengthening or a combination of these in complex patterns of exponence. In addition, reduplicated words in Cahuilla exhibit variation in terms of their surface phonological form in patterns that resemble those attested in closely related Uto-Aztecan languages. In particular, reduplication in Cahuilla exhibits presence/absence of vocalic segments in reduplicated forms with respect to the base, a phenomenon attested in closely related Takic languages (Cupeño (Hill 2005) and Luiseño (Kroeber & Grace 1960)), and elsewhere in the Uto-Aztecan language family (Haugen 2008, 2009).

This chapter examines patterns of reduplication attested in prior published sources (Sauvel & Munro 1981; Sauvel & Elliott 2004; Seiler 1970, 1977, 1979) and unpublished field notes (Seiler 1955-1973; Hioki 1972-1973), as well as data from the TMD Cahuilla corpus.

Based on examination of reduplicative patterns from multiple corpora of the language, this chapter aims to fulfill two goals. The first goal, addressed in §6.2, is to provide a preliminary description of the variety of meanings and functions that reduplication can convey in the language, focusing on verbs, and the patterns of exponence of each of these morphological constructions. The second goal, addressed in §6.3, is to examine the factors that govern the phonological form of reduplication, where two formal patterns emerge with respect to either the presence or absence of a vowel in the initial syllable of the root in Cahuilla reduplication. I show that regardless of its meaning or function, reduplication of in TMD Cahuilla exhibits consistent phonological characteristics. I analyze reduplication in Cahuilla as involving prefixing CV reduplication plus syncope (following Seiler (1977) for Cahuilla and Hill (2005) for Cupeño) and show that syncope may be blocked due to fully general phonotactic constraints.

6.2 Functions and patterns of exponence of Cahuilla reduplication

6.2.1 Distributivity

As discussed in §5.3.2, one construction that involves reduplication in TMD Cahuilla and other previously described Cahuilla varieties is distributivity, which encodes that an event is taking place in several places or is being performed by several agents or is affecting several patients/undergoers. A general definition of distributivity allows this category to be encoded in quantifiers, numerals, adjuncts and verbs (Henderson 2019). In Cahuilla, nouns, adjectives and numerals may also have distributive forms which may involve reduplication (Seiler 1977:323),

but they are left outside of the scope of this dissertation.[64] Examples of distributive verbs and their non-distributive counterparts are provided in (1) and (2), where distributivity is shown to encode (i) that an event is performed repeatedly in different locations (1b), (ii) that multiple participants are involved (2b).

(1) Distributed action: performing the same action in different locations

a.	*penqivish'i*	b.	*penqiqvichan'i*
	[pɛnˈqivɪʃʔi]		[pɛnˈqiqvɪt͡ʃɐnʔi]
	/pɛ-n-ˈqivitʃ-ʔi/		/pɛ-n-ˈqi~qivit͡ʃ-an-ʔi/
	3SG-1SG-cut-PRET		3SG-1SG-RED ~cut-DISTR-PRET
	'I cut it (once)'		'I cut it (all over)'
	CM(TMDC0008.WAV)		CM(TMDC0008.WAV)

(2) Distributed action: involving several participants

a.	*tumkaw'i*	b.	*chemtutumkaw'i*
	[0ˈtumkɐwʔi]		[t͡ʃɛmˈtutumkɐwʔi]
	/0-ˈtumkaw-ʔi/		/t͡ʃɛm-ˈtu~tumkaw-ʔi/
	3SG-lie.down-PRET		1PL-RED~lie.down-PRET
	'He was lying down on his stomach'		'We were lying down on our stomachs'
	CM(TMDC0014.WAV)		CM(TMDC0014.WAV)

[64] Seiler describes nouns, adjectives and numerals as having distributive forms involving reduplication (Seiler 1977:323-335); the reduplicant in these word classes shows considerable variation in the size of the reduplicant (C, CV, CVC, among other prosodic forms).

Distributive marking may co-occur with durative marking and other morphological constructions (described in §6.2.2 below) that independently may involve reduplication in a particular verb class. A similar pattern is reported for Cupeño: Hill (2005:134) describes reduplication in Cupeño verbs as encoding "secondary aspectual distinctions," particularly with respect to repetitives (performing the same event repeatedly), duratives (continuing to perform an action over time), and distributives (doing the same action in several places, or to several objects, or by several subjects) and consultants are reported to have offered diverse interpretations for reduplicated forms (2005:134). It should be noted, however, that there is evidence (shown below) that distributive and durative are independent morphological constructions in Cahuilla, despite their interaction in morphologically complex verbs.

Distributivity in Cahuilla verbs is marked through reduplication, reduplication plus suffixation or vowel lengthening. As discussed in Chapter 5 (§5.3.2), reduplication encoding distributivity exhibits distinct morphological patterns in different verb classes. Each of these patterns of exponence is described next.

6.2.1.1 Distributivity encoded via reduplication

Distributivity may be encoded with partial reduplication alone, as in (2b) above. The class of verbs that encodes distributivity via reduplication only is a large class characterized as lacking thematic suffixes (Class IV verbs). As shown in (3), distributive verbs always involve partial

stem-initial reduplication. Just as in plural reduplication, primary stress falls on the reduplicated prefix and the unstressed stem-initial vowel may undergo syncope, as in (3e-h).[65]

(3) Distributive reduplication (Class IV verbs)

	Base	*RED stem*
a.	*pax*	*nepapax'i*
	pax	nɛ-ˈpa~pax-ʔi
	'to enter'	1SG-RED~enter-PRET
		'I entered in different places.' CM(TMDC0017.WAV)
b.	*lepeqi*	*hemlelepeqiwen*
	lɛpɛqi	hɛm-ˈlɛ~lɛpɛqi-wɛn
	'to kneel'	3PL-RED~kneel-DUR.PL
		'They all kneeled.' CM(TMDC0024.WAV)
c.	*tumkaw*	*chemtutumkaw'i*
	tumkaw	t͡ʃɛm-ˈtu~tumkaw-ʔi
	'to lie down'	1PL-RED~lie.down-PRET
		'I lied in different places.' CM(TMDC0014.WAV)
d.	*mukni*	*taxnemumukninem*
	mukni	tax-nɛ-ˈmu~mukni-nɛm
	'to win'	REFL-1SG-RED~win-FUT
		'I will win a lot.' CM(TMDC0015.WAV)

[65] Presence of stem-initial vowel syncope is usually determined by phonotactics, but there are exceptions: in (3a, c-d), syncope would be blocked to avoid complex margins, but in (3b), syncope is blocked even though the resulting form would be phonotactically illicit.

e.	*humay*	*memhuhmaywen*
	humaj	mɛ-m-ˈhu~h_maj-wɛn
	‘to paint’	3PL-3PL-RED~paint-DUR.PL
		‘They painted them.’ CM(TMDC0006.WAV)
f.	*mamvay*	*taxnemamvayqal*
	mavaj	tax-nɛ-ˈma~m_vaj-qal
	‘to rub’	REFL-1SG-RED~rub-DUR.SG
		‘I rub my body all over.’ (KH[FN] 1972:5251)
g.	*wani*	*wawneqal*
	wani	0-ˈwa~w_nɛ-qal
	‘to flow (of liquids)’	3SG-RED~flow-DUR.SG
		‘Water flows in different places.’ (KH[FN] 1972:5275)
h.	*wayiki*	*newawyikingiqal*
	wajiki	nɛ-ˈwa~w_jiki-ŋi-qal
	‘to eat’	1SG-RED~eat-MOTGA-DUR.SG
		'I go around eating.' (HS[FN] M6:2496)

Verb stems that encode distributivity through reduplication only are primarily intransitive and contrast with verbs that encode distributivity through both reduplication and suffixation, addressed in the next section. Both exponence strategies of distributivity have been noted previously in the literature (Seiler 1977:163) and are well attested in the TMD Cahuilla data.

6.2.1.2 Distributivity encoded via reduplication and concomitant suffixation

Distributivity is encoded through both reduplication and suffixation in two lexical classes of verbs: Class II verbs attach an *-mV* suffix in distributive verb forms, and Class III verbs attach an

-an suffix in these same contexts. As with other constructions involving reduplication that have been discussed so far, stem-initial syncope as a concomitant phonological effect of reduplication also shows up in these types of verbs.

As discussed in more detail in §5.3.2, Class II verbs is composed of verbs with a thematic *-i* suffix and a surface CVC-i shape in non-distributive forms that exhibits additional morphophonological changes not attested in other verb classes. The distributive forms of these verbs is encoded through CV- reduplication and a suffix that surfaces as [mi], [mɛ] or just [m][66] and is preceded by the theme *-i* vowel that may undergo total assimilation to the quality of the preceding stressed vowel (Seiler describes this as an "increment" /V + m/ added to a stem marked for distributive (1977:166)).[67] Examples of the distributive form of this class of verbs are shown in the stems in (4).

(4) Stems with reduplication plus *-mV* suffixation (Class II verbs)

	Base	*Distributive stems*	
a. *ngali*	/ŋal-i/ 'to rope'	ŋa~ŋ_l-a-mi	(KH[FN] 1972:690)
b. *piki*	/pik-i/ 'to turn upside down'	pi~p_k-i-mi	(KH[FN] 1972:5241)

[66] The vowel following the distributive *-m* suffix exhibits variation in quality between [i] and [ɛ] and is sometimes absent in some forms (e.g. (5b) and (5g)), in patterns that appear to be governed by both phonological and morphological factors. Determining whether these different surface forms involve allomorphy or whether presence/absence and quality of the suffix-final vowel is phonologically or morphologically predictable is outside of the scope of this dissertation.

[67] This class of verbs is treated as involving a theme *-i* vowel in this dissertation, following Fuchs (1970), Seiler (1977) and Hill & Hill (2019:818). Alternatively, verb roots in this class could be treated as having an epenthetic [i] vowel in non-distributive suffixation contexts. I leave this question for further research.

c. *sali*	/sal-i/ ‘to tear, rip’	sa~s_l-a-mi	(KH[FN] 1972:744)
d. *suti*	/sut-i/ ‘to tie around’	su~s_t-u-mi	(HS[FN] M8:2594)
e. *qapi*	/qap-i/ ‘to break’	qa~q_p-a-mɛ	(KH[FN] 1972:5283)
f. *chapi*	/t͡ʃap-i/ ‘to split, to crack’	t͡ʃa~ʃ_p-a-mɛ	(KH[FN] 1972:722)
g. *paki*	/pak-i/ ‘slap, clap hands’	pa~p_k-a-mɛ	(KH[FN] 1972:5249)
h. *heli*	/hɛl-i/ ‘to spread out’	hɛ~h_l-ɛ-m	(KH[FN] 1972:799)

Further examples of this pattern of distributive exponence in fully inflected verbs is shown in (5) below.

(5) Distributive reduplication and suffixation in Class II verbs

	Base	*Reduplicated*	*Unreduplicated*
a.	*chuvi*	*memchushvumiwen*	*memchuvin’i*
	t͡ʃuv-i	mɛ-m-ˈt͡ʃu~ʃ_v-u-mi-wɛn	mɛ-m-ˈt͡ʃuv-in-ʔi
	‘to untie’	3PL-3PL-RED~untie-TS-DISTR-DUR.PL	3PL-3PL-untie-TS-PRET
		‘They’re untying their shoes.’	‘They untied their shoes.’
		CM(TMDC0012.WAV)	CM(TMDC0012.WAV)
b.	*nami*	*nenanmamqal*	*nenamiqal*
	nam-i	nɛ-ˈna~n_m-a-m-qal	nɛ-ˈnam-i-qal
	‘to cross’	1SG-RED~cross-TS-DISTR-DUR.PL	1SG-cross-TS-DUR.PL
		‘I’m crossing many roads.’	‘I’m crossing the road.’
		(KH[FN] 1972:726)	(KH[FN] 1972:726)
c.	*wali*	*pichemwawlamiwen*	*penwalinqal*
	wal-i	pi-t͡ʃɛm-ˈwa~w_l-a-mi-wɛn	pɛ-n-ˈwal-in-qal
	‘to dig’	3SG-1PL-RED-dig-TS-DISTR-DUR.PL	3SG-1SG-dig-TS-DUR.SG
		‘We are digging holes all over.’	‘I’m digging a hole.’
		CM(TMDC0008.WAV)	(HS 1979:230)

d.	*taki*	*mentatkamenem*	*pentakinqa*
	tak-i	mɛ-n-ˈta~t_k-a-mɛ-nɛm	pɛ-n-ˈtak-in-qa
	‘stick together’	3PL-1SG-RED-stick-TS-DISTR-FUT	3SG-1SG-stick-TS-DUR.SG
		‘I will be sticking them together.’	‘I’m sticking it together.’
		CM(TMDC0011.WAV)	(HS^{FN} M4:2250)
e.	*chupi*	*mechushpumeqal*	*penchupinka*
	t͡ʃup-i	mɛ-0-ˈt͡ʃu~ʃ_p-u-mɛ-qal	pɛ-n-ˈt͡ʃup-in-ka
	'dip in water'	3PL-3SG-RED-dip-TS-DISTR-DUR.SG	3SG-1SG-dip-TS-IF
		‘They’re diving in.’	'I’m going to dive in.’
		(HS^{FN} M6:2439)	(HS^{FN} M6:2439)
f.	*chiki*	*penchishkimeqal*	*penchikinqal*
	t͡ʃik-i	pɛ-n-ˈt͡ʃi~ʃ_k-i-mɛ-qal	pɛ-n-ˈt͡ʃik-in-qal
	‘sticking up’	3SG-1SG-RED-be.stuck-TS-DISTR-DUR.SG	3SG-1SG-be.stuck-TS-DUR.SG
		‘I’m putting lots of post in.’	‘I’m putting one post in.’
		(HS^{FN} M6:2439)	(HS^{FN} M6:2439)
g.	*waqi*	*chewawqamqal*	*penchewaqinqal*
	waq-i	t͡ʃɛ-ˈwa~w_q-a-m-qal	pɛ-n-t͡ʃɛ-ˈwaq-in-qal
	‘to tear, split’	just-RED-tear-TS-DISTR-DUR.SG	3SG-1SG-just-tear-TS-DUR.SG
		‘The tree tears itself apart.’	‘The dog’s mouth is torn.’
		(KH^{FN} 1972:5316)	(KH^{FN} 1972:5316)

In some cases, the theme suffix vowel preceding the distributive suffix fails to copy or harmonize with the quality of the stem-initial stressed vowel. This is shown in (6a-c), where the vowel surfaces sometimes as [i] (as it does in unreduplicated forms) or [ɛ].

(6) Reduplicated vs. unreduplicated distributive forms of Class II verbs

a.	*qayi*	*memqaqyimiwen*	*pemqayinwen*
	qaj-i	mɛ-m-ˈqa~q_j-i-mi-wɛn	pɛ-m-ˈqaj-in-wɛn
	‘to clean’	3PL-3PL-RED~clean-TS-DISTR-DUR.PL	3SG-3PL-clean-TS-DUR.PL
		‘They’re cleaning all over.’	‘They’re cleaning one area.’
		(TMDC0006.WAV)	(TMDC0006.WAV)
b.	*qachi*	*penqaqchimika*	*neqachinqal*
	qat͡ʃ-i	pɛ-n-ˈqa~q_t͡ʃ-imi-ka	nɛ-0-ˈqat͡ʃ-in-qal
	‘to punch, hit’	3SG-1SG-RED~hit-TS-DISTR-IF	1SG-3SG-hit-TS-DUR.SG
		‘I’m going to spar with him.’	‘He hit me (once).’
		(TMDC0008.WAV)	(HS 1979:164)
c.	*hati*	*chemehahtemeqal*	*chemehatinqal*
	hat-i	t͡ʃɛmɛ-0-ˈha~h_t-ɛ-mɛ-qal	t͡ʃɛmɛ-0-ˈhat-in-qal
	‘to shine’	1PL-3SG-RED-shine-TS-DISTR-DUR.SG	1PL-3SG-shine-TS-DUR.SG
		‘Light shining all over us (moving).’	‘Shining on us in one place.’
		(KH[FN] 1972:798)	(KH[FN] 1972:798)

An additional pattern of distributive marking in Class II verbs involving suffixation without reduplication is attested in data reported in Hioki's unpublished field notes (KH[FN] 1972), exemplified in (7). As shown here, the theme vowel preceding the *-mV* suffix is attested independently of reduplication. These forms are reported in Hioki's field notes alongside distributive forms of the same verbs involving reduplication plus suffixation.

(7) Class II verbs: distributive suffixed forms with and without reduplication

	Reduplication plus suffixation	Suffixation only
a.	*penhehlemi'i*	*penhelemi'i*
	pɛ-n-ˈhɛ~h_l-ɛ-mi-ʔi	pɛ-n-ˈhɛl-ɛ-mi-ʔi
	3SG-1SG-RED-spread-TS-DISTR-PRET	3SG-1SG-spread-TS-DISTR-PRET
	'I spread out (my clothes).'	'I spread out (many clothes).'
	(KH[FN] 1972:799)	(KH[FN] 1972:799)
b.	*penhehlemnik*	*penhelemnik*
	pɛ-n-ˈhɛ~h_l-ɛ-m-n-ik	pɛ-n-ˈhɛl-ɛm-n-ik
	3SG-1SG-RED-spread-DISTR-n-IF	3SG-1SG-spread-DISTR-n-IF
	'I'm g. to spread out (my clothes).'	'I'm going to spread out (many clothes).' (KH[FN] 1972:799)
	(KH[FN] 1972:799)	
c.	*penlalmameqa*	*penlamamnik*
	pɛ-n-ˈla~l_m-amɛ-qa	pɛ-n-ˈlam-am-n-ik
	3SG-1SG-RED-fold-DISTR-DUR.SG	3SG-1SG-fold-DISTR-n-IF
	'I am folding my clothes.'	'I am folding my clothes.'
	(KH[FN] 1972:5292)	(KH[FN] 1972:5292)
d.	*nepekuklumqal*	*henpekulumnik*
	nɛ-pɛ-ˈku~kl-um-qal	hɛn-pɛ-ˈkul-um-n-ik
	1SG-3SG-RED-fall-DISTR-DUR.SG	1SG-3SG-fall-DISTR-n-IF
	'I got stuck here and there.'	'I got stuck here and there.'
	(KH[FN] 1972:730)	(KH[FN] 1972:730)

e.	*penkakvameqal*	*penkavamnik*
	pɛ-n-ˈka~kv-amɛ-qal	pɛ-n-ˈkav-am-n-ik
	3SG-1SG-RED-hole-DISTR-DUR.SG	3SG-1SG-hole-DISTR-n-IF
	‘I am making many holes.’	‘I am making many holes.’
	(KH[FN] 1972:671)	(KH[FN] 1972:671)

In all of the examples shown in (7a) above, the presence of the *-mV* suffix appears to contribute a distributive meaning, regardless of whether there is concomitant reduplication.[68] There also appears to be no difference in meaning that corresponds to form between the reduplicated durative forms and unreduplicated inceptive forms.[69] These examples provide further evidence that reduplication as an exponence strategy may both co-occur and operate independently of suffixation in the language.

Another class of transitive verbs that encodes distributivity via both reduplication and suffixation is Class III verbs, which involve a distributive morpheme *-an* not attested in other verb classes. This class of verbs consists of consonant-final verb roots. A list of distributive forms of these verbs along with their base form are shown in (8).

[68] In the unreduplicated forms inflected with the inceptive future suffix *-ik*, the distributive suffix is always followed by [n] in a sequence that Seiler analyzes as two separate morphemes (*mn-ik*). It is unclear whether this segment should be parsed as part of the distributive morpheme or if it is a separate morpheme.

[69] Hioki (unpublished fieldnotes) noted that his Cahuilla consultant indicated to him that both the unreduplicated and reduplicated version are equivalent in meaning. In particular, (7d) shows that both forms have a distributive meaning where an action is performed multiple times and in multiple locations.

(8) Distributive verbs with reduplication plus *-an* suffixation (Class III verbs)

	Base	Reduplicated form
a.	*wek*	*taxchemwewkan'i*
	wɛk 'to slice'	tax-t͡ʃɛm-ˈwɛ~w_k-an-ʔi
		REFL-1PL-RED~slice-DISTR-PRET
		'We cut each other.' CM(TMDC0008.WAV)
b.	*ket*	*hemkektanwen*
	kɛt 'to cover'	hɛm-ˈkɛ~k_t-an-wɛn
		3PL-RED~cover-DISTR-DUR.PL
		'They are covered up.' (HS^{FN} M3:2217)
c.	*ke'*	*penkek'an'i*
	kɛʔ 'to bite'	pɛ-n-ˈkɛ~k_ʔ-an-ʔi
		3SG-1SG-RED~bite-DISTR-PRET
		'I bit it many times.' (HS^{FN} M4:2258)
d.	*qivish*	*menqiqvichanqal*
	qiviʃ 'to cut'	mɛ-n-ˈqi~q_vit͡ʃ-an-qal
		3PL-1SG-RED~cut-DISTR-DUR.SG
		'I am cutting them.' CM(TMDC0008.WAV)
e.	*wichax*	*michemwiwchaxannem*
	wit͡ʃax 'to toss'	mi-t͡ʃɛm-ˈwi~w_t͡ʃax-an-nɛm
		3PL-1PL-RED~toss-DISTR-FUT
		'We will toss them.' CM(TMDC0011.WAV)

f.	*lapash*	*pelalpachanka*
	lapaʃ ‘to collapse’	pɛ-ˈla~l_pat͡ʃ-an-ka
		3SG-RED~collapse-DISTR-IF
		‘All the houses are going to fall.’ (HS^{FN} M5:2333)
g.	*xelew*	*penxexlewanqal*
	xɛlɛw ‘to scratch’	pɛ-n-ˈxɛ~x_lɛw-an-qal
		3SG-1SG-RED~scratch-DISTR-DUR.SG
		‘I am scratching it many times.’ (KH^{FN} 1972:395)
h.	*yumex*	*taxhemyumemxanwen’e*
	ju-mɛx ‘dress up’	tax-hɛm-ˈju-mɛ~m_x-an-wɛn-ʔɛ
		REFL-3PL-hair-RED~do-DISTR-DUR.PL-PRET
		‘They dress themselves up.’ (HS^{FN} M4:2276)

As the examples in (8) above show, these stems always show reduplication (with concomitant stem-initial syncope) and what Seiler (1977:164) refers to as a distributive suffix *-an*. Unlike verbs included in the ‘i-stem’ class, these stems do not appear with the distributive suffix *-an* in unreduplicated forms (e.g., *pɛ-n-xɛlew-qal* ‘I scratch once’ vs. *pɛ-n-xɛ~xlew-an-qal* ‘I scratch many times’). Thus, reduplication with concomitant suffixation is the only exponence strategy that encodes distributivity in these stems.

6.2.1.3 Distributivity encoded via vowel lengthening

In some verb stems, distributivity is encoded through vowel lengthening of the stressed vowel. As described in §5.3.2, this pattern diagnoses verbs that belong to a class of irregular verbs in TMD Cahuilla, Class V verbs. Recall that while vowels in Cahuilla are typically short, there is evidence for contrastive vowel length (Seiler 1965; see discussion in §2.5.6.3). Such lexically

specified vowel length should be distinguished, however, from a separate morphological process of vowel lengthening. Seiler (1977:52) notes that there are fewer than a half a dozen of such verbs that undergo vowel lengthening instead of reduplication to encode distributivity in previously documented Cahuilla varieties.[70] Examples of stems exhibiting this marginal pattern are shown in (9), taken from Seiler's fieldnotes on Mountain Cahuilla.[71] Fully inflected forms, both with and without vowel lengthening are included for contrast.

(9) Morphological vowel lengthening encoding distributivity

	Base	**Non-distributive**	**Distributive**
a.	*hing*	*hemhingwe*	*hemhiingwe*
	hiŋ	hɛm-ˈhiŋ-wɛ	hɛm-ˈh**i**ːŋ-wɛ
	'fly'	3PL-fly-DUR.PL	3PL-fly.DISTR-DUR.PL
		'Birds flying in a group.'	'Birds flying each in their place.'
		(HS[FN] M6:2465)	(HS[FN] M6:2465)

[70] Some of these stems contain sequences of syllables with identical onsets (*wiway* 'hang' (9b) and *nanal* 'ask' (9c)), which may suggest reduplication may be blocked given this repetition. Other forms exhibiting this pattern have onsets with glottal fricatives (*hiŋ* 'fly' in (9a)). Seiler (1977:52) proposes that these forms derive historically from deletion of glottal fricatives or sonorants. Hill & Hill (2019:817) also report vowel lengthening effects in reduplicated forms, as the result of glottal and nasal deletion in certain stems. Outside of reduplication, there is a small group of words whose vowels have become lengthened due to the loss of an intervocalic consonant /h/ (e.g., *muːt* 'owl' and *mɛːt* 'gopher'). In these types of examples, the underlying /h/ is realized whenever the plural suffix is attached (e.g., *muht-am* 'owls' and *mɛht-am* 'gophers' (Jacobs 1975)).

[71] The durative suffixes for Mountain Cahuilla are /-qa/ (singular) and /-we/ (plural).

b.	*wiway*	*penwiwayqa*	*penwiiwayqa*
	wiwaj	pɛ-n-ˈwiwaj-qa	pɛ-n-ˈw**i**ːwaj-qa
	‘hang’	3SG-1SG-hang-DUR.SG	3SG-1SG-hang.DISTR-DUR.SG
		‘I’m hanging it.’	‘I’m hanging more than one.’
		(HS[FN] M6:2468)	(HS[FN] M6:2468)
c.	*nanal*	*pennanalqa*	*pennaanalqa*
	nanal	pɛ-n-ˈnanal-qa	pɛ-n-ˈn**a**ːnal-qa
	‘ask’	3SG-1SG-ask-DUR.SG	3SG-1SG-ask.DISTR-DUR.SG
		‘I ask it (a single question).’	‘I ask it repeatedly (many questions).’
		(HS[FN] M6:2468)	(HS[FN] M6:2468)

As these examples show, there is a difference in meaning between the stems with vowel lengthening and those without, where vowel lengthening encodes a meaning of distributed action (action performed in multiple locations and/or by multiple agents) (9a). Vowel lengthening may also be interpreted as encoding that an action is performed repetitively as in (9b) and (9c). This morphological process of stem-initial vowel lengthening is so far unattested in the data from contemporary TMD Cahuilla speakers. In addition to these cases, vowel lengthening may also co-occur with reduplication, where the stressed vowel of the reduplicative prefix lengthens, a pattern of long vowel reduplication (CVV-) as shown in (10).

(10) Long vowel reduplicative prefixes

a.	*chaway*	*nechawayqal*	*chemchaashwaywen*
	t͡ʃawaj	nɛ-ˈt͡ʃawaj-qal	t͡ʃɛm-ˈt͡ʃ**a**ː~ʃ_waj-wɛn
	‘to climb’	1SG-climb-DUR.SG	1PL-RED~climb-DUR.PL
		‘I am climbing around.’	‘We are climbing around.’
		CM(TMDC0008.WAV)	CM(TMDC0008.WAV)
b.	*kavay*	*nepekavayqal*	*nepekaakvayqal*
	kavaj	nɛ-pɛ-ˈkavaj-qal	nɛ-pɛ-ˈk**a**ː~k_vaj-qal
	‘to circle’	1SG-3SG-circle-DUR.SG	1SG-3SG-RED~circle-DUR.SG
		‘I go around once.’	‘I go around many times.’
		(KH[FN] 1972:740)	(KH[FN] 1972:740)
c.	*kusmeti*	*nekusmetiqal*	*chemkusmeemtiwen*
	kuʃ-mɛti	nɛ-kuʃ-ˈmɛti-qal	t͡ʃɛm-kuʃ-ˈm**ɛ**ː~m_ti-wɛn
	‘to choke’	1SG-throat-close-DUR.SG	1PL-throat-RED~close-DUR.PL
		‘I am choking.’	‘We are choking.’
		CM(TMDC0029.WAV)	CM(TMDC0029.WAV)
d.	*way*	*menwawayqal*	*menwaawayqal*
	waj	mɛ-n-ˈwa~waj-qal	mɛ-n-ˈw**a**ː~waj-qal
	‘to marry’	3PL-1SG-RED-marry-DUR.SG	3PL-1SG-RED-marry-DUR.SG
		‘I marry them.’	‘I marry many of them (one by one).’
		(KH[FN] 1972:5314)	(KH[FN] 1972:5314)

As these examples show, in some verbs the reduplicated stem always surfaces with a long vowel reduplicant (10a-c), while in other cases there is both a reduplicated stem with a short vowel CV- prefix (where reduplication may be triggered by a durative suffix) and one with a long vowel reduplicant prefix (CVV-), as shown in (10d). Most of these types of reduplicated

forms also have stem-initial vowel syncope unless it would result in a complex syllable margin (10d). The meaning of forms with long vowel reduplication also seems to vary, depending on the dialect. For example, in the data from the Desert dialect collected by Hioki, reduplication seems to encode repetition of an action (10b) and (10d), whereas in the TMD Cahuilla variety, reduplication simply encodes a plurality of subjects (10a) and (10c).

6.2.2 Durativity and 'automatic' reduplication

In addition to encoding distributive aspect in verbs, reduplication in TMD Cahuilla and other Cahuilla varieties is also attested with verbs marked for what Seiler proposes to be durative aspect, encoding events that are performed continuously or iteratively over some period of time. As discussed in §5.3.2, durative aspect is one of the morphological constructions that triggers reduplication as an associated phonological effect in a particular class of verbs, Class I verbs with 'automatic' reduplication (Seiler 1977:51; Fuchs 1970:69-72). According to Hill & Hill (2019:816), there are approximately 60 verbs (mainly of the shape CVC or CVCCV) that make up this class in Cahuilla. In this verb class, reduplication is attested with the durative (DUR) and future (FUT) suffixes, as well as the imperative (IMP), while the unreduplicated form of the stem appears when affixed with the factive or preterite suffix (PRET), the immediate future (IF) and realis and irrealis subordinating (SUB) suffixes (Seiler 1977:51). The list of suffixes which conditions reduplication in Class I verbs is provided in §5.3.2 and repeated in (11) for convenience.[72]

[72] Reduplication in this context may be analyzed as involving a case of morphologically conditioned phonology; alternatively, this pattern may instantiate a case of multiple exponence, where durative aspect or another

(11) Suffixes that trigger reduplication with Class I verbs

a.	*-qal*	Durative singular subject	DUR.SG
b.	*-wɛn*	Durative plural subject	DUR.PL
b.	*-nɛm*	Future	FUT
c.	*-0/-ɛ, -am,*	Imperative	IMP
d.	*-ikaw*	Distributed action (V here and there)	DISTR.MOT
e.	*-ŋi*	Motion tither and hither (go around V-ing)	MOTGA
f.	*-itʃi*	Motion with simultaneous action (V while going)	MOTG
g.	*-max*	Benefactive	BEN
h.	*-wɛn*	Stative	STAT

Hill & Hill (2019:817) propose that these morphological constructions permit an imperfective reduplication and gloss reduplication in this class as an imperfective marker. They differ from Seiler in treating *-qal* and *-wen* as nonfuture suffixes, rather than durative aspect markers.[73] I follow Seiler in analyzing *-qal* and *-wɛn* as durative aspect suffixes (and label them as such), exemplify 'automatic' reduplication with these morphemes as they are highly frequent in all prior literature and available corpora of Cahuilla varieties.

morphological construction of the class listed in (11) is encoded both by suffixation and concomitant reduplication (as I have shown is the case for plural and distributive exponence for some nouns and verbs, respectively).

[73] Hill & Hill (2018:948) note that these suffixes have a durative-like interpretation when attested in combination with a subordinating suffix, but that they may encode punctual or perfective meanings. An examination of the Tense-Aspect-Mood system of TMD Cahuilla is left outside of the scope of this dissertation.

In (12) below durative and non-durative forms are shown with singular and plural subjects for a single verb. As with plural and distributive forms, reduplication in the durative construction involves partial reduplication, with a prefixed CV- reduplicant that is stressed.

(12) Durative verb forms (Class I verbs)

a. Durative singular
nesasawqal
nɛ-ˈsa~saw-qal
1SG-RED~make.tortillas-DUR.SG
'I am making tortillas.' CM(TMDC0014.WAV)

b. Durative plural
hemsasawen
hɛm-ˈsa~saw-wɛn
3PL-RED~make.tortillas-DUR.PL
'They are making tortillas.' CM(TMDC0014.WAV)

c. Non-durative singular
hensawka
hɛn-ˈsaw-ka
1SG-make.tortillas-IF
'I am going to make tortillas.' CM(TMDC0014.WAV)

d. Non-durative plural
hemsawkatem
hɛm-ˈsaw-kat-ɛm
3PL-make.tortillas-IF-PL
'They are going to make tortillas.' CM(TMDC0014.WAV)

As shown in (12), reduplication is triggered by the durative suffix, regardless of the number of subjects or objects. This shows that reduplication is not encoding distributivity (which in other verbs involves plurality of subjects, as discussed in §6.2.1) but rather is simply a concomitant effect associated with the presence of the durative suffix. Verbs belonging to this class are not attested with a distributive suffix. In (13), I provide further examples of durative-marked verbs, where a reduplicated stem is triggered by the presence of a durative suffix and not by a non-durative suffix (i.e., preterite and immediate future).

(13) Durative vs. non-durative forms in Class I verbs

	Base	Durative	Non-durative
a.	*kutash*	*kuktashngiqal*	*kutaspuli'i*
	kutaʃ	0-ˈku~k_taʃ-ŋi-qal	0-ˈkutaʃ-pulɛ-ʔi
	'talk'	3SG-RED~talk-MOTGA-DUR.SG	3SG-talk-MOTC-PRET
		'He speaks all over.'	'He came here and talked.'
		(HS^{FN} M5:2382)	(HS^{FN} M5:2382)
b.	*sem*	*hemsesempuliwen*	*semkatem*
	sɛm	hɛm-ˈsɛ~sɛm-puli-wɛn	0-ˈsɛm-kat-ɛm
	'laugh'	3PL-RED~laugh-MOTC-DUR.PL	3PL-talk-IF-PL
		'They came from all over laughing.'	'They are going to laugh.'
		(HS^{FN} M5:2379)	(HS^{FN} M5:2378)
c.	*way*	*newawayqa*	*henwayka*
	waj	nɛ-ˈwa~waj-qa	hɛn-ˈwaj-ka
	'holler'	1SG-RED~holler-DUR.SG	1SG-holler-IF
		'I'm hollering.'	'I'm going to holler.'
		(HS^{FN} M5:2388)	(HS^{FN} M5:2388)

d.	*mish*	*penmimishqal*	*penmishka*
	miʃ	pɛ-n-ˈmi~miʃ-qal	pɛ-n-ˈmiʃ-ka
	‘to chew’	3SG-1SG-RED~chew-DUR.SG	3SG-1SG-chew-IF
		‘I’m chewing it.’	‘I’m going to chew it.’
		(HS[FN] M5:2379)	(HS[FN] M5:2379)

e.	*kul*	*menkukulikawqa*	*menkulka*
	kul	mɛ-n-ˈku~kul-ikaw-qa	mɛ-n-ˈkul-ka
	‘make, fix’	3SG-1SG~RED-chew-DISTR.MOT-DUR.SG	3SG-1SG-chew-IF
		‘I’m fixing them here and there.’	‘I’m g. to fix them.’
		(HS[FN] M5:2387)	(HS[FN] M5:2387)

f.	*ñush*	*penñuñushqa*	*penñush’i*
	ɲuʃ	pɛ-n-ˈɲu~ɲuʃ-qa	pɛ-n-ˈɲuʃ-ʔi
	‘make dough’	3SG-1SG-RED~make.dough-DUR.SG	3SG-1SG-make.dough-PRET
		‘I’m making it (dough).’	‘I’m made it (dough).’
		(KH[FN] 1972:755)	(KH[FN] 1972:755)

g.	*neh*	*nenehqa*	*nehqa’*
	nɛh	0-ˈnɛ~nɛh-qa	0-ˈnɛh-qa-ʔ
	‘basket-weave’	3SG-RED~weave-DUR.SG	3SG-weave-DUR.SG-PRET
		‘She weaved baskets all the time.’	‘She would weave (with it).’
		KS(S&E 2014:710)	KS(S&E 2014:711)

As the examples in (13) show, durative suffixes (which are often accompanied by motion-related suffixes) condition a reduplicated stem, while non-durative suffixes, such as the preterite and inceptive do not. As the example in (13a) shows, reduplication in this context may also condition syncope of the stem-initial vowel, as long as it would not result in an illicit consonant cluster.

As described in Chapter 5, Class I verbs with ‘automatic’ reduplication are described as encoding distributivity via the formally identical CV- reduplication pattern described in §6.2.1 above, since forms that are already reduplicated may not reduplicate again (Seiler 1977, Hill & Hill 2019). This creates a confound as to whether reduplication is brought about by a durative suffix (/-qal/ (singular subject) or /-wɛn/ (plural subject)) or another morphological marker of the class that triggers reduplication or as an exponent of distributivity. A reduplicated stem of this verb class that exhibits reduplication without one of the suffixes that triggers ‘automatic’ reduplication is predicted to involve distributive reduplication (Hill & Hill 2019:817). In these cases, distributivity would be encoded exclusively by reduplication. However, there are no cases documented of distributive reduplication without the presence of a reduplication triggering suffix in TMD Cahuilla verbs belonging to Class I. It is thus unclear whether distributive verb forms of Class I verbs are possible in this language variety.

Finally, there are cases in which vowel lengthening (described as encoding distributivity in Class V verbs) appears to be triggered ‘automatically,’ i.e., as a stem modification brought about by durative or other reduplication-triggering suffixes. Examples of this pattern are illustrated in (14).

(14) Durative suffix-triggered vowel lengthening

a.	*kikitam*	*hemngaangwen*	*ngang*
	/ˈkikit-am	hɛm-ˈŋ**a**ːŋ-wɛn/	/ŋaŋ/ ‘to cry’
	child-PL	3SG-cry.DUR -DUR.PL	
	‘The children are crying.’ (KH[FN] 1972:5255)		

b. *kiat* *ngaangqal*
/ˈkiat 0-ˈŋ**a**ːŋ-qal/
child 3SG-cry.DUR-DUR.SG
‘The child is crying.’ (KH[FN] 1972:5255)

c. *kiat* *ngangik*
/ˈkiat 0-ˈŋaŋ-ik/
child 3SG-cry-IF
‘The child is going to cry.’ (KH[FN] 1972:5255)

d. *penhaalqa* *hal*
/pɛ-n-ˈh**a**ːl-qa/ /hal/ ‘to look for’
3SG-1SG-look.for.DUR-DUR.SG
‘I’m looking for it.’ (HS[FN] M6:2465)

e. *mehaalqal*
/mɛ-0-ˈh**a**ːl-qal/
3PL-3SG-look.for.DUR-DUR.SG
‘He’s looking for them.’ (HS[FN] M7:2500)

f. *penhalka*
/pɛ-n-ˈhal-ka/
3SG-1SG-look.for-IF
‘I’m going to look for it.’ (HS[FN] M6:2465)

As the examples in (14) show, vowel lengthening in these types of stems does not appear to be conditioned by the subject number, as would be expected with the distributives (compare (14a-b) and (14d-e)), nor does it appear to convey a repetitive meaning. Instead, we see an alternation between a lengthened stem that only shows up with the durative suffix, and a non-lengthened

stem that shows up with non-durative suffixation. In these cases, vowel lengthening is part of the encoding of durative aspect.

In sum, while of very limited productivity, vowel lengthening or a long vowel reduplicant are alternative realizations to reduplication in all of the contexts and environments where reduplication is predicted in Cahuilla. This pattern is consistent with what is documented in other Uto-Aztecan languages, where distributive reduplication may involve a long vowel or another strategy (gemination or glottal stop epenthesis), analyzed as an instance of heavy syllable reduplication in Haugen (2005, 2008, 2009).

6.2.3 Summary

In this section, I have described two types of verbal morphological constructions in Cahuilla where reduplication is deployed, with or without concomitant suffixation and/or vowel lengthening: (1) distributivity and (2) durativity and other morphological constructions that are associated with reduplication in Class I verbs. Regardless of its meaning or function, reduplicative patterns in TMD Cahuilla and other Cahuilla varieties exhibits the following phonological characteristics (this includes reduplication in plural nouns described in Chapter 5 (§5.4.5)):

(15) Phonological characteristics of Cahuilla noun and verb reduplication

a. Reduplication patterns involve partial reduplication, analyzed here as prefixing CV-reduplication with the stem as base for reduplication.
b. All reduplicated forms bear stress on the first syllable of the stem, on the reduplicative prefix.

c. Reduplication may condition syncope of the first vowel of the stem (vs. final root-vowel syncope attested in suffixation). Syncope results in closed, stressed syllables.
d. Stem-initial syncope may be blocked due to general phonotactic constraints (e.g., a ban on complex syllable margins) in some stems, resulting in an open, stressed syllable.

Both syncope and epenthesis appear to be independently required to derive the presence or absence of vowels in complex words in Cahuilla. While syncope may be conditioned by more than one morphological process (reduplication and suffixation) in a single complex word, syncope appears to only apply once, an observation first made in Seiler (1977). This contrasts with what is attested in other Uto-Aztecan languages where syncope has a rhythmic distribution (e.g., Southeastern Tepehuan (Tepiman; Willett 1982, 1989; Kager 1997)).

The next section addresses the phonological properties of Cahuilla partial reduplication in terms of presence or absence of syncope and how these relate to the synchronic phonological grammar of the language. In what follows, I focus on the phonological properties of verbal reduplication patterns. Table 21 summarizes the main patterns of exponence of distributive and durative verb forms for each of the verb classes in the language.

Table 21. Distributive and durative exponence patterns by verb class in Cahuilla

	Verb base	**Distributive**	**Durative**
Class I ‘automatic’ reduplication	/sɛm/ 'to laugh'	--	nɛ-ˈsɛ~sɛm-qal 1SG-RED~laugh-DUR.SG ‘I’m laughing.’
Class II thematic *-i*	/qatʃ-i/ ‘to punch, hit’	pe-n-ˈqa~qtʃ-i-mi-ka 3SG-1SG-DISTR~hit-TS-DISTR-IF ‘I’m going to spar with him.’	ne-0-ˈqatʃ-in-qal 1SG-3SG-hit-TS-DUR.SG ‘He hit me (once).’
Class III distributive *-an*	/tʃut/ 'to light'	mi-tʃɛm-ˈtʃu~ʃtʃ-an-wɛn-ɛ 3PL-1PL-DISTR~light-DISTR-DUR.PL-PRET ‘We were lighting them.’	pɛ-n-ˈtʃuʃ-qal-ɛ 3SG-1SG-light-DUR.SG-PRET ‘I was lighting it.’
Class IV a-thematic verbs	/pax/ 'to enter'	tʃɛm-ˈpa~pax-wɛn 1PL-DISTR ~enter-DUR.PL ‘We go in (repeatedly)’	nɛ-ˈpax-qal 1SG-enter-DUR.SG ‘I am going in.’
Class V irregular verbs	/hiŋ/ 'to fly'	hem-ˈhiːŋ-we 3PL-fly.DISTR-DUR.PL ‘(Birds) flying each in their place.’	hem-ˈhiŋ-we 3PL-fly-DUR.PL '(birds) flying in a group.’

In the next section, I address the phonological form of reduplicative patterns in TMD Cahuilla and the factors that govern the presence/absence of syncope in reduplication.

6.3 Partial Reduplication and syncope in Cahuilla verbs

I have shown that a variety of morphological constructions in Cahuilla involve a reduplicative CV prefix where the stem provides the base for reduplication. Two formal patterns emerge with

respect to either the presence or absence of a vowel in the initial syllable of the root in Cahuilla reduplication: the most prevalent reduplication pattern is that of CV prefixation with concomitant syncope of the first root vowel, while a secondary pattern involves CV prefixation with no syncope. These patterns are exemplified below in (16a) and (16b), respectively (as represented previously, the underscore represents the locus of syncope). As mentioned earlier, whether syncope is attested or not, all reduplicated forms bear stress on the reduplicative prefix.

(16) Two patterns of syncope in partial reduplication

a. Primary pattern: CV reduplication + stem-initial syncope

penwawlimika	cf.	*wali*
pɛ-n-ˈwa~**w_li**-mi-ka		/wali/ ‘dig’
3SG-1SG-RED~dig-DISTR-IF		
‘I am going to go around digging holes’		
CM(TMDC0008.WAV)		

b. Secondary pattern: CV reduplication, no syncope

menqaqapʔi	cf.	*qap*
mɛ-n-ˈqa~**qap**-ʔi		/qap/ ‘break’
3PL-1SG-RED~break-PRET		
‘I broke them (the boards)’		
CM(TMDC0010.WAV)		

The asymmetrical distribution of these patterns in terms of frequency is reflected in all the corpora I have compiled from various sources on Cahuilla, both published (Sauvel & Elliott 2004; Seiler 1970, 1977, 1979) and unpublished (Seiler 1955-1973; Hioki 1972-1973), as well as my own fieldwork data from the Torres Martinez Desert dialect. A tally of the number and

percentage of verbal lexemes displaying each of the two patterns from the three sources is shown in Table 22.

Table 22. Percentage of lexemes displaying primary and secondary patterns

Source	Primary Pattern	Secondary Pattern
Seiler & Hioki	55 out of 69 lexemes (80%)	14 out of 69 lexemes (20%)
Sauvel & Elliott	19 out of 28 lexemes (68%)	9 out of 28 lexemes (32%)
TMD C. corpus	19 out of 33 lexemes (58%)	14 out of 33 lexemes (42%)

As shown in this table, the primary pattern (with syncope) comprises an overall higher proportion of reduplicated verb forms across all sources.[74]

In the remainder of this section, I present data for each of the two patterns. As I will show, the emergence of the secondary pattern can be, for the most part, explained in terms of adherence to general phonological constraints in the language, i.e., reduplicated forms without syncope surface as such when syncope would yield phonotactically illicit sequences.

6.3.1 The Primary pattern

Reduplicated verbs have concomitant syncope when the resulting words have a well-formed phonotactic structure. The initial stressed syllable of the reduplicated verb is always a closed

[74] It should be noted that the TMD Cahuilla corpus reflects elicitation designed to probe the phonological properties of reduplication in TMD Cahuilla, with a focus on the secondary pattern, so the proportions of the primary vs. the secondary pattern are consequently skewed towards the latter. Otherwise, we would expect to see higher proportions of the primary pattern in TMD Cahuilla, similar to the other two Cahuilla sources.

syllable (CVC), a pattern that holds across the different varieties surveyed in this paper. This is exemplified in (17), with a list of reduplicated verb stems in their citation form, as well as the corresponding base forms after syncope of the root-initial stressed syllable. In (18) I provide further examples of fully inflected verb forms of this type. In (17), stressed syllables are highlighted in boldface (no derivational nor inflectional affixes are included for simplicity of exposition).

(17) Reduplicated verb roots and syncope

	Base	Reduplication	Gloss	
a. *sekay*	ˈ**sɛ**kaj	ˈ**sɛ-s**_kaj	‘to whip’	(TMDC0008.WAV)
b. *qepay*	ˈ**qɛ**paj	ˈ**qɛ-q**_paj	‘to throw’	(TMDC0008.WAV)
c. *chaway*	ˈ**t͡ʃa**waj	ˈ**t͡ʃa-ʃ**_waj	‘to climb’	(TMDC0008.WAV)
d. *humay*	ˈ**hu**maj	ˈ**hu-h**_maj	‘to paint’	(TMDC0008.WAV)
e. *chilyay*	ˈ**t͡ʃi**ʎaj	ˈ**t͡ʃi-ʃ**_ʎaj	‘to shell nuts’	(KH[FN] 1972:5306)
f. *si’ay*	ˈ**si**ʔaj	ˈ**si-s**_ʔaj	‘to peel’	(KH[FN] 1972:5309)
g. *si’al*	ˈ**si**ʔal	ˈ**si-s**_ʔal	‘to braid’	(HS[FN] M3:2196)
h. *huvi*	ˈ**hu**vi	ˈ**hu-h**_vi	‘to smell’	(KH[FN] 1972:5272)
i. *puli*	ˈ**pu**li	ˈ**pu-p**_li	‘to fall’	(HS[FN] M7:2534)
j. *mu’aqi*	ˈ**mu**ʔaqi	ˈ**mu-m**_ʔaqi	‘to pile’	(HS[FN] M6:2415)
k. *wayiki*	ˈ**wa**jiki	ˈ**wa-w**_jiki	‘to eat’	(HS[FN] M7:2496)
l. *xelya’*	ˈ**xɛ**ʎaʔ	ˈ**xɛ-x**_ʎaʔ	‘to dress’	(HS[FN] M4:2295)

(18) Reduplicated and unreduplicated forms with syncope

	Base	**Reduplicated**	**Unreduplicated**
a.	*chaway*	*chemchashway'i*	*nechaway'i*
	t͡ʃaway	t͡ʃɛm-ˈ**t͡ʃa~ʃ**_way-ʔi	nɛ-ˈ**t͡ʃa**way-ʔi
	'to climb'	1PL-RED~climb-PRET	1SG-climb-PRET
		'We climbed (a tree).'	'I climbed a tree.'
		(TMDC0008.WAV)	(TMDC0008.WAV)
b.	*mavay*	*taxnemamvayqal*	*taxnemavay'i*
	mavay	tax-nɛ-ˈ**ma~m**_vay-qal	tax-nɛ-ˈ**ma**vay-ʔi
	'to rub'	REFL-1SG-RED~rub-DUR.SG	REFL-1SG-rub-PRET
		'I'm rubbing myself.'	'I rubbed myself.'
		(KH[FN] 1972:5251)	(KH[FN] 1972:5251)
c.	*wani*	*wawniqal*	*waniqal*
	wane	0-ˈ**wa~w**_nɛ-qal	0-ˈ**wa**nɛ-qal
	'to flow'	3SG-RED~flow-DUR.SG	3SG-flow-DUR.SG
		'Water flows all over.'	'Water flows on the ground.'
		(KH[FN] 1972:5275)	(KH[FN] 1972:5275)
d.	*ma'uni*	*mam'uniqal*	*penma'uniqaleve*
	ma-ʔuni	0-ˈ**ma~m**_-ʔuni-qal	pɛ-n-ˈ**ma**-ʔuni-qal-ɛ-vɛ
	'to point'	3SG-RED~hand-show-DUR.SG	3SG-1SG-hand-show-DUR.SG-PRET-SUB
		'He/she points (distrib.)'	'I pointed with it (my index finger).'
		(HS[FN] M4:2275)	(HS 1979:104)

As stated earlier, the target for reduplication is the CV portion of the stressed syllable, whether stems are composed of a single root like (18a-c) or two roots as part of a compound form, as in (18d) (in this case, reduplication targets the first syllable of the first member of the

N+V compound).[75] That the base of reduplication involves the stem-initial, stressed stem syllable is further evidenced by complex verb forms containing derivational prefixes, as shown below in (19) (recall from §5.3.1 above that the left edges of stems are coextensive with the left edges of roots, as stems include the root plus suffixes, but exclude all prefixes).

(19) Reduplication of verbs stems with derivational prefixes

	Stem	Reduplicated	Unreduplicated
a.	*vukseqay*	*penvuksesqanqal*	*penvukseqayqal*
	vuk-sɛqaj	pɛ-n-ˈvuk-**sɛ~s**_qa-an-qal	pɛ-n-ˈvuk-**sɛ**qaj-qal
	'to hit'	3SG-1SG-PROX-RED~hit-DISTR-DUR.SG	3SG-1SG-PROX-throw-DUR.SG
		'I hit him once.'	'I hit him repeatedly.'
		(KH[FN] 1972:743)	(KH[FN] 1972:743)
b.	*vukmeni*	*vukmemniqal*	*vukmeniqal*
	vuk-mɛni	0-vuk-ˈ**mɛ~m**_nɛ-m-qal	0-vuk-ˈ**mɛ**nɛ-qal
	'to turn over'	3SG-PROX-RED~turn.over-DISTR-DUR.SG	3SG-PROX-turn.over-DUR.SG
		'He turns over many times.'	'The car flips (turns over)'
		(HS[FN] M6: 2473)	(HS[FN] M6:2473)
c.	*vukqepay*	*menvukqeqpanqa*	*penvukqepayqa*
	vuk-qɛpaj	mɛ-n-vuk-ˈ**qɛ~q**_pa-an-qa	pɛ-n-vuk-ˈ**qɛ**paj-qa
	'to hit'	3PL-1SG-PROX-RED~throw-DISTR-DUR.SG	3SG-1SG-PROX-throw-DUR.SG
		'I hit many things.'	'I hit something.'
		(HS[FN] M6:2458)	(HS[FN] M6:2458)

[75] As noted by Seiler (1977:41-41) stress patterns vary in compound stems, with stress falling on either the first or second member of the compound. Since reduplication targets the stressed syllable, either the first or second member may also be reduplicated.

d.	*peqepay*	*penpeqeqpaanqal*	*penpeqepayqal*
	pɛ-qɛpaj	pɛ-n-pɛ-ˈ**qɛ~q**_pa-an-qal	pɛ-n-pɛ-ˈ**qɛ**paj-qal
	‘to throw’	3SG-1SG-DIST-RED~throw-DISTR-DUR.SG	3SG-1SG-DIST-throw-DUR.SG
		‘I throw it many times.’	‘I throw it once.’
		(KH[FN] 1972:791)	(KH[FN] 1972:743)

In (19c) and (19d) we can see that when the derivational prefixes *vuk-* ‘proximal’ and *pɛ-* ‘distal’ are added, stress remains on the root (ˈ*qɛpaj*) when unreduplicated and the reduplicative prefix when reduplicated (ˈ*qɛ~qpa*).

6.3.2 The Secondary Pattern

The secondary pattern, where stem-initial syncope is blocked, can in most cases be accounted for by instances of phonotactic violations. In other words, non-syncopated forms emerge when stem-initial syncope would otherwise result in phonotactically illicit sequences. Next, I discuss the relevant phonotactic constraints responsible for the blocking of syncope, as well as some exceptional cases where syncope is blocked even though there are no clear phonotactic violations involved.

Recall from §3.2.2 that sequences of more than two adjacent consonants are unattested in the language due to a more general phonotactic constraint that places a ban on complex syllable margins.[76] In (20), a list of fully inflected forms is provided to illustrate cases where the avoidance of complex syllable margins (shown in bold) results in the blocking of syncope,

[76] With the exception of loanwords from Spanish, which may show complex onsets i.e., ***tr****i:waʔa* ‘wheat’ (Seiler 1979:217) c.f. Spanish ‘trigo.’

giving rise to the secondary pattern. Unattested forms without syncope are also provided for comparison, with illicit consonant sequences listed in the rightmost column.

(20) Avoidance of syncope to prevent complex syllable margins

	Base	Reduplicated form	Unattested form	Illicit sequence
a.	*qap*	*menqaqap'i*		
	qap	mɛ-n-ˈqa~qap-ʔi	*mɛ-n-ˈqa~**q_p-ʔi**	***qpʔ**
	'to break'	3PL-1SG-RED~break-PRET		
		'I broke them (many objects).'		
		CM(TMDC0010.WAV)		
b.	*pax*	*nepapax'i*		
	pax	nɛ-ˈpa~pax-ʔi	*nɛ-ˈpa~**p_x-ʔi**	***pxʔ**
	'to enter'	1SG-RED~enter-PRET		
		'I entered (in different places).'		
		CM(TMDC0017.WAV)		
c.	*tumkaw*	*chemtutumkaw'i*		
	tumkaw	t͡ʃɛm-ˈtu-tumkaw-ʔi	*t͡ʃɛm-ˈtu~**t_mk**aw-ʔi	***tmk**
	'lie on belly'	1PL-RED-lie.down-PRET		
		'We laid down (in different places).'		
		CM(TMDC0014.WAV)		
d.	*mukni*	*taxnemumukni'i*		
	mukni	tax-nɛ-ˈmu~mukni-ʔi	*tax-nɛ-ˈmu~**m_kn**i-ʔi	***mkn**
	'to win'	REFL-1SG-RED~win-PRET		
		'I won (over and over).'		
		CM(TMDC0015.WAV)		

e.	*saw*	*hemsasawwen*		
	saw	hɛm-ˈsa~saw-wɛn	*hɛm-ˈsa~**s_w-wɛn**	***sww**
	‘make	3PL-RED~make.tortillas-DUR.PL		
	tortillas’	'They are making tortillas.'		
		CM(TMDC0014.WAV)		

As these examples show, stem-initial syncope is generally avoided in reduplication of monosyllabic roots of the shape CVC (e.g., (20a-b) and (20e)), as well as disyllabic roots with an initial closed CVC syllable (20c-d). Since most inflectional and derivational suffixes begin with a consonant in Cahuilla (see the verb template in Chapter 5 (Table 16 in §5.3.1), syncope of the root-initial vowel in CVC and CVCCV... roots would produce a sequence of three adjacent consonants. Syncope thus appears to be blocked in these cases, in order to avoid violating a more general phonotactic constraint banning complex syllable margins, resulting in the observed secondary pattern without stem-initial syncope.

There are other examples, however, where syncope is blocked in reduplication and there are no clear phonological factors at play. In these cases, the expected reduplicated form with syncope would result in a phonologically well-formed sequence, yet syncope is unattested in reduplication. An exhaustive list of these verb forms is shown in (21) and fully inflected forms are shown in (22). These reduplicated verbs are attested in both the TMD Cahuilla data and the archival corpus. Some of these examples involve additional phonological changes in their reduplicated form with respect to the base (21e-h).

(21) Verb stems with unexplained blocking of syncope

	Stem	RED stem	Unattested RED stem	
a. *tacha*	ˈtat͡ʃa ‘lie down’	ˈta~tat͡ʃa	*ˈta~**t_t͡ʃ**a	(TMDC0017.WAV)
b. *tuqan*	ˈtuq-an ‘to put out fire’	ˈtu~tuq-an	*ˈtu~**t_q**-an	(TMDC0017.WAV)
c. *tewan*	ˈtɛw-an ‘to name’	ˈtɛ~tɛw-an	* ˈtɛ~**t_w**-an	(S&E 2004:875)
d. *lepeqi*	ˈlɛpɛqi ‘to kneel’	ˈlɛ~lepɛqi	* ˈlɛ~**l_p**ɛqi	(TMDC0024.WAV)
e. *welisew*	ˈwɛlisɛw ‘to wed a man’	ˈwɛ~wɛlisɛw	*ˈwɛ~**w_l**isɛw	(KH[FN] 1972:5314)
f. *qiwiw*	ˈqiwiw ‘to tear, rip’	ˈqi~qiw-an	*ˈqi~**q_w**iw	(TMDC0015.WAV)
g. *nu’uqan*	ˈnuʔuq-an ‘to push’	ˈnu~nuq-an	*ˈnu~**n_ʔ**uq-an	(TMDC0015.WAV)
h. *tawas*	ˈtawas ‘to lose something’	ˈtaa~tus	*ˈta~**t_w**as	(KH[FN] 1972:5321)

(22) Fully inflected verb forms with unexplained blocking of syncope

	Base	Reduplication	Unattested (with syncope)
a.	*tuk*	*pentutukan’i*	
	tuk	pɛ-n-ˈtu~tuk-an-ʔi	*pɛ-n-ˈtu~**t_k**-an-ʔi
	‘turn off light’	3SG-1SG-RED-put.out-an-PRET	
		‘I turn off many lights.’	
		CM(TMDC0017.WAV)	
b.	*tewan*	*pemtetewanwe’*	
	tɛw-an	pɛ-m-ˈtɛ~tɛw-an-wɛʔ	*pɛ-m-ˈtɛ~**t_w**-an-wɛʔ
	‘to name’	3SG-3PL-RED-namɛ-an-DUR.PL	
		‘They call it that (in our language).’	
		KS(S&E 2004:875)	

c.	*welisew*	*menwewelisewqal*	
	wɛlisɛw	mɛ-n-ˈwɛ~wɛlisɛw-qal	*mɛ-n-ˈwɛ~**w_l**isɛw-qal
	‘marry man’	3PL-1SG-RED-marry-DUR.SG	
		‘I marry them many times.’	
		(KH[FN] 1972:5314)	
d.	*lepeqi*	*hemlelepeqiwent*	
	lɛpɛqi	hɛm-ˈlɛ~lepɛqi-wɛn	*hɛm-ˈlɛ~**l_p**ɛqi-wɛn
	‘to kneel’	3PL-RED-kneel-DUR.SG	
		‘They are kneeling.’	
		(HS[FN] M7:2532)	

In all of the examples shown in (21) and (22), blocking of syncope cannot be explained on phonotactic grounds. Crucially, since the consonant clusters that would result from syncope in these reduplicated forms are in fact attested elsewhere in the language (in this case, in other reduplicated verbs). Relevant examples are shown in Table 22 below with consonant clusters shown in boldface. For simplicity of comparison, only unattested reduplicated forms with blocked syncope are provided.

Table 23. Variable blocking of syncope in reduplicated forms

Base	**Unattested (blocked syncope)**	**Attested CC elsewhere**
a. tuk ‘turn off light’ (22a)	* pɛ-n-ˈtu~t_k-an-ʔi	
b. taki ‘patch together’		*mentatkameqal* mɛ-n-ˈta~**t_k**a-mɛ-qal CM(TMDC0011.WAV)
c. wɛlisɛw ‘to wed’ (22c)	*mɛn-ˈwɛ~w_lisɛw-qal	
d. wal-i ‘dig a hole’		*pemwawlemiwen* pɛm-ˈwa~**w_l**-ɛmi-wɛn CM(TMDC0008.WAV)
e. lɛpɛqi ‘kneel’ (22d)	* hɛm-ˈlɛ~l_pɛqi-wɛn	
f. lupin ‘pluck’		*lulpume* -lu~**l_p**u-mɛ- (HS 1979:213)
g. tɛwan ‘to name’ (22b)	*pɛ-m-ˈtɛ~t_w-an-wɛʔ	
h. tɛw ‘to find’		*tetwan* -tɛ~**t_w**an- (HS 1979:98)

As these examples in Table 22 show (referenced from (22)), stem-initial syncope fails to apply in certain stems (a), (c), (e), (g) even though the resulting stem-internal consonant clusters are attested in similar reduplicated verb stems (b), (d), (f), (h). In addition, all of the examples in Table 21 show consonant sequences of varying sonority contrasts (rising, falling and level). Recall from §3.2.2 that no sonority sequencing restrictions appear to be relevant in the language generally. However, this does not mean that such restrictions cannot apply exclusively in a restricted set of domains, such as reduplication. For example, in Cupeño, the restriction on

sonority sequencing applies only in reduplication (Yates 2017). Thus, it is relevant to assess whether a similar restriction may be responsible for the blocking of syncope in some reduplicated verb stems in Cahuilla. In (21) above there are several examples where stem-initial syncope would result in consonant clusters with rising sonority in unattested forms: *ˈ*tɛ*~***t_w**-*an* ‘to name’ (21c); *ˈ*qi*~***q_w***iw* ‘to tear, rip’ (21f). However, there are also attested reduplicated forms with stem-initial syncope that results in consonant clusters with rising sonority: ˈ*ca*-***ʃ_w***ay* ‘to climb’ (17c); ˈ*hu*-***h_m***ay* ‘to paint’ (17d). Thus, syncope does not appear to be blocked in order to avoid sonority reversals in reduplicated forms in Cahuilla. In the remainder of cases where syncope is blocked in reduplication, many of these stems exhibit additional, unpredictable phonological changes with respect to their bases (21f-h), including presence/absence of additional vocalic or consonantal segments, suggesting that these may be cases of lexicalization in the context of reduplication. Thus, forms where syncope is blocked with no apparent phonological motivation appear to be exceptional.

There are also cases where syncope is blocked in certain verbs stems in one language variety but not in another. As shown below in (23), a reduplicated form without syncope is unattested in the speech of older speakers of the Desert dialect recorded previously but is attested in the TMD Cahuilla dialect. Likewise, a reduplicated form with syncope is unattested in TMD Cahuilla, but attested in the speech of speakers of the older Desert Cahuilla variety.

(23) Dialectal inconsistencies in the blocking of syncope

a. Torres Martinez Desert Cahuilla

Reduplication	Unattested
pen'a'amiqal	
pɛ-n- ˈ**ʔa~ʔa**mi-qal	*pɛ-n-ˈʔa-ʔ_mi-qal
3SG-1SG-RED~drop-DUR.SG	
'I drop him many times.' CM(TMDC0017.WAV)	

b. Older Desert Cahuilla

Reduplication	Unattested
pe'a'mamiqal	
pɛ-0-ˈ**ʔa~ʔ**_ma-mɛ-qal	* pɛ-0-ˈʔa~ʔami-qal
3SG-3SG-RED~drop-DUR.SG	
'He drops things all the time' (HS^{FN} M3:2205)	

Cases such as these provide further evidence that the reduplicated form of these stems may have become lexicalized over time since the resulting sequences are well-formed and do not violate any of the general phonotactic constraints of the language.

6.4 Conclusions

This chapter has provided a description of verbal reduplication patterns in Cahuilla utilizing both published and unpublished data, as well as new data of a contemporary Cahuilla variety (TMD) obtained through field research. It was shown that a single reduplicative pattern, namely prefixing CV- reduplication can encode a variety of meanings such as plurality, durative aspect and distributivity in the language. Reduplication is attested in complex patterns of exponence

that exhibit morphophonological effects that are sensitive to membership of verbs to different inflection classes. In addition, reduplication may also occur 'automatically' with a class of verbs that is both morphologically and lexically conditioned.

Across patterns, reduplication triggers syncope in the root-initial vowel, a default pattern that may be blocked due to general phonotactic constraints. More data in the form of a robust corpus that includes rich prosodic annotation of morphologically related words is needed in order to further examine the prosodic system of contemporary varieties of Cahuilla such as that of the Torres Martinez Desert dialect. Such a detailed study would also serve a larger goal of strengthening Cahuilla language revitalization and pedagogy efforts by integrating various aspects of a precise grammatical and phonological description into the development of curricular materials for second language learning.

Chapter 7: Conclusion

In this dissertation, I have presented a detailed description of several salient topics in the phonology and morphology of TMD Cahuilla, a Desert Cahuilla variety spoken on the Torres Martinez Desert Cahuilla Indian Reservation located near the town of Thermal in Southern California. Specifically, particular attention was paid to phonological and morphological partterns and phenomena that are sensitive to prosodic structure in the language not addressed in previous literature, including the distribution of phonological contrasts and patterns, word-level stress, intonation and reduplicative patterns. Crucially, this dissertation presents novel data from contemporary speakers of TMD Cahuilla and examines data from conversations and other previously underdocumented speech genres that are part of a documentary collection of the language (Huaute 2020). Furthermore, I have discussed the patterns and processes of this variety within the context of previous description of related Cahuilla language varieties documented earlier in the twentieth century.

I began in Chapter 2 by providing a phonemic inventory that included several examples for each phoneme, as well as a description of their distribution and frequency. I also provided acoustic illustrations of phonemic contrasts where relevant. In this chapter, I provide novel data to show that TMD Cahuilla has a retroflex lateral [ɭ], an allomorph of the alveolar lateral [l] that is in complementary distribution with the alveolar lateral appearing only in the coda position of the syllable, while the alveolar appears in the onset position. The distribution of these two laterals mirrors that of the another alternation between the voiceless post alvoelar fricative [ʃ] and affricate [tʃ], further demonstrating the extent that the phonology interfaces with prosodic structure in TMD Cahuilla. I also provided a side-by-side comparison of the phonemic inventories of previously documented Cahuilla varieties that included the various ways of

representing each sound in different documented sources over that last couple centuries. No other such comparison has been compiled in the previous literature.

In Chapter 3, I discussed phonotactic requirements with regard to syllable structure and the sequencing of consonants and vowels. Phonotactics are also discussed in a subsequent chapter on morphology since some morphological patterns, including reduplication, are conditioned by phonological constraints. In Chapter 4, I described the suprasegmental phonology of TMD Cahuilla with regard to primary stress and intonation. With regard to word-level stress, I used cross-linguistically relevant phonological criteria to diagnose primary stress in TMD Cahuilla and to assess previous accounts of a rhythmic secondary stress system in Cahuilla to see whether such an analysis can also be claimed for TMD Cahuilla. After examining several phonological diagnostics, it was determined that only one level of stress (primary) can be posited for TMD Cahuilla. I also used spectrogram images generated in Praat to examine several acoustic parameters described as salient indicators of prominence in previous documentation, and which are also typically used cross-linguistically to diagnose secondary stress (f0, intensity, and duration). Audio samples taken from archvial collections containing forms posited to exhibit an alternating secondary stress pattern were examined along with audio from cognate forms in TMD Cahuilla. These illustrations provided no evidence to posit secondary stress for the TMD Cahuilla data. In Chapter 4, I also presented a description and analysis of the intonational patterns attested in TMD Cahuilla declaratives and interrogatives, the first such description for any variety of Cahuilla.

In Chapter 5, I provided an overview of the morphology, providing a description of the morphological structure and morphological processes of both nouns and verbs, the two lexical classes that show complex morphophonological exponence in the language. This chapter

presents evidence for a high degree of synthesis in morphological exponence in both nouns and verbs, as well as evidence for complex systems of inflectional classes in these word classes. Through examination of exponence patterns of plural marking in nouns, this chapter also illustrates the complex morphophonological patterns attested in TMD Cahuilla. One important observation is that some patterns of morphological exponence documented in previous literature (specific markers for derivational morphology, patterns of variable affix ordering, among others) are not attested in the TMDCahuilla corpus.

Finally, in Chapter 6, I provided a comprehensive description of reduplication patterns in TMD Cahuilla and prior published and archival sources, focusing on verbal reduplication. I addressed the meanings and functions encoded by reduplication in this language, the patterns of exponence involved in reduplicative constructions (which in some cases involve suffixation in addition to reduplication), as well as the factors that govern the surface phonological form of reduplicative verbs. In this chapter, I also identify five verb classes based on their unique morphophonological exponence when inflected for distributive aspect. These verb classes generally aligned with previous analyses by Seiler (1977) and Hill and Hill (2019), with little variation. I also describe a variable process of stem-initial vowel syncope that targets the stressed syllable. In many cases syncope can be explained by phonotactic constraints, while in other cases where syncope would not violate any phonotactic constraint, it seems to be lexically conditioned. This chapter presents novel data that contributes to existing descriptions of reduplication patterns in other Uto-Aztecan languages.

This dissertation presents original data collected through fieldwork that demonstrates the extent to which prosodic structure interfaces with other systems in the grammar. The discovery of a retroflex lateral in Cahuilla also contributes to areal studies on the distribution of sounds of

in related Uto-Aztecan languages. The data presented on Cahuilla intonation also contributes to a growing body of crosslinguistic work that seeks to broaden its empirical base and include languages that are currently underrepresented in the literature, in order to understand what types of intonational patterns and features are possible across languages. This study also provided novel data on morphologically complex verb forms in TMD Cahuilla, such as the distributive forms, which exhibit reduplication, suffixation and other concomitant processes such as root-initial vowel syncope. Reduplication in Uto-Aztecan languages has been discussed extensively in the literature for both related Takic languages (Cupeño (Hill 2005) and Luiseño (Kroeber & Grace 1960)), as well as elsewhere in the UA language family (Haugen 2008, 2009). This dissertation provides novel data that adds to these and other typological studies on reduplication. Given the limitations of this study, no one topic could be investigated in its entirety, thus future research on these and other topics on Cahuilla morphonology are warranted. For example, a thorough investigation on syncope patterns in reduplication would require a larger data set, in order to determine the factors that condition syncope, both in reduplicative forms and elsewhere in the grammar. Another topic to be left for future research is to develop a full model of intonation for TMD Cahuilla, which includes interrogatives and other sentence types that account for narrow focus. Again, this would require a larger data set that included both elicited data, as well as data from conversations. Such an endeavor will likely require supplementing data from L1 speakers with archival materials available for the language.

Finally, one of the important goals of this study was to assess how the description provided in this dissertation could be leveraged to support Cahuilla language revitalization and reclamation. One question that was posed in Chapter 4 is how the investigation of prosodic structure can be used to convey and package meaning in the language. As stated in Chapter 4,

such research could form the basis for developing tools that enhance language learners' awareness of prosodic patterns and helps them to develop their perception and production skills. A good example of this would be the study by Bird & Miyashita (2018) where 'pitch art' where f0 contours were converted into tribal graphic art that was used to teach word-internal pitch trajectories or "word melodies" in Blackfoot to second language (L2) learners of the language. Such a project would not only allow learners of the language additional ways of conveying information or mood in the language but would also improve their pronunciation to near-native like.

In conclusion, this dissertation has provided a concise and detailed description of several salient topics in the phonology and morphology of TMD Cahuilla. Although far from being a comprehensive reference grammar, it provides a baseline for future research on the language. It will also form the basis for a forthcoming pedagogical grammar of the language, which I will be undertaking in the near future.

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