

## Verb Classes in Juchitán Zapotec

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**Abstract.** This study presents a comprehensive analysis of verb classes in Juchitán Zapotec, an Otomanguean language belonging to the Zapotec branch of Zapotecan, following the four-class system of verbal classification laid out in earlier work by Terrence Kaufman. Our analysis, based on a thorough review of over two thousand Juchitán Zapotec verbs, confirms the applicability of the four-class system to Juchitán Zapotec data, improving over previous analyses of verbal morphology in the language and adding to the evidence that this system can be applied throughout the Zapotecan family (including Chatino); further, our study stresses the relevance of data-driven rather than theory-driven linguistic analyses.

**1. Introduction.** The motivations for undertaking this study are manifold. At the descriptive level, our intention is to make widely available for the first time a comprehensive analysis of Juchitán Zapotec verb classes. The phonology of this language is conservative; both the consonantal and the vocalic segments of the inflectional allomorphs have been well preserved and are unequivocally identifiable across paradigms. The extensive data presented here thus constitutes a valuable resource against which to compare verbal classification in other Zapotec and Chatino languages—for example, Campbell’s (2011) study of verb classification in Zenzontepec Chatino. Our analysis offers a clear and simple system of verbal classification—an improvement, we argue, over the earlier attempts at understanding Juchitán Zapotec verb morphology by Marlett and Pickett (1987) and Pickett (1953, 1955)—which, more importantly, applies throughout both the Zapotec and the Chatino language groups.

Zapotec languages constitute one of the two branches of the Zapotecan family of the Otomanguean stock, alongside the Chatino branch. Kaufman (1989, 2004, 2007) refers to Zapotec as a “language complex”—a term that provides an alternative to “language” and “language family” that allows reference to both the structural diversity within Zapotec languages and the challenge that such diversity represents for the identification of discrete Zapotec languages. Within the Zapotec-speaking area, Kaufman (2007) identifies the following “virtual languages,” or clusters of closely related dialects: Western Zapotec, Papabuco Zapotec, Southern Zapotec, Central Zapotec, and Northern Zapotec. Several other classifications of Zapotec languages have been proposed in the

literature. Smith-Stark (2007) reviewing observations made about the diversification of Zapotec languages since the 1600s, classification proposals dating back to the 1800s, and his own analysis of isoglosses, proposes a three-way classification: Solteco, Western Zapotec, and Medullar Zapotec.

We are concerned in this article with contemporary data from the language referred to here as Juchitán Zapotec or Juchiteco, which Kaufman's classification considers as part of Central Zapotec.<sup>1</sup> Juchiteco is spoken in and around the municipality of Juchitán de Zaragoza in Oaxaca, Mexico. Vitality assessments can be made for Juchiteco on the basis of census data. For instance, Smith-Stark (1997) assigns Juchiteco as spoken in the municipality of Juchitán de Zaragoza a -4.66 vitality index, indicating that the population of Juchiteco speakers of ages five to fourteen is 4.66 percentage points smaller than is the proportion of the overall Mexican population in the same age bracket—which implies that the population maintaining active use of the Juchiteco language is growing at a lower rate than the overall national population. A more recent report by Marcial Cerqueda (2014) utilizes the *Índice de reemplazo etnolingüístico* ('ethnolinguistic replacement index') methods proposed by Ordorica et al. (2008) to determine that seven of the eight Juchiteco-speaking municipalities are undergoing a process of *extinción acelerada* ('accelerated extinction'). Only Santa María Xadani, a Juchiteco-speaking community south of Juchitán, is considered to be in *recuperación lenta* ('slow recovery').

The bulk of the data in this article was provided by Rosaura López Cartas and Javier López Cartas, sister and brother, from La Ventosa, Juchitán de Zaragoza, and by Rosalino Gallegos Luis from Santa María Xadani. In addition, three dictionaries of the language were consulted: those of Jiménez Girón (1979), Pickett (1979), and Jiménez Jiménez and Marcial Cerqueda (2000). The data was collected over the course of the Project for the Documentation of the Languages of Mesoamerica (PDLMA) between 1995 and 2010 by the two authors, with contributions from Marilyn Feke in the year 2000, and constitutes a significant portion of the extensive Juchitán Zapotec lexical database. Supplemental data comes from the Dialect Survey of Zapotec and Chatino languages commissioned by the Instituto Nacional de Lenguas Indígenas and carried out by the PDLMA under the direction of Terrence Kaufman and Mark Sicoli.

Section 2 summarizes relevant typological traits of Juchiteco and presents an overview of its phonology. Section 3 describes the overall system of verbal morphology insofar as it is relevant for the present analysis. Section 4 provides an overview of the verb classification proposed by Kaufman (1989), followed by an extensive description of the system in Juchitán Zapotec. Section 5 reviews previous literature on verbal morphology in Juchiteco. We conclude in section 6, noting that our analysis is applicable across the Zapotecan family.

**2. Overview of Juchiteco phonology.** Juchitán Zapotec is a head-marking language with verb-subject-object constituent order. Its complex phonology includes contrastive tone and three different types of syllabic nuclei that interact

with stress. Stress is consistently assigned to the first syllable of a root, which can have one or two syllables. Tones are low (unmarked, as it is the most frequent, although it is not the default), rising, or high, and have both lexical and grammatical functions. Five cardinal vowels /i, e, a, o, u/ may each be plain (V), checked (V?), and rearticulated (VV), with the last appearing in surface phonology only in the stressed syllables of roots. In a multiword phrase, any underlyingly rearticulated vowel in a word that is not the last in the phrase will be simplified to a plain vowel.

Roots are canonically of the shape *CV(CV)*. In this respect, Juchiteco is particularly conservative, compared with the patterns of deletion of either pre-stress or poststress vowels, and occasionally of both, that are observable in many other varieties of Zapotec, including other languages in the Central Zapotec language area. Inflectional and derivational morphemes and plural and person-marking clitics in verbs may extend the *CV(CV)* phonological word, but stress remains on the first syllable of the root.

An articulatory chart of the consonantal inventory of Juchiteco is shown in table 1. The table lists the consonantal phonemes both in the orthographic system developed by the Project for the Documentation of the Languages of Mesoamerica (PDLMA), under whose auspices the documentation of Juchiteco presented here was conducted and which faithfully represents the phonological structure of Juchiteco, and the Americanist Phonetic Alphabet (APA).<sup>2</sup> The PDLMA grapheme is in italics; where the APA character is different, it is shown in square brackets after the PDLMA grapheme.

**Table 1. Consonantal Inventory of Juchitán Zapotec in PDLMA and APA Notation**

	BILABIAL	ALVEOLAR	PALATO-ALVEOLAR	PALATAL	VELAR	LABIO-VELAR
Plosives	<i>b</i>	<i>d</i>	<i>dx</i> [j]		<i>g</i>	
	<i>p</i>	<i>t</i>	<i>ch</i> [č]		<i>k</i>	<i>kw</i>
Fricatives		<i>z</i>	<i>zh</i> [ž]			
		<i>s</i>	<i>x</i> [š]			
Nasals		<i>n</i>		<i>ny</i> [ɲ]		
		<i>nd</i>				
	<i>m</i> [m:]	<i>nn</i> [n:]				
Laterals		<i>l</i>				
		<i>ll</i> [l:]				
Rhotics		<i>r</i>				
Semivowels	<i>w</i>			<i>y</i>		

Table 1 presents those consonants and apparent clusters that can begin syllables in native vocabulary. Synchronically, every syllable-initial consonant is

underlyingly either single or geminate; geminate plosives and fricatives are written with voiceless symbols (*p, t, s*, etc.), while single plosives and fricatives are written with voiced symbols (*b, d, z*, etc.). Geminate consonants such as *p* are longer in duration than single consonants, and geminate plosives are aspirated in stressed syllables. The proposal that contemporary Zapotec languages have a contrast between single and geminate consonants (rather than between voiced and voiceless consonants) originated with Swadesh (1947) and was adopted by Suárez (1973). Evidence that the appropriate distinction is between single and geminate comes from early Spanish loan-words into Zapotec where both the voiced and voiceless obstruents of Spanish were borrowed as single consonants. For example, Zapotec /t/ (currently spelled ⟨d⟩) was used to represent both Spanish /t/ and Spanish /d/, while Zapotec fortis /tt/ (currently spelled ⟨t⟩) was not used to represent any Spanish consonant (Kaufman 1989; Smith-Stark 2002). In other words, in the sixteenth century, Zapotec had only voiceless obstruents and only voiced resonants.<sup>3</sup>

An analysis based on a distinction between single and geminate consonants also leads to a more revealing morphological analysis (cf. Pérez Báez 2011, 2015). Geminate consonants can be underlyingly complex morphophonemically. For instance, as is discussed in detail in section 4, a morpheme consisting of a single consonantal segment causes a stem-initial consonant to become geminate. This happens when the causative morpheme *g*= and the potential marker *g*˘= are preposed to a consonant-initial verb stem. Both of these morphemes are segmentally a single velar plosive (the potential marker also bears a rising tone). Geminate consonants can also be underlying. The geminate consonants resulting from preposing a single velar plosive to a root-initial consonant are listed in table 2. (Note that the geminate members of the pairs in table 2 are not always the geminate consonants that are phonetically closest to the single members: *g* + *b* results in ⟨kw⟩ rather than ⟨p⟩, *g* + *l* results in ⟨nd⟩ rather than ⟨ll⟩, and so on.)

**Table 2. Geminates Resulting from *g* + C<sub>[sgll]</sub>**

SINGLE	<i>b</i>	<i>d</i>	<i>dx</i>	<i>g</i>	<i>z</i>	<i>zh</i>	<i>l</i>	<i>r</i>	<i>y</i>
GEMINATE	<i>kw</i>	<i>t</i>	<i>ch</i>	<i>k</i>	<i>s</i>	<i>x</i>	<i>nd</i>	<i>ch</i>	<i>ch</i>

Other consonants in the phonemic inventory need an explanatory note. The bilabial nasal ⟨m⟩ is only geminate, while ⟨w⟩ and ⟨y⟩ are only single. The geminate lateral ⟨ll⟩ occurs word-medially, although it is not derivable from *g* + *l*; ⟨ll⟩ may not begin a stressed syllable. Similarly, ⟨nn⟩ occurs word-medially but may not begin a stressed syllable. Word-initial *g* + *n* yields ⟨n⟩. The consonants ⟨f⟩, ⟨j⟩, and ⟨rr⟩, not listed in table 2, occur only in loans from Spanish; the same is true of syllable-initial consonant clusters. We provide a detailed explanation of the sound system of the Juchitán Zapotec in the appendix at the end of this article.

**3. Verbal morphology in Juchitán Zapotec.** All types of Zapotec have highly elaborate systems of inflectional and derivational verb morphology. In Juchitán Zapotec, inflectional and derivational morphemes can be attached to the root, as shown in (1). These morphemes are shown with the clitic boundary symbol = in (1) and elsewhere in this article because they are unstressed; stress remains on the first syllable of the root.<sup>4</sup>

(1) ORDER OF MORPHEMES IN JUCHITECO VERBS

Position 3	Position 2	Position 1
TAM=	(=AUX=)	(=DERV=) =ROOT (=PL) (=SJT)

Position 1 can be occupied by derivational morphemes, including morphemes that form participles, adjectives, and statives; morphemes that form versives, middles, intransitives, and nonactives; and morphemes that form conversives, causatives, transitives, and actives. By “versives,” we refer to an intransitive verb derived from a root that describes a state; the verb then has the meaning of becoming or acquiring the properties described by the root. The transitive or causative counterpart of a versive is a conversive, and means ‘to make something turn into X’. By transitive, we mean verbs that can be used transitively (but may appear as antipassives or with unexpressed direct object), as opposed to verbs that cannot be used transitively, which are referred to here as intransitive.

Morphological valence-changing processes in Juchiteco are summarized in table 3 (see Pérez Báez [2015] for a thorough analysis). Table 3 is organized in valence-increasing and valence-decreasing columns. The reader may focus first on the “Basic root” column which lists the valence of the roots that participate in the derivational processes described in each table row. The “ACT-” column lists the morphemes which, when preposed to the basic root, decrease its valence. The “ACT+” column, in turn, lists the morphemes that increase the valence of the basic root. The column labeled “Causative” lists morphemes that convert a basic root into a causative verb. The columns labeled “Morpheme” list the relevant prefixes involved in each derivational strategy, while the “Valence” quantifies the valence change. The upper part of table 3 lists the four patterns documented for vowel-initial roots, whereas the lower part lists four patterns documented for consonant-initial roots.

The most frequent morphological valence-changing pattern is for verb roots to participate in dyads where they are associated with a causative stem. As table 3 shows, this happens for consonant-initial roots listed under groups C1–4 (with some exceptions) and for vowel-initial roots in groups V2 and V3. There is significant variation in causative morphology, possibly due to a (probably piecemeal, case-by-case) diachronic regularization process.<sup>5</sup> Facts about variation are given where appropriate in the form <u(=g)=zi=>. This notation is intended to account for the alternation between /z/ and /s/ in the last morpheme of the string: the causative morpheme <g>, when preposed to the single consonant /s/, will result

in fortition (as explained in section 2). Some triadic patterns are documented for groups V1 and V2, where more active and less active verbs can be derived from a vowel-initial stem.

**Table 3. Morphological Valence-Changing Patterns in Juchitán Zapotec**

BASIC ROOT		ACT-		ACT+		CAUSATIVE
VALENCE	Morpheme	Valence	Morpheme	Valence	Morpheme	
VOWEL-INITIAL ROOTS						
V1	INTR.	-y-	intr.	=g= (Class D verb)	2	none attested
V2	TRANS.	-y-	intr.	—		=u-, =g-, =u=g-, =u=zi-, =u=g=zi-, which surfaces as =u=si= following the rule $g + z \rightarrow s$
V3	INTR., TRANS.	—		—		<u=g>
V4	—	=d=	intr.	=g= (Class D verb)	2	marginally
CONSONANT-INITIAL ROOTS						
C1	INTR., TRANS.	—		—		<g> where $g + C \rightarrow CC$
C2	INTR. (VERSIVES)	—		—		<u>
C3	INTR., TRANS.	—		—		<u=g>
C4	INTR., TRANS.	—		—		<u(=g)=zi>

The details of the derivation of participles, summarized in table 4, merit attention. Zapotec participles have a meaning like those of perfective participles of Indo-European languages. They may be based on both transitive verbs (e.g., ‘eaten’) and intransitive verbs (e.g., ‘gone’); with transitive verbs, the meaning is passive. Participles, like adjectives, can (sometimes) modify nouns and can (sometimes) behave as predicates. Table 4 lists participle-forming strategies in Juchiteco. Most verbs that have participles form them by preposing <na=) to the verb stem (type 1).<sup>6</sup> In some cases, <na=) is optional (type 1a). In others, no participle morpheme is used and the participle is derived by preposing a rising tone to the verb stem (type 2).<sup>7</sup> A combination of a preposed rising tone and the morpheme <na=) has also been documented (type 3). Moreover, optional <na=) can occur with the rising tone (type 3a). Certain verbs lack a dedicated participle form; instead, a completive form of the verb serves as a participle, or rather, a

“pseudoparticiple” (type 4). Finally, some verbs form no participle at all (type 5). If there is any systematic relationship between the inflectional class of a verb (labeled A, B, C, D; see section 4) and the way its participle is formed, it has not yet been ascertained.

**Table 4. Participle-Forming Strategies**

TYPE	STRATEGY	STEM	GLOSS	PARTICIPLE	GLOSS
1	<i>na=</i>	<i>-bezǎ</i>	‘to wait’	<i>na=bezǎ</i>	‘residing’
1a	<i>(na=)</i>	<i>-bidxi</i>	‘to dry’	<i>(na=)bidxi</i>	‘dry’
2	rising tone	<i>-cheepa</i>	‘to become blind’	<i>ché?pa</i>	‘blind’
3	<i>nǎ=</i>	<i>-daagu</i>	‘to close, to cover’	<i>na=dǎ?gu</i>	‘closed, covered’
3a	<i>(na)ˇ=</i>	<i>-chaawi</i>	‘to fix up’	<i>(na=)chá?wi</i>	‘good’
4	pseudo-participle	<i>-dubi</i>	‘to sink’	<i>bi-dubi</i>	‘sunken’
5	(none)	<i>-ache</i>	‘to burst open’	—	—

Position 2 in the verbal template can optionally be occupied by an auxiliary morpheme to form andatives. Position 3 is obligatorily occupied by one of the seven tense-aspect-mood (TAM) morphemes listed in table 5. Morphemes are cited in their underlying shapes. For the purposes of the present study, the crucial evidence for the assignment of any Juchiteco verbs to one of four classes (A, B, C, D) comes from the interactive behavior of a verb stem with its potential and completive markers (in bold in table 5). The habitual form is presented for each verb because removing the habitual marker (*ri=* before a consonant, or *r=* before a vowel or semivowel) reveals the basic shape of a verb stem. When one knows the class of a verb, the behaviors of all the other markers are completely predictable. Therefore, the data sets presented in this article include habitual, potential, and completive forms of the relevant verbs. Verb stems are cited with an initial dash as a reminder that they must be preceded by inflectional markers, at least.

**Table 5. Tense-Aspect-Mood (TAM) Markers in Juchitán Zapotec**

FUNCTION	ABBREVIATION	MORPHEMES
Habitual	HAB	<i>ri=</i>
<b>Completive</b>	<b>CMP</b>	<b><i>be=, gu=</i></b>
<b>Potential</b>	<b>POT</b>	<b><i>gĩ=, gˇ=</i></b>
Counterfactual	CTF	<i>nĩy=</i>
Progressive	PRG	<i>kǎy=</i>
Perfect	PRF	<i>wáy=</i>
Future	FUT	<i>za=</i>

**4. Verb classes in Juchitán Zapotec.** For this article, we have analyzed over two thousand verbs documented in the Juchitán Zapotec Lexical Database (Pérez Báez, Kaufman, and Feke 2016). To save space, however, we focus here

on verb stems and exclude verbal compounds. Verbal compounds present the same inflectional morphemes as roots do, although their valence properties may differ from those of the uncompounded verb. Table 6 summarizes verbal classification in Juchiteco and the basic morphophonological rules related to the inflectional processes, as an introduction to the detailed discussions of class membership, allomorphy, and phonotactics in sections 4.1–4.5. Habitual forms allow the stem to be isolated; the habitual marker does not interact with any consonantal segment of the verb stem the way the potential marker does. The aspectual categories that are crucial for defining the classes are the Potential and the Completive. In the presentation of data in tables throughout the rest of this section, all verbs are shown in their habitual, completive, and potential forms.<sup>8</sup>

**Table 6. Verb Classes in Juchitán Zapotec**

	CLASS A mainly transitive (incl. causatives)	CLASS B mainly intransitive	CLASS C transitive and intransitive	CLASS D transitive and intransitive
Initial segment	-C; -u, -e	-C, -V	-C, -V	-C, -V
Habitual	ri=	ri=	ri=	ri=
Completive	be=	gu=	gu=	gu=, with replacive initial consonant
Potential	g̃i=	g̃i=	g̃=, where g̃ + C → #CC	g̃=, where g̃ + C// → #CC

Class A verbs are characterized by the marker *be=* in the completive, which is the reflex of earlier *\*kwe=* (Kaufman 2004) and appears on the surface as *bi=*. (Further explanation and justification of these remarks are deferred until section 4.1.3.) All other classes take the completive marker *gu=*. Class C and D verbs can be identified on the basis of their potential form, in which the root-initial consonant is geminated (see table 2) when the potential marker *g̃=* is attached. Class D verbs are distinguished from class C verbs by a stem-initial alternation whereby one consonant appears in the completive while a different consonant appears in all the other TAM forms of the lexical verb. This and other details of each verb class are explained in detail in sections 4.1–4.5 below. When appropriate, classes are further subdivided into subclasses based on the root-initial segment. In these cases, the uppercase letter designating the class is followed by a lowercase letter suggestive of the root-initial segment. For instance, subclass Ac refers to class A verbs that are consonant-initial, and subclass Av refers to vowel-initial verbs.

It should be noted that verbs across all four classes exhibit tonal perturbations in their potential forms stemming from the tone inherent to the potential marker. This tone has been analyzed as a high tone in Chichicapán

Zapotec (Smith-Stark 2002)—another Central Zapotec language—and in San Blas Atempa Zapotec, adjacent to Juchiteco and a variety of it. Pérez Báez (2011) and Pérez Báez et al. (2013) show that Juchitán Zapotec has an underlying rising tone, whereas San Blas Atempa displays a rising tone in all but class C verbs and Santo Domingo Petapa exhibits an underlying high tone in all four classes.

**4.1. Class A verbs.** Class A verbs are characterized by the completive morpheme *be=*, which surfaces as /bi/. This is the largest verb class in Juchiteco, with some sixteen hundred verbs attested in our data. Verb roots in this class may begin in vowels /e/ and /u/ or in consonants. About half of the class A verbs begin in /u/. The other half of the class A verb inventory is comprised mostly of intransitive verbs, including versives.

**4.1.1. Subclass Ac.** Consonant-initial verb roots (subclass Ac) amount to about half the verbs in class A and include both transitive and intransitive verbs. Table 7 provides a small, representative subset of subclass Ac verbs. Verbs are selected to show both roots beginning in geminate consonants and roots beginning in single consonants. The habitual form of the verb features an easily segmentable habitual morpheme *ri=* that attaches to an unmodified root of the verb, allowing the root to be readily isolated. The potential marker is *gĩ=* (the surface realizations of the underlying rising tone of this morpheme are discussed in section 4.3.2).

**Table 7. Subclass Ac Roots**

ROOT	TAM PARADIGM	GLOSS
<i>-bani</i>	<i>ri=bani</i> <i>bi=bani</i> <i>gi=báni</i>	‘to awaken’
<i>-dǎ</i>	<i>ri=dǎ</i> <i>bi=dǎ</i> <i>gi=dǎ</i>	‘to gush’
<i>-kichi</i>	<i>ri=kichi</i> <i>bi=kichi</i> <i>gi=kíchi</i>	‘to whiten, to become white’
<i>-luzhe</i>	<i>ri=luzhe</i> <i>bi=luzhe</i> <i>gi=lúzhe</i>	‘to finish, to conclude’
<i>-papa</i>	<i>ri=papa</i> <i>bi=papa</i> <i>gi=pápa</i>	‘to fly’

There is little about subclass Ac verbs that is noteworthy except for the analysis of *y*-initial verbs. These have been treated as belonging to a discrete

subclass in other analyses but are grouped with consonant-initial roots in this study, as explained below.

Analyses for San Blas Atempa (Enríquez Licón 2009) and Chichicapan (Smith-Stark 2002) have proposed a set of /i/-initial verb roots, whose behavior differs depending on whether the /i/ is in the nucleus of the first syllable of the root or whether it is the first vowel in a diphthong. In this article, we analyze /y/-initial roots as behaving like consonant-initial roots; the apparent difference from the inflection of other consonant-initial roots results from deletion of the high vowel of the morpheme before the homorganic glide—that is,  $Ci=yaCV$  becomes  $C=y-aCV$ . Apparent surface sequences  $CyV$  and  $CwV$  in Juchiteco are special cases of the  $CVCV$  pattern in which the vowel of the first syllable is deleted before a homorganic semivowel, following the rules in (2).

- (2)  $CiyV \rightarrow [CyV]$   
 $CuwV \rightarrow [CwV]$

Support for this analysis comes from the inventory of /y/-initial stems where the /y/ is, in fact, a mediopassive morpheme attached to a vowel-initial root. Table 8 lists such mediopassive class A verbs. There are an additional forty-nine /y/-initial verbs attested in the data and treated as consonant-initial class A verbs, including verbs where /y/ is the initial segment of the root and not a separate morpheme. It should be noted that some of these verbs alternate between class A and either class B or class C, as is seen from the fact that they use more than one set of TAM markers. This is discussed in detail in section 4.5.

**Table 8. Class A Mediopassive Verbs and Their Roots**

MEDIO-PASSIVE	TAM	GLOSS	ROOT	CLASS AND VALENCE	GLOSS
-y-a	r=y-a b=y-a g=y-á	'to disintegrate, to melt'	-a	intr.	'to ripen'
-y-a?de	r=y-a?de b=y-a?de g=y-á?de	'to be given a gift'	-a?de	C:t	'to receive a gift'
-y-aana	r=y-aana b=y-aana g=y-áana	'to get cleared for plowing'	-aana	B:t	'to clear (land) for plowing'
-y-aapa	r=y-aapa b=y-aapa g=y-áapa	'to get watched over'	-apa	C:t	'to watch over somebody, something'
-y-aaxǎ	r=yaaxǎ, b=y-aaxǎ g=y-aǎxǎ	'to be pulled out, to get uprooted, knocked down'	-axa	C:t	'to pull out, to uproot something'
-y-aaze	r=y-aaze b=y-aaze g=y-áaze	'to be soaked, to sink'	-aze	C:i	'to soak, to bathe'

-y- <i>adě</i>	r=y- <i>adě</i> b=y- <i>adě</i> g=y- <i>ădě</i>	‘to become perforated, to get a hole’	- <i>adě</i>	C:i	‘to be perforated, pierced, to get a hole’
-y- <i>aka</i>	r=y- <i>aka</i> b=y- <i>aka</i> g=y- <i>áka</i>	‘to be taken advantage of, to get made’	- <i>aka</i>	C:i	‘to become, to happen’
-y- <i>allě</i>	r=y- <i>allě</i> b=y- <i>allě</i> g=y- <i>állě</i>	‘to be made, to get born’	- <i>allě</i>	C:i	‘to be born’
-y- <i>uwi?</i>	r=y <i>wi?</i> b=y <i>wi?</i> g= <i>wí?</i>	‘to become extinguished, to get doused, to go out’	- <i>uwi?</i>	A:i	‘to go out (e.g., light)’
-y- <i>a?ki</i>	r=y- <i>a?ki</i> gu=y- <i>a?ki</i> g=y- <i>á?ki</i> ~ ch= <i>akí?</i>	‘to be burned, to burn by itself’	- <i>a?gi</i>	C:i	‘to burn, to get burnt’

**4.1.2. Subclass Av.** There is a set of eighty-two vowel-initial Class A verbs whose roots begin in stressed /e/ and /u/ and a large set of Class A causative verbs beginning with the =u= causative proclitic that comprises about half of all Class Av verbs. We list first the relevant eleven roots beginning in stressed /e/ and /u/ in table 9. For the completive forms of the verbs -*uni*, -*u?cha*, -*uuna*, -*uunda*, -*uutu*, and -*uuya*, both surface forms and underlying forms are given. This is because it is difficult to notate the morphological analysis of a surface form that involves a high checked or rearticulated vowel, as it is unclear from the surface phonology whether the vowel should be assigned to the completive marker or to the verb root.

**Table 9. Subclass Av Roots**

INITIAL VOWEL	ROOT	GLOSS	TAM INFLECTION	VALENCE
e	- <i>eedă</i>	‘to come, to arrive’	r= <i>eedă</i> b= <i>eedă</i> g= <i>eědă</i>	intr.
u	- <i>udű</i>	‘to stab’	r= <i>udű</i> bi= <i>dű</i> g= <i>úđű</i>	trans.
u	- <i>una</i>	‘to listen to’	r= <i>una</i> bi= <i>na</i> g= <i>úna</i>	trans.
u	- <i>unda</i>	‘to twist, to braid’	r= <i>unda</i> bi= <i>nda</i> g= <i>únda</i>	trans.

<i>u</i>	<i>-uni</i> <sup>†</sup>	'to make (something)'	<i>r=uni</i> /bi?ni/ ← //be=uni// <i>g=ǔni</i>	trans.
<i>u</i>	<i>-uwi?</i>	'to go out (e.g., light)'	<i>r=uwi?</i> <i>bi=wi?</i> <i>gu=wi?</i>	intr.
<i>u</i>	<i>-u?cha</i>	'to bathe'	<i>r=u?cha</i> /bi?cha/ ← //be=u?cha// <i>g=ú?cha</i>	intr.
<i>u</i>	<i>-uuna</i>	'to cry'	<i>r=uuna</i> /biina ~ bi?na/ ← //be=uuna// <i>g=ú?na</i>	intr.
<i>u</i>	<i>-uunda</i>	'to read, sing, learn (something)'	<i>r=uunda</i> /biinda/ ← //be=uunda// <i>g=ú?nda ~ g=úunda</i>	trans.
<i>u</i>	<i>-uutu</i>	'to grind'	<i>r=uutu</i> /biitu/ ← //be=uutu// <i>g=ú?tu</i>	trans.
<i>u</i>	<i>-uuya</i>	'to see (something)'	<i>r=uuya</i> /biïya/ ← //be=uuya// <i>g=ú?ya</i>	trans.

<sup>†</sup> The verb *-uni* 'to make (something)' presents a small irregularity: the stressed plain vowel in the root becomes checked in the completive form of the verb. This is discussed in section 4.5.

Unlike what Smith-Stark (2002) proposes for Chichicapan Zapotec, subclassification by root-initial vowel quality is not warranted for Juchiteco, as there does not appear to be any correlation between the quality of the root-initial vowel and any semantic or morphological properties of the verbs. The analysis presented here also differs from that proposed by Enríquez Licón (2009) for the San Blas Atempa variety, which posits a subgroup of roots that begin in /a/ or /i/. Roots beginning in /a/ in Juchiteco belong to class C, as is explained in section 4.3. Roots corresponding to those listed by Enríquez Licón as beginning in /i/ are discussed in section 4.1.1.

There are 846 class A verbs that are causatives derived through proclitic attachment of the causative morpheme =u=, occurring either by itself or as the first in one of the following strings of causative morphemes: =u=g=, =u=zi=, and =u=g=zi= (which surfaces as =u=si= following the rule whereby *g + z* becomes *s*). It should be noted, however, that not all causative verbs require the morpheme =u= and that not all causative verbs are class A verbs; twelve verbs have been documented as class B causative verbs formed by attaching =g= alone. Table 10 provides a selection of class A causative verbs along with their respective inflectional patterns; it is representative of the derivational patterns attested in morphological causative formation (analyzed in depth by Pérez Báez [2015]). The inflectional pattern =u=*kwaani* is provided in both surface and underlying

form, since it is difficult to notate the morphological analysis of surface forms in which results from  $g + r$  and  $/kw/$  (surface  $b$ ) results from  $g + b$ .

**Table 10. Selected Class A Causative Verbs**

DERIVED CLASS A CAUSATIVE	DERIVATIONAL MORPHOLOGY	GLOSS	INFLECTIONAL PATTERN	BASIC ROOT (AND CLASS)	GLOSS
$=u=rootě$	$=u=$	‘to take all of someone’s money’	$r=u=rootě$ $bi=rootě$ $gu=roótě$	$-rootě$ (A:i)	‘to go broke’
$=u=g=aze$	$=u=g=$	‘to bathe somebody’	$r=u=g=aze$ $bi=g=aze$ $g=u=g=áze$	$-aze$ (C:i)	‘to bathe’
$=u=kwaani$	$=u=g=$	‘to wake somebody up’	$/ru=kwaani/ \leftarrow$ $//r=u=g=bani//$ $/bi=kwaani/ \leftarrow$ $//bi=g=bani//$ $/gu=kwáani/ \leftarrow$ $//gĩ=u=g=bani//$	$-bani$ (A:i)	‘to wake
$=u=zi=rikí?$	$=u=zi=$	‘to make somebody/ something stand on its head’	$r=u=zi=rikí?$ $bi=zi=rikí?$ $g,u=zí=rikí?$	$-rikí?$	‘to stand on one’s/ it’s head’
$=u=si=g=apa$	$=u=g=zi=$	‘to have somebody care for somebody/ something’	$r=u=si=g=apa$ $bi=si=g=apa$ $gu=sí=g=apa$	$-apa$ (C:t)	‘to care for’

The consonantal alternation  $g + b \rightarrow kw$ , occurring in causatives such as  $=u=kwaani$ , is one of a series of alternations characteristic of this and other Zapotec languages (see table 2). No such alternation occurs when the morpheme  $\langle=g\rangle$  appears before a vowel-initial root. Finally,  $=u=si=g=apa$  ‘to have someone care for someone/something’ is an example of a quite common pattern in which the three causative morphemes are concatenated, with  $\langle=g\rangle$  appearing twice:  $\langle=u=g=zi=g=$ ; this is clearest when the morpheme sequence precedes a vowel-initial root such as  $-apa$  ‘to care for’.

**4.1.3. Vowel simplification processes.** The interactions between the vocalic segments of the TAM markers and the initial vowel of the root in subclass Av verbs present an analytical challenge. These interactions yield different surface outcomes for the habitual and the potential markers, on the one hand, and the completive marker, on the other. The high vowel  $/i/$  of the habitual and the potential markers does not surface, while the  $/i/$  of the completive marker does.

Two features proposed and broadly confirmed for Zapotecan (Zapotec and Chatino) languages permit a resolution of this complication that is crosslinguistically applicable and consistent with the documented sound change: a vowel hierarchy rule and the reconstruction of the completive marker as *\*kwe=*.

Kaufman (1989) proposes the vowel hierarchy in (3), on the basis of how vowel sequences are simplified. When two vowels are brought together in underlying forms by morpheme combination, a vowel on the left in (3) prevails over the vowel to its right, which is deleted. The order in which the vowels occur in underlying forms is not relevant.

(3)  $e > u/o > a > i$

The vocalic segment of the habitual marker *ri=* and of the potential marker *gĩ=* do not surface in the inflected forms of verbs when they precede a vowel such as that of the causative marker *=u=* in *r=u=rootě* 'she/he goes broke', or the stressed root-initial /u/ in *r=unda* 'she/he twists/braids'. This is explained by the higher position of /u/ in the hierarchy as compared to /i/. It might seem puzzling that the same does not happen to the /i/ of the completive marker—a high front vowel, the weakest vowel in the vowel hierarchy, which is nonetheless retained while the following *u* fails to appear, as can be seen in tables 9 and 10. However, the historical phonology of Juchiteco and of Zapotecan in general provides an explanation of this apparent anomaly.

Kaufman (1989) reconstructs the completive marker for Proto-Otomanguean as *\*kwe=*, stating that this form of the completive survives as such in Otomí and Chiapanec in the Western branch of Otomanguean languages, and in Mazatecan, Zapotecan (Zapotec and Chatino), Mixtecan, and Amuzgo in the Eastern Branch. Córdova (1987) documents the reflex of *\*kwe* in a Central Zapotec variety in colonial times as *pe=*, showing that the vocalic segment of the completive marker remained as a mid front vowel until at least colonial times in a variety within the same language area as Juchiteco (cf. Córdova [1987:368r], for instance). In contemporary varieties of Zapotec, one finds that in Atepec, a Northern Zapotec variety, the class A completive proclitic is pronounced [be]. In the diachronic phonology of Juchiteco, *\*e* becomes /i/ in final posttonic syllables, in pretonic syllables, and in stressed syllables before *Ci*. In light of all this, we specify the underlying form of the Juchiteco completive marker as //be//; its vocalic segment of the marker thus prevails in hiatus resolution in accordance with the vowel hierarchy rule in (3) above, where *e* ranks higher than *u*. The high front vowel is a present-day surface form of the vocalic segment and secondary to the language's morphological processes.

Thus, the interaction between stem-initial vowels such as the causative morpheme *=u=* and the vowel in TAM markers can be explained with absolute regularity, in a manner consistent with the historical phonology of Juchiteco and related languages, and with applicability across the Zapotecan family: Smith-Stark (2002) shows this analysis to be valid for Chichicapan Zapotec, a Central

Zapotec variety spoken in the Central Valleys of Oaxaca; it holds as well for ~~for~~ colonial Zapotec, judging from the data of Córdova (1987); and Campbell (2011) applies these principles effectively for the description of Zenzontepec Chatino verb classes.

**4.2. Class B verbs.** Class B verbs use the completive marker *gu=* and the potential marker *gĩ=*. Class B includes transitive and intransitive verbs; it contains 125 attested verbs, of which twenty-five are roots. All but two are consonant-initial; the exceptions are *-aana* ‘to clear a field for plowing’ and *-aani* ‘to press, to lay weight on something’. These two verbs are discussed in section 4.3.2, following the analysis of class C verbs, since their nature as vowel-initial roots calls for a special explanation. For the moment, it can be said that the root-initial vowel deletes in accordance with vowel simplification following the hierarchy in (3) to produce the surface forms listed in table 11. Table 11 provides, in addition, a complete inventory of class B roots. It should be noted that class B verbs that begin with ⟨nd⟩ often reflect the attachment of the causative morpheme *g=* before root-initial ⟨l⟩; *g= + l* becomes *nd*. The verb roots to which this applies are *-ndaã* /*g=laã*/ and *-ndadí?* /*g=ladí?*/. In all other cases, ⟨nd⟩ is underlying.<sup>9</sup>

**Table 11. Class B Roots**

ROOT	TAM PARADIGM	CLASS AND VALENCE	GLOSS
<i>-aana</i>	<i>r=aana</i> <i>gu=una</i> <i>g=á?na</i> where / <i>gu=aana</i> / → [guuna]	B:t	‘to clear a field for plowing’
<i>-aani</i>	<i>r=aani</i> <i>gu=uni</i> <i>g=á?ni</i> where / <i>gu=aani</i> / → [guuni]	B:t	‘to press, to lay weight on something’
<i>-chesa</i>	<i>ri=chesa</i> <i>gu=chesa</i> <i>gi=chésa</i>	B:i	‘to jump’
<i>-dye</i>	<i>ri=dye</i> <i>bi=dye</i> ~ <i>gu=dye</i> <i>gi=dyé</i>	A ~ B:i	‘to squeeze’
<i>-ka</i>	<i>ri=ka</i> <i>gu=kwa</i> <i>gi=ká</i>	Birr:i	‘to adhere’
<i>-kaã</i>	<i>ri=kaã</i> <i>gu=kwaã</i> <i>gi=kaã</i>	B:t ▲	‘to grab’

-lǎ	<i>ri=lǎ</i> <i>gu=lǎ</i> <i>gi=lǎ</i>	B:t	'to crash, shove'
-laǎ	<i>ri=laǎ</i> <i>gu=laǎ</i> <i>gi=laǎ</i>	B:i	'to break'
-laadxi	<i>ri=laadxi</i> <i>gu=laadxi</i> <i>gi=láadxi</i>	B:i	'to wedge in'
-ladxǐ	<i>ri=ladxǐ</i> <i>gu=ladxǐ</i> <i>gi=lǎdxǐ</i>	B:t	'to chase (away)'
-na	<i>ri=na</i> <i>gu=na</i> <i>gi=nǎ</i>	B:i	'to accept, to allow'
-naaze	<i>ri=naaze</i> <i>gu=naaze</i> <i>gi=náaze</i>	B:t	'to capture'
-naazě	<i>ri=naazě</i> <i>gu=naazě</i> <i>gi=náazě</i>	B:t	'to hold'
-nabá?	<i>ri=nabá?</i> <i>gu=nabá?</i> <i>gi=nabá?</i>	B:t	'to request'
-ndaǎ	<i>ri=ndaǎ</i> <i>gu=ndaǎ</i> <i>gi=ndaǎ</i>	B:t	'to break'
-ndadí?	<i>ri=ndadí?</i> <i>gu=ndadí?</i> <i>gi=ndadí?</i>	B:t	'to detach'
-ndani	<i>ri=ndani</i> <i>gu=ndani</i> <i>gi=ndáni</i>	B:i	'to be born'
-ndanǐ	<i>ri=ndanǐ</i> <i>gu=ndanǐ</i> <i>gi=ndǎnǐ</i>	B:t	'to carry'
-ndapí?	<i>ri=ndapí?</i> <i>gu=ndapí?</i> <i>gi=ndapí?</i>	B:t	'to pull'
-ndiǐ	<i>ri=ndiǐ</i> <i>gu=ndiǐ</i> <i>gi=ndiǐ</i>	B:t	'to lick'
-ndisá?	<i>ri=ndisá?</i> <i>gu=ndisá?</i> <i>gi=ndisá?</i>	B:t	'to pick up'

<i>-needxě</i>	<i>ri=needxě</i> <i>gu=needxě</i> <i>gi=neědxě</i>	B:t	‘to hand over’
<i>-nesa</i>	<i>ri=nesa</i> <i>gu=nesa</i> <i>gi=nésa</i>	B:i	‘to urinate’
<i>-ni?</i>	<i>ri=ni?</i> <i>gu=ni?</i> <i>gi=ní?</i>	B:t	‘to speak’
<i>-reza</i>	<i>ri=reza</i> <i>gu=reza</i> <i>gi=réza</i>	B:i	‘to crack open’

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**4.3. Class C verbs.** Class C includes 237 verbs, of which forty-three are roots. The large number of compounds includes fifty-seven based on the root *-aka* ‘to become’. Class C verbs can be vowel-initial or consonant-initial and either transitive or intransitive. They can be identified by the completive marker *gu=* and by gemination of the root-initial consonant in the potential, which is the result of the attachment of the marker *g̃=* and which, in turn, is not evident in the surface form of the inflected verb. An analytical problem is raised by vowel-initial class C roots because their potential form does not (and cannot) exhibit consonantal gemination; thus, in this respect they resemble class B verbs. Consonant-initial class C verbs are described in section 4.3.1; section 4.3.2 treats vowel-initial roots, explaining the tonal perturbations that occur in the potential due to the rising tone that is inherent in the potential marker, and how these phenomena clarify the correct classification of these verbs.

**4.3.1. Subclass Cc.** Subclass Cc includes seventy-seven verbs, of which eleven are roots. Table 12 lists the consonant-initial roots in class C organized by transitivity type. Consonantal alternations at the beginning of the stem are triggered by /g/, the consonantal segment of the potential marker (see table 2 for the complete list of possible alternations). Potential forms of all the verbs in table 12 are given in both surface and underlying form to show the interaction between the potential marker and root-initial consonants.

**Table 12. Inventory of Consonant-Initial Class C Roots in Juchitán Zapotec**

ROOT	TAM PARADIGM	VALENCE	GLOSS
<i>-di?di</i>	<i>ri=di?di</i> <i>gu=di?di</i> <i>/t=idí?/ ← //g̃=didí?//</i>	intr.	‘to pass (through)’
<i>-dindě</i>	<i>ri=dindě</i> <i>gu=dindě</i> <i>/t=ĩndě/ ← //g̃=dĩndě//</i>	intr.	‘to fight’

-ye	ri=ye gu=ye /ch=ěʔ/ ← //g̃=ye//	intr.	'to go away'
-za	ri=za gu=za /s=ǎʔ/ ← //g̃=za//	intr.	'to walk'
-zhidxi	ri=zhidxi gu=zhidxi /x=idxi/ ← //g̃=zhidxi//	intr.	'to ring'
-zhudxi	ri=zhudxi gu=zhudxi /x=údxi/ ← //g̃=zhudxi//	intr.	'to get drunk'
-zhana	ri=zhana gu=zhana /x=ána/ ← //g̃=zhana//	trans.	'to give birth'
-zhubi	ri=zhubi gu=zhubi /x=ǔbi/ ← //g̃=zhubi//	trans.	'to bend'
-zhupi	ri=zhupi gu=zhupi /x=upiʔ/ //g̃=zhupi//	trans.	'to lick'
-zhuuna	ri=zhuuna gu=zhuuna /x=úʔna/ ← //g̃=zhuuna//	trans.	'to defecate'
-zi?	ri=zi? gu=zi? /s=iʔ/ ← //g̃=ziʔ//	trans.	'to buy'

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**4.3.2. Subclass Cv.** Both Smith-Stark (2002) and Enríquez Licón (2009) report on a small set of vowel-initial verbs whose classification is problematic. These verbs take the marker *gu=* in the completive. However, on the basis of the surface form of the potential, it is not possible to determine whether these verbs belong to class B or class C. According to the vowel simplification rule in (3), /i/ is the weakest vowel in the hierarchy and is deleted next to any other vowel. As such, the surface form of a class B vowel-initial verb, independent of tonal perturbations, would be  $g=V(CV)$ . The same surface form, again, independently of tonal perturbations, would result from the inflection in the potential with  $g̃=$  in class C verbs, as the consonantal alternation that is otherwise a characteristic of class C verbs would not occur. We propose that in Juchiteco, a close analysis of tonal perturbations allows for adequate classification of these vowel-initial roots.

Juchiteco exhibits close interaction between tone, vowel types, and word shapes. There is much to be said on this topic, but in the interest of brevity we focus on the points that are relevant to the classification of subclass Cv verbs in

Juchiteco. There are two patterns of tonal perturbation that result from attaching the potential marker. One pattern shows the rising tone docking on the first available vowel that underlyingly has a low tone. In the second pattern, the rising tone splits into a low tone on the potential marker and a high tone on the first syllable of the verb root, as shown in (4). This pattern is very clear in consonant-initial roots of various shapes; some examples are shown in table 13.

(4)  $g\check{i} + CV \dots \rightarrow gi=C\acute{V} \dots$

**Table 13. Splitting of the Rising Tone in Potential Verb Forms in Juchitán Zapotec**

SHAPE	ROOT	GLOSS	POTENTIAL	CLASS	TONAL PERTURBATION RULE
-CV	-ga	‘to cut’	$gi=g\acute{a}$	A	$g\check{i} + CV \rightarrow gi=C\acute{V}$
-CV?	-do?	‘to calm down, to domesticate’	$gi=d\acute{o}?$	A	$g\check{i} + CV? \rightarrow gi=C\acute{V}?$
-C $\acute{V}$ ?	-ndá?	‘to warm up’	$gi=nd\acute{a}?$	A	$g\check{i} + C\acute{V}? \rightarrow gi=C\acute{V}?$
-CVCV	-bani	‘to wake up’	$gi=b\acute{a}ni$	A	$g\check{i} + CVCV \rightarrow gi=C\acute{V}C\acute{V}^\dagger$
-CV?CV	-bi?xi	‘to turn over’	$gi=bi?xi$	A	$g\check{i} + CV?CV \rightarrow gi=C\acute{V}?CV$

<sup>†</sup> This rule only applies to class A and B verbs.

If the first vowel of the first syllable is a rearticulated low tone vowel, the rising tone will also split and the resulting high tone will dock on the first portion of the low tone rearticulated vowel, as shown in table 14.

**Table 14. Roots Containing Rearticulated Vowels**

SHAPE	ROOT	GLOSS	POTENTIAL	CLASS	TONAL PERTURBATION RULE
-CVV	-d $\acute{x}aa$	‘to be switched’	$gi=d\acute{x}\acute{a}a$	A	$g\check{i} + CVV \rightarrow gi=C\acute{V}V$
	-doo	‘to be sold’	$gi=d\acute{o}o$	A	
-CVVCV	-chaaba	‘to be lazy’	$gi=ch\acute{a}aba$	A	$g\check{i} + CVVCV \rightarrow gi=C\acute{V}VCV$
	-chaani	‘to limp’	$gi=ch\acute{a}ani$	A	

The same pattern of tonal distribution occurs in the potential form of class A roots that begin in a rearticulated vowel: the high tone docks on the first portion of the low-tone rearticulated vowel. These verbs suggest a process in which the low portion of the rising tone remains in the vowel of the potential marker with the high tone docking on the next available vowel segment, after which, the vowel of the potential marker is deleted in keeping with the vowel simplification rules. The resulting word would be expected to be of the shape C $\acute{V}$ VCV, which is not a shape allowed in native Juchiteco lexemes. The actual surface shape is C $\acute{V}$ ?CV. We explain this phenomenon by proposing that the rearticulated vowel is reduced to a checked vowel, motivated by a need to avoid the disallowed C $\acute{V}$ VCV shape. It should be noted that inflected verb forms of the shape CV=C $\acute{V}$ VCV, containing the complete TAM marker from which the high tone is

derived, are possible, as shown in table 14. Also, some Spanish names can be adapted to the shape  $C\acute{V}VCV$ , for example, *Máada* ‘Magdalena’ (ten out of one hundred documented female names and thirty-six out of one hundred fifty documented male names undergo this particular phonological adaptation). However, there are no native, monomorphemic words of the shape  $C\acute{V}VCV$  in the language; hence the reduction that we see in the surface forms of roots of the shape  $-VVCV$  with the potential marker in table 15. These result from the series of processes in (5).

**Table 15. Roots of the Shape  $-VVCV$**

SHAPE	ROOT	GLOSS	POTENTIAL	CLASS	TONAL PERTURBATION
$-VVCV$	<i>-uuna</i>	‘to cry’	$g=ú?na$	A	$g\check{i} + VVCV \rightarrow g=\acute{V}?CV$
	<i>-uutu</i>	‘to grind’	$g=ú?tu$	A	
	<i>-uuya</i>	‘to see’	$g=ú?ya$	A	

(5)  $g\check{i} + VVCV \rightarrow gi=\acute{V}VCV \rightarrow g=\acute{V}VCV \rightarrow g=\acute{V}?CV$

There are two additional verbs not belonging to class A that also begin with a rearticulated vowel and whose classification could not be established until now. Their inflected forms in the potential exhibit the same surface form as that of the roots in table 15, which suggests that they take the potential marker  $g\check{i}=\bar{=}$  and are therefore class B verbs rather than class C verbs. These roots behave like consonant-initial roots to avoid a word of the shape  $CV\check{V}CV$ , which is strictly prohibited in the language. Phonation is simplified to avoid a disyllabic word of the shape  $C\acute{V}VCV$ , which does not occur in native words.

**Table 16. Roots of the Shape  $-VVCV$**

ROOT	GLOSS	POTENTIAL	CLASS	TONAL PERTURBATION RULE
<i>-aana</i>	‘to clear a field for plowing’	$g=\acute{a}?na$	B	$g\check{i} + VVCV \rightarrow g=\acute{V}?CV$
<i>-aani</i>	‘to lean’	$g=\acute{a}?ni$	B	

There are additional vowel-initial verb roots whose classification is problematic. Verb roots of the shapes listed in rows 1, 2, and 3 of table 17 can be classified following the same analysis as above. If the potential marker in these verbs were  $g\check{i}=\bar{=}$ , we would expect the tone of the marker to split, with a high tone appearing on the first available vowel of the root. However, the tone does not split, but instead docks onto the first vowel of the root as a rising tone; this suggests that the potential marker of these verbs is in fact  $g\check{i}=\bar{=}$  and that these are class C verbs. This, in turn, means that class C verbs can be vowel-initial as well as consonant-initial.

**Table 17. Remaining Class C Vowel-Initial Roots**

SHAPE	ROOT	GLOSS	POTENTIAL	CLASS	TONAL PERTURBATION
1 -V?	-e?	'to drink'	$g=e?$	C	$g^{\check{}} + V? \rightarrow g=V\check{V}?$
2 -VC $\check{V}$	-abi	'to swallow'	$g=abi$	C	$g^{\check{}} + VC\check{V} \rightarrow g=V\check{C}\check{V}$
3 -VC <sub>[sgl]</sub> V	-adxe	'to get wet'	$g=adxe$	C	$g^{\check{}} + VCV \rightarrow g=V\check{C}V$
4 -VC <sub>[gem]</sub> V	-ache	'to split open'	$g=aché?$	C	$g^{\check{}} + VC_{[gem]}V \rightarrow g=VC\check{V}?$
5 -V?CV	-a?gi	'to get burned'	$g=agi?$	C	$g^{\check{}} + V?CV \rightarrow g=VC\check{V}?$

The roots in rows 4 and 5 are not as straightforward, as they appear to follow neither the pattern of tone distribution nor the pattern of tone docking. We suggest that these are class C verbs in which the rising tone of the potential marker also docks onto the first available vowel of the root. However, this results in words shapes that do not occur in Juchiteco. The first is the shape  $C\check{V}C_{[gem]}V$ , which only occurs in Spanish loanwords where Spanish stress in the penultimate syllable is adapted into Juchiteco as a rising tone, as in *bōte* 'bucket' (from Spanish *bote*). The second word shape is  $C\check{V}?CV$ , which does not occur at all in the language. To avoid these noncanonical word shapes, the tone splits following the rules in (6) and (7).

$$(6) g^{\check{}} + VC_{[gem]}V \rightarrow g\check{V}C_{[gem]}V \rightarrow g=VC\check{V}?$$

$$(7) g^{\check{}} + V?CV \rightarrow g\check{V}?CV \rightarrow g=VC\check{V}?$$

**4.4. Class D verbs.** There are 294 documented class D verbs for Juchiteco, of which thirty-five are basic roots. Class D verbs exhibit the same allomorphs for the habitual, potential, and completive markers as class C verbs, but are characterized by the fact that the initial consonant of the verb varies depending on the TAM category. Specifically, the initial consonant of a class D verb shows two alternants (which we refer to as replacive consonants), one of which is used in all TAM categories but the completive, while the other is used in the completive; if the class D verb is transitive, and there is an associated intransitive verb (of some other class), the second alternant appears in all TAM categories of the associated intransitive verb. There are several definable sets of initial consonant alternations, none of which are phonologically conditioned.

There are two possible ways to analyze and present class D verbs: by the distributional properties of their consonantal alternations, or by the valence patterns in which they participate. In order to address both points of interest and to provide a full inventory of Class D verbs, we provide sets of Class D verbs based on valence patterns as well as distributional analyses of the alternations as appropriate. All Class D verbs are listed with their TAM forms and the relevant alternation in its underlying form.

The documented consonantal replacive pairs are listed in table 18 in their surface and underlying forms. The function or functions of these morphemes are not fully understood, but it is conceivable that they could be the relics of

morphological valence-changing processes that are no longer functioning. In particular, *\*t=* is an Otomanguean-level marker of mediopassive and *\*k=* is a Zapotec-level causative marker. In view of this, it is noteworthy that twenty-four transitive class D verbs show an alternation between *//k=//* in transitives and *//t=//* or *//ch=//*. Juchiteco *//ch=//* comes either from Proto-Zapotec *\*ty*, diachronically a palatalization of *\*t*, or from *\*tz* before *\*i*. For nine verbs, the alternation is between *//kw=//* in transitives and *//l=//* in class D. With verb roots that begin with a rounded vowel, *//kw=//* is realized as [g] in Juchiteco (and in Zapotec generally) by delabialization.<sup>10</sup> The [r] in the third alternation comes from *\*ty* (before a vowel other than /i/, and before /i/ in clitics). Both the third and fourth alternations, *//kw=//* : *//r=//* and  $\emptyset$  : *//t=//*, as in *\*-awo* ‘to eat’, are unique.

**Table 18. Consonantal Alternations in Class D Verbs**

CONSONANTS USED IN CLASS D TRANSITIVE VERBS EXCEPT IN THE COMPLETIVE	CONSONANTS USED IN NON-CLASS D INTRANSITIVE VERBS AND IN CLASS D TRANSITIVE VERBS IN THE COMPLETIVE ONLY	NUMBER OF VERBS DOCUMENTED
<i>g</i> <i>//k=//</i>	<i>d</i> <i>//t=//</i>	20
<i>g</i> <i>//k=//</i>	<i>dx</i> <i>//ch=//</i>	4
<i>g</i> <i>//kw=//</i>	<i>l</i> <i>//l=//</i>	2
<i>b</i> <i>//kw=//</i>	<i>l</i> <i>//l=//</i>	7
<i>b</i> <i>//kw=//</i>	<i>r</i> <i>//r=//</i>	1
$\emptyset$	<i>d</i> <i>//t=//</i>	1

Class D verbs that participate in the replacive alternations presented in table 18 are listed in table 19. Note that, except for one verb, all the intransitive counterparts are class A verbs. The exception is *-r-ee* ‘to go/come out’, the intransitive counterpart of *-b-eě* ‘to take out’; *-r-ee* is in transition from class D to class A and thus exhibits alternating class A and class D TAM morphology. The potential forms of the class D verbs are provided in the surface and underlying forms in order to show the interaction between consonants as this cannot be unpacked with a simple morpheme breakdown.

**Table 19. Class D Transitive Verbs and Intransitive Counterparts**

CLASS D TRANSITIVE		INTRANSITIVE (CLASS A)	
VERB ROOT	TAM	VERB ROOT	TAM
<i>-b-eě</i>	<i>ri=b-eě</i>	<i>-r-ee</i>	<i>ri=r-ee</i>
<i>//p » l//<sup>†</sup></i>	<i>gu=l-eě</i>	D ~ A	<i>gu=l-ee ~ bi=r-ee</i>
‘to take out’	<i>/kw=eě/ ← //g̃=b-eě//</i>	<i>//r » l//</i>	<i>gi=r-ée</i>
		‘to go out’	
<i>-g-apă</i>	<i>ri=g-apă</i>	<i>-d-aapă</i>	<i>ri=d-aapă</i>
<i>//k » t//</i>	<i>gu=d-apă</i>	‘to be hit with	<i>bi=d-aapă</i>
‘to slap’	<i>/k=ăpă/ ← //g̃=g-apă//</i>	the hand’	<i>gi=d-aăpă</i>

-g-apĩ //k » t// 'to haul'	ri=g-apĩ gu=d-apĩ /k=ǎpĩ/ ← //g̃=g-apĩ//	-d-apĩ 'to be carried'	ri=d-apĩ bi=d-apĩ gi=d-ǎpĩ
-g-a?na //k » t// 'to touch'	ri=g-a?na gu=d-a?na /k=aná?/ ← //g̃=g-a?na//	-d-a?na 'to be touched (to touch oneself)'	ri=d-a?na bi=d-a?na gi=d-á?na
-g-aabi //k » t// 'to rub'	ri=g-aabi gu=d-aabi /k=ǎ?bi/ ← //g̃=g-aabi//	-d-aabi 'to be massaged'	ri=d-aabi bi=d-aabi gi=d-áabi
-g-aanyě //k » t// 'to dig'	ri=g-aanyě gu=d-aanyě /k=aǎnyě/ ← //g̃=g-aanyě//	-d-aanyě 'to be dug'	ri=d-aanyě bi=d-aanyě gi=d-aǎnyě
-g-ibǎ //k » t// 'to sew'	ri=g-ibǎ gu=d-ibǎ /k=ǐbǎ/ ← //g̃=g-ibǎ//	-d-iiba 'to be sewn'	ri=d-iiba bi=d-iiba gi=d-íiba
-g-ibi //k » ch// 'to strain'	ri=g-ibi gu=dx-ibi /k=ǐbi/ ← //g̃=g-ibi//	-dx-iibi 'to be soothed out'	ri=dx-iibi bi=dx-iibi gi=dx-íibi
-g-inyě //k » t// 'to hack, to hit'	ri=g-inyě gu=d-inyě /k=ǐnyě/ ← //g̃=g-inyě//	-d-iinyě 'to be hit'	ri=d-iinyě bi=d-iinyě gi=d-iǐnyě
-g-iinye //k » t// 'to borrow'	ri=g-iinye gu=diinye /k=ǐnye/ ← //g̃=g-iinye//	-d-iinye 'to be loaned'	ri=d-iinye bi=d-iinye gi=d-íinye
-g-u?ba //k » t// 'to suck in'	ri=g-u?ba gu=d-u?ba /k=ubá?/ ← //g̃=g-u?ba//	-d-u?ba 'to be sucked in'	ri=d-u?ba bi=d-u?ba gi=d-ú?ba
-g-uunyě //k » t// 'to scratch'	ri=g-uunyě gu=d-uunyě /k=uǔnyě/ ← //g̃=g-uunyě//	-d-uunyě 'to be scratched'	ri=d-uunyě bi=d-uunyě gi=d-uǔnyě
-g-ye <sup>††</sup> //k » t// 'to squeeze with the hands'	ri=g-ye gu=d-ye /k=yě?/ ← //g̃=g-ye//	-d-ye <sup>††</sup> 'to be squeezed'	ri=d-ye bi=d-ye gi=d-yě

<sup>†</sup> The symbol » indicates the replacive alternation of an underlying root-initial consonant in the completive of class D verbs.

<sup>††</sup> The sequence *g + y* would be expected to result in a ⟨ch⟩ as per the process of simplification of consonant sequences explained in section 4. However, this does not happen in the verb *-g.ye*, which indicates that the underlying representation of this verb is //k.iye// and that of its counterpart is //t.iye//. As per the rules in (2), the orthographic representation of a *CiyV* sequence is *CyV*.

A subset of class D verbs is characterized by an alternation of /i/ in the class D verbs and of /a/ in their class C intransitive counterparts. Table 20 shows these verbs. Twenty-two of the thirty-five class D stems begin with /i/. Seven of these, including those in table 20, begin with /a/ in their intransitive form. This predominance of /i/ in transitive verbs and /a/ in some of the corresponding

intransitive verbs likely expresses a valence system that may have been in play in the distant past. In these cases, at least, we can postulate that ⟨-i-⟩ is (or was) a morpheme that encodes transitivity and ⟨-a-⟩ is (or was) a morpheme that encodes intransitivity. At least ⟨-i-⟩ has a separate identity from the class D markers *\*k=*, *\*t=*, and *\*ch=*. This morpheme may originally have had a similar function to that of the Proto-Zapotec causative marker *\*k=*, but its presence in the attested verbs probably represents a different, earlier, layer of morpheme attachment. Investigation of varieties of Chatino and other Otomanguean languages may shed some light on the relevant diachronic morphological processes.

As table 20 indicates, some of these verbs participate in triads in which the form with initial /a/ not only appears as an intransitive verb in its own right, with no derivational morpheme, but can also take the morpheme /y-/ to derive a mediopassive verb. The corresponding transitive class D verbs begin with the replacive consonant pair /g-/ ~ /d-/, which, as mentioned above, may correspond, respectively, to *\*k=*, a typical causative marker in Proto-Zapotec, and *\*t=*, a marker of mediopassive found in several branches of Otomanguean. Hence, for verbs like those in table 20, we hypothesize that the alternation between *\*k=* : *\*t(y)=* is associated with marking as more or less active a stem whose root is otherwise unmarked for valence.

**Table 20. Class D Verbs with Alternation between *i* and *a***

BASIC INTRANSITIVE		MEDIOPASSIVE		CLASS D TRANSITIVE	
VERB STEM	TAM	VERB STEM	TAM	VERB STEM	TAM
<i>-ache</i>	<i>r=ache</i>			<i>-g-iche</i>	<i>ri=g-iche</i>
C:i	<i>gu=che</i>			D:t	<i>gu=d-iche</i>
‘to burst open’	<i>g=aché?</i>			//k > t//	<i>k=iché?</i>
				‘to burst’	
<i>-achě</i>	<i>r=achě</i>			<i>-g-ichě</i>	<i>ri=g-ichě</i>
C:i	<i>gu=chě</i>			D:t	<i>gu=d-ichě</i>
‘to break’	<i>g=ächě</i>			//k > t//	<i>k=ichě</i>
				‘to break’	
<i>-aze</i>	<i>r=aze</i>	<i>-y-aaze</i> ~	<i>r=y-aaze</i> ~	<i>-g-iize</i>	<i>ri=g-iize</i> ~
C:i	<i>gu=ze</i>	<i>-y-aazi</i>	<i>r=y-aazi</i>	D:t	<i>ri=g-iizi</i>
‘to bathe’	<i>g=áže</i>	A:med	<i>b=y-aaze</i> ~	//k > t//	<i>gu=d-iize</i> ~
		‘to sink’	<i>b=y-aazi</i>	‘to give away’	<i>gu=d-iizi</i>
			<i>g=y-áaze</i> ~		<i>k=i?ze</i> ~
			<i>g=y-áazi</i>		<i>k=i?zi</i>
<i>-adě</i>	<i>r=adě</i>	<i>-y-adě</i>	<i>r=y-adě</i>	<i>-g-iidě</i>	<i>ri=g-iidě</i>
C:i	<i>gu=dě</i>	A:med	<i>b=y-adě</i>	D:t	<i>gu=dx-iidě</i>
‘to be perforated’	<i>g=ădě</i>	‘to become perforated’	<i>g=y-ădě</i>	//k > ch//	<i>k=iidě</i>
				‘to perforate’	

One particular verb, *-g-uu* ‘to put in’, does not have a corresponding intransitive verb, but does have a mediopassive formed by attaching the mediopassive morpheme ⟨*y-*⟩ to the root *-uu*, which does not occur as a class C intransitive verb as would be expected. This is shown in table 21. We do not have an explanation to offer for the visible gap in this pattern. An examination of cognate forms in other types of Zapotec might show this to be a long-standing irregularity.

**Table 21. Verbs Based on *-uu***

MEDIOPASSIVE		CLASS D TRANSITIVE	
VERB STEM	TAM	VERB STEM	TAM
<i>-y-uu</i>	<i>r=y-uu</i>	<i>g-uu</i>	<i>ri=g-uu</i>
A:med ~ C	<i>b=y-uu ~ gu=y-uu</i>	D:t	<i>gu=l-uu</i>
‘to go in’	<i>g=y-úu ~ ch=ú?</i>	//kw » l//	<i>k=ú?</i> ‘to put in’ (← //g=g=uu//)

Another set of fifteen class D verbs has no documented intransitive counterparts; these are listed in table 22. Seven of these pairs have, however, a class A causative counterpart formed by prefixation of the string ⟨*=u=g-*⟩ (with some variation). Such is the case for two of the few class D intransitive verbs. The precise semantic and morphosyntactic functions of the other five causative forms is unclear, as they are associated with verbs that are already transitive. Potential forms are given in both surface and underlying forms to show the interaction between consonants.

**Table 22. Class D Verbs without Intransitive Counterpart**

VERB STEM	TAM	CLASS A CAUSATIVE	TAM
GLOSS			
<i>-b-agu</i>	<i>ri=b-agu</i>	—	
D:t	<i>gu=l-agu</i>		
//p » l//	/kw=águ/ ←		
‘to glean’	//g̃ =b-agu//		
<i>-b-a?ki</i>	<i>ri=b-a?ki</i>	<i>=u=kw-a?ki</i>	<i>r=u=kw-a?ki</i>
D:t	<i>gu=l-a?ki</i>	‘to make somebody put	<i>bi=kw-a?ki</i>
//p » l//	/kw=a?ki/ ←	on clothes’	<i>g=u=kw-á?ki</i>
‘to place’	//g̃ =b-a?ki//		
<i>-b-a?na</i>	<i>ri=b-a?na</i>	—	
D:t	<i>gu=l-a?na</i>		
//p » l//	/kw=aná?/ ←		
‘to steal’	//g̃ =b-a?na//		
<i>-b-ezǎ</i>	<i>ri=b-ezǎ</i>	<i>=u=kw-eezǎ</i>	<i>r=u=kw-eezǎ</i>
D:t	<i>gu=l-ezǎ</i>	‘to make somebody stop’	<i>bi=kw-eezǎ</i>
//p » l//	/kw=ézǎ/ ←		<i>g-u=kw-eézǎ</i>
‘to stay, to wait for’	//g̃ =b-ezǎ//		

-b-i D:i //p » r// 'to sit'	ri=b-i gu=r-i /kw=ĩl/ ← //g̃=b-i//	=u=kw-i 'to sit somebody'	r=u=kw-i bi=kw-i gu=kw-i
-b-ĩ D:t //p » l// 'to select'	ri=bĩ gu=l-ĩ /kw=ĩl/ ← //g̃=bĩ//	—	
-b-idxĩ D:t //p » l// 'to call'	ri=b-idxĩ gu=l-idxĩ /kw=ĩdxĩ/ ← //g̃=b-idxĩ//	—	
-g-inde D:i //k » t// 'to fart'	ri=g-inde gu=d-inde /k=ĩnde/ ← //g̃=g-inde// to fart'	=u=kinde ← //u=g-g-inde// =u=si-g-inde 'to make somebody to fart'	r=u=kinde bi=kinde g=u=kinde
-g-iru D:t //k » t// 'to pinch'	ri=g-iru, gu=dx-iru /k=ĩru/ ← //g̃=g-iru//	—	
-g-ite D:t //k » ch// 'to play'	ri=g-ite gu=dx-ite /k=itẽl/ ← //g̃=g-ite//	=u=kite ← //u=g-g-ite// 'to make somebody play'	r=u=kite bi=kite g=u=kite
-g-ixe D:t //k » t// 'to lay something down (horizontally)'	ri=g-ixe gu=d-ixe /k=ixẽl/ ← //g̃=g-ixe//	—	
-g-izhe D:t //k » t// 'to pay'	ri=g-izhe gu=d-izhe /k=izhe/ ← //g̃=g-izhe//	=u=k-izhe ← //u=g-g-izhe// 'to make somebody pay'	r=u=k-izhe bi=kizhe g=u=kizhe
-g-iibi D:t //k » t// 'to wash'	ri=g-iibi gu=d-iibi /k=ĩbi/ ← //g̃=g-iibi//	—	
-g-iidxĩ D:t //k » t// 'to hug'	ri=g-iidxĩ gu=d-iidxĩ /k=ĩidxĩ/ ← //g̃=g-iidxĩ//	=u=k-iidxĩ 'to make somebody hug somebody'	r=u=k-iidxĩ bi=k-iidxĩ g=u=k-iidxĩ
-o D:t //∅ » t// 'to eat'	r=o gu=d-o g=ó ← //g̃=o//		

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**4.5. Irregular verbs and exceptions.** There are sixteen verbs that do not adhere strictly to the patterns described above; these are listed in table 23. (Some of these are discussed in sections 4.1–4.4 above as well.) There are two kinds of verbs in this category: verbs whose TAM marking alternates between two verb classes, and verbs whose segments have some unusual behavior. The first type of verbs include a small group of class B, C, and D verbs whose inflectional patterns alternate with class A patterns. This suggests that these are verbs that are in transition to class A as part of a piecemeal process of regularization that has been going on in numerous other types of Zapotec.<sup>11</sup> The potential forms of verbs whose alternations involve Class C potential forms are presented in surface and underlying forms to show the interaction between consonants.

**Table 23. Verbs with Alternating TAM Morphology**

ROOT	TAM	CLASS	GLOSS
- <i>ladí?</i>	<i>ri=ladí?</i> <i>gu=ladí? ~ bi=ladí?</i> <i>gi=ládí?</i>	B ~ A	'to become detached'
- <i>late</i>	<i>ri=late</i> <i>gu=late ~ bi=late</i> <i>gi=láte</i>	B ~ A	'to unload'
- <i>nda?</i>	<i>ri=nda?</i> <i>gu=nda? ~ bi=nda?</i> <i>gi=ndá?</i>	B ~ A	'to smell'
-( <i>y</i> -) <i>wa?</i>	<i>r=wa? ~ r=y-wa?</i> <i>gu=y-wa? ~ b=y-wa?</i> <i>g=wǎ?</i>	B ~ A	'to carry'
- <i>y-uwi?</i>	<i>r=y-wi?</i> <i>gu=y-wi? ~ b=y-wi?</i> <i>g=wǐ?</i>	B ~ A	'to turn off'
- <i>zaabǐ</i>	<i>ri=zaabǐ</i> <i>gu=zaabǐ ~ bi=zaabǐ</i> <i>gi=zaǎbǐ</i>	B ~ A	'to please'
- <i>y-a?</i>	<i>r=y-a?</i> <i>gu=y-a? ~ b=y-a?</i> <i>/ch=ǎʔ/ ← //g̃=y-aʔ//</i> <i>~ g=y-á? ← //gǐ=y-a//</i>	C ~ A	'to become'
- <i>y-aʔki</i>	<i>r=y-aʔki</i> <i>gu=y-aʔki</i> <i>/ch=akiʔ/ ← //g̃=y-aʔki//</i> <i>~ g=y-áʔki ← //gǐ=y-aki//</i>	C ~ A	'to be burned'
- <i>y-aʔpi</i>	<i>r=y-aʔpi</i> , <i>gu=y-aʔpi ~ b=y-aʔpi</i> <i>/ch=apíʔ/ ← //g̃=y-aʔpi//</i> <i>~ g=y-áʔpi ← //gǐ=y-aʔpi//</i>	C ~ A	'to climb'

-y-uu	r=y-uu gu=y-uu ~ b=y-uu /ch=úʔ/ ← //g̃=y-uu// ~ g=y-úu ← //g̃=y-uu//	C ~ A	‘to enter’
-zhuuba	ri=zhuuba gu=zhuuba ~ bi=zhuuba /x=úʔba/ ← //g̃=zhuuba// ~ gi=zhuúba	C ~ A	‘to swim; to thresh’
-r-ee	ri=r-ee gu=l-ee ~ bi=r-ee gi=r-ée	D (r » l) ~ A	‘to come out’

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There is also a small set of verbs that in the completive exhibit alternations that fit none of the patterns above. These are listed in table 24. These verbs are treated (and listed) as members of ordinary verb classes, but they also have peculiarities that warrant that they be discussed separately as well. For *-abi* ‘to say’, *-udxi* is the suppletive variant. The irregularity in *-ka* ‘to adhere’ and *-kaã* ‘to grab’—namely, the rounding of *k* to *kw* in the completive—is phonetically motivated by the rounded vowel preceding the stem-initial consonant. For *-o* ‘to eat’, /d/ in the completive does not correspond to any consonant in the root otherwise, and the tonal pattern in the potential is not the expected rising tone; these two oddities point to earlier sound change. The high tone in the potential form of *-o* ‘to eat’ in Juchiteco suggests a process of contraction from a form with the shape *-VCV*, which in the potential would have exhibited a rising tone split between the two available vowels with the root-final vowel, the remaining vowel in the contemporary form of the verb, displaying the high tone that remains today. Comparison with other forms of Zapotec allows us to reconstruct this verb as *\*-awo*. There are a few verbs that undergo some change in syllable structure. Table 24 lists *-uni*, where checked articulation is added to the stressed vowel in the completive with no apparent phonological motivation. The completive form of the verb *-uni* is given in both its surface form and its underlying form, owing to the difficulty of showing the morphological analysis in the surface form when this involves a high-toned checked vowel.

There is one verb that appears to be defective in that its paradigm apparently includes no completive form. The root in question is *-a* ‘to ripen’, whose potential and habitual forms are *g=ǎ* and *r=a*, respectively. We have consulted with a number of native speakers, who invariably shift to an entirely different verb to convey the meaning ‘it ripened’. We suspect that the root *-a* simply does not contain enough phonological material to sustain a complete paradigm; *gu + a* would yield /gu/, and *bi + a* would yield /bi/, but there are no class A verbs that begin with /a/.

**Table 24. Irregular Verbs**

ROOT	TAM PARADIGM	CLASS AND VALENCE	GLOSS
-abi	<i>r=abi</i> <i>gu=dxi</i> <i>g=ǎbi</i>	Cirr:t	‘to say’
-ka	<i>ri=ka</i> <i>gu=kwa</i> <i>gi=ká</i>	Birr:i	‘to adhere’
-kaǎ	<i>ri=kaǎ</i> <i>gu=kwaǎ</i> <i>gi=kaǎ</i>	Birr:t	‘to grab’
-o	<i>r=o</i> <i>gu=d-o</i> <i>g=ó</i>	Dirr:t //∅ » t//	‘to eat’
-uni	<i>r=uni</i> <i>/biʔni/ ← //be=uʔni//</i> <i>g=ǔni</i>	Airr:t	‘to make’

**5. Comparison with previous analyses.** This article provides evidence that it is useful to consider the historical phonology of a language when accounting for synchronic features and to require that an analysis have applicability across closely related languages when this is achievable. Previous analyses of the verbal morphology of Juchiteco have not done so, and, as a result, they have yielded elaborate descriptions that are unlikely to be applicable to any other language but Juchiteco and, in any case, lack elegance.

The earliest analysis of the Juchiteco verb system is that of Pickett (1953, 1955). A revised analysis is presented by Marlett and Pickett (1987), to which a response is presented by Kaufman (1989). Pickett, Black, and Marcial Cerqueda (2001) provide a basic grammar that includes an overview of the inflectional and derivational system of verbs in the language. A conference paper by Enríquez Licón (2009) describes the verb classes in San Blas Atempa Zapotec, spoken in a municipality adjacent to Juchitán. Various aspects of Juchiteco verbal morphology are taken up in conference papers by Pérez Báez (2011) and Pérez Báez and Kaufman (2012). In the discussion below, we focus on the works by Pickett (1953, 1955) and by Marlett and Pickett (1987).<sup>12</sup>

Pickett (1953:293) recognizes seven aspectual categories, marked by morphemes whose allomorphs fall into four sets, 1A, 1B, 1C, and 2; these are shown in table 25, using her identifications of morphemes and TAM labels. Sets 1A to 1C are differentiated by their completive and potential allomorphs (bold in the table). Set 2 is characterized as the set of allomorphs that is used with most (i.e., not all) causative verb stems of the language. That is, she does not recognize =u= as a causative morpheme; rather, it is taken to be part of the aspectual morphemes in set 2. Verb stems are sorted into seven different distribution

types according to the allomorphs with which they cooccur and whether the stem is simple (noncausative) or causative. No underlying tone is identified in any of the allomorphs, nor is allomorphy based on the root-initial segments considered. More importantly, Pickett fails to recognize the causative morpheme =g-, which leads her to posit that some causative stems do not follow set 2 morphology.

**Table 25. Verbal Classification according to Pickett (1953)**

	1A	1B	1C	2
Habitual	<i>ri-</i>	<i>ri-</i>	<i>ri-</i>	<i>ru-</i>
Incompletive	<i>za-</i>	<i>za-</i>	<i>za-</i>	<i>zu-</i>
Continuative	<i>ka-</i>	<i>ka-</i>	<i>ka-</i>	<i>ku-</i>
Unreal	<i>ni-</i>	<i>ni-</i>	<i>ni-</i>	<i>nu-</i>
<b>Completive</b>	<b><i>bi-</i></b>	<b><i>gu-</i></b>	<b><i>gu-</i></b>	<b><i>bi-</i></b>
<b>Potential</b>	<b><i>gi-</i></b>	<b><i>gi-</i></b>	<b>∅</b>	<b><i>gu-</i></b>
Perfective	<i>wa-</i>	<i>wa-</i>	<i>wa-</i>	<i>wa-</i>

In later work, Pickett (1955) broadens the scope of the analysis to include morphemes other than aspectual markers and their proposed causative allomorphs. Those morphemes that are relevant to aspect and valence are shown in table 26; it can be seen that her analysis posits a large number of allomorphs for most morphemes.

**Table 26. Aspectual and Valence Morphology according to Pickett (1955)**

11	<i>si-</i>	<i>si-, ∅, s-, z-, g-, ch-, nd-, kw-, dx-, zh-, t-</i>	Causative	
21	<i>na-</i>		Stative	Construction begins with 21 and continues with stative stem, e.g., <i>na-wi?ini</i>
31	<i>gu-</i>	<i>gi-</i>	Potential	Constructions begin with morpheme and continue with the stem
32	<i>wa-</i>		Perfective	
33	<i>zu-</i>	<i>za-, zy-</i>	Incompletive	
34	<i>bi-</i>	<i>gu-, guy-</i>	Completive; Singular imperative	
35	<i>ru-</i>	<i>ri-</i>	Habitual	
36	<i>nu-</i>	<i>ni-, ny-, nyu</i>	Unreal	
37	<i>ku-</i>	<i>ka-, kay, ku-, kayu-</i>	Continuative	Considers the sequence of 37 + 41 (+31) + stem to be the andative <i>ka-na-ka-na-gu-ka?-beé</i> or <i>ka-nay-aasi+beé</i>
41	<i>na-</i>		Movement	

Pickett's incomplete understanding of the syllable structure of Juchiteco leads her to describe the checked syllabic nucleus as containing a segmental glottal stop, and to propose allomorphs for what she describes as glottal-initial stems in addition to vowel-initial and consonant-initial roots. Her analysis also shows only an incipient understanding of vowel reduction rules; this is one reason for the large number of allomorphs that she proposes. Unsurprisingly, given its date, her analysis did not benefit from more recent comparative data and resulting reconstructions that have improved the understanding of the phonotactics and historical evolution of vowel-reduction rules.

Pickett (1955) correctly identifies the causative morpheme =*si*=, but, as in her earlier article, maintains that =*u*= is not a single morphemic unit but rather a part of causative allomorphs of the TAM markers (e.g., causative habitual *ru*=). She also fails to identify the causative morpheme =*g*=, which, as is explained in sections 2 and 3 above, interacts with a root-initial consonant, causing a surface alternation at the beginning of the root. Such is the case for a verb root such as *-reeza*, which Pickett glosses as 'be or get torn' and describes as occurring "with the same set in both non-causative and causative constructions" (1955:225), as in the intransitive verb *gi=réeza* 'let it get torn' and the transitive verb *gi=chéeza* 'let him tear it'.

Pickett (1955) does not recognize the set of verbs labeled in the present article (see section 4.4) as class D verbs, which exhibit a consonantal alternation between the completive and other TAM forms. This leads her to posit four additional underlying forms to account for such alternations.

Juchiteco verbal morphology is reevaluated by Marlett and Pickett (1987), who take a Lexical Phonology approach. They posit a stratum "y," where stem formation and irregular aspect are assigned, including the formation of causative stems, irregular completives, and potentials, and a stratum "z," where regular aspect, i.e., all aspects other than completives and potentials, is assigned. They propose (Marlett and Pickett 1987:409) underlying forms for the aspectual markers as shown in table 27, and a series of rules that apply differently to vowel-initial and consonant-initial roots and act at one or both of the proposed strata.

**Table 27. Aspectual Allomorphs according to Marlett and Pickett (1987)**

HABITUAL	POTENTIAL	FUTURE	PROGRESSIVE	REPETITIVE	UNREAL	COMPLETIVE
<i>r-</i>	<i>k-</i>	<i>z-</i>	<i>ka-</i>	<i>wa-</i>	<i>ni-</i>	<i>gb-</i>

The inventory of proposed underlying forms is suggestive of difficulties that Marlett and Pickett may have found in describing this system. One such challenge is the fact that the TAM inflection of verbs exhibits a variety of CV sequences, which the authors identify as being of three kinds: sequences where V might be the initial segment in a small inventory of vowel-initial verb roots; cases where /i/ after the habitual, potential, and completive morphemes

alternates with /a/ after the future marker (accounted for by insertion rules in stratum *z*, deletion rules in stratum *y*, and a dissimilation rule in stratum *z* whereby *u* is replaced by *i* after *b*); and cases involving /u/ analyzed as a causative theme vowel but not a causative morpheme. A second challenge is the allomorphy of the completive, which Marlett and Pickett account for by positing that the underlying form of the morpheme is *gb-*, but that only one of the two segments ever surfaces; the deletions are accounted for in part by the Erasure Convention, which proposes that segments not incorporated into the syllable structure are deleted, and by the rule that vocalizes *b* to *u* after a consonant. They propose additional rules as well, such as a *y*-insertion rule in stratum *z* for vowel-initial roots. Marlett and Pickett's analysis leads to an account involving numerous apparent exceptions and irregularities. Notably, they identify a set of verbs, "PC," with what they consider to be irregular forms in the completive and the potential, and a set "C" that they consider to exhibit irregularity in the completive only. There is no indication in the article that this analysis can be extended to other varieties of Zapotec; the only other Zapotec language mentioned is Texmelucan Zapotec, and the applicability of Marlett and Pickett's analysis of Juchiteco to this language is not discussed.

Our analysis in the present article groups verbs into the four verb classes proposed by Kaufman (1989). Based on contemporary data on recognizably distinct Zapotec languages—four Northern, five Central, one Western, and one Southern—and including data from a variety of dialect groups for each language, Kaufman's synchronic analysis is compatible with cross-dialectal evidence. The present article tests the analysis on an exhaustive body of Juchiteco data, as described in section 4, explaining forms in detail and providing comprehensive sets of data. We see no need to posit *gb-* as the underlying representation of the completive morpheme, a segmental structure that is otherwise unattested in the language. Instead, Kaufman's classification proposes the completive allomorphs *be=* in class A verbs and *gu=* for the other three verb classes, a distribution that holds with regularity. This proposal avoids problematic features of Marlett and Pickett's (1987) approach, such as their exceptional group C and their resort to the Erasure Convention, or their vocalization, *a*-insertion and *i*-insertion rules. What Marlett and Pickett consider as the PC set of exceptional verbs can be easily explained through the properties of class D verbs.

In the present study, we find that causative morphology is underlyingly concatenative, and identify *=u=* and *=g=* as causative morphemes in addition to *=zi=*; *=g=* interacts with root-initial consonants to yield regular consonantal alternations that are relevant across Zapotec languages. The vowel simplification rule presented in section 4.1.3, governed by the vowel hierarchy in (3), is central to our analysis of verbal morphology: it explains in a regular fashion the vowels that appear in the initial CV sequences of inflected verbs, eliminating the need for various rules posited by Marlett and Pickett, such as the insertion rules and the *y*-insertion, dissimilation, and vocalization rules.

**6. Conclusion.** We present above a detailed analysis of over two thousand Juchitán Zapotec verbs to demonstrate the applicability of the verbal classification system proposed by Kaufman (1989). In this system, four verb classes are identified: class A takes the completive marker *be=*; class B takes the completive marker *gu=*; classes C and D also take the completive marker *gu=*, but, in addition, take the potential marker *g̃=*, which causes predictable alternations in the initial segment of consonant-initial roots; finally, class D exhibits an alternation in the root-initial consonant in the completive, suggesting that this consonant has (or had) a morphemic identity. The four-class verb system allows for a highly regular system with few exceptions. Some of these verbs are in transition from one class to another, possibly as a process of regularization common across Zapotec languages and evidenced in Juchiteco by alternating morphology characteristic of class A and one other class. Another handful of verbs have alternations in the root for which no motivation is apparent.

This analysis yields an elegant and economical account of verbs in Juchitán Zapotec. In contrast, previous analyses proposed by Pickett (1953, 1955) and Marlett and Pickett (1987) involve systems of complex multistep rules and a considerable amount of data that appeared as irregular. Further, these proposals have no apparent applicability to Zapotec languages other than Juchiteco. The four-class system of verbal classification laid out by Kaufman (1989) and applied in this article, in addition to accounting for the data in a comprehensive manner with few irregularities, has been applied successfully to a number of other Zapotec as well as Chatino languages: Central Zapotec varieties in the Isthmus, including San Blas Atempa (Enríquez Licón 2009; Pérez Báez et al. 2013), Santo Domingo Petapa, Guevea de Humboldt, Guadalupe Guevea (Pérez Báez et al. 2013), and the Valley language of San Baltazar Chichicapan (Smith-Stark 2002); the Southern varieties of Coatlán and Loxicha (Beam de Azcona 2004); the Western varieties of Santa María Lachixío, San Pedro Totomachapan, San Mateo Mixtepec, San Antonino el Alto and San Pedro el Alto (Pérez Báez et al. 2013); and the Chatino languages of Zenzontepec (Campbell 2011), Zacatepec (Villard 2009), and Tataltepec (Sullivant 2011). The four-class system allows rather consistent analyses across the languages, with only minor adjustments. In Juchiteco, class A verbs include vowel-initial and consonant-initial roots, and a large number of class A verbs include versives; these two characteristics are shared with class A verbs at least in San Blas Atempa (Enríquez Licón 2009), San Baltazar Chichicapan (Smith-Stark 2002), and Coatlán and Loxicha (Beam de Azcona 2004). Class B verbs in Juchiteco can be both transitive and intransitive, and the same is true of class B verbs in San Baltazar Chichicapan. Class B in Coatlán, and Loxicha Zapotec, as well as Zenzontepec Chatino, contain roots that tend to be primarily intransitive. Juchiteco class C verbs are also both transitive and intransitive as well as both vowel-initial and consonant-initial. The latter is a characteristic that is not shared by class C verbs in Zenzontepec Chatino (Campbell 2011) nor in Coatlán and Loxicha (Beam de Azcona 2004), which have no consonant-initial class C verbs.

Beyond the descriptive value of the analysis presented here, this study stresses the importance of generating analyses that are data-driven rather than theory-influenced. The four-class system of verbal classification presented in Kaufman (1989) has been applied to the aforementioned languages through extensive and detailed documentation of the verbal inventories of each language. The crosslinguistic applicability of any given analysis allows us to account for structural commonalities across languages. This, in turn, is especially critical in improving our understanding of systems across large language families where dialectal diversity is especially rich, as is the case for Zapotecan.

### Appendix

This appendix provides a more detailed explanation of the sound system of Juchitán Zapotec (Juchiteco) than that presented in section 2, to ensure that the analysis of verbal classification in this study is adequately grounded. It summarizes the phonemic system and morphophonology of Juchitán Zapotec described in section 2 and other sections of the article; moreover, it provides additional details, outside the scope of the study, that might be relevant to readers who wish to delve deeper into Juchitán Zapotec phonology. For the sake of broad accessibility to the data and analysis, the orthography and annotation conventions employed throughout the article have diverged from those established by the Project for the Documentation of the Languages of Mesoamerica (PDLMA), under whose auspices the data for this analysis was collected, partially as a means to conform to more widely used conventions. In this appendix, however, we follow PDLMA conventions.

We represent the sounds of Juchitán Zapotec by means of a completely explicit practical orthography devised in 1995 within the PDLMA. This system is based partially on the conventional way of spelling present-day Spanish, partially on the way indigenous languages have been spelled (in Spanish-based orthography) in Mesoamerica since 1519, and partially on other considerations when the first two customary systems are inadequate. It is important to recognize, however, that while it is completely accurate and exact, the orthography we use does not straightforwardly represent what we consider to be the phonological elements of Juchitán Zapotec. This is because this orthographic system tolerates and reflects the effect of the prejudice that has historically led to equating single obstruents with voiced sounds and geminate obstruents with voiceless sounds. The decision to make these allowances is based on a number of cultural and practical considerations which lend sufficient validity to the use of this orthographic system. In the following paragraphs we expound the conventions used in the present study.

**Table A. Conventions for the Representation of Sounds in Juchitán Zapotec**

/abc/	phonemic representation
//abc//	underlying representation
[abc]	phonetic/allophonic representation
⟨abc⟩	graphemic/orthographic representation
*abc	reconstructed segments and strings
abc*	hypothetical but unreal/false segment or string
abc=	proclitic string
=abc	enclitic string

Juchitán Zapotec has thirteen consonants: five plosives, two spirants, two nasals, two resonants, and two semivowels; it has five vowels, and three tones. Consonants are listed in table B. Certain consonants can be geminate. These are represented in table B with double graphemes.

**Table B. Consonantal Inventory for Juchitán Zapotec**

PLOSIVES	<i>p</i>	<i>t</i>	<i>c</i>	<i>k</i>	
	<i>pp</i>	<i>tt</i>	<i>cc</i>	<i>kk</i>	<i>kkW</i>
SPIRANTS		<i>s</i>	<i>s<sup>^</sup></i>		
		<i>ss</i>	<i>s<sup>^</sup>s<sup>^</sup></i>		
NASALS		<i>n</i>			
	<i>mm</i>	<i>nn</i>			
RESONANTS		<i>l</i>			
		<i>ll</i>			
		<i>r</i>			
SEMIVOWELS	<i>w</i>		<i>y</i>		

As can be noted in table B, /r w y/ cannot be geminate and /m/ cannot be single. With regards to /m/, this property suggests a different analysis for /mm/, perhaps /nw/\* or /np/\*, but we have not found this speculation profitable. /mm/ does not take part in any phonological alternations. Some other types of Zapotec have [b] /p/ where Juchiteco has /mm/, but, while /mm/ can yield [b] /p/ in certain types of Zapotec, [b] /p/ cannot yield /mm/.

The sequence /kW/ appears only in geminate contexts. It reflects /p/ preceded by /k=/ (/k=/ + /p/ → /kkW/). At the same time, Juchiteco /p/ reflects proto-Zapotec \*kW, and Proto-Zapotec medial \*kkW > /pp/ in Juchiteco. Before \*kW > /p/ in Juchiteco, \*kW > \*k before rounded vowels in all forms of Zapotec. This sound change feeds into the fact that a proclitic \*kWe= developed an allomorph \*ku=; two different morphemes show this alternation: the completive marker /pe=/ ~ /ku=/ and the animate classifier /pe=/ ~ /ku=, both originally simply as \*kWe=. Whether \*kWe= developed the allomorph \*ku= by combining \*kWe= with root initial \*u, or whether \*ku= results from \*kWe= losing the vowel \*e has not yet been determined. Another case of /p/ ~ /k/ in Juchiteco is seen in class D verbs. Certain class D verbs have a noncompletive variant with initial /p/ before nonrounded vowels, and /k/ before rounded vowels; the original exponent of this morpheme was \*kW.

Certain phonological processes yield surface phonemes that are quite different from their underlying representation. These are listed in table C. Otherwise //k + C// → /C1C1/. Table D lists phonemes and allophones along with the graphemes used for their representation.

**Table C. Divergences in Underlying and Surface Phonemes**

//k + p//	→ /kkw/
//k + y//	→ /cc/
//k + r//	→ /cc/
//k + l//	→ [nd]

**Table D. Phonemes, Allophones and Graphemes of the PDLMA Orthographic System**

PHONEME	GRAPHEME ROOT-INITIALLY	PHONETIC REALIZATION ROOT-MEDIAALLY	PHONETIC REALIZATION
<i>p</i>	<b>	[B]	[b]
<i>pp</i>	<p>	[pʰ]	[p:]
<i>t</i>	<d>	[D]	[d]
<i>tt</i>	<t>	[tʰ]	[t:]
<i>c</i>	<dx>	[DZʰ]	[dzʰ]
<i>cc</i>	<ch>	[tsʰ]	[tsʰ:]
<i>k</i>	<g>	[G]	[g]
<i>kk</i>	<k>	[kʰ]	[k:]
<i>kkW</i>	<kw>	[kwʰ]	—
<i>s</i>	<z>	[Z]	[z]
<i>ss</i>	<s>	[s:]	[s:]
<i>sʰ</i>	<zh>	[Zʰ]	[zʰ]
<i>sʰsʰ</i>	<x>	[sʰ:]	[sʰ:]
<i>mm</i>	<m>	[m:]	[m:]
<i>n</i>	<n>	[n]	[n]
<i>nn</i>	<nn>	—	[n:]
<i>l</i>	<l>	[l]	[l]
<i>ll</i>	<ll>	—	[l:]
<i>//kl//</i>	<nd>	[nd]	[nd]
<i>r</i>	<r>	[r]	[r]
<i>w</i>	<w>	[w]	[w]
<i>y</i>	<y>	[y]	[y]

Some observations are in order. [B D DZʰ G Z Zʰ] are partly voiced and partly devoiced lenis obstruents, like initial /b d dzʰ g/ in some forms of English spoken in England and northeast United States (but not the southeast), but very much unlike any pronunciation of any kind of Spanish. The grapheme <kw> represents a labialized velar consonant /kʷ/ rather than a consonant-glide sequence since, underlyingly, there are no /CyV/ or /CwV/ syllables in Juchitán Zapotec. Diachronically we must posit \*kʷ, which developed into /p/, /k/, and /kkʷ/ in Juchiteco.

The vocalic inventory of Juchitán Zapotec is comprised of five cardinal vowels, /i, e, a, o, u/. Vowels can be of three types as shown in table E: plain, checked, and broken. Vowels can carry one of three tones—low, rising and high—as listed in table F.

**Table E. Vowel Types in Juchitán Zapotec**

V	plain	<V>	[V:] when stressed before single C; otherwise [V]
Vʰ	checked	<V7>	[V7]
Vʰʰ	broken	<VV>	[V7V] (in slow speech) ~ [V':] (in fast speech)

**Table F. Tone in Juchitán Zapotec**

low	⟨V⟩	[V_], [V]
rising	⟨V*⟩	[V_], [V!]
high	⟨V!⟩	[V!]

Grammatical morphemes, all of them proclitics, are spelled via the PDLMA orthography, thus ⟨za=⟩, ⟨gi=⟩, ⟨g\*=⟩, ⟨be=⟩, and ⟨gu=⟩, whereas phonemically they are /sa=/, /ki=/, /k\*=/, /pe=/, and /ku=/. We present the interactions of proclitic /k/ with immediately following consonants /p t c k s s^ n l r y/ (no verb roots begin with /w/) as ⟨g⟩ + ⟨b d dx g z zh n l r y⟩. The resulting interactions are listed in table G.

**Table G. Interactions of Proclitic /k/ with Immediately Following Consonants**

⟨g⟩ + ⟨b⟩ → ⟨kw⟩
⟨g⟩ + ⟨d⟩ → ⟨t⟩
⟨g⟩ + ⟨dx⟩ → ⟨ch⟩
⟨g⟩ + ⟨g⟩ → ⟨k⟩
⟨g⟩ + ⟨z⟩ → ⟨s⟩
⟨g⟩ + ⟨zh⟩ → ⟨x⟩
⟨g⟩ + ⟨n⟩ → ⟨n⟩
⟨g⟩ + ⟨l⟩ → ⟨nd⟩
⟨g⟩ + ⟨r⟩ → ⟨ch⟩
⟨g⟩ + ⟨y⟩ → ⟨ch⟩

### Notes

*Abbreviations.* The following abbreviations are used: AUX = auxiliary; DERV = derivational; gem = geminate; i, intr. = intransitive; irr = irregular; med = mediopassive; PL = plural; sgl = single; SJT = subject; TAM = tense, aspect, and mood; t, trans. = transitive; A, B, C, D = verb of class A, B, C, D (Ac = consonant-initial verb of class A, Av = vowel-initial verb of class A, and similarly for the other classes).

*Transcription.* An acute accent mark represents a high tone; a háček represents a rising tone; V = plain vowel; V? = checked vowel; VV = rearticulated vowel; the equals sign (=) marks clitic boundary; a dash (-) marks morpheme boundaries; an asterisk (\*) immediately before a word marks a reconstruction; double slashes // . . // frame an underlying representation; angle brackets ⟨ . . . ⟩ identify phonemes in their orthographic representation and also frame the representation of both the underlying and phonemic properties of a morpheme. The graphemes used in this article follow the orthographic and coding conventions of the Project for the Documentation of the Languages of Mesoamerica. They differ from the *Alfabeto popular para la escritura del zapoteco del Istmo*, the local practical orthography, in not utilizing any conventions for consonantal representation borrowed from Spanish orthographic conventions. For instance, velar plosives are represented in this article as *k* (geminate) and *g* (single) before any vowel, as opposed to the Spanish representation of velars as *qu* and *gu* before front vowels and *c* and *g* elsewhere; the Spanish conventions have no phonological reality in Juchiteco. Also, unlike the *Alfabeto popular*, the orthography used in this article systematically marks tone and extrametrical material. Americanist phonetic notation equivalents are provided in table 1.

1. The language is called *diidxazá* by its speakers. In the literature, the language is known as Isthmus Zapotec or *zapoteco del Istmo*. The designation given by the Instituto Nacional de Lenguas Indígenas is *zapoteco de la planicie costera* (INALI 2008).

2. For explanations of the graphemes used in this article, see the note on transcription, after the abbreviations.

3. It is worth mentioning that the distinction of single vs. geminate is not limited to Zapotec languages and is phonologically justified by various analogies in other languages. Within Otomanguean, both Tlapanec and Otopamean exhibit this opposition.

4. Alterations to the placement of stress on the first syllable of the root may occur in compounds and, of course, in larger utterances as part of natural speech. We are concerned here with the inflected or derived verb in isolation.

5. The distribution of causative markers across varieties and dialects of Zapotec has not been determined. We expect that closely related dialects will agree about which causative markers are used on cognate verb roots, but would not be surprised to find that distantly related varieties are not in agreement. Disagreement is the result of morphological change or renewal, and will help to tell us in which parts of the grammar the meanings of morphological constructions are more accessible to speakers. Disagreement will also serve to delineate dialect groups.

6. Forms derived by preposing *na=* to a root are often referred to as statives in descriptions of other Zapotec languages; this is the case in Pickett, Black, and Marcial Cerqueda's (2001) description of Juchitán Zapotec grammar. As is shown in table 4, the derivations in question are part of a system of participle derivation rather than aspectual inflection.

7. Following phonotactic rules in Juchiteco, a rising tone will split between the tone-bearing vowel and the vowel in the following syllable. This may result in tonal perturbation patterns and changes in vowel type to avoid certain disallowed word shapes. Tonal perturbation patterns involving a morpheme bearing an underlying rising tone occur also in verbal inflection in the potential (see section 4.3.2).

8. A serious investigation of valency and transitivity is beyond the scope of this article. However, we indicate the kinds of argument structure and predicate structure found among verbs in each of the classes A–D as an aid to comparative analysis. For more complete information on morphological valence-changing processes, consult Pérez Báez (2015).

9. The tonal perturbations of several verbs in table 11 do not surface. The roots in question are *-nabá?* 'to request', *-ndadí?* 'to detach', *-ndapí?* 'to pull', and *-ndisá?* 'to pick up'. These belong to a group of verbs where the application of the regular tonal perturbation rules proposed by Pérez-Báez (2011) would result in word shapes not allowed in the language. Specifically, avoidance of the word shape *gi-CVCV?* motivates merging of the split high tone with the root-final high tone. There is one other merging process among the tonal perturbation patterns of potential forms in which the rising tone of the potential fuses with a rising tone of a vowel in the first syllable of a root.

10. The possible prehistoric sources of *\*kw-* and *\*l-* have not yet been uncovered.

11. Migration from one verb class to another has been documented for a number of Zapotec languages. Isthmus varieties exhibit cases where cognate verbs might belong to one class in one language and to a different class in other languages. For instance, the verb 'to insert' in Juchiteco is the class D root *-g-uu*, whereas its cognate in the closely related variety of San Blas Atempa is the root *-g-o*, which exhibits morphology consistent with both class A and class D verbs. Beam de Azcona (2004) indicates that some class D verbs have shifted to class A in Coatlán-Loxicha Zapotec and other Southern Zapotec varieties. In the Western Zapotec variety of Santa María Lachixío, class A has lost all its membership, as verbs moved to other classes (Sicoli p.c. 2012). Campbell (2011) reports

that no trace of class D morphology is detectable in Zenzontepec Chatino, and suggests that this fact implies that class D may have been an innovation of Zapotec.

12. Data from Pickett (1953, 1955) and Marlett and Pickett (1987) is presented in the notation and organizational system presented in the original works, which sometimes differs from the notation used in the present article.

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