0. Abstract

The analysis of systems of tone, stress, and intonation in the world’s languages is a center of debate in modern phonology. While prototypical cases of stress languages such as English and tone languages such as Yoruba are well understood, languages on the peripheries of these prototypes, especially those with interactions between tone and stress systems, often pose challenges to researchers and theorists. The interaction between stress and tone in Huichol (Uto-Aztecan) language of western Mexico, can be understood using van der Hulst’s (2014) concept of ACCENT, a lexically underlying mark of prominence. This analysis is based on both published and original Huichol-language data that Huichol is an accentual language with one accented mora per word. Huichol has privative tone that interacts with the accentual system: accented moras are assigned high tone. Thus, Huichol should be classified as a tone-accent language.

1. Introduction

The prosodic systems of the world’s languages have been the subject of considerable study in the field of linguistics. Much has been written and debated about the issue of typology—what languages can be considered “tonal”, for instance, and what languages can be labelled as “stress languages”. While languages that are canonical prototypes of each category have been rigorously researched and are well understood, the typological literature has often struggled to...
Huichol (Wixárika) as a word accent language

explain languages on the periphery of these typologies. For example, English has been identified as a language with stress based on the prototype supplied by Hyman (2014:57-58). However, languages such as Turkish and French are more difficult to analyze using the frameworks for stress that describe English well, necessitating the use of different tools for different “types” of languages (Hyman 2014).

This paper adds to a varied and rapidly-moving literature in the analysis of the interaction between tone and stress systems. As a language with a complex and highly interdependent interaction between the systems of tone and stress, the description and analysis of Huichol has much to offer the current debate. Currently, three major theoretical frameworks are prevalent in the study of prosody. Early works such as that of Inkelas and Zec (1988) isolate tone and stress as independent phenomena. This approach is also taken in the pioneering work of McIntosh (1945) and Grimes (1959) in Huichol phonology. Subsequent work such as that of Hyman (2006; 2009; 2014) and Michael (2010) advocate what is known as a “property-driven”, or highly descriptive, approach to issues in the typology of complex tone and stress systems. The suprasegmental features of the Huichol language are best understood in Abercrombie’s framework of accent (1976).

Early in the study of the phonological prominence of certain sublexical domains, Accent referred to an underlying “mark” (Abercrombie 1976; van der Hulst 1999, 2010, 2014; Hyman 2001; Yip 2002) borne by a syllable that signified increased prominence within the prosodic or phonological word. This use of the concept of accent draws a distinction between languages in which accented syllables affect pitch, rather than other phonetic features such as duration, intensity, and vowel quality. The use of the term here also significantly differs from its use in the intonational literature, in which a “pitch accent” refers to a particular phrasal pitch contour
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However, terms such as “accent”, “stress”, “tone”, and “pitch accent” have borne numerous definitions across scholars, time periods, and schools of thought. For this reason, I take care in Section 2 to define the theoretical concepts in use in this work.

1.1. Huichol: Contextual and sociolinguistic background

The Huichol language (ISO code hch), also known by its autonym, Wixárika, is a language in the Uto-Aztecan family spoken by approximately 35,724 people (INEGI 2009:151). Huichol is spoken primarily in the Sierra Madre Occidental in the western Mexican states of Jalisco and Nayarit, as well as in parts of Durango and Zacatecas (see Figure 1).

While most speakers of Huichol live in the Huichol homeland, in modern times many have migrated to urban areas outside of western Mexico in search of economic opportunity. In the Mexico City metropolitan area, for instance, the 2005 Mexican census counts 51 Huichol-speakers in the Federal District as well as an additional 67 in the State of Mexico (INEGI 2009:152). The original data in this study was collected through interactions with one individual, a 22-year-old migrant from Tuapurie (also known by its Spanish name, Santa...
Catarina, and its Náhuatl name, Huaixtita) who is a member of the Mexico City Huichol community and lives in a Huichol household.

1.2. Linguistic features of Huichol

Huichol is a highly polysynthetic, head-marking language with loosely-defined word classes; nouns, verbs, prepositions, and adjectives, using three methods of incorporation to form words (Iturrioz and Gómez 2011). Huichol has ten general word classes, each arranged on a spectrum of predicativity from most predicative to most indicative (Iturrioz and Gómez 2011:163). In fact, Conti (2012) calls the formation of predicates on non-verbal bases “one of the most interesting syntactic aspects of Huichol”. Huichol has 12 vowels and 23 consonants;

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Table 1. Consonantal phones of Huichol

²The phones [r̃] and [r̃²], both phonetic realizations of the phoneme /r̃/ ( <x> in orthography) do not co-occur in the same dialect; Iturrioz and Gómez (2011) state that while [r̃] (an alveolar trill) occurs mostly in western dialects of Huichol, its counterpart [ɬ̃], a lenited and assibilated ‘r’ sound, occurs only in eastern dialects.

³ While the phone [ɬ̃] is not attested in the grammar of Iturrioz and Gómez (2011) or previous phonetic inventories, it was a prominent feature of the dialect spoke by my language consultant. It pertains to the phoneme /ɬ̃/ and alternates regularly with [r̃].
these 35 phones pertain to 23 phonemes (Iturrioz and Gómez 2011). Tables 1 and 3 illustrate the full inventory of consonantal phones and phonemes in Huichol, while Tables 2 and 4 display the five phonologically distinctive vowel qualities and their phonetic counterparts. As vowel length is contrastive in Huichol, each vowel quality corresponds to two phonemes, a short and long vowel. I will use Huichol orthography to represent sounds in Huichol; this
orthography differs minimally from the conventional Americanist phonetic alphabet in ways shown in Table 3. I will use diacritic marks to represent an analysis of tone: level tones will be represented by the acute accent (', H tone) grave accent (', L tone) and contours with the circumflex (', fall) and haček (', rise).\(^4\) As described in Iturrioz and Gómez (2011), the maximal syllable in Huichol is CVV, a single consonant followed by a diphthong, or CVː, a single consonant followed by a long vowel. A well-formed syllable may not begin with a vowel nor end in a consonant, and no complex consonant clusters are allowed. Thus, the syllable template in Huichol can be formally written as CV₁(V₂), where V₂ may have the same vowel quality as V₁ or a different one conforming to the inventory of diphthongs in Huichol (see Figure 2). Based on my data and the data presented in Iturrioz and Gómez (2011), a full word may not consist of a single syllable of less than maximal weight. This claim bears significant consequences for suprasegmental phenomena in the Huichol language (Section 4.2).

1.3. Overview

The remainder of this paper will be organized as follows: Section 2 presents an overview of past and current understandings of the notion of “accent” in the field of phonology, including arguments for and against the typological category of “pitch-accent”. I

\(^4\) As shown below, the Huichol tone-bearing unit is the mora; contour tones can only be realized on the surface of multimoraic syllables.
follow Section 2 with a discussion of previous work in Huichol phonology, especially noting the contribution of Grimes (1959).

Section 4 presents an argument for Huichol as an accentual language, using original Huichol-language data to illustrate claims made, and elaborates on these findings by detailing the phonological exponent of accent in Huichol: H(igh) tone. I discuss my findings and trace the argument for Huichol’s categorization in the typology I construct in previous sections. Finally, I conclude with commentary on possible limitations of my data and methodology, and indicate directions for further research.

2. Accent

In the task of linguistic typology, languages that fit well into the categories of “tonal” and “stress” (or “stress-accentual”) have been explained well by established literature; considerable disagreement exists, however, in the analysis of languages on the periphery of these typological categories. To begin, I discuss the typology of languages into “tonal” and “stress-accentual”, drawing examples from the literature. I devote the rest of this section to the elaboration of the Abercrombian framework of word accent presented by van der Hulst and others.

Frameworks such as that of Hyman (2014:57-8), rely on prototypes, rather than definitions, to categorize languages. This means that languages lie on a spectrum between perfect members of a typological category and perfect non-members. Hyman’s prototype of a stress-accent language, then, involves the following:
a. Stress location is not reducible to simple first or last syllable (which could simply represent a boundary phenomenon).\(^5\)  

a. Stressed syllables show positional prominence effects:  
   i. Consonant, vowel, and tone contrasts are greater on stressed syllables.  
   ii. Segments are strengthened in stressed syllables (e.g. Cs become aspirated or geminated, Vs become lengthened, diphthongized).  

b. Unstressed syllables show positional non-prominence effects:  
   i. Consonant, vowel, and tone contrasts are fewer on unstressed syllables.  
   ii. Segments are weakened in unstressed syllables (e.g. Cs become lenited, Vs become reduced).  

c. Stress shows cyclic effects (including non-echo secondary stresses).  

d. Stress shows rhythmic effects lexically/post-lexically (cf. the English ‘rhythm rule’).  

e. Lexical stresses interact at the post-lexical level, e.g. compounding/phrasal stress.  

f. Lexical stress provides the designated terminal elements for the assignment of intonational tones (‘pitch-accents’).  

g. Other arguments that every syllable is in a metrical constituent that can be globally referenced. (Hyman 2014)

As I allude above, stress is considered a syntagmatic property of syllables, meaning that stress is assigned based on a framework consisting of domains of typically larger than one syllable, in which one syllable (the HEAD of the domain) bears stress. In languages most closely resembling the prototype, the domains are regular, and the head of the domain can always be predicted.

In addition to the prototype presented above, which describes a lexical stress system at the syllable domain, it is generally agreed that stress has two important properties acting at the

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\(^5\) Moskal (forthcoming) posits a phenomenon she calls “edge prominence”, though which a language might naturally lend prominence to the first, second, last, or penultimate syllable/mora of a word due to its position, rather than due to an accentual effect, even though it obeys both principles of obligatoriness and culminativity.
lexical level: obligatoriness and culminativity. The condition of obligatoriness holds that every lexical domain will contain at least one “stressed” syllable (that is, one marked for particular prominence). The condition of culminativity holds that all words will contain exactly one syllable marked for primary stress. This entails that languages with words containing more than one stress will have a mechanism for assigning one—and only one—word-level prominence. For the purposes of this paper, I will consider obligatoriness and culminativity necessary—but not sufficient—conditions for the classification of a language as accentual.

Hyman (2014:58) points out that the prototype presented in (1) closely resembles English; he further comments that “as a result of the thorough-going phonological activations [of stress phenomena], it would be folly to attempt to analyze English without stress... let us assume that there is no disagreement of interpretation; that all researchers agree that English has word stress.” Gussenhoven (2004:20) shows further that for English, there exist many levels of stress: while there exist unstressed syllables and stressed syllables, there is a further distinction between stressed syllables that also gain prominence at the phrasal level (confusingly termed “accented” by Bolinger (1958, 1981) and Vanderslice and Ladefoged (1972)) and those that do not. These phrasal patterns of prominence are known as intonational; intonational patterns involve phrase-long pitch melodies with components that dock to heads of sub-phrasal prosodic domains such as words or metrical feet.

On a different spectrum of typology lie tone languages. Various definitions exist; Pike (1948:3) narrowly defines the set of tone languages as “language[s] having lexically significant, contrastive, but relative pitch on each syllable”. This definition is generally accepted following Pike as the definition of “unrestricted” tone systems (Voorhoeve 1973; Gussenhoven 2004); tone systems can also be restricted by suppressing the inventory of tones permitted on any
given syllable. Hyman (2001, 2006), in line with keeping a broad range of languages in the frame of analysis, opts for a wider definition of tone languages; he puts forth that “A language with tone is one in which an indication of pitch enters into the lexical realization of at least some morphemes” (Hyman 2006:229). Consistent in the above definitions is the characterization of tone as PARADIGMATIC (as opposed to syntagmatic)—that, in a tone language, the tone of tone-bearing units is identified from the full tonal inventory of the language or a subset thereof. Hyman (2006:230) goes on to say:

The definition in (3) refers to “an indication of pitch” rather than pitch itself. This is intentional, and is designed to abstract away from analytic preferences. For example, it was mentioned in Section 2 that Kinga and Nubi require exactly one H tone per lexical word. The question was also raised as to whether these systems should be thought of as [stress-accent, pitch-accent, or tonal]. They could thus be analyzed with a /H/ tonal feature or an abstract accent, which could be said to be realized as [H] by a postlexical pitch-assignment rule. However, since only pitch is involved, it is clear that the abstract accent is nothing but “an indication of pitch”. By (3), Kinga and Nubi are tonal.

(Hyman 2006)

The latter analytical model referred to by Hyman is the most relevant for use with the Huichol language, and thus I spend the rest of this section discussing the structure and components of this model.

2.1. Types of word accent

Accent, in its most basic form, is an abstract mark of prominence that is the property of a particular position in the underlying representation of a prosodic domain. While in some languages, accent may be underlingly unpredictable, in the majority of cases the location of accent is predictable to some degree. Arguably, the most famous case of accent predictability is rhythmic accent. In rhythmic accent systems, words are parsed into feet consisting of two or
three syllables, with stress falling on either the rightmost or leftmost syllable of the foot. For instance, Selkirk (1980) shows that all English words can be parsed into three types of exclusively left-headed feet, shown respectively in the three examples below. Note that in this example, an acute accent marks the primary word stress, and a grave accent marks all non-primary word stresses.

(2) a. (σ) b. (Pâw)(túcket)
(3) a. (σ σ) b. (Missis)(síippi)
(4) a. (((σ σ) σ) b. (((Chéro)(kee))) (Selkirk 1980)

As shown, (3) shows a canonical bisyllabic foot with the first syllable stressed; (4) accounts for syllables following a bisyllabic foot by incorporating them into a prosodic domain larger than a foot. Finally, (2) shows a foot consisting of a single stressed syllable. This allows all syllables in English to be parsed into feet. An alternative analysis could mark these syllables as extrametrical, and therefore not required to be parsed into feet (Hayes 1995).

As shown in both (2) and (3), there can be more than one stressed syllable in a single word, but the condition of culminativity limits the number of primary stresses to one. The phenomenon of cyclicity selects one preferred foot among many feet in the same prosodic word or phrase to receive primary stress. Gussenhoven defines cyclic effects as those “such that smaller constituents are provided with a prosodic structure which may or may not be copied into the larger constituent (2004:163). For instance, Truckenbrodt (2002) cites the example of Bengali in showing that while each prosodic word is left-headed, the prosodic phrase is right-headed; I use the grid notation of Hayes (1995) to show prominence at multiple levels simultaneously: in (5) below, the lower row of X marks notate word-level accents, while the upper row represents phrasal stress.
The above example shows that while each individual word begins with word-initial stress, the phrasal stress is found on the last word of the phrase. The assignment of phrasal stress is crucial due to the presence of elements of certain pitch contours that can only dock to syllables with prominence at a domain larger than the word (Wright 1988). Another consequence of the interaction between metrical accent and intonational systems is the phenomenon of stress clash, such as Hayes’ (1995) English rhythm rule, in which the word-level accent is shifted to the nearest foot-level accent to avoid two word-level accents occurring next to each other; Gordon (2014) cites the examples below, in which the word-final primary stress in Tennesee is shifted to the first syllable of the word in reaction to the addition of the word governor, which has primary stress on its first syllable.

(6)     Tennesee
(7)     Tennesèe governor     (Gordon 2014)

Languages with non-metrical accent contrast with systems of metrical accent: they do not use rhythmic calculation or parse syllables into feet. Languages without metrical accent include those that use syllable weight as candidates for primary word stress, those that assign invariant stress to a certain syllable of a word relative to either edge of the word (e.g. first, second, third, antepenultimate, penultimate, final), and languages that combine more than one of the systems mentioned.

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6 A full glossary of abbreviations used in this paper can be found in Appendix 2: Abbreviations.
It is not clear that languages with completely unbounded systems are accentual, as a central characteristic of accent is that it marks relative prominence in a particular bounded domain (van der Hulst 2010). Thus, Hyman’s (2006) example of the assignment of H tones in Kirundi, shown below in (8), would not be considered an example of accent.

\[(8)\]
\[
\begin{align*}
\text{ku-bá-z-a} \\
\text{ku-bí-baz-a} \\
\text{ku-bí-mu-bá-z-a} \\
\text{ku-bí-mu-kú-bar-iz-a} \\
\text{ku-há-bi-mú-ku-bár-iz-a} \\
\text{ku-ha-bi-mu-ku-bar-iz-a}
\end{align*}
\]
inf there them to.him for.you ask.question inf
\‘to ask him (for) them for you are there’ (Hyman 2006)

As a final note, it is important to recognize that some languages may be claimed not to have accentual systems at all. The most compelling evidence of this is languages, like Bella Coola (Hyman 2014:64), which contain words entirely without vowels, such as the notorious phrase $lpl'k$ ‘then he had had in his possession a bunchberry plant’, which consists of only voiceless obstruents.

### 2.2. Correlates and exponents of accent

A necessary component of the accentual model discussed and used here is the realization of underlying accent in the surface form of spoken language. As accent is a purely abstract concept, held to manifest only in the underlying lexical form of any word, it is important to discuss the implications of accent on the surface realizations of these words as well.

Correlates of accent include phonetic properties, such as syllable duration, vowel non-reduction, amplitude, aspiration, and pitch. Phonological properties including length,
consonant gemination, allowance of full vowel contrast, syllable closure, and tone can also affect or be affected by the presence of underlying accent. As mentioned above, a common pitch phenomenon held to be linked to accent is intonation: in many languages, only accented syllables can provide docking points for intonational pitch contours. For instance, take the English phrase cited in van der Hulst (2010:3)

(9) Harry wrote [a lengthy introduction]

|                      |
| *H                   |

(van der Hulst 2010)

In the bracketed domain, only two syllables are candidates for the docking of the *H toneme: <léng>, the first syllable of *lengthy, and <dúc>, the third syllable of *introduction. This is because these are the only two primary word accent in the phonological phrase (in this context, the English word *a is a clitic without primary word accent). A native speaker can easily point to the fact that the *HL toneme can certainly never dock to a syllable such as <tro>, which bears no accent, nor can it dock to <in>, a syllable with secondary accent, without sounding extremely unnatural.

Languages falling in the category of “pitch-accent languages” are easily accounted for by this framework. For instance, many works hold that these languages are essentially tonal, albeit with extremely restricted tonal inventories—for instance, Tokyo Japanese has an HL melody docking to a single unpredictable, lexically underlying syllable in each word as seen in (10) (Hyman 2009; van der Hulst 2011); Kinga has a single tone, H, which appears once per word, on the antepenultimate syllable, as in the Kinga verbs in (11) below (Schadeberg 2010; Goldsmith 1975):

(10) mákura ga ‘pillow’ + NOM
    kokóro ga ‘heart’ + NOM
atamá ga ‘head’ + NOM
sakana ga ‘fish’ + NOM (Hyman 2009)

(11) ukúheka ‘to laugh’
ukóvala ‘to count’
ukogéenda ‘to go’
ukugeendéléla ‘to walk around’
ukuhwaánana ‘to become similar’ (Schadeberg 2010)

Such languages, previously classified as “pitch-accent languages”, can be analyzed in both a tonal framework and a traditional “stress-accent” framework. Consider, for instance, the first examples in (10) and (11) below in (12) and (13) using a tonal analysis, where no syllables are assigned tone except one per word, where the only tone in the tonal inventory docks.

(12) \[ \text{ma ku ra ga} \]
     \[ \text{HL} \] (Hyman 2009)

(13) \[ \text{u ko he ka} \]
     \[ \text{H} \] (Schadeberg 2010)

However, the theory of underlying accent with particular surface-level correlates allows both analyses to be carried out simultaneously. This rationale motivates its use in this paper.

3. Previous studies of suprasegmental Huichol phonology

3.1. Tone in Huichol

In descriptions of Huichol, the existence of contrastive tone is debatable and unclear. In the limited literature on Huichol, there is only one article which treats tone in depth (Grimes

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7 The content of this section is largely based on a previous review I conducted for a Seminar in Tone and Stress at Haverford College under Prof. Brook Danielle Lillehaugen.
1959), and two others which mention tone only in passing (Grimes 2006:401; Iturrioz, Ramírez, and Pacheco 1999:153). Of these, Grimes (1959) claims that Huichol moras carry tone and conducts an in-depth analysis of the tonal system of Huichol based on the author’s fieldwork.8

Other works mentioning tone include Iturrioz, Ramírez, and Pacheco (1999:153), who puts forth that “when a syllable is significantly long, it has a rising tone”, and Grimes (2006:401) says,

Syllables carry high tone (’ over the first vowel) or low tone (no symbol). Stress comes from the interaction of length, tone, and foot boundary, symbolized with space between words and a period (full stop) within words. Intonation is placed relative to the stress of the final foot of an intonation group. (Grimes 2006)

The above is a summarized and informally revised version of the analysis posited in Grimes’ first paper on Huichol tone (1959). (As far as I am aware, no formal revision of Grimes (1959) has been published.) The most recent publication, a review of current literature on Huichol by Conti, states that “there is no clear opinion among experts about the existence or not of tone in this language” (2012:64).

According to Grimes, a phonological phrase in Huichol consists of a number of syllables grouped into feet; the head of the phonological phrase is the PHRASAL NUCLEUS, which consists of, variously, the final foot in a phonological phrase or the penultimate and final feet. The

8 It is important to note here that, although the language or dialect analyzed in Grimes (1959) is called “Huichol” and is largely similar to the dialect identified and analyzed in this paper, it has significant differences, especially in the two dialects’ relative phonologies. Several phonemes cited in Grimes (1959), such as /q/ (an unvoiced uvular stop) and /z/ (a voiced alveolar fricative) are not members of subsequent inventories such as Iturrioz, Ramírez, and Pacheco (1999), nor were they observed in the corpus used in this paper. It can similarly be assumed that the systems of tone and stress will differ between the dialect examined by Grimes and the dialect in the corpus used by this paper.
mechanism of this variation is unclear; according to Grimes, it “is not statable phonologically”, and that, in modern linguistic parlance, it is determined—somewhat tautologically—by which segmental material serves as the landing site of the **NUCLEAR CONTOUR** (that is, “the pitch pattern of the nucleus”) (1959:227-8). According to Grimes, there are four contrastive level tones in Huichol; a four-way distinction is made in the nuclear contour, while a two-way distinction is made in the **PRECONTOUR**, the tonal material preceding the nuclear contour (1959). Examples of the four tones at the end of their respective phonological phrases are found below; Grimes claims that each phrase in (14)-(17) ends in a sequentially higher lexically distinctive tone.

(14) \(?e^3\) na\(^1\) pe\(^1\) ka\(^1\) niu\(^2\) yei\(^3\) kaa\(^1\) mi\(^3\) ki\(^3\) ‘You are to stay here’

(15) Kee\(^1\) ri\(^1\) tiu\(^2\) yuu\(^2\) ni\(^3\) zi\(^2\) ‘Where did he go?’

(16) Taa\(^3\) hi\(^3\) kai\(^3\) ?u\(^3\) ra\(^1\) kaa\(^1\) kai\(^3\) ku\(^3\) ‘In the afternoon when the sun was near the horizon’

(17) Kee\(^3\) tsi\(^3\) zi\(^4\) ‘What on earth!’ (Grimes 1959)

In the explanation given for the marking of tones, Grimes writes that the base point of reference for pitch is tone level 3, while pitch 4 is “one or two semitones higher”, pitch 2 is “one or two semitones below”, and pitch 1 is “three semitones or more below”. Grimes also claims that there are six pitch contours, which “occur occasionally on stressed syllables near the end of the intonational phrase” (1959). However, it is important to note here that simply because Grimes finds evidence for four levels of possible phonetic realization does not entail that there is necessarily a four-way distinctive contrast between all possible tonal realizations of segmental material. While much of Grimes’ analysis focuses on intonational realizations of speech, my analysis makes a case for the somewhat unrelated presence of **LEXICAL** tonal accent, as opposed to **PHRASAL** pitch contours.
Grimes (1959) posits that in Huichol, the tone-bearing unit is the syllable; syllable structures attested by Grimes include V, CV, CCV, CVV, VC, or CVC, which are subject to location-based phonotactic constraints (Conti 2012). This analysis differs from Grimes (1959) and Iturrioz, Ramírez, and Pacheco (1999) mostly because Conti (2012) accepts the possibility that an underlyingly initial glottal onset may be realized as null. This analysis is further complicated by Grimes’ analysis of onset consonant clusters, such as /mp/ in the word /mpai/ ‘thus’. Pronunciations of ‘thus’ attested by Grimes (1959) include:

(18)    a. /m3pai1/
    b. /m3pai2/
    c. /m2pai3/
    d. /mpai31/  (Grimes 1959)

Grimes (1959:225) takes care to note that the last example can only arise when no stress falls on the word, although he also states that with the regular patterns of stress, stress will fall on the first “syllable”, /m/, which does not obey the phonotactic constraints on the formation of a syllable discussed in Section 1.2.

Furthermore, the fact that all four of the realizations in (18)a-d are variant phonological realizations of the same morpheme raises significant doubt about the level of tonal contrast in the nuclear contour. If it is possible that words with the same segmental material but three different tonal melodies can be reliably produced and understood to be the same word—regardless of whether or not it falls within the phrasal nucleus or not—it is unlikely that the tones, as observed by Grimes, are in contrastive distribution.

Indeed, at least for the precontour, he admits that they are not: he states that many so-called “tonal morphemes”, morphemes which consist of only tonal material, can appear as a nuclear contour. In modern literature, these tonal morphemes would be known as distinct
melodies in an intonational system. These melodies do not, in fact, alter the morphemes being uttered, nor is the case made that the pitch alternations in these intonational items are an underlying part of the morphemes. Rather, they add information about the mood of the speaker, such as the melodies below.

(19) /4/ the speaker is asking for instructions

(20) /31/ slight attention is called to the first morpheme in the nucleus

(21) /31/ encouragement or enthusiasm

(22) /31/ + /3/ attention is called to one phrase of a series

(23) /231/ pique, in both jocular and bitter moods (Grimes 1959)

As can be observed, Huichol intonational melodies vary by length (one, two, or three tones), contour or level realization, and can appear in sequences of mutually distinct tonal morphemes. In the examples below, for instance, (19) consists of a single extra-high tone in the nuclear contour, which presumably spreads to all segmental material in the phrasal nucleus. The example given by Grimes (1959:229) of this is the realization of the word ?ari ‘now’ as

(24) /?ari4/ ‘Now?’ (Grimes 1959)

Here, Grimes does not specify the tone of the first syllable of the word, /?a/, but notates pitch 4 on the second syllable, /ri/. The case of (20) is distinct from that of (21) in that (20) consists of two level tones that dock to a bi-syllabic phrasal nucleus, as indicated by the bar; in (21), both tones dock to the same syllable. In (22), Grimes uses the plus sign to represent a morphemic boundary. Finally, Grimes posits the existence of a three-pitch /231/ tonal contour, with each pitch docking to the subsequent syllable.

In summary, previous literature on Huichol tone and intonation and confuse large areas of the tonal, accentual, and intonational systems of Huichol, presenting strong motivation for a re-analysis of these systems.
3.2. Stress in Huichol

It is more accepted in Huichol linguistic research that Huichol is a stress language. For instance, McIntosh (1945) marks stressed syllables in his analysis of Huichol phonology. Iturrioz, Ramírez, and Pacheco (1999) and Iturrioz and Gómez (2011) do as well, and emphasizes the difference between the two distinct phenomena in Huichol of grammatical stress accent and lexical stress accent. Iturrioz, Ramírez, and Pacheco define grammatical accent as a surface prosodic effect of grammatical distinctions such as plurality and causativity; as Huichol is a polysynthetic language, the addition of various affixes to mark these grammatical distinctions have the ability to shift stress from its canonical position. Iturrioz, Ramírez, and Pacheco (1999:147) lists the following word pairs as examples of grammatical stress accent; note that the authors do not mark tone in his transcription of data, but rather marks stress accent with an acute diacritic over the stressed vowel.

\begin{align*}
(25) & \quad a. /\text{máxa}/ \text{‘venison’} \quad b. /\text{maxátsi}/ \text{‘venison.INSTR’} \\
(26) & \quad a. /\text{tsíki}/ \text{‘dog’} \quad b. /\text{tsiikíri}/ \text{‘dog.PL’} \text{ (Iturrioz, Ramírez, and Pacheco 1999)}
\end{align*}

While grammatical stress accent is a surface effect, lexical stress accent is a property of the underlying word stem, where the stress always lies in its canonical position (Iturrioz, Ramírez, and Pacheco 1999:55). Note that in (25), for instance, the instrumental suffix shifts the stressed syllable from the first syllable to the second, and in (26), the plural suffix achieves the same result; the stress stays on the penultimate syllable in both cases. The stress in the above examples is grammatical because in both examples, the underlying stress remains on the first vowel of /máxa/ and /tsíki/, even though the stress shift alters the surface realization of the stress placement when a suffix is added. (27) and (28) show lexical stress accent because the shift in the placement of stress in the segmental material /niwe/ and /tutu/ result in the production of different words.

\begin{align*}
(27) & \quad a. /\text{niwe}/ \text{‘niwe’} \quad b. /\text{niwe}/ \text{‘niwe’} \\
(28) & \quad a. /\text{tutu}/ \text{‘tutu’} \quad b. /\text{tutu}/ \text{‘tutu’} \text{ (Iturrioz, Ramírez, and Pacheco 1999)}
\end{align*}
As evidenced by (28) above, contrastive vowel length is found in Huichol. This consideration is distinct from a phenomenon noted by Iturrioz, Ramírez, and Pacheco (1999), who mention that both stressed syllables and syllables directly before the stressed syllable tend to be lengthened slightly. This lengthening is not lexically significant, and surface realizations with and without this lengthening are interpreted as correct pronunciations of the same lexical element. An example of vowel lengthening that is lexically significant is presented in (29) below.

(29) ?ē:kì
   2SG
   ‘you’

Grimes (1959:231) posits that the “stress”, as recorded in word lists and in previous works, is simply an artifact of the McIntosh (1945) hearing a 31 tone contour. Grimes thus puts forth an alternative hypothesis: that the assignment of stress is predictable given a list of five rules.

It is Grimes’ position that the stress-bearing unit in Huichol is the FOOT; however, the foot is simply defined as “a sequence of one or more syllables with phonological boundaries”—distinct from later notions of the metrical foot put forth by Hayes (1995) and others. It is useful to note that as Huichol is a weight-by-position language, the heavy syllables, which Grimes

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9 It should be noted that while Iturrioz’, Ramírez’, and Pacheco’s (1999) account of Huichol explains the presence or absence of surface shifts in stressed syllables with reference to different kinds of word roots—those with grammatical accent and those with lexical accent—an alternative treatment of this phenomenon (cf. Siegel’s (1974) account of Class I and Class II affixes in English) is possible claiming that the difference lies in varying classes of affixes, rather than various classes of roots.
calls “long syllables”, are CVV and CVC. The rules Grimes (1959:225) puts forth, and sample derivations using these rules, are found in Appendix 1.

However, as we have seen, the tones marked on the words above are heavily dependent on the intonational context of the phonological phrase: based on whether the word appears in the precontour or in the phrasal nucleus, what type of precontour it appears in, and the “tonal morphemes” also appearing in the phonological phrase, the same word—that is, the same semantic material—may have many tonal realizations. Furthermore, the rules and examples above put further pressure on Grimes’ explanation of tone; for instance, the fact that a rise from 2 to 3 is interpreted the same as a level 3 tone across two syllables is evidence that tones 2 and 3 are not contrastively distributed, as mentioned above in Section 2.1.

To sum up, the literature on Huichol tone and stress processes shows considerable confusion of suprasegmental systems in the language, at times conflating lexical tone, metrical, foot-level stress, and phrasal intonation through the use of stipulative and occasionally unwieldy theoretical frameworks. Huichol, as demonstrated below, lends itself best to analysis as an accentual language in the framework of Section 2.

4. Phonological evidence for accent in Huichol

In this section, I provide a description of the accentual processes observed in the data of the corpus, beginning with direct evidence for accent and extending this description to show the benefit of the analysis employed.

4.1. Direct evidence for accent

In order to gain an understanding of tone, accent, or any other suprasegmental phonological phenomenon, it is first necessary to examine lexical items insulated from other
systems which may interact or interfere with the system in question. Thus, the most compelling evidence for the presence of accent in Huichol is the existence of minimal pairs, elicited in isolation, distinguished only by the placement of accent on the word; three such instances appear in the corpus. I will discuss these three in succession, beginning with the most straightforward example, found in (30):

(30)  
a.  tâmè¹⁰  
    'tooth'  
b.  támè  
    1PL  
    'we'¹¹  

(Carrillo and Banerji 2014b)

Here, the two words with segmental material /tame/ have different meanings based on the placement of the accent—the phenomenon Iturrioz, Ramírez, and Pacheco (1999) called “lexical stress accent”. This example provides evidence for the presence of differing accent in underlying forms of these two words, as they were produced in isolation of any other linguistic material. It suggests that, at least in a certain subsection of the lexicon, Huichol uses accent to distinguish between different words with the same segmental material. The example below in (31) gives evidence for the distinctive use of tone to serve a grammatical purpose (an areal feature of Mesoamerica, cf. Campbell, Kaufman, and Smith-Stark (1986)), which in this case is

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¹⁰ Examples containing data in this paper from Carrillo and Banerji (2014) will be treated with a three-line gloss: the first line in Huichol orthography treated with a tonal analysis, the second with a word-by-word gloss, and the third line with an idiomatic translation.

¹¹ There exists compelling evidence for the position that támè ‘we’ is monomorphemic, an important consideration for the current analysis. First, no morphological rule in any Huichol literature allows for a plural morpheme to be added to the first-person singular morpheme née to transform it to támè. Second, cross-linguistic literature on Uto-Aztecan languages generally suggests that the first-person plural pronoun is monomorphemic (Heath 1972; Haugen 2009).
verb tense; the shift of high tone from penultimate to final results in the distinction between present tense and past tense for the verb ne?ena ‘I hear’.

(31) a. nè?énà  
1SG.hear.PRES  
‘I hear’

b. nè?éná  
1SG.hear.FUT  
‘I will hear’  
(Carrillo and Banerji 2014b)

A final example of a minimal accent pair is found in (32). Here, two lexical items with the segmental material /naka/, with accent falling on the final and initial vowels respectively.

(32) a. nàká  
ear  
‘ear’

b. nákà  
(vulgar word)  
(Carrillo and Banerji 2014b)

However, this distinction may be taken with caution, as (32)b is most likely a direct borrowing of the Spanish vulgar word naca, in which the stress falls penultimately. In the two other borrowed Spanish words in the corpus, accent also falls penultimately:

(33) wàkári  
cf. Spanish vaca  
‘cow’

(34) kàpúrà  
cf. Spanish cabra  
‘goat’  
(Carrillo and Banerji 2014b)

Notice that the penultimate accent in the above words cannot be a directly borrowed effect from Spanish, even though most Spanish words bear penultimate accent. This is evident because the final syllable in wàkári ‘cow’ has no corresponding syllable in Spanish; vaca ‘cow’ bears stress on the first (and penultimate) syllable /va/.
4.2. Prosodic domains of Huichol

My data provides clear evidence for the selection of the mora as the tone-bearing unit (TBU) in Huichol; this is made clear by two trends in the data. First, there is no evidence for contour tones appearing on a single light syllable. A speaker's pitch may only vary within a syllable if the syllable is CVV; consider the following, transcribed with contour tones in (35)a-(39)a and re-analyzed with one tone on each mora in (35)b-(39)b:

(35)  a. tāu  b. tāû  ‘sun’
(36)  a. tākāi’h  b. tākāi’h  ‘yesterday’
(37)  a. hî  b. hî  ‘yes’
(38)  a. ʔiː’yâ  b. ʔiː’yâ  ‘I breathe’
(39)  a. hâwēîkî  b. hâwēîkî  ‘no’  (Carrillo and Banerji 2014b)

The examples above show that both in multisyllabic and monosyllabic words, it is possible for heavy syllables to carry contour tones. However, contour tones are not found on any light syllables in the corpus.

Second, my data makes clear that the minimal word in Huichol is bimoraic, emphasizing the centrality of the mora in Huichol phonology. Michael (2010) observes the same phenomenon in his analysis of Iquito, an unrelated Zaparoan language, and demonstrates that Iquito words regularly alternate between monomoraic bound forms and bimoraic free forms, as shown in the Iquito-language examples in (40) and (41).

(40)  nu  makii  ‘she/he is sleeping’
     3SG  sleep.IMPF
(41)  nuu  ‘she/he, her/him’  (Michael 2010)

He thus posits that while the reduced monosyllabic words are licensed when included in the larger domain of a multisyllabic word, a minimal word constraint prevents the monosyllabic alternants from appearing in standalone words. This same analysis can be easily applied to
Huichol, where pronouns such as the first-person singular pronoun in isolation found in (43) and the combining form found at the beginning of the verb ‘to make beadcraft’.

(42) nètiwéwiye
1SG.beadcraft
‘I make beadcraft’

(43) nèè
1SG
‘I’ (Carrillo and Banerji 2014b)

A further example of this phenomenon is found in Huichol pluralization of single-syllable nouns. For instance, (44) shows the isolated form of the word ‘snake’; when pluralized in (45), the root is shortened to a light syllable.

(44) kùù
snake
(45) kù- kùtèrírh
snake PL (Carrillo and Banerji 2014b)

4.3. Establishing the properties of Huichol accent

Accent, with the tonal correlate of H tone, is both obligatory and culminative in Huichol. Given that the prosodic word in Huichol maps roughly to a word root with clitic affixes, no entry in the corpus lacks at least one high tone per prosodic word. This would suggest that H tone, and therefore accent, is obligatory.

As a side note, one may make the following argument as well: since all entries are at least bimoraic, and all bimoraic corpus entries contain one pitch lower than the pitch I call H tone, it is in fact L tone which should be considered ‘prominent’, and the correlate of accent, not H tone. However, this argument can be dismissed because of the overwhelming presence of multisyllabic words containing a single H tone, such as (46) and (47).
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Because of the condition of culminativity, the presence in the corpus of words with six L tones or more renders the hypothesis that L tone is the correlate of accent in Huichol highly unlikely. The tonal analysis corresponding to this conclusion is that Huichol tone is privative—syllables can be assigned H tone or no tone at all, in which case the syllable is phonetically realized as low pitch.

Accent is also culminative in Huichol. This means that all instances in the corpus of a lexical word carrying more than one H tone must be shown to consist of more than one prosodic word. As claimed for English above, I hold that different classes of affixes behave in different ways with regard to the root words they modify. The first class of affix has underlying accent and preserves it after affixation, but removes the accent from the root. An example of this process is seen in (48) and (49), where the affix -\(\text{-ratish}\) removes the accent from the root words ?\(\text{ukí}\) ‘man’ and ?\(\text{uká}\) ‘woman’.

(48) a. ?\(\text{ukí}\)  ‘man’
     b. ?\(\text{ukí}r\text{-ratish}\)  ‘old’

(49) a. ?\(\text{uká}\)  ‘woman’
     b. ?\(\text{uká}r\text{-ratish}\)  ‘young’

The second class of affix maintains its accent and does not eliminate the accent from the root word. Thus the root t\(\text{ewtí}\) ‘long’ stays identical, with penultimate accent, before and after affixation, as shown in (50).

(50) a. t\(\text{ewtí}\)  ‘long’
     b. t\(\text{íj}t\text{ewtí}\)  ‘short’
It is my claim that the present and future tense markers on verbs sometimes fall into each class of affixes, leading to a distribution of verbs including those in (46) and (47) which have a single accented mora, as well as verbs such as those in (51) and (52), which contain more than one.

(51) nępántiyàníh  ‘I climb’
(52) nèénèpírè́f  ‘I see’ (Carrillo and Banerji 2014b)

In the cases above, I posit that the tense affix consists of a floating H tone, which docks to the final mora of the lexical word. As the root form of each verb already contained an accented mora with an H tone docked to it, the surface form of the resultant word contains two moras realized as H.

As a final note, it is important to consider many sources of evidence for the co-occurrence of tone and accent. In this case, the argument made above for the presence of privative H tone is bolstered by native speaker’s judgment; at several points during elicitation, my language consultant corrected my pronunciation citing the notion that certain syllables sounded ‘heavier’ or ‘more forceful’ than others, in ways that did not specifically involve high pitch, although the syllables in question invariably included a mora with perceptibly higher pitch than other syllables. This evidence leads to the conclusion that Huichol has accented syllables which, if pronounced in an unaccented manner (including their realization with high pitch) contribute to the well-formedness of words.

In summary, I have shown in this section that Huichol has lexically underlying, distinctive, and unpredictable word accent, and that tone in Huichol is borne by the mora, rather than the syllable. I have further confirmed that Huichol accent is both obligatory and
culminative, thus satisfying the two main necessary conditions for being analyzed as accent, rather than tone.

5. Reflection and Conclusion

This study contributes an important new step in the study of Huichol and the analysis of accentual systems incorporating tonal elements. This research may be refined and furthered in a number of ways. First, it is noted that prepausal and word-isolation effects can affect the production and perception of pitch and other phonetic correlates of accent, and can affect the positions of underlying abstract marks as well.

For instance, in Michael’s (2010) account of Iquito, words elicited in prepausal position showed two effects: prepausal short vowels underwent devoicing, and prepausal long vowels were shortened and glottalized. Hyman (2010) and Coupe (2014) also recommend elicitation of target words in a matrix sentence in order to isolate the effects of tone in a single phonetic environment and syntactic position.

It is not possible at this stage in the research to conclusively determine that the corpus for Huichol does not contain similar effects, especially regarding phrasal intonational items, which may affect the reliability of the data. Further research into the tonal and intonational systems of Huichol may focus on phrase-level effects, as well as elicitation of nominal and verbal morphemes in matrix sentences to neutralize or counteract these effects.

The analysis of the tonal and accentual systems of tone in Huichol is important for the reasons of documentation, heritage, and revitalization. As indigenous languages are displaced by more widely spoken national languages, features such as tone and accent are often the first to cease being present in the speech of children and young adults (Dimmendaal 1992). With
this study, heritage language learners of Huichol will be able to preserve their language in the form it is spoken currently. Finally, this paper, as well as the recordings and field notes collected to substantiate its results, will serve as an important resource for indigenous and foreign linguists and Huichol language learners who wish to gain a better understanding of the tonal and accentual systems of the language.
Acknowledgments

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Appendix 1: Rewrite rules from Grimes (1959)

Grimes (1959:225) posits five rules for the derivation of stress based on pitch. They are:

(53) Rule 1: If the pitch in a foot drops, the last syllable with the higher pitch is stressed.
(54) Rule 2: If the pitch rises from pitch 1, and if the first syllable is long and succeeding syllables are short, the first syllable is stressed.
(55) Rule 3: If the pitch rises from pitch 1, the first syllable of higher pitch is stressed.
(56) Rule 4: If the pitch is level, or if it rises from pitch 2, and if the first syllable begins with /ʔ/, is short, and is followed by a long syllable, the second syllable is stressed.
(57) Rule 5: The first syllable is stressed.

These five highly stipulative rules account for all of data presented in Grimes’ paper. Sample derivations based on Grimes’ claims are shown below, with changes from one rule to another underlined for ease of reference (Grimes 1959:225):

<table>
<thead>
<tr>
<th>UR</th>
<th>ha(^3)ke(^2)</th>
<th>yii(^3)wi(^3)pa(^1)</th>
<th>tei(^1)te(^1)ri(^2) yaa(^3)ri(^1)</th>
<th>haa(^1)ku(^2) nai(^1)ka(^2) ya(^3)ri(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloss</td>
<td>‘where?’ (incredulously)</td>
<td>‘in the dark’</td>
<td>‘type of people’</td>
<td>‘bamboo roofing needle’</td>
</tr>
<tr>
<td>Rule 1</td>
<td>ʰha(^3)ke(^2)</td>
<td>yii(^3)wi(^3)pa(^1)</td>
<td>tei(^1)te(^1)ri(^2) ʰyaa(^3)ri(^1)</td>
<td>haa(^1)ku(^2) nai(^1)ka(^2) ʰya(^3)ri(^1)</td>
</tr>
<tr>
<td>Rule 2</td>
<td>ʰtei(^1)te(^1)ri(^2) ʰyaa(^3)ri(^1)</td>
<td>ʰha(^1)ku(^2) nai(^1)ka(^2) ʰya(^3)ri(^1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| UR         | tee(^1)pii(^3) | ka(^1)kai(^3)ku(^3) | ?u(^3)tai(^3) | ?i(^1)wie(^1) yaa(^3)me(^1) | tsi(^1) mua(^3)ka(^1) |
| Gloss     | ‘flea’ | ‘when it was down there’ | ‘giant woodpecker’ | ‘swallow’ | ‘red squirrel’ |
| Rule 1    | tee(^1)pii(^3) | ka(^1)kai(^3)ku(^3) | ?u(^3)tai(^3) | ?i(^1)wie(^1) ʰyaa(^3)me(^1) | tsi(^1) mua(^3)ka(^1) |
| Rule 2    | tee(^1)pii(^3) | ka(^1)kai(^3)ku(^3) | ?u(^3)tai(^3) | ?i(^1)wie(^1) ʰyaa(^3)me(^1) | tsi(^1) mua(^3)ka(^1) |
| Rule 3    | tee(^1)pii(^3) | ka(^1)kai(^3)ku(^3) | ?u(^3)tai(^3) | ?i(^1)wie(^1) ʰyaa(^3)me(^1) | tsi(^1) mua(^3)ka(^1) |
| Rule 4    | ?u(^3)tai(^3) | ?i(^1)wie(^1) ʰyaa(^3)me(^1) | ʰtsi(^1) mua(^3)ka(^1) |
| Rule 5    | | | | ʰtsi(^1) mua(^3)ka(^1) |</p>
<table>
<thead>
<tr>
<th>UR</th>
<th>zi¹ka¹</th>
<th>ta³tsiu³</th>
<th>yii¹zi¹naa¹ wee³ka¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloss</td>
<td>‘if’</td>
<td>‘rabbit’</td>
<td>‘having got himself loose’</td>
</tr>
<tr>
<td>Rule 1</td>
<td>zi¹ka¹</td>
<td>ta³tsiu³</td>
<td>yii¹zi¹naa¹ wee³ka¹</td>
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<td>yii¹zi¹naa¹ wee³ka¹</td>
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<td>Rule 4</td>
<td>zi¹ka¹</td>
<td>ta³tsiu³</td>
<td>yii¹zi¹naa¹ wee³ka¹</td>
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<td>Rule 5</td>
<td>'zi¹ka¹</td>
<td>'ta³tsiu³</td>
<td>'yii¹zi¹naa¹ 'wee³ka¹</td>
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</table>
## Appendix 2: Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1PL</td>
<td>First-person plural pronoun <strong>táme</strong></td>
</tr>
<tr>
<td>1SG</td>
<td>First-person singular pronoun <strong>née</strong></td>
</tr>
<tr>
<td>2SG</td>
<td>Second-person singular pronoun <strong>tééki</strong></td>
</tr>
<tr>
<td>FUT</td>
<td>Future tense marker</td>
</tr>
<tr>
<td>GEN</td>
<td>Genitive case marker</td>
</tr>
<tr>
<td>INEGI</td>
<td>Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography)</td>
</tr>
<tr>
<td>INSTR</td>
<td>Instrumental case marker</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<td>NOM</td>
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<td>Underlying representation</td>
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