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Syntactic influences on stress:
Noun Incorporation and Denominal Verbs in Choguita Rarámuri

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1   Introduction[1]

This paper investigates phonological properties of stress in an understudied language Choguita Rarámuri (Uto-Aztecan; CR henceforth). CR is a *lexical stress* system, i.e., stress is unpredictable within a morpheme, and both roots and affixes can be underlyingly marked as accented or unaccented (Caballero 2008). I assume that *accent* is the underlying marking for prominence of some syllables within some morphemes, while *stress* is the surface phonetic realization of such marking (van der Hulst 2012). This study focuses on two patterns in CR which have previously been treated as exceptional and required idiosyncratic stress rules (Caballero 2008, 2011): Noun Incorporation (NI) and Denominal Verbs (DNV). First, I argue that no special stress rules are needed to account for these patterns, i.e., they can be accounted for by the regular stress assignment rules active in CR. Second, I argue that it is not an accident that NI and DNV exhibit the same stress pattern – it is due to them having the same syntactic structure.

2   Relevant background and data

The basic properties of Choguita Rarámuri stress, as described in Caballero (2008, 2011) and Caballero & Carroll (2015), are as follows. Stress in the language displays phonological and phonetic properties which are characteristic of "prototypical" stress systems: (i) stress is culminative and obligatory within the morphological word domain; (ii) unstressed vowels undergo quality and quantity reduction; (iii) longer duration and higher overall intensity are phonetic correlates of stress. It has also been reported that there is no secondary stress in the language. Stress is lexically contrastive, cf. minimal pairs in (1) below:

(1) a.   ˈsawa   'smell'   saˈwa   'leaf'
    b.   ˈkot͡ʃi   'pig'   koˈt͡ʃi   'dog'
    c.   ˈnowi   'have son'   noˈwi   'maggot'

                                          (Caballero & Carroll 2015: 461)

An important property of the Choguita Rarámuri stress system which has been identified by Caballero (2008) is the bounded nature of stress. CR has a left-aligned three-syllable window, meaning that stress must be present in one of the first three syllables in every morphological word. I formalize it as an *Obligatory Stress Domain (OSD)* constituent (Bogomolets 2020) consisting of a *disyllabic domain (DD)* and a left-adjoined *satellite* (van der Hulst 2012)[2]. The representation in (2) below groups the three syllables at the left edge of a word into a constituent where the disyllabic stress domain is within the parentheses and the disyllabic stress domain with the adjunct of a satellite is in curly brackets; the square bracket represents the word boundary:

(2) Obligatory Stress Domain in Choguita Rarámuri

   $[\{_{OSD} \; \sigma + (_{DD} \sigma \; \sigma)\}\ldots$

Disyllabic domain in this approach is similar to a non-iterative foot in the Metrical Theory (Halle and Vergnaud 1987; Hayes 1980, 1995; Idsardi 1992; Liberman and Prince 1977). However, it is not associated with rhythm or with headedness in the way the term *foot* normally is. This makes it preferable for capturing stress facts in languages like Choguita Rarámuri which lack rhythm. The notion of *satellite* adopted from van der Hulst (2012) captures the notion of *extrametricality* in the Metrical Theory[3]. The advantage of the notion *satellite* for the present analysis of Choguita Rarámuri is that satellite, unlike an extrametrical syllable, can be accented either regularly or in a limited set of language-specific circumstances (see van der Hulst *ibid.,* 1502-1504 for some examples).

The three-syllable window at the left edge of a morphological word – or OSD – in (16), contains the external satellite and the disyllabic domain. Stress must be assigned within the OSD, and the 2nd syllable and the 3rd-syllable stress are the common patterns in the language, while the initial-syllable stress is much rarer. This suggests the 'adjunct' status of the syllable at the left periphery in a sequence of three syllables. The trisyllabic *Obligatory Stress Domain* will play a prominent role in the analysis of stress patterns proposed in this paper.

2.1   Underlying accent in roots and affixes
Underlying accent in roots can fall on any syllable:

(3) a.   ˈhu.mi.si-   'to take off'
    b.   se.ˈba.ri-   'to complete'
    c.   ba.hu.ˈre-   'to invite'   (Caballero 2008: 177, 182)

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[2] Caballero (2008) formalizes the stress window in terms of a ternary constituent comprising of a binary foot and a left-adjoined syllable. For metrical accounts of three-syllable stress windows see, for example, Blevins & Harrison (1999); for a typology of stress window systems see Kager (2012).
[3] In metrical theories which allow for 'weakly layered feet' (Hewitt 1992; Kager 1994, 2012), the notion of an adjunct within a weakly layered foot corresponds to the notion of *satellite* adopted here.

Notably**,** all *accented* suffixes produce stress on the 3rd-syllable if there is one (4-5), otherwise on the 2nd syllable (6)[4]. The stress assigned by an underlyingly accented suffix can be on the suffix itself (4) or on the root (5), the only requirement being that it falls on the 3rd-syllable (Caballero 2008: 176)[5]:

(4) **Root^{-acc}-Suffix^{+acc}**	(5) **Root^{-acc}-Suffix^{+acc}**	(6) **Root^{-acc}-Suffix^{+acc}**
t͡ʃaɁi-ˈ**sa**	raɁiˈt͡ʃa-sa	ru-ˈ**sa**
t͡ʃaɁi-ˈsa	raɁit͡ʃa-ˈsa	ru-ˈsa
grab-COND	speak-COND	say-COND
'If s/he grabs.'	'If s/he speaks.'	'If s/he says.'

Bogomolets (2020: 158) analyzes the underlying accent contributed by accented suffixes as a floating prosodic feature i.e., as an accent not associated with any unit of the segmental structure but specified to dock onto the rightmost syllable within the stress window constituent. This is represented in (7). Lexical accents in the representations below are marked with an 'x' on the stress grid (following the representation of lexical stress in van der Hulst 2010 on the basis of the derivational tradition established in Halle & Vergnaud 1987; Halle & Idsardi 1995 a.o.). The floating accent feature supplied by an underlyingly accented suffix is formally represented by associating a grid mark with the rightmost syllable within the OSD in the context of SUFFIX^{+acc}:

(7)   x

                  x   x

    [{$_{OSD}$ σ + ($_{DD}$ σ σ)}…-   SUFFIX^{+acc}

The accent pattern produced by the lexically accented suffixes in CR is then formally treated as either an accenting pattern (8) or as a pre-accenting pattern (9) depending on whether the suffix contributing the accent falls within the OSD or outside of it (see Bogomolets 2020: ch.4 for details):

(8)   Accenting grid marking

                x

                x

    [{$_{OSD}$ σ + ($_{DD}$σ σ$_{Suffix}$$^{+acc}$)}…

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[4] Note that there is no productive prefixation in Choguita Rarámuri (Gabriela Caballero *p.c.*).

[5] The following abbreviations and symbols are used in the glosses: COND: conditional, FUT: future, IMP: imperative, PL: plural, PROG: progressive, PST: past, SG: singular, VBLZ: verbalizing morpheme. Four-line glosses, wherever used, show the surface stress position in the first line and the underlying accent position in the second line.

(9)   Pre-accenting grid marking

$$\begin{array}{ccc} & \text{x} & \\ & \text{x} & \text{x} \\ [\{_{\text{OSD}}\, \sigma + (_{\text{DD}}\, \sigma\ \ \sigma)\}\ldots\text{-} & \sigma_{\text{Suffix}}^{+\text{acc}} \end{array}$$

2.2   Default pattern

If no underlyingly accented morphemes are present in a word, a 2nd syllable default stress surfaces (Bogomolets 2020: 153-167)[6]; consider examples from (Caballero & Carroll 2015: 463):

(10) **Root$^{\text{-acc}}$**

ruˈ**ru**wa

ruruwa

throw.liquid

'S/he throws liquid.'

(11) **Root$^{\text{-acc}}$-Suffix$^{\text{-acc}}$**

ruˈ**ru**wa-li

ruruwa -li

throw.liquid-PST

'S/he threw liquid.'

2.3   Accent competition

In the cases of accent competition, the *leftmost* of underlying accents is realized as stress (bold-faced in the examples below), and the remaining accents are deleted (Bogomolets 2020: 154-155); consider examples from Caballero (2011: 755-6):

(12) **Root$^{+\text{acc}}$-Suffix$^{+\text{acc}}$**

ˈ**la**ni-sa

ˈlani-ˈsa

bleed-COND

'If s/he bleeds.'

(13) **Root$^{+\text{acc}}$-Suffix$^{+\text{acc}}$**

naˈ**ha**ta-ma

naˈhata-ˈma

follow-FUT.SG

'S/he will follow.'

2.4   Summary of stress rules

In this section, I have presented the basic traits of the CR stress system which will be important for the analysis of stress patterns found in Noun Incorporation

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[6] Note that no single default pattern has been identified for the language in Caballero (2008, 2011) and Caballero and Carroll (2015) who treat both of the common stress patterns in the language – the stress patterns produced by the underlyingly accented suffixes (3rd-syllable) and the 2nd syllable pattern as two "defaults" or "morphologically conditioned defaults". Such an analysis is, however, undesirable as it (i) gives no predictions regarding the stress position in case there is no underlying accent within a wordform, and (ii) introduces an otherwise cross-linguistically unattested pattern of multiple "morphologically conditioned" defaults.

constructions and in Denominal Verbs. The relevant traits of CR stress are summarized once again in (14) below:

(14)   a.   CR is a lexical accent system (Caballero 2008: 54).
b.   CR has a trisyllabic stress window at the left edge of a morphological word (Caballero *ibid.*).
c.   CR has a single default stress pattern – the 2nd syllable default (Bogomolets 2020: 153-167).
d.   All accented suffixes produce stress on the rightmost syllable of OSD, i.e., 3rd-syllable if there is one (Bogomolets *ibid.*).
e.   In the cases of accent competition, the *leftmost* of underlying accents is realized as stress (Bogomolets *ibid.*).

3   The Noun Incorporation and Denominal Verbs puzzle

In this section I present the puzzling data which are the main focus of this paper. We find unexpected 3rd-syllable stress in two constructions in the language – Noun Incorporation constructions and Denominal Verbs[7]. I will propose that the 3rd-syllable stress in both constructions can be captured with the regular interpretation of underlying accents in suffixes as obligatorily aligning to the right edge of the OSD (7). Importantly, the proposed account explicitly connects identical stress patterns observed in DNV and the NI constructions to them being morpho-syntactically related, meaning that it is not an accident that we observe the same prosodic behavior in the two constructions.

3.1   Stress in Denominal Verbs

DNV in CR can be morphologically formed either with one of many overt verbalizing suffixes or without a segmentally overt verbalizing suffix. Crucially, in both cases, the 3rd-syllable stress pattern surfaces. Consider examples of denominal verbs in (15)-(16) formed with no overt verbalizing morpheme:

(15)   **Root^{-acc}**   (16)   **Root^{-acc}-Suffix^{-acc}**

na'**pat͡ʃ**a   napa'**t͡ʃa**-ri

napat͡ʃa   napat͡ʃa-ri

blouse   blouse-PST

'a blouse'   'S/he put a blouse on.'

                                         (adapted from Caballero 2008:119)

As shown in (15)-(16), despite the lack of an overt verbalizing morpheme, the stress position in the verb (16) changes if compared with the noun (15). The stress "shift" in (16) cannot be attributed to the effect of the tense inflection: the past tense suffix *-ri* is underlyingly unaccented (Caballero 2008: 180). Note also that the noun in

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[7] See also section **5.3** for a discussion of other constructions showing a similar pattern.

(15) is underlyingly unaccented and receives the default stress on the 2nd syllable in the bare form[8]. Thus, such forms as (16) consist of two underlyingly unaccented segmentally overt morphemes, but unexpectedly shows a 3rd-syllable stress pattern, which is found in the language only through underlying lexical marking of either a root (underlyingly accented on the 3rd-syllable) or a suffix (all SUFFIX^{+acc}, cf. (7)).

Denominal verbalization in Choguita Rarámuri, as in other Uto-Aztecan languages, can also be achieved with a variety of overt verbalizing suffixes. Notably, all of them show the same stress pattern, i.e., the 3rd-syllable stress (Caballero 2008: 125), consider (17):

(17) **Root^{-acc}- Suffix^{-acc}-Suffix^{-acc}**

riʔi-ˈ**bu**-a

riʔi-bu-a

stone-VBLZ-PROG   (adapted from Caballero 2008: 127, fragment of a sentence)

'taking out stones'

3.2 Stress in Noun Incorporation

Noun incorporation in CR is restricted to the so-called 'body-part incorporation' constructions, i.e., incorporation of noun roots referring to body parts and bodily fluids (Caballero 2008: 121)[9]. Consider (18) where the NI form comprised of two unaccented roots has no suffixes, and (19) where NI is affixed with an unaccented suffix (examples adapted from Caballero 2008: 122). In both cases, the 3rd-syllable stress surfaces. This holds across the board for NI constructions:

(18) **Root^{-acc}-Root^{-acc}**   (19) **Root^{-acc}-Root^{-acc}-Suffix^{-acc}**

busi-ˈ**ka**si   moʔo-ˈ**re**pi-ri

busi-kasi   moʔo-repi-ri

eye-break   head-cut-PST

'to be blind'   'beheaded'

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[8] If the noun is underlyingly accented, it retains its underlying accent as stress when verbalized, i.e. the leftmost of the underlying accents receives primary stress as predicted by the accent competition rule proposed in Bogomolets (2020: 154-55, 174).

[9] Other Uto-Aztecan languages do not necessarily limit incorporation to nouns denoting body parts and fluids, allowing for incorporation of semantically diverse nominals. In addition, other Uto-Aztecan languages also have productive instrument- and manner-incorporation, while CR retains only a small set of lexicalized non-productive incorporated roots of this category (see Caballero 2008: 121 for examples, and Haugen 2008: 120 for examples of productive instrument-incorporation constructions in other Uto-Aztecan languages).

In (18)-(19), the 2nd syllable default (cf. (10)), which could be predicted in the forms comprised of underlyingly unaccented morphemes only, fails to apply, and instead the 3rd-syllable stress surfaces. The 3rd-syllable stress surfaces in NI forms across the board, and, similarly to the DNV stress patterns, the 3rd-syllable stress surfaces in NI forms which are not carrying any overt inflection (18) as well as in the forms affixed with overt underlyingly unaccented suffixes, s.a. the past tense suffix -*ri* in (19)*.* We are thus presented with two outstanding puzzles:

(20)   a. Why do NI and DNV constructions behave as though there is always an underlyingly accented suffix, i.e. always have the 3rd-syllable stress?
b. Why do NI and DNV have the same (seemingly exceptional) stress pattern?

The following section provides answers to the two outstanding questions in (20).

4   Proposal and analysis

Firstly, as shown in the previous section, NI and DNV forms, which consist of two or more underlyingly unaccented segmentally overt morphemes, in a derived environment behave as though an underlyingly accented suffix is present. This pattern can be naturally accounted for if there is a derivational segmentally null underlyingly accented morpheme in the word. I propose that one of the allomorphs of the verbalizing morpheme in the little *v* head in the morphological structure of CR is a segmentally null morpheme which carries an underlying accent[10]: -$\emptyset^{+acc}$. The morpheme in *v* in these constructions does not have an overt segmental form, but it provides the floating accent feature. The 3rd-syllable stress pattern in both NI and DNV is then due to the regular in CR stress rule which ensures that SUFFIX^{+acc} assigns stress to the 3rd-syllable if there is one (7), i.e., it is due to the regular in CR interpretation of SUFFIX^{+acc}.

Secondly, I argue that the identical stress pattern in DNV and NI is not an accident but is due to the two constructions being underlyingly the same at the morpho-syntactic level. DNVs have been argued to be morpho-syntactically highly comparable to NI cross-linguistically (Hale and Keyser 1993; Haugen 2008; Hill 2003; Johns 2017; Sadock 1980, 1986). In the analysis presented below, I follow Haugen (2008), who puts forward extensive evidence in support of treating DNV and NI as stemming from an identical syntactic structure specifically in Uto-Aztecan.

4.1   Analysis

Haugen (2008) proposes a unified analysis for DNV and NI as derived via head-movement of the noun into *v* in Uto-Aztecan: the noun in both cases originates in the direct object position, merges with the verbal root in V, and then moves to *v*.

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[10] Segmentally null accented morphemes have previously been proposed to account for stress facts in languages other than CR, see, for instance, Özçelik (to appear) for Turkish.

Crucially, I propose that the allomorph of *v* found in NI and DNV constructions is a segmentally null underlyingly accented suffix, $-\mathcal{O}^{+acc}$; the structure is schematized in (21) below[11]:

(21) $[[[[t_N \text{ NP}] t_V \text{ V'}] \text{ VP}] NV\text{-}\mathcal{O}^{+acc} {}_{vP}]$

Consider thus the NI in the example (18) repeated below as (22):

(22)   Noun Incorporation

busi-ˈ**ka**si

busi-kasi

eye-break

'to be blind'

(23)   a. $[[[[\text{busi }_{NP}] \text{ kasi }_{V'}] \text{ VP}] \text{-}\mathcal{O}^{+acc} {}_{vP}]$
        b. $[[[[t_N \text{ NP}] t_V \text{ V'}] \text{ VP}] (\text{busi}_N\text{-kasi})_V\text{-}\mathcal{O}^{+acc} {}_{vP}]$

In (23), the noun originates in the direct object position and incorporates via head-movement into the verbal position[12]. In *v*, it adjoins to the underlyingly accented segmentally null verbalizing suffix. All underlyingly accented suffixes in CR supply a floating accent feature which docks at the right edge of the OSD (7), thus resulting in the 3rd-syllable stress observed across the board in NI forms.

An identical derivation is proposed for Denominal Verbs. Compare the structures of DNV without an overt verbalizer (24)-(25) and DNV with an overt verbalizing suffix (27)-(28). These structures reflect the syntactic parallelism between NI and DNVs of both types as well as the underlyingly accented allomorph of *v* found in these constructions:

(24) Denominal verb without a VBLZ suffix

napaˈt͡ʃa-ri

napat͡ʃa-ri

blouse-PST

'S/he put a blouse on.'

(25)   a. $[[[[\text{napat͡ʃa }_{NP}] {}_{V'}] \text{ VP}] \text{-}\mathcal{O}^{+acc} {}_{vP}]\ldots$

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[11] CR, as most Uto-Aztecan languages, is head-final, and the structures adopted here assume that the moving head attaches to the left of the higher head. A detailed morpho-syntactic analysis of these constructions is outside of the scope of this paper. For empirical and theoretical issues with and justifications for the proposed structure, as well as for a discussion of alternative syntactic accounts I refer the reader to Haugen (2008: 163-204).

[12] See Haugen (2008) for a discussion of the NP-DP debate in Uto-Aztecan.

b. [[[[t_N NP] V'] VP] napat͡ʃa$_N$ -Ø$^{+acc}$ $_{vP}$]…

In (25), in parallel to the NI construction in (23), the noun originates as the complement of VP, head-moves through V, and adjoins to the underlyingly accented suffix in *v,* which then results in the 3rd-syllable stress in DNV forms.

Importantly, overt verbalizing suffixes in CR do not solely signal the change of category; they also have distinct lexical meanings. For instance, the *-bu* suffix in (17), repeated below as (26), appears to have a lexical meaning roughly parallel to the prefix *de-* in English and is used to indicate removal and separation. Moreover, at least some of these suffixes have lexical verbs as their diachronic source: for example, Caballero (2008: 126) suggests that suffix *-bu* has the verb *buʒe* 'to take away' as its lexical source (see also Miller 1996 for a discussion of verbalizing suffixes derived from lexical verbs in a closely related language Guarijío). This twofold nature of the meaning of these suffixes (i.e., the verbalizing meaning and the lexical meaning) is captured in the structure proposed for denominal verbs in Uto-Aztecan languages in Haugen (2008) (see also Hale and Keyser 2002) and adopted here (27): the grammatical 'verbalizing' meaning is obtained in *v*, while the lexical meaning is obtained in V.

(26)   Denominal verb with a VBLZ suffix

riʔi-ˈ**bu**-a

riʔi-bu-a

stone-VBLZ-PROG

'taking out stones'

(27)   a. [[[[riʔi NP] -bu V'] VP] -Ø$^{+acc}$ $_{vP}$]…

b. [[[[t_N NP] t_V V'] VP] (riʔi$_N$-bu)$_V$-Ø$^{+acc}$ $_{vP}$]…

Thus, I have proposed that denominal forms with no overt verbalizing morpheme (24), the forms with overt verbalizing suffixes in (26), and the noun incorporation forms (22) show the same stress pattern because they contain the same morpheme in the structure, whose sole phonological realization is the underlying accent specification: -Ø$^{+acc}$ in the *v* head.

5   Extensions and Implications

In this section, I discuss a number of implications of the analysis proposed in this paper. In addition to capturing in a unified manner the stress patterns in the constructions which are unified syntactically, below, I show that the proposed analysis has an improved empirical coverage as it eliminates an exceptional rule in the grammar required in the analysis proposed earlier (Caballero 2008, 2011).

5.1   Stress in NI with trisyllabic nouns

No analysis has been previously proposed for the (unexpected) 3rd-syllable stress in Denominal Verbs in CR. However, Caballero (2008, 2011) stipulates a special stress rule for the Noun Incorporation pattern:

(28)   ACC-TO-HEAD(σ_1): The head of an incorporation construction must have a stress in the first syllable.   (Caballero 2008: 206)

The exceptional rule (28) and the analysis proposed here predict the same stress position in forms like (22) with disyllabic nouns incorporated: stress falls on the 3rd-syllable, which happens to be the first syllable of the verbal head of the incorporation construction. However, the rule in (28) and the current account make different predictions for NI with trisyllabic noun roots. Consider (29) vs (30) below:

(29)   Prediction of (28) for NI with trisyllabic noun roots
       a. $\sqrt{}_N$ σσσ-$\sqrt{}_V$ ˈ**σσ**   *illicit due to the 3-syllable stress window (2)*

According to the exceptional NI stress rule proposed by Caballero (2008, 2011) (28), in NI constructions stress must fall on the first syllable of the verb root. However, when a trisyllabic nominal root is incorporated, the rule in (28) predicts a fourth-syllable stress which is illicit in the language due to the bounded nature of stress (2). The current analysis makes a different prediction for the same structure:

(30)   Prediction of the current analysis for NI with trisyllabic noun roots
       $\sqrt{}_N$ σσˈ**σ** -$\sqrt{}_V$ σσ -Ø$^{+acc}$ *by (7): SUFFIX^{+acc} always produces stress at the right edge of OSD*

As schematized in (30), the analysis proposed in this paper predicts that we should find stress at the rightmost syllable within the OSD in NI forms because NI forms contain an underlyingly accented suffix in their structure. Recall from (7) that I have proposed to analyze the underlying accent in suffixes as a floating accent feature which always docks onto the rightmost syllable within the OSD, i.e., onto the 3rd-syllable if there is one. The prediction schematized in (30) is borne out; consider examples in (31)-(32) involving incorporation of trisyllabic noun roots:

(31) a.   t͡ʃameˈ**ka**-repu   (32) a.   kutaˈ**t͡ʃi**-repu

           tongue-cut   neck-cut

           'to cut a tongue'   'to cut a neck'

      b.   *t͡ʃameka-ˈ**re**pu   b.   *kutat͡ʃi-ˈ**re**pu

                                                            (data from Caballero 2008: 193)

It should be noted that Caballero (2008: 191-193) reports that trisyllabic body part roots are not very common, and it is usual for trisyllabic noun roots to syncopate the last syllable in the body-part incorporation constructions, for example, the root

kuta͡t∫i 'neck' from (32) would regularly surface as *kuta* when incorporated[13]. The forms in (31)-(32) with the unsyncopated trisyllabic roots and stress on the 3rd-syllable are, however, reported as acceptable by the speakers, while forms predicted by (29), i.e., with the stress on the fourth syllable, are judged as completely unacceptable by the speakers. To account for the 3rd-syllable stress in forms like (31)-(32), Caballero states that stress "retracts one syllable to the left", i.e., these forms, under Caballero's analysis, would be treated as an 'exception to an exception' requiring yet another rule in addition to the special NI rule in (28)[14].

5.2   Stress in NI with monosyllabic nouns

I briefly address an apparent exception to the predictions of the analysis proposed in this paper – namely, the stress position in NI forms with a monosyllabic noun incorporated. Caballero (2011: 761) notes that monosyllabic nouns denoting body parts and bodily fluids are extremely rare and documents only one such form: *la* 'blood'. Consider an example in (33):

(33) a.   la-ˈ**biʔ**wa

           blood-clean

           'to clean blood'

      b.   *la-biʔˈ**wa**

Caballero (*ibid.*) notes that the form in (33a) with the stress on the 2nd syllable was not spontaneously produced, but it was judged by the speakers as acceptable while the form in (33b) with the stress on the 3rd-syllable was rejected as ungrammatical.

The example with the monosyllabic root (33) looks like an exception to the account proposed in the current paper as it does not have the predicted 3rd-syllable stress as do other NI forms. I argue that the noun in (33) is, however, not a counter-example to the analysis proposed here, but it shows an exceptional stress pattern in the same way as a group of exceptional underlyingly unaccented roots identified in Caballero (2008: 186). The exceptional behaviour of these roots is evident when they combine with underlyingly unaccented suffixes as well as when they combine

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[13] Trisyllabic root truncation is an instance of phonological parallelism between NI and DNV beyond the stress patterns. Notably, these two constructions are the only environment where such truncation takes place in the language (Caballero 2008: 309). The significance of this fact in light of the analysis presented in this paper is currently being investigated.

[14] Recall from ftn. 5: Caballero's analysis does not have a single default stress rule to deal with cases like (29) where the stress predicted by the NI rule that she proposes (28) is ungrammatical due to the stress window restrictions. Thus, under such an analysis, there is no prediction for the stress position in cases like (29) and a stress position has to be described/stipulated on a construction-by-construction basis. This is markedly different from the current analysis where a single 2nd syllable default stress pattern is proposed for all cases where no underlying accent is present within the trisyllabic stress window. This default pattern, however, will not be relevant for the NI constructions under the analysis proposed in this paper since NI constructions always have an underlyingly accented suffix in their structure and thus always have at least one underlying accent projected within the stress window – specifically, on the rightmost syllable of the stress window.

with underlyingly accented suffixes. These roots have a 1st syllable stress when affixed with the underlyingly unaccented suffixes such as the past tense suffix -*ri* in (34), instead of the 2nd syllable default stress (cf. (10)-(11)). When affixed with underlyingly accented suffixes such as the future singular suffix -*ma* in (35), they have a 2nd syllable stress, instead of the 3rd-syllable stress found in all the combinations of unaccented disyllabic roots and underlyingly accented suffixes (7). Consider one such exceptional root – *pewa* 'smoke' (Caballero 2008: 186):

(34) ˈ**pe**wa-ri   (35) peˈ**wa**-ma

        pewa-ri   pewa-ˈma

        smoke-PST   smoke-FUT.SG

        'S/he smoked.'   'S/he will smoke.'

Caballero (*ibid.*), based on the comparison of these roots to their cognates in Guaríjio, a closely related Taracahitan language, suggests that these exceptional roots at some point in the history of the language were trisyllabic (as they still are in Guaríjio). Diachronically, in CR, these roots lost the initial syllable, which then led to the exceptional stress pattern which is strikingly parallel to the behaviour of stress in regular unaccented trisyllabic roots, i.e. stress surfaces one syllable to the left of the regular pattern.

I propose that the form with the incorporation of *la* 'blood' in (33) behaves in the same way as the set of exceptional roots such as *pewa* 'smoke'. Specifically, I suggest that the nominal root incorporated in (33) has diachronically lost the initial syllable in the same way that roots like *pewa* 'smoke' have. This results in the same exceptional pattern when *la* 'blood' is affixed with an underlyingly accented suffix: stress surfaces one syllable to the left of the regular pattern. This proposal is supported by the fact that the cognate of the CR *la* 'blood' in Guaríjio has in fact an additional (initial) syllable which has been lost in CR: cf. Guaríjio *ela* 'blood'. Thus, we observe the same pattern with this root and with the other roots which have lost the initial syllable diachronically.

5.3   Underlyingly accented segmentally null morphemes

I have argued that an identical syntactic structure in NI and DNV is responsible for their identical prosodic behavior. It should however be noted that the correlation which I have aimed to establish in this paper is a one-way correlation. Thus, an identical prosodic behavior should not be taken to signal an identical syntactic structure. For CR specifically, this point is especially crucial because *all* the underlyingly accented suffixes produce the same prosodic pattern in the language, namely, stress at the right edge of the stress window. If the correlation between prosodic behavior and morpho-syntactic identity were to be understood as a two-way correlation, we would be forced to say that the fact that we observe the same prosodic pattern in all cases where an underlyingly accented suffix is present must mean that all those suffixes stem from morpho-syntactically parallel structures, which is undeniably false.

As an illustration of the one-way nature of the correlation which is in the core of the analysis proposed in this paper, let us briefly consider another stress pattern in the language which requires positing an underlyingly accented segmentally null morpheme – imperatives [15]. Consider (36) below; in (36a) an underlyingly unaccented root *raʔitʃa* 'speak' is affixed with an underlyingly unaccented past tense suffix *ki-*, and in (36b) the same root is affixed with an underlyingly accented future tense suffix *ma-:*

(36)	a.	ra'**ʔit͡ʃa**-ki	(36)	b.	raʔi'**t͡ʃa**-ma
		raʔit͡ʃa-ki			raʔit͡ʃa-'ma
		speak-PST			speak-FUT.SG
		'S/he spoke.'			'S/he will speak.'

(adapted from Caballero 2008: 119)

As evident from (36a-b), the underlyingly unaccented root *raʔi t͡ʃa* 'speak' behaves as a regular unaccented root: when combined with an unaccented suffix (36a), the 2nd syllable bears the default stress, and when combined with an accented suffix (36b), stress at the rightmost syllable of the left-aligned trisyllabic stress window surfaces. Consider now the imperative form of the same verb in (37):

(37)   raʔi'**t͡ʃa**
       raʔit͡ʃa
       speak
       'Speak!'   (adapted from Caballero 2008: 119)

In the imperative form in (37), we observe the 3rd-syllable stress although no overt underlyingly accented suffixes have been added to the unaccented verb root. We thus observe abstractly the same pattern as in NI and DNV: in a derived environment, the underlyingly unaccented root *raʔi t͡ʃa* 'speak' behaves as though an underlyingly accented suffix is present. This pattern is naturally accounted for if the structure of imperatives contains a segmentally null but underlyingly accented morpheme. An analysis of imperatives involving a segmentally null imperative suffix in the CP domain has been proposed cross-linguistically on multiple occasions (see, for example, Bogomolets & Syed *to appear;* Bošković 2012; Miyoshi 2002 a.o). The only CR-specific assumption that is needed to account for the stress pattern in forms like (37) is that this segmentally null morpheme is accented; consider a (simplified) structure in (38) below:

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[15] I thank Gabriela Caballero for pointing out to me that imperatives in CR also show the 3rd-syllable stress pattern without an addition of overt imperative morphology.

(38) $[[[[V\ _{VP}]\ _{vP}]\ _{TP}] -\emptyset^{+acc}\ _{CP(Imp)}]$

As proposed above (7), *all* underlyingly accented suffixes contribute a floating accent feature which is always realized at the rightmost edge of the stress window. Thus, given the structure in (38), the 3rd-syllable stress in (37) is expected. Imperatives illustrate the one-way nature of the correlation between morpho-syntactic identity and stress behavior: imperatives on one hand and NI and DNV on the other hand show the same 3rd-syllable stress, but in imperatives it is due to the underlyingly accented morpheme in the head of CP_{Imp} while in NI and DNV it is due to the underlyingly accented morpheme in the head of vP (21).

6   Conclusions

In this paper, I have proposed a unified account of two stress patterns in Choguita Rarámuri which have previously been treated as exceptional and required idiosyncratic stress rules: Noun Incorporation and Denominal Verbs.

The analysis of stress in NI constructions and DNV developed in this paper captures a number of important generalizations. Firstly, the current analysis captures the generalization that NI constructions behave with respect to stress in exactly the same way as DNVs. The analysis proposed here explicitly derives the identical stress pattern in DNV forms and the NI constructions from them being morpho-syntactically related. It is thus not an accident that we observe the same prosodic behavior in the two constructions. Secondly, the proposed analysis provides an explanation for the identical stress behavior of DNV with any of multiple overt verbalizing suffixes and DNV without an overt verbalizing suffix: the same (marked) stress pattern in these is not accidental under the current account but is derived in a principled way. Finally, the current analysis also captures the generalization that NI forms and DNV behave with respect to stress in the same way as any word containing an underlyingly accented suffix, i.e. they have the 3rd-syllable stress. This is naturally derived from NI and DNV containing an underlyingly accented (segmentally null) suffix in *v*. That suffix behaves in exactly the same way as all the other underlyingly accented suffixes in the language; namely it projects an accent at the right edge of the OSD, i.e. always on the 3rd-syllable if one is available. The seemingly exceptional pattern is thus captured with the regular stress mechanism in the proposed analysis.

The "big-picture" conclusion drawn in this paper is that cross-linguistic evidence and syntactic theory can deepen our understanding of phonological patterns. Thus, such cross-linguistic evidence suggesting that Noun Incorporation and Denominal Verbs are syntactically identical can be taken to inform our understanding of a seemingly exceptional phonological pattern in Choguita Rarámuri. The more "local", language-specific contribution of this paper is in providing an analysis which captures a seemingly exceptional pattern through a regular stress rule thus eliminating the need for a number of idiosyncratic rules in the phonological grammar of Choguita Rarámuri.

References

Blevins, J., & Harrison, S. P. 1999. Trimoraic feet in Gilbertese. *Oceanic Linguistics*, 38(2), 203-230.

Bogomolets, K., and S. Syed. to appear. Negation, Imperatives, and Agreement in Coorgi. In *Proceedings of the 11th (Formal) Approaches to South Asian Languages conference.*

Bogomolets, K. 2020. *Lexical accent in languages with complex morphology*. Doctoral dissertation. University of Connecticut, Storrs.

Bošković, Ž. 2012. When are negative imperatives banned? In *Selected papers from SinFonIJA 3*, ed. by S. Halupka-Rešetar, M. Marković, T. Milićev, and N. Ilićević, 6-17.

Caballero, G. 2008. *Choguita Rarámuri (Tarahumara) phonology and morphology*. Doctoral dissertation. University of California, Berkeley.

Caballero, G. 2011. Morphologically conditioned stress assignment in Choguita Rarámuri. *Linguistics*, *49*(4), 749-790.

Caballero, G., & Carroll, L. 2015. Tone and stress in Choguita Rarámuri (Tarahumara) word prosody. *International Journal of American Linguistics*, *81*(4), 457-493.

Hale, K. L., & Keyser, K. L. H. S. J. 2002. *Prolegomenon to a theory of argument structure* (Vol. 39). MIT press.

Halle, M., & Idsardi, W. J. (1995). General Properties of Stress and Metrical Structure. In John Goldsmith (ed.). *A Handbook of Phonological Theory*. Oxford: Blackwells, 403-443.

Halle, M. & Vergnaud, J.-R. (1987). *An essay on stress.* Cambridge, Mass.: MIT Press.

Hayes, B. P. (1980). *A metrical theory of stress rules* (Doctoral dissertation). MIT.

Hayes, B. (1995). *Metrical stress theory: Principles and case studies*. University of Chicago Press.

Haugen, J. D. 2008. *Morphology at the interfaces: reduplication and noun incorporation in Uto-Aztecan* (Vol. 117). John Benjamins Publishing.

Hewitt, M. 1992. *Vertical maximization and metrical theory*. Doctoral dissertation. Waltham, MA: Brandeis University.

Hill, K.C. 2003. Hopi Denominal and Noun-incorporating Verbs. In: Barragan L. and J. Haugen (eds.). *Studies in Uto-Aztecan*, 215-244. Cambridge, MA: MIT Working Papers on Endangered and Less Familiar Languages #5.

Hulst, H. van der. (2010). Representing accent. *Phonological Studies* 13. 117-128.

Hulst, H. van der. 2012. Deconstructing stress. *Lingua* 122, 1494-1521.

Idsardi, W. J. (1992). *The computation of prosody* (Doctoral dissertation). MIT.

Johns, A. 2017. Noun Incorporation. *The Wiley Blackwell Companion to Syntax*, Second Edition, 1-27.

Kager, R. 1994. Ternary rhythm in alignment theory. *Unpublished manuscript*. Utrecht University. Retrieved from: Rutgers Optimality Archive, http://roa.rutgers.edu/files/35-1094/35-1094-KAGER-0-0.PDF (accessed October 2021).

Kager, R. 2012. Stress in windows: Language typology and factorial typology. *Lingua*, 122(13), 1454-1493.

Liberman, M., & Prince, A. (1977). On stress and linguistic rhythm. *Linguistic inquiry*, *8*(2), 249-336.

Lowenstamm, J. 2015. Affixes as Roots. In: A. Alexiadou, H. Borer, F. Schäfer (eds.). *The Roots of Syntax, the Syntax of Roots*. Oxford: Oxford University Press.

Miller, W. R. 1996. Sketch of Shoshone, a Uto-Aztecan language. *Handbook of North American Indians*, 17, 693-720.

Miyoshi, N. 2002. Negative imperatives and PF merger. Ms., University of Connecticut, Storrs.

Özçelik, Ö. (to appear). Prosody in Turkish. In K. Bogomolets & H. van der Hulst (eds.). *Word prominence in languages with complex morphology*. Oxford University Press.

Sadock, J. M. 1980. Noun incorporation in Greenlandic: A case of syntactic word formation. *Language*, 300-319.

Sadock, J. M. 1986. Some notes on noun incorporation. *Language*, 62(1), 19-31.