elpublishing

Language Documentation and Description

ISSN 1740-6234

This article appears in: *Language Documentation and Description, vol 10: Special Issue on Humanities of the lesser-known: New directions in the description, documentation and typology of endangered languages and musics*. Editors: Niclas Burenhult, Arthur Holmer, Anastasia Karlsson, Håkan Lundström & Jan-Olof Svantesson

The Wichita pitch phoneme: a first look

DAVID S. ROOD

Cite this article: David S. Rood (2012). The Wichita pitch phoneme: a first look. In Niclas Burenhult, Arthur Holmer, Anastasia Karlsson, Håkan Lundström & Jan-Olof Svantesson (eds) *Language Documentation and Description, vol 10: Special Issue on Humanities of the lesser-known: New directions in the description, documentation and typology of endangered languages and musics*. London: SOAS. pp. 113-131

Link to this article: http://www.elpublishing.org/PID/116

This electronic version first published: July 2014

The Wichita pitch phoneme: a first look

David S. Rood

1. Introduction

Wichita is a polysynthetic language currently spoken fluently by only one person, Doris Jean Lamar, who is in her mid-80s and lives in Anadarko, Oklahoma, USA. It is a North Caddoan language, closely related to Kitsai, Pawnee, and Arikara and somewhat more distantly to Caddo. Some scholars believe that Caddoan is distantly related to Iroquoian and/or Siouan. Overviews of Wichita grammar and conversation can be found in Rood (1976, 1996) and Mirzayan (2008). The polysynthetic structure of the language entails the inclusion of many bound morphemes in long words built around a verb root, with numerous complex phonological adjustments at the morpheme boundaries.

Among these morphophonemic adjustments is the addition of a suprasegmental high pitch to some of the vowels. Elsewhere in the language, pitch seems to be a lexically basic element in some morphemes, but with one important exception: the only minimal pairs for its presence vs. its absence are the third person (abbreviated 33 or 3(-3) in this paper) vs. indefinite subject paradigms illustrated in many places below (see e.g. Table 7, Class 1a and Tables 9 and 10). The exception involves prefixes on pronoun roots creating equivalents to 'someone', 'no one', 'something', 'nothing', etc. In those paradigms, low-pitched *ka:*- means 'indefinite' ('some') while high-pitched *ká:* means 'negative'. There are thus important contrasts such as *ka:kirih* 'something' vs. *ká:kirih* 'nothing'.

This paper explores the appearance and disappearance of the pitch feature accompanying the inclusion of one verbal morpheme, the dative, trying to place the pitch patterns in the context of what we know about prosodic phenomena cross-linguistically. The conclusion is that this pitch functions exactly the way a segmental phoneme functions, and that it is not phonologically prosodic. This is a first look at the distribution and function of pitch in this language; as such, it provides an organizational framework for further study.

2. The descriptive problem

A minimal verb consists of four morphemes: tense/mode/evidential (TME), pronominal person marker, verb root, and aspect, but most verbs are more complex than this. Near the TME and pronominals many verbs have another

David S. Rood 2011. The Wichita pitch phoneme: a first look. In Jan-Olof Svantesson, Niclas Burenhult, Arthur Holmer, Anastasia Karlsson and Håkan Lundström (eds.) *Language Documentation and Description*, *Vol 10,* 113-131. London: SOAS.

morpheme called a 'preverb', which may mark the case role of one of the pronominal arguments, but which more often simply indicates the verb's conjugation class.

The template for the part of the verb we are studying is in example (1).

(1) du-quot-TME-pers$_1$-pvcome-pers$_2$-aorist-pv

du	some arguments are dual (or non-singular)
	(only marginally part of this study)
quot	quotative evidential with aorist or perfect TM
TME	tense, mode, and/or evidential
pers$_1$	agent personal pronouns
pvcome	the preverb required by *ʔa* 'come' or *ʔi* 'have'
pers$_2$	patient personal pronouns, including reflexive
pv	one or two other preverbs, with 'dative' first if it is present

Wichita has 18 TME prefixes and nine personal pronominal prefixes. All 162 combinations occur with each of nine preverbs. That makes 1,458 possible combinations, but the actual number is greater, because many verbs permit two personal pronouns, and some verbs allow two or three preverbs to occur together. It seems to me to be doubtful that speakers have memorized this many combinations – I think they must assemble the combinations from the constituent morphemes as they speak. The combinatory process must therefore be rule-governed. What are the rules?

3. The morphemes

3.1. Pronouns

If all arguments are third person, a speaker must choose either the appropriate TME allomorph, or indefinite *iy*. The latter often signifies a plural actor, but it can also be an obviative, and it may be the only third person pronoun in a stative verb.

If one or more arguments are non-third person, the morphemes are as in Table 1.

Table 1: Non-third person pronominal prefixes

	agent	patient
1st	*t/c*	*ki*
2nd	*s*	*a:*
inclusive	*ciy*	*ca:ki*

If appropriate, the patient slot can instead contain *a* 'reflexive'. The first person prefix *t* appears as [t] before /a/ or (reconstructed underlying) /u/, whereas it is [ts] (phonemically /c/) before consonants or underlying /i/. Underlying /u/ is unconditionally surface [i]. The surface sequence [ti] (at least if [t] represents the first person pronoun, and perhaps elsewhere as well) is thus always representative of underlying /tu/[1].

3.2. Combinations of TME with Pronouns

Before we can examine the preverbs, we need to establish how TME and person affixes combine in the absence of any preverb.

TME morphemes fall into four sets (Tables 2–5); phonology within a set is essentially identical for all members. In sets 1 and 2 all the non-third-person morphemes except the second person patient behave the same and are represented by /t/. The notation 3(-3) means all arguments are third person.

Table 2: Set 1 TME morphemes combined with representative pronouns

	non-third	2patient	3(-3)	indefinite
participle	*na-t*	*n-a:*	*na*	*n-iy*
indicative interrogative	*ra-t*	*r-a:*	*ra*	*r-iy*
directive	*a-t*	*a:*	*a*	*iy*
perfect	*ara-t*	*ar-a:*	*ara*	*ar-iy*
quotative perfect	*a:ra-t*	*a:r-a:*	*a:ra*	*a:r-iy*
debetative	*kara-t*	*kar-a:*	*kara*	*kar-iy*
future quotative	*ehe:-t*	*ah-a:*	*ehe:*	*ehe:y*

[1] This kind of opacity – the surface sequence /ti/ exists despite a rule that changes underlying /ti/ to /ci/ – is the sort of thing that optimality theory cannot account for because there is no constraint against either the input sequence or the output sequence. Counterfeeding ordered rules, recapitulating the historical developments (*t* > *c* before *i*, then *u* > *i*), handle it nicely.

Table 3: Set 2 TME prefixes with selected pronouns

	non-third	2 patient	3(-3)	indefinite
indicative	*ta-t*	*t-a:*	*ti*	*t-iy*
indicative negative	*ʔa-t*	*ʔ-a:*	*ʔi*	*ʔ-iy*
exclamatory	*iskira-t*	*iskir-a:*	*iskiri*	*iskir-iy*
optative	*kaʔa-t*	*kaʔa:*	*keʔe*	*keʔiy*

Sets 3 and 4 group the pronouns differently (Tables 4–5). The forms in parentheses are an alternative analysis.

The general pattern for all of these combinations is that there are allomorphs of the TME prefixes which are morphologically conditioned by the pronoun after them. When two vowels come together, only the second one surfaces. There are a few spots where we need additional rules, mostly for the vowel-initial pronouns *a:* 'second person patient' and *iy* 'indefinite'.

Table 4: Set 3 TME prefixes with selected pronouns

	agent and incl.	1 patient	3(-3)	indefinite
(finite) aorist	*a:-t-ki (a-at-ki)*	*a -ki-ki*	*a-ki*	*í-ki*
quotative aorist	*a:-ʔa-t-ki (a:ʔ-at-ki)*	*a:-ki-ki*	*a:-ki*	*e:ʔ-í-ki*
aorist participle	*a-t-ki (at-ki)*	*ki-ki*	*ki*	*i-ki*
subjunctive	*ha-t-ki*	*ha-ki-ki*	*ha-ki*	*hiki*

Table 5: Set 4 TME prefixes with selected pronouns

	agents and incl.	patients 1st, 2nd	3-3	indefinite
imperative/conditional	*i-t*	*hi-ki, ha:*	*hi*	*hiy*
future imperative	*kiʔi-t*	*ki:ki, kiya:*	*ki:*	*ki:y*
Future	*keʔe-t*	*ke:ki, ká:*	*ke:*	*ke:y*

3.3. Datives and pitch phenomena

The combinations illustrated above may occur with any of eight morphemes or morpheme combinations called 'preverbs'. Most of these follow the pronoun or the aorist /ki/, but one of them intervenes between the agent and patient pronouns, and some verbs allow a combination of up to three preverbs. In this paper we will examine only one of the eight, the dative (*u*)*c*. It may be

added to any appropriate verb to indicate the presence of an additional argument, or it may simply be required by the verb.

The dative has two allomorphs, *uc* and *c*. The former occurs with the pronouns /t, s, ki/ and with verbs which have only regular third person arguments. Underlying /u/ is always surface [i:] in these forms. The effect of the /u/ is seen most clearly in the aorist, where the /ki/ morpheme separates the pronoun from the preverb; see Table 6.

Table 6: Aorist allomorphs with specified pronouns and the dative

aorist *ki:c*		aorist *kic*	
cki:c (<*t-ki:c*)	1st agent	*ca:kikic*	inclusive patient
ski:c	2nd agent	*íkic* (<*iy-kic*)	indefinite 3rd person
ki:c	3rd agent and patient	*a:kic*	2nd patient
kiki:c	1st patient	*ákic*	reflexive
		cíkic (<*ciy-kic*)	inclusive agent

In addition, some verbs require that the vowel after /k/ has high pitch. Without the aorist, the pronouns merge in various ways with the /u/ of /uc/. There are four patterns for pitch assignment; see Table 7.

Table 7: Four patterns for pitch assignment to pronoun plus dative combinations.

		1a (15)		1b (18)		1c (12)		2 (27)	
t	1agent	*ti:c*	Vhigh	*ti:c*	V	*ti:c*	Vhigh	*tí:c*	V
s	2 agent	*si:c*	Vhigh	*si:c*	V	*si:c*	Vhigh	*sí:c*	V
	3-3	*i:c*	Vhigh	*i:c*	V	*i:c*	Vhigh	*í:c*	V
ki	1 patient	*ki:c*	Vhigh	*ki:c*	V	*ki:c*	Vhigh	*kí:c*	V
a:	2 patient	*ác*	Vlow	*ác*	V	*ác*	Vhigh	*ác*	V
iy	indef	*i:c*	Vlow	*i::c*	V	*í:c*	Vhigh	*i:c*	V
ciy	incl agt	*ci:c*	Vlow	*ci:c*	V	*ci:c*	Vhigh	*ci:c*	V
ca:ki	incl pat	*ca:kíc*	Vlow	*ca:kíc - ra:k*	V	?		?	
a	reflexive	*á:c*	Vlow	*á:c*	V	*á:c*	Vhigh	*á:c*	V

The column headings are verb stem class labels; the number in parentheses is the number of stems of this class in the database. The vowel on the right in each cell is in the verb stem.

The next few pages of this article are devoted to discussion and examples demonstrating the patterns in Table 7.

In Class 1, all three subclasses show low pitch on the preverbs except with the pronouns *a*, *a:*, and *ca:ki*. In Class 2, the preverbs have high pitch unless the pronoun ends in /y/. Class 1 is divided into three subclasses depending on two things: first, whether the pitch on the verb stem vowel varies from pronoun to pronoun or stays constant, and second, whether *iy* is pronounced /i:/, /i::/ or /i:/. The second person dative patient, *ác*, has the additional peculiarity that its pitch is relocated one syllable to the left if there is a vowel for it to dock on.

In Class 1a, the first stem vowel pitch varies. It is high if the preverb is *uc*, but low otherwise. The indefinite differs from the regular third person by the pitch on the stem vowel, not the pronoun. Class 1b has the same preverb variations, but the stem pitch never varies, and at least the first vowel is low. Here *iy* contrasts with 33 by vowel length, /i::c/ for *iy*, /i:c/ for 33. Class 1c has almost the same preverb variations (*iy*, but not *ciy*, has high pitch on the preverb), and the first stem vowel is constant, usually high. Class 2 has high pitch on the preverb unless the pronoun ends in /y/, and the stem vowel is always low. This is summarized in Table 8.

Note that this means that the feature which contrasts the regular third person with the indefinite is different among the classes. In Class 1a, the difference is in the pitch of the stem vowel (high for 33, low for *iy*). In Class 1b, 33 has a long vowel before [c], while *iy* has a double long vowel there (but *ciy* does not have this extra-long vowel). In Class 1c, the preverb is low for 33, but high for *iy*. In Class 2, the preverbs contrast in a mirror image of Class 1c: high for 33, but low for *iy*. A summary is presented in Table 9.

Table 8: Summary of pitch variation patterns for dative verbs

Class	preverb *uc*	pronoun *iy* or *ciy*	*a*, *a:*, *ca:ki*
1a	preverb low stem high	preverb low stem low	preverb high stem low
1b	preverb patterns as above, first stem vowel always low		
1c	preverb patterns as above except *iy*, which goes with *a* etc.; first stem vowel always high		
2	preverb high except after *ciy* or *iy*, first stem vowel low		

Table 9: Pitch patterns distinguishing regular and indefinite third person datives

	Class 1a	Class 1c	Class 2
33	high stem vowel	low preverb vowel	high preverb vowel
iy	low stem vowel	high preverb vowel	low preverb vowel

We can illustrate this beginning with a Class 1a verb, *tarʔa:ti* 'doctor'. Again, it is good to begin with the aorist forms because they have the *-ki-* morpheme between the pronoun and the preverb, allowing us to see both of those morphemes in something close to their basic forms (2). The pitch patterns referred to above as 'preverb' patterns are here realized on the vowel of the aorist *ki*, suggesting that the pitch assignment must come from the preverb. The relevant stem syllable in the examples[2] is *-ta-*:

(2) (a) (*t-ki-uc*) *á:cki:ctárʔa:ti*

á:-	*t-*	*ki-*	*uc-*	*tarʔa:ti*
AOR_1-	1AGT-	AOR_2-	DAT-	doctor

'I doctored him'

(b) (*s-ki-uc*) *á:ski:ctárʔa:ti*

á:-	*s-*	*ki-*	*uc-*	*tarʔa:ti*
AOR_1-	2AGT-	AOR_2-	DAT-	doctor

'you doctored him'

(c) (*ki-uc*) *aki:ctárʔa:ti*

a-	*ki-*	*uc-*	*tarʔa:ti*
AOR_1-	AOR_2-	DAT-	doctor

'he/she doctored him'

---

[2] Abbreviations used in the examples: 12PL 'first or second person argument is plural (3 or more)', 1AGT 'first person agent', 1PAT 'first or exclusive person patient', 2AGT 'second person agent', 2PAT 'second person patient', 33 'all arguments are third person', AOR_1 'first part of discontinuous aorist', AOR_2 'second part of discontinuous aorist', CONDIT 'conditional', DAT 'dative', DEBET 'debetative mode', DU 'dual' or 'non-singular' (2 or more), EXCL 'exclusive', FUT IMP 'future imperative', HABIT 'habitual', IMP 'imperative', IMPF 'imperfective', INCAGT 'first person inclusive agent', INCL 'inclusive', INCPAT 'first person inclusive patient', INDEF 'indefinite third person', INDIC 'indicative mode', PL 'plural', PPL 'participle', RFLX 'reflexive', $SJTV_1$ 'first part of discontinuous subjunctive mode', $SJTV_2$ 'second part of discontinuous subjunctive mode', SUBP 'perfective subordinate'.

(d) (*ki-ki-uc*) *hakiki:c**tár**ʔa:tih*

ha-	*ki-*	*ki-*	*uc-*	*tarʔa:ti-*	*h*
$SJTV_1$-	1PAT-	$SJTV_2$-	DAT-	doctor-	SUBP

'for him to doctor me'

(e) (*iy-ki-c*) *íkic**tar**ʔa:c*

a-	*iy-*	*ki-*	*c-*	*tarʔa:ti-*	*s*
AOR_1-	INDEF-	AOR_2-	DAT-	doctor-	IMPF

'he was being doctored'

(f) (*ciy-ki-c*) *í: ʔacíkic**tar**ʔa:ti*

hiʔ-	*a-*	*ciy-*	*ki-*	*c-*	*tarʔa:ti*
DU-	AOR_1-	INCAGT-	AOR_2-	DAT-	doctor

'we INCL doctored him'

(g) (*a:-ki-c*) *a:kíc**tar**ʔa:ti*

a-	*a:-*	*ki-*	*c-*	*tarʔa:ti*
AOR_1-	2PAT-	AOR_2-	DAT-	doctor

'he doctored you'

(h) (*ca:ki-ki-c*) (no examples of *ca:ki* without *ʔak* – see below)

(i) (*a-ki-c*) *a:ʔákic**tar**ʔa:ti*

a:ʔ-	*a-*	*ki-*	*c-*	*tarʔa:ti*
AOR_1-	RFLX-	AOR_2-	DAT-	doctor

'he doctored himself'

The pitch on the *iy* and *ciy* pronouns in the aorist is the consequence of a separate, very regular rule:

$$iy > í \;/\; \_\_k$$

The pitches on the other forms fall either on the aorist (second person patient) or on the pronoun itself (reflexive). It is important to note, again, that the second person patient morpheme and the reflexive morpheme show their underlying lengths when the aorist (*ki*) separates them from dative (*c*), the former with length, the latter without.

This pattern of pitch distribution is the same with other TME prefixes, but sometimes the segments of the pronoun and the dative coalesce. Table 10 displays more examples of 'doctor' to demonstrate the stem pitch variation.

Table 10: Examples from TME sets 1, 2, and 4 (see Tables 2–5) with the dative

	perfect	indicative	future or conditional
t/s+uc	*arati:ctárʔa:ti*	*tati:ctárʔa:c*	*keʔeti:ctárʔa:ti*
33+uc	*(í:k)ari:ctárʔa:ti*	*ti:ctárʔa:c*	*ke::ctárʔa:ti*
ki+uc	*araki:ctárʔa:ti*	*taki:ctárʔa:c*	*ke:ki:ctárʔa:ti*
iy+c	*(í:)ri:ctarʔa:ti*	*ti:ctarʔa:c*	*(hi)ke::ctarʔa:ti*
ciy+c	*(í:)raci:ctarʔa:ti*	*hitaci:ctarʔa:c*	*(hi) ʔci:ctarʔa:tih*
a:+c (2PAT)	*áractarʔa:ti*	*táctarʔa:c*	*háctarʔa:tih*
ca:ki+c	(no form without *ʔak* or *ra:k*)		
a+c (RFLX)	*a:rá:ctarʔa:ti*	*(hi) tá:ctarʔa:c*	*há:ctarʔa:tih*
iy+RFLX+*c*		*tiyá:ctarʔa:c* 'they are doctoring themselves'	

The initial segments in parentheses are the dual and sometimes the quotative mentioned in the template in example (1), hence they are part of the number marking system and not part of the patterns we are examining. Note that the only phonetic difference between the 33 form and the indefinite (*iy*) form is the pitch, and that the contrast between second person object (*a:*) and reflexive object (*a*) is often only the vowel length – but the two forms are exactly reversed from their underlying forms. The 'perfect' example of the second person object form also illustrates the leftward shift of the pitch, since the TME prefix has a vowel available for that shift. Note also that in addition to the segmental difference, the pitch patterns of the exclusive (/-ti:c-/) and inclusive (/-ci:c-/) contrast.

These data seem to be quite straightforward with respect to stem pitch assignment: if the dative allomorph is /uc/, the first syllable of the verb has high pitch. But observe (in example (3)) what happens when we insert another morpheme, *ʔak*, after the dative preverb. By itself this morpheme usually means 'non-singular 3rd person patient', but it also occurs with *hiʔ-* to mean 'dual patient'. Note that /k/ becomes /s/ before /t/, and that now the pitch is on the preverb and not on the stem vowel.

(3) (a) *(t-uc-ʔak)* *tatíːcʔastarʔaːc*

ta-	*t-*	*uc-*	*ʔak-*	*tarʔaːti-*	*s*
INDIC-	1AGT-	DAT-	PL-	doctor-	IMPF

'I doctored them'

(b) *(ki-uc-ʔak)* *hitakíːcʔastarʔaːc*

hiʔ-	*ta-*	*ki-*	*uc-*	*ʔak-*	*tarʔaːti-*	*s*
DU-	INDIC-	1PAT-	DAT-	PL-	doctor-	IMPF

'he/they doctored us EXCL DU'

(c) (*uc-ʔak*) *tíːcʔastarʔaːc*

ta-	*uc-*	*ʔak-*	*tarʔaːti-*	*s*
INDIC-	DAT-	PL-	doctor-	IMPF

'he/she doctored them'

(d) *(iy-c-ʔak)* *hitiːcʔastarʔaːc*

hiʔ-	*ta-*	*iy-*	*c-*	*ʔak-*	*tarʔaːti-*	*s*
DU-	INDIC-	INDEF-	DAT-	PL-	doctor-	IMPF

'he/they doctored them'

(e) *(ciy-c-ʔak)* *hitaciːcʔastarʔaːc*

hiʔ-	*ta-*	*ciy-*	*c-*	*ʔak-*	*tarʔaːti-*	*s*
DU-	INDIC-	INCAGT-	DAT-	PL-	doctor-	IMPF

'we INCL doctored them'

(f) (*caːki-c-ʔak*) *(hi)tacaːkícʔastarʔaːc*

hiʔ-	*ta-*	*caːki-*	*c-*	*ʔak-*	*tarʔaːti-*	*s*
DU-	INDIC-	INCPAT-	DAT-	PL-	doctor-	IMPF

'he/they doctored us INCL DU'

Apparently *ʔak* moves a verb into Class 2. There are many morphemes besides *ʔak* that can intervene between the preverb and the stem, but only two of them are frequent enough to be of interest here. One of them is another preverb, *i*, which we will not discuss; the other is *raːk*, marking a first or second person argument plural (3 or more). With *raːk*, both the preverb vowel and the stem vowel are always high pitched in Class 1a. This is illustrated in (4). Note that /r/ disappears after /c/, and /k/ changes to /s/ before /t/, so *raːk* is [aːs] in (4); also note leftward shift of pitch from second person patient pronoun in (4c).

(4) (a) (*t*) *tatí:ca:stárʔa:c*

ta-	*t-*	*uc-*	*ra:k-*	*tarʔa:ti-*	*s*
INDIC-	1AGT-	DAT-	12PL-	doctor-	IMPF

'We PL exclusive are doctoring him'

(b) (*ki)* *kiʔskí:ca:stárʔa:ti*

kiʔ-	*s-*	*ki-*	*uc-*	*ra:k-*	*tarʔa:ti*
FUT IMP-	2AGT-	1PAT-	DAT-	12PL-	doctor

'you PL must doctor me/us later'

(c) (*a:*) *káraca:stárʔa:c*

kara-	*a:-*	*c-*	*ra:k-*	*tarʔa:ti-*	*s*
DEBET-	2PAT-	DAT-	12PL-	doctor	IMPF

'he should doctor you all'

(d) (*ca:ki)* *taca:kíca:stárʔa:c*

ta-	*ca:ki-*	*c-*	*ra:k-*	*tarʔa:ti-*	*s*
INDIC-	INCPAT	DAT-	12PL-	doctor-	IMPF

'he is doctoring us EXCL PL'

(e) (*ciy*) *icí:ca:stárʔa:tih*

i-	*ciy*	*c-*	*ra:k-*	*tarʔa:ti-*	*h*
CONDIT-	INCAGT-	DAT-	12PL-	doctor-	SUBP

'if we INCL PL doctor him'

(f) (*ciy+a*) *kiʔcá:ca:stárʔa:ti*

kiʔ-	*ciy-*	*a-*	*c-*	*ra:k-*	*tarʔa:ti*
FUT IMP-	INCAGT-	RFLX-	DAT-	12PL-	doctor

'let us INCL PL doctor ourselves later'

There are of course no forms with *ra:k* with either 33 or *iy*, since it only refers to non-third person arguments.

Class 1b, as stated above, looks like Class 1a except that the stem or root does not vary. The preverb is low except with *a*, *a:* and *ca:ki*, and the stem (the first vowel of the stem) is always low. In addition to the low pitch, as we already noted above, *iy* manifests an extra vowel mora with these verbs, but its source is a mystery. However, *ciy* does not match that pattern. This is illustrated in (5) with the verbs *kannéʔe* 'write, intransitive', *waʔasánnʔstiri* 'cook for' and *wakharʔi:ri* 'know how'.

(5) (a) (33) *ti:ckanné ʔes*

ta-	*uc-*	*kanne ʔe-*	*s*
INDIC-	DAT-	write-	IMPF

'he wrote'

(b) (iy) *ti::ckanné ʔes*

ta-	*iy-*	*c-*	*kanne ʔe-*	*s*
INDIC-	INDEF-	DAT-	write-	IMPF

'someone wrote'

(c) (*t*) *tati:ckanné ʔes*

ta-	*t-*	*uc-*	*kanne ʔe-*	*s*
INDIC-	1AGT-	DAT-	write-	IMPF

'I wrote'

(d) (*ki*) *taki:ckwa ʔasánn ʔstic*

ta-	*ki-*	*uc-*	*wa ʔasann ʔstiri-*	*s*
INDIC-	1PAT-	DAT-	cook-	IMPF

'she cooked for me'

Note that /w/ becomes /kw/ after /s/ or /c/.

(e) (*a:*) *táckwa ʔasánn ʔstic*

ta-	*a:-*	*c-*	*wa ʔasann ʔstiri-*	*s*
INDIC-	2PAT-	DAT-	cook-	IMPF

'she cooked for you'

(f) (*a*) *tá:ckwa ʔasánn ʔstiri:ss*

ta-	*a-*	*c-*	*wa ʔasann ʔstiri-*	*:ss*
INDIC-	RFLX	DAT-	cook-	HABIT

'she always plans to cook for herself'

(g) (*ciy*) *hi ʔci:ckwa ʔasánn ʔ istiri*

hi ʔ-	*i-*	*ciy-*	*c-*	*wa ʔasann ʔstiri*
DU-	IMP-	INCAGT-	DAT-	cook-

'let us INCL DU cook for her'

Again, as with Class 1a, adding /ʔak/ converts this to the pattern for Class 2, in which the preverb vowel has high pitch except with /iy/ and /ciy/ (6a–b); contrast this with (6c), in which *ʔak* is absent.

(6) (a) (*ki*) *hitakí:c ʔakwa ʔasánn ʔistic*

hiʔ-	*ta-*	*ki-*	*uc-*	*ʔak-*	*wa ʔasann ʔistiri-*	*s*
DU-	INDIC-	1PAT-	DAT-	PL-	cook-	IMPF

'she cooked for us DU EXCL'

(b) (*t*) *hitatí:c ʔakwakha:r ʔi:ris*

hiʔ-	*ta-*	*t-*	*uc-*	*ʔak-*	*wakhar ʔi:ri-*	*s*
DU-	INDIC-	1AGT-	DAT-	PL-	teach.how-	IMPF

'we EXCL taught them how'

(c) (*t* without *ʔak*) *hitati:ckwakha:r ʔi:ris*

hiʔ-	*ta-*	*t-*	*uc-*	*wakha:r ʔi:ri-*	*s*
DU-	INDIC-	1AGT-	DAT-	teach.how-	IMPF

'we EXCL taught her how'

With *ra:k*, all the preverbs are high as they are with this morpheme in Class 1a, but here the first stem vowel retains its consistent low pitch; see examples in (7).

(7) (a) (*ki-uc-ra:k*) *takí:ca:kwa ʔasánn ʔistic*

ta-	*ki-*	*uc-*	*ra:k-*	*wa ʔasann ʔistiri-*	*s*
INDIC-	1AGT-	DAT-	12PL-	cook-	IMPF

'she cooked for us PL EXCL'

(b) (*ca:ki-c-ra:k*) *taca:kíca:kwa ʔasánn ʔistic*

ta-	*ca:ki-*	*c-*	*ra:k-*	*wa ʔasann ʔistiri-*	*s*
INDIC-	INCPAT-	DAT-	12PL-	cook-	IMPF

'she cooked for us PL INCL'

(c) (*ciy-c-ra:k*) *tací:ca:kanné ʔes*

ta-	*ciy-*	*c-*	*ra:k-*	*kanne ʔe-*	*s*
INDIC-	INCAGT-	DAT-	12PL-	write-	IMPF

'we INCL PL wrote'

Class 1c has the same preverb variations except that *iy*, but not *ciy*, is high, but the stem vowel (usually, but not always, the first one) is always high. In these verbs, then, we sometimes get adjacent syllables with high pitch on both. This is illustrated with *-háreʔe* 'plant for' and *hé:sti* 'feed'.

(8) (a) (*t-uc*) *tati:cháreʔes*
ta- *t-* *uc-* *háreʔe-* *s*
INDIC- 1AGT- DAT- plant- IMPF
'I planted for her'

(b) (ki-uc) *taki:cháreʔes*
ta- *ki-* *uc-* *háreʔe-* *s*
INDIC- 1PAT- DAT- plant- IMPF
'she planted for me'

(c) (*uc*) *ti:cháreʔes*
ta- *uc-* *háreʔe-* *s*
INDIC- DAT- plant- IMPF
'he planted for her'

(d) (*uc*) *ti:ché:stis*
ta- *uc-* *hé:sti-* *s*
INDIC- DAT- feed- IMPF
'she fed him'

(e) (*iy-c*) *hití:ché:stis*
hiʔ- *ta-* *iy-* *c-* *hé:sti-* *s*
DU- INDIC- INDEF- DAT- feed- IMPF
'they fed her'

(f) (c*iy-c*) *hitaci:cháreʔes*
hiʔ- *ta-* *ciy-* *c-* *háreʔe-* *s*
DU- INDIC- INCAGT- DAT- plant- IMPF
'we INCL planted for him'

(g) *(a:-c>ác)* *tácháreʔes*

ta-	*a:-*	c-	*hárеʔe-*	*s*
INDIC-	2PAT-	DAT-	plant-	IMPF

'she planted for you'

(h) (*a-c>á:c*) *tá:chárеʔes*

ta-	*a-*	*c-*	*hárеʔe-*	*s*
INDIC-	RFLX-	DAT-	plant-	IMPF

'she planted for herself'

With *ʔak*, again the pattern is that of Class 2, except that the stem is consistently high, as it is throughout the paradigm. We illustrate in (9) with the stative verb *reʔehiya:s* 'be sleepy' and active *hi:ré::s-hisha* 'catch up with' (note that /k-r/ changes to /rh/; *-hisha*, the imperfective of the verb 'go', is irregular).

(9) (a) (*uc-ʔak*) *tí:cʔarhéʔehiya:ss*

ta-	*uc-*	*ʔak-*	*reʔehiya:s-*	*s*
INDIC-	DAT-	PL-	be sleepy-	IMPF

'they are sleepy'

(b) (*uc-ʔak*) *tí:cʔakhi:ré::sis*

ta-	*uc-*	*ʔak-*	*hi:re::-hisha*
INDIC-	DAT-	PL-	catch.up.with

'he caught up with them

With *ra:k*, as we have come to expect, all the preverb vowels are high pitched, and the verb stem remains constant. Recall that *ra:k* is restricted to non-third person arguments, so there is no need to distinguish *iy* from 33 when this morpheme is included.

(10) (a) (*ki-uc-ra:k*) *takí:ca:rhéʔehiya:ss*

ta-	*ki-*	*uc-*	*ra:k-*	*reʔehiya:s-*	*s*
INDIC-	1PAT-	DAT-	12PL-	be.sleepy-	IMPF

'we EXCL PL are sleepy'

(b) (*ca:ki-c-ra:k*) *taca:kíca:rhéʔehiya:ss*

ta-	*ca:ki-*	*c-*	*ra:k-*	*reʔehiya:s-*	*s*
INDIC-	INCPAT-	DAT-	12PL-	be.sleepy-	IMPF

'we EXCL PL are sleepy'

(c) (*t-uc-ra:k*) *tatí:ca:khi:ré::sis*

ta-	*t-*	*uc-*	*ra:k-*	*hi:re::-hisha*
INDIC-	1AGT-	DAT-	12PL-	catch.up.with

'we EXCL PL caught up with him'

(d) (*ciy-uc-ra:k*) *tací:ca:khi:ré::sis*

ta-	*ciy-*	*c-*	*ra:k-*	*hi:re::-hisha*
INDIC-	INCAGT-	DAT-	12PL-	catch.up.with

'we INCL PL caught up with him'

In Class 2, all the *uc* preverb vowels have high pitch, but *iy* and *ciy* do not. The attested examples all have a low pitch on the vowel of the verb; see (11).

(11) (a) (*t-uc*) *tatí:cthira:c*

ta-	*t-*	*uc-*	*thira:ri-*	*s*
INDIC-	1AGT-	DAT-	build.a.fire-	IMPF

'I built her a fire'

(b) (*uc*) *tí:ccarisariʔ*

ta-	*uc-*	*carisariʔ*
INDIC-	DAT-	be.a.good.worker

'she is a good worker'

(c) (*s-uc*) *isí:ccarisariʔih*
i- *s-* *uc-* *carisariʔi-* *h*
CONDIT- 2AGT- DAT- be.a.good.worker- SUBP
'if you are a good worker'

(d) (*ki-uc*) *takí:ccaris*
ta- *ki-* *uc-* *carisi-* *s*
INDIC- 1PAT- DAT- be.greedy- IMPF
'I am greedy'

(e) (*iy-c*) *ti:ccaris*
ta- *iy-* *c-* *carisi-* *s*
INDIC- INDEF- DAT- be.greedy- IMPF
'he is greedy'

This stative verb uses *iy* for 3rd person.

(f) (*ciy-c*) *hitaci:cshiriya:s*
hiʔ- *ta-* *ciy-* *c-* *rhiriya:-* *s*
DU- INDIC- INDEF- DAT- scold- IMPF
'we INCL scolded her'

(g) (*a:-c*) *táccaris*
ta- *a:-* *c-* *cari-* *s*
INDIC- 2PAT- DAT- be.greedy- IMPF
'you are greedy'

(h) (*a-c*) (*kiya)ʔá:cthira:c*
kiya- *ʔ-* *a-* *c-* *thira:ri-* *s*
someone- HABIT- RFLX- DAT- build.a.fire- IMPF
'one builds a fire for oneself'

(i) (*ca:ki-c-ra:k*) *naca:kíca:sthirá:rih*
na- *ca:ki-* *c-* *ra:k-* *thira:ri-* *h*
PPL- INCPAT- DAT- 12PL- build.a.fire- SUBP
'when he built a fire for us INCL'

In this class, *ʔak* seems to make no difference in the pitch pattern, but for many of the verbs the *ra:k* morpheme takes on a high pitch and all the preverbs, including those with the reflexive, inclusive object, and the second person object, take a low pitch. These Class 2 verbs with *ra:k* are the only forms where *a*, *a:*, and *ca:ki* have a low-pitched vowel in the dative. Note that the verb 'build a fire for' cited above is an exception to this pattern for *ra:k.*

4. Conclusions

The above is not a complete illustration of all the pronoun, preverb, and verb class combinations that occur, but it is enough to illustrate that (1) the pitch phenomena must be rule-governed, since there are numerous recurring patterns and (2) it is the juxtaposition of certain morphemes that conditions the pitches. The problem, obviously, is to determine what there is about the edges of those morphemes which results in the pitch assignments (or deletions, perhaps).

Pitch is not conditioned by syllable count or syllable structure because there are minimal pairs for high versus low pitch (e.g. for many verbs the difference between indefinite /iy/ and regular third person forms).

Pitch is not conditioned by morphemes, because *iy* 'indefinite' is sometimes in a high-pitched syllable, sometimes in a low-pitched one, and in some verbs it requires a low-pitched stem vowel, while in others it has no effect on the stem vowel.

Pitch is not conditioned by the surface initial segment of the verb. Although there are some intriguing patterns, e.g. all verbs that begin with consonant clusters or with /c/ are Class 2, stems in any class may begin with /r/, /w/, /k/, or /h/.

Pitch is not conditioned by other pitches – adjacent syllables may be marked high. I would therefore propose that pitch is just another phoneme, entirely on par with the consonants and vowels. It will be described by the same kinds of ordered rules that account for changes at morpheme boundaries. At this point in the analysis of the preverbs, all the rules cannot yet be determined, but two things are clear. First, the preverb pitch must be controlled by the preverb interacting with the stem, since the variation is the same with and without the aorist (hence the pronoun is not playing a role), and since intervening morphemes such as *ʔak* and *ra:k* change their surrounding pitches. Second, the stem class must be a feature of the stem. There is much more to learn about these phenomena.

References

Mirzayan, Armik. 2008. A preliminary study of same-turn self-repair initiations in Wichita conversation. In K. David Harrison, David S. Rood & Arienne Dwyer (eds.), *Lessons from documented endangered languages* (*Typological studies in language* 78), 317–354. Amsterdam: John Benjamins.

Rood, David S. 1976. *Wichita grammar*. New York: Garland Publishing.

Rood, David S. 1996. Sketch of Wichita, a Caddoan language. In William A. Sturtevant (ed.), *Handbook of North American Indians* 17, 580–608. Washington: Smithsonian Institution.