The complex exponence relations of tonal inflection in SJQ Chatino verbs

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Talk outline

- The SJQ Chatino tone system
  - The modularity of tonal conjugation in SJQ Chatino
  - The person/number (PN) triplets
  - The aspect/mood (AM) classes
- The polyfunctionality of PN triplets
- Distributional asymmetries among PN triplets
- Exponence in the SJQ Chatino system of tonal conjugation
- Theoretical and typological significance
  - Metaconjugation
  - The complexity of the AM class system
- Conclusion

The SJQ Chatino tone system

In the Chatino languages [Oto-Manguean; Mexico], verb inflection depends on a rich system of tones. In San Juan Quiahije Chatino (SJQ), there are twelve tones.

The SJQ Chatino tone system

Table 1. Three alternative representations of the SJQ Chatino tones		
H	1	E
HS	10	D
HL	14	B
M	2	C
MS	20	H
MH	32	I
ML	24	J
L	4	A
L	∅ (unmarked)	A
LS	40	M
LH	42	G
LM	3	F

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For present purposes, we will use representations of the first sort.

The modularity of tonal conjugation in SJQ Chatino

A remarkable feature of SJQ Chatino's system of tonal conjugation is its modular character. This system is morphologically organized on two levels.

- The first level is that of **person/number (PN) triplets.**
- The second level is that of **aspect/mood (AM) classes.**

The PN triplets

The PN triplets

Each of the PN triplets is a series of three tones.

When a PN triplet **X-Y-Z** is employed in realizing a verbal subparadigm,

- tone **X** appears in the 3sg form and in all plural forms;
- tone **Y** appears in the 2sg form; and
- tone **Z** appears in the 1sg form.

Table 2.The exponence relations of a PN triplet X-Y-Z

tone	X	Y	Z
	↓	↓	↓
person/number	3sg + all pl	2sg	1sg

Table 3. Examples of PN triplets

PN triplet	tone pattern
(a)	L-L-MS
(b)	L-LH-L
(c)	L-LH-H
(d)	L-LH-MS
(e)	HL-H-MS
(f)	HL-H-LS
(g)	HL-LH-L
(h)	HL-LH-HL

In all, conjugation in SJQ Chatino involves 74 PN triplets.

Table 4. The 74 PN triplets

PN triplet	Tone pattern
(a)	L-L-MS
(b)	L-LH-L
(c)	L-LH-H
(d)	L-LH-MS
(e)	HL-H-MS
(f)	HL-H-LS
(g)	HL-LH-L
(h)	HL-LH-HL
(i)	HL-LH-ML
(j)	HL-LH-ML/L
(k)	HL-LH-LS
(l)	HL-MS-MS
(m)	HL-MS-LS
(n)	HL-MH-LS
(o)	M-M-LS
(p)	M-H-M
(q)	M-H-H
(r)	M-H-LS
(s)	M-MS-LS

PN triplet	Tone pattern
(t)	HS-H-LS
(u)	HS-MS-LS
(v)	HS-MH-LS
(w)	H-H-MS
(x)	H-H-MH
(y)	H-LH/MH-MH
(z)	H-LH-L
(aa)	H-LH-H
(bb)	H-LH-MS
(cc)	H-LH-MH
(dd)	H-MH-L
(ee)	H-MH-HL
(ff)	H-MH-H
(gg)	H-MH-MH
(hh)	H-MH-LS
(ii)	H-LS-L
(jj)	H-LS-MH
(kk)	LM-M-LM
(ll)	LM-H-H

PN triplet	Tone pattern
(mm)	LM-H-LM
(nn)	LM-H-LS
(oo)	LM-LH-L
(pp)	LM-MS-LS
(qq)	LM-MH-L
(rr)	LM-MH-H
(ss)	LM-MH-LS
(tt)	LM-LS-L
(uu)	LM/M-H-LM
(vv)	LH-LH-LH
(ww)	LH-MS-L
(xx)	LH-MH-L
(yy)	LH-MH-H
(zz)	LH-MH-LH
(aaa)	LH-MH-MS
(bbb)	LH-MH-MH
(ccc)	LH-MH-ML
(ddd)	LH-MH-ML/L
(eee)	LH-MH-LS

PN triplet	Tone pattern
(fff)	MS-LH-L
(ggg)	MS-LH-L/MS
(hhh)	MS-LH-MS
(iii)	MS-LH-MH
(jjj)	MS-LS-L
(kkk)	MH-LH-H
(lll)	MH-LH-MH
(mmm)	MH-MH-H
(nnn)	MH-MH-MH
(ooo)	ML-LH-L
(ppp)	ML-LH-HL
(qqq)	ML-LH-MS
(rrr)	ML-LH-ML
(sss)	ML-LH-ML/L
(ttt)	ML-LH-LS
(uuu)	ML-MH-HL
(vvv)	ML-MH-ML

The modularity of tonal conjugation in SJQ Chatino

A remarkable feature of SJQ Chatino's system of tonal conjugation is its modular character. This system is morphologically organized on two levels.

- The first level is that of **person/number (PN) triplets.**
- The second level is that of **aspect/mood (AM) classes.**

The AM classes

The AM classes

Each verbal lexeme belongs to an AM class. Each AM class is associated with a series of three PN triplets **abc**-**def**-**ghi**.
When a member of that AM class is inflected,

- the first PN triplet **abc** is used in that verb's completive forms;
- the second PN triplet **def** is used in its progressive forms; and
- the third PN triplet **ghi** is used in its habitual and potential forms.

Table 5. The tone pattern of an AM class

PN triplet	abc	def	ghi
	↓	↓	↓
aspect/mood	CPL	PRG	HAB, POT
	(completive)	(progressive)	(habitual, potential)

Table 6. Examples of AM classes

AM class	CPL	PRG	HAB, POT
I	(u) = HS-MS-LS	(u) = HS-MS-LS	(m) = HL-MS-LS
II	(u) = HS-MS-LS	(u) = HS-MS-LS	(u) = HS-MS-LS
III	(t) = HS-H-LS	(r) = M-H-LS	(m) = HL-MS-LS
IV	(u) = HS-MS-LS	(s) = M-MS-LS	(m) = HL-MS-LS
V	(z) = H-LH-L	(cc) = H-LH-MH	(fff) = MS-LH-L
VI	(z) = H-LH-L	(lll) = MH-LH-MH	(fff) = MS-LH-L
VII	(aa) = H-LH-H	(nnn) = MH-MH-MH	(nnn) = MH-MH-MH
VIII	(z) = H-LH-L	(w) = H-H-MS	(fff) = MS-LH-L

In all, conjugation in SJQ Chatino involves 94 AM classes.

Table 7. The 94 AM classes

AM class	CPL	PRG	HAB, POT
I	(u)	(u)	(m)
II	(u)	(u)	(u)
III	(t)	(r)	(m)
IV	(u)	(s)	(m)
V	(z)	(cc)	(fff)
VI	(z)	(lll)	(fff)
VII	(aa)	(nnn)	(nnn)
VIII	(z)	(w)	(fff)
IX	(z)	(lll)	(b)
X	(z)	(gg)	(fff)
XI	(z)	(bb)	(fff)
XII	(bb)	(lll)	(hhh)
XIII	(ii)	(jj)	(jjj)
XIV	(z)	(z)	(b)
XV	(dd)	(cc)	(fff)
XVI	(z)	(bb)	(hhh)
XVII	(bb)	(bb)	(hhh)
XVIII	(z)	(z)	(fff)
XIX	(z)	(x)	(fff)
XX	(z)	(cc)	(iii)
XXI	(bb)	(cc)	(iii)
XXII	(bb)	(d)	(bb)
XXIII	(r)	(r)	(m)
XXIV	(r)	(r)	(r)

AM class	CPL	PRG	HAB, POT
XXV	(s)	(o)	(m)
XXVI	(s)	(f)	(m)
XXVII	(s)	(p)	(m)
XXVIII	(q)	(q)	(e)
XXIX	(q)	(q)	(l)
XXX	(r)	(p)	(r)
XXXI	(p)	(rrr)	(rrr)
XXXII	(p)	(p)	(p)
XXXIII	(nn)	(nn)	(m)
XXXIV	(kk)	(r)	(m)
XXXV	(nn)	(nn)	(nn)
XXXVI	(nn)	(mm)	(m)
XXXVII	(tt)	(jj)	(jjj)
XXXVIII	(nn)	(pp)	(m)
XXXIX	(nn)	(ll)	(m)
XL	(qq)	(nnn)	(k)
XLI	(ll)	(ll)	(l)
XLII	(ll)	(l)	(l)
XLIII	(mm)	(mm)	(mm)
XLIV	(mm)	(mm)	(m)
XLV	(ss)	(rr)	(m)
XLVI	(pp)	(p)	(m)
XLVII	(nn)	(uu)	(m)
XLVIII	(nn)	(p)	(m)

AM class	CPL	PRG	HAB, POT
XLIX	(oo)	(cc)	(fff)
L	(b)	(lll)	(b)
LI	(c)	(kkk)	(d)
LII	(b)	(lll)	(ooo)
LIII	(d)	(d)	(d)
LIV	(d)	(kkk)	(d)
LV	(b)	(lll)	(fff)
LVI	(a)	(aaa)	(d)
LVII	(n)	(v)	(m)
LVIII	(m)	(r)	(m)
LIX	(m)	(t)	(m)
LX	(f)	(t)	(m)
LXI	(m)	(u)	(m)
LXII	(m)	(pp)	(m)
LXIII	(ccc)	(nnn)	(rrr)
LXIV	(bbb)	(rrr)	(rrr)
LXV	(ccc)	(mmm)	(i)
LXVI	(ww)	(mmm)	(h)
LXVII	(xx)	(cc)	(fff)
LXVIII	(zz)	(nnn)	(rrr)
LXIX	(eee)	(nnn)	(g)
LXX	(eee)	(mmm)	(zz)
LXXI	(xx)	(nnn)	(b)
LXXII	(xx)	(mmm)	(ooo)

AM class	CPL	PRG	HAB, POT
LXXIII	(yy)	(qqq)	(qqq)
LXXIV	(aaa)	(aaa)	(d)
LXXV	(yy)	(aaa)	(qqq)
LXXVI	(ccc)	(mmm)	(rrr)
LXXVII	(zz)	(nnn)	(ooo)
LXXVIII	(ddd)	(nnn)	(ooo)
LXXIX	(xx)	(nnn)	(ooo)
LXXX	(zz)	(nnn)	(vv)
LXXXI	(yy)	(mmm)	(qqq)
LXXXII	(eee)	(lll)	(b)
LXXXIII	(xx)	(rr)	(m)
LXXXIV	(mmm)	(d)	(qqq)
LXXXV	(nnn)	(nnn)	(nnn)
LXXXVI	(vvv)	(ff)	(rrr)
LXXXVII	(vvv)	(mmm)	(vvv)
LXXXVIII	(sss)	(y)	(j)
LXXXIX	(uuu)	(ee)	(ppp)
XC	(ttt)	(hh)	(ttt)
XCI	(hhh)	(aa)	(hhh)
XCII	(hhh)	(hhh)	(hhh)
XCIII	(fff)	(cc)	(fff)
XCIV	(ggg)	(cc)	(fff)

The polyfunctionality of PN triplets

The polyfunctionality of PN triplets

In this modular system, the tonal inflection of lexemes in a single AM class is realized by means of up to three distinct PN triplets, the choice of which depends on a form's aspect/mood.

Table 8. *lyu*^{H} 'fell', **AM class XXI**

PN triplet:	CPL (bb) H-LH-MS	PRG (cc) H-LH-MH	HAB (iii) MS-LH-MH	POT (iii) MS-LH-MH
1SG	*lyon*^{MS}	*nlyon*^{MH}	*nlyon*^{MH}	*klyon*^{MH}
2SG	*lyu*^{LH}	*nlyu*^{LH}	*nlyu*^{LH}	*klyu*^{LH}
3SG	*lyu*^{H}	*nlyu*^{H}	*nlyu*^{MS}	*klyu*^{MS}
1INCL	*lyon*^{H}*on*^{H}	*nlyon*^{H}*on*^{H}	*nlyon*^{MS}*on*^{MH}	*klyon*^{MS}*on*^{MH}
1EXCL	*lyu*^{H} *wa*^{LH}	*nlyu*^{H} *wa*^{LH}	*nlyu*^{MS} *wa*^{LH}	*klyu*^{MS} *wa*^{LH}
2PL	*lyu*^{H} *wan*^{ML}	*nlyu*^{H} *wan*^{ML}	*nlyu*^{MS} *wan*^{ML}	*klyu*^{MS} *wan*^{ML}
3PL	*lyu*^{H} *renq*^{ML}	*nlyu*^{H} *renq*^{ML}	*nlyu*^{MS} *renq*^{ML}	*klyu*^{MS} *renq*^{ML}

The polyfunctionality of PN triplets

For the same reason, an individual PN triplet may express one aspect/mood in one AM class but a different aspect/mood in another AM class.

Table 8. *lyu*^{H} 'fell', **AM class XXI**

PN triplet:	CPL (bb) H-LH-MS	PRG (cc) H-LH-MH	HAB (ii) MS-LH-MH	POT (iii) MS-LH-MH
1SG	*lyon*^{MS}	*nlyon*^{MH}	*nlyon*^{MH}	*klyon*^{MH}
2SG	*lyu*^{LH}	*nlyu*^{LH}	*nlyu*^{LH}	*klyu*^{LH}
3SG	*lyu*^{H}	*nlyu*^{H}	*nlyu*^{MS}	*klyu*^{MS}
1INCL	*lyon*^{H}*on*^{H}	*nlyon*^{H}*on*^{H}	*nlyon*^{MS}*on*^{MH}	*klyon*^{MS}*on*^{MH}
1EXCL	*lyu*^{H} *wa*^{LH}	*nlyu*^{H} *wa*^{LH}	*nlyu*^{MS} *wa*^{LH}	*klyu*^{MS} *wa*^{LH}
2PL	*lyu*^{H} *wan*^{ML}	*nlyu*^{H} *wan*^{ML}	*nlyu*^{MS} *wan*^{ML}	*klyu*^{MS} *wan*^{ML}
3PL	*lyu*^{H} *renq*^{ML}	*nlyu*^{H} *renq*^{ML}	*nlyu*^{MS} *renq*^{ML}	*klyu*^{MS} *renq*^{ML}

The polyfunctionality of PN triplets

For the same reason, an individual PN triplet may express one aspect/mood in one AM class but a different aspect/mood in another AM class.

Table 9. *nkwi*^{H} 'boiled', **AM class XVI**

PN triplet:	CPL (z) H-LH-L	PRG (bb) L-LH-MS	HAB (hhh) MS-LH-MS	POT (hhh) MS-LH-MS
1SG	*nkwen*^{L}	*ntkwen*^{MS}	*ntykwen*^{MS}	*ykwen*^{MS}
2SG	*nkwi*^{LH}	*ntkwi*^{LH}	*ntykwi*^{LH}	*ykwi*^{LH}
3SG	*nkwi*^{H}	*ntkwi*^{H}	*ntykwi*^{MS}	*ykwi*^{MS}
1INCL	*nkwen*^{H}*en*^{H}	*ntkwen*^{H}*en*^{H}	*ntykwen*^{MS}*en*^{MH}	*ykwen*^{MS}*en*^{MH}
1EXCL	*nkwi*^{H} *wa*^{LH}	*ntkwi*^{H} *wa*^{LH}	*ntykwi*^{MS} *wa*^{LH}	*ykwi*^{MS} *wa*^{LH}
2PL	*nkwi*^{H} *wan*^{ML}	*ntkwi*^{H} *wan*^{ML}	*ntykwi*^{MS} *wan*^{ML}	*ykwi*^{MS} *wan*^{ML}
3PL	*nkwi*^{H} *renq*^{ML}	*ntkwi*^{H} *renq*^{ML}	*ntykwi*^{MS} *renq*^{ML}	*ykwi*^{MS} *renq*^{ML}

The polyfunctionality of PN triplets

For the same reason, an individual PN triplet express one aspect/mood in one AM class but a different aspect/mood in another AM class.

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PN triplet:	CPL (z) H-LH-L	PRG (bb) L-LH-MS	HAB	POT (hhh) MS-LH-MS
1SG	*nkwen*^{L}	*ntkwen*^{MS}	*ntykwen*^{MS}	*ykwen*^{MS}
2SG	*nkwi*^{LH}	*ntkwi*^{LH}	*ntykwi*^{LH}	*ykwi*^{LH}
3SG	*nkwi*^{H}	*ntkwi*^{H}	*ntykwi*^{MS}	*ykwi*^{MS}
1INCL	*nkwen*^{H}*en*^{H}	*ntkwen*^{H}*en*^{H}	*ntykwen*^{MS}*en*^{MH}	*ykwen*^{MS}*en*^{MH}
1EXCL	*nkwi*^{H} *wa*^{LH}	*ntkwi*^{H} *wa*^{LH}	*ntykwi*^{MS} *wa*^{LH}	*ykwi*^{MS} *wa*^{LH}
2PL	*nkwi*^{H} *wan*^{ML}	*ntkwi*^{H} *wan*^{ML}	*ntykwi*^{MS} *wan*^{ML}	*ykwi*^{MS} *wan*^{ML}
3PL	*nkwi*^{H} *renq*^{ML}	*ntkwi*^{H} *renq*^{ML}	*ntykwi*^{MS} *renq*^{ML}	*ykwi*^{MS} *renq*^{ML}

Distributional asymmetries among PN triplets

The PN triplets vary in their distribution.

First, they vary with respect to the aspect/mood subparadigms with which they are associated:

- some triplets are highly restricted in that they are always associated with the same aspect/mood subparadigm;
- others are less restricted, the limiting case being that of triplets that are associated with each of the four subparadigms in one or another conjugation class.

Distributional asymmetries among PN triplets

Nine appear in all aspect/mood categories, in one or another AM class:	(bb), (d), (hhh), (mm), (nn), (nnn), (p), (r), (u)
Ten appear in the completive and the progressive:	(aa), (aaa), (f), (ll), (mmm), (pp), (q), (s), (t), (z)
Six appear in the completive and the habitual/potential:	(b), (fff), (m), (zz), (vvv), (ttt)
Three appear in the progressive and the habitual/potential:	(l), (qqq), (rrr)
Twenty only appear in the completive:	(a), (bbb), (c), (ccc), (dd), (ddd), (eee), (ggg), (ii), (kk), (n), (oo), (qq), (ss), (sss), (tt), (uuu), (ww), (xx), (yy)
Fifteen only appear in the progressive:	(cc), (ee), (ff), (gg), (hh), (jj), (kkk), (lll), (o), (rr), (uu), (v), (w), (x), (y)
Eleven only appear in the habitual/potential:	(e), (g), (h), (i), (iii), (j), (jjj), (k), (ooo), (ppp), (vv)

Distributional asymmetries among PN triplets

The PN triplets also vary with respect to the number of AM classes in which they play a role: some triplets serve in the definition of only a single AM class, while others may serve in the definition of several.

(n) only plays a role in LVII:

AM class	CPL	PRG	HAB, POT
LVII	(n)	(v)	(m)

Distributional asymmetries among PN triplets

(m) plays a role in two dozen AM classes:

AM class	CPL	PRG	H, P
I	(u)	(u)	(m)
III	(t)	(r)	(m)
IV	(u)	(s)	(m)
XXIII	(r)	(r)	(m)
XXV	(s)	(o)	(m)
XXVI	(s)	(f)	(m)
XXVII	(s)	(p)	(m)
XXXIII	(nn)	(nn)	(m)
XXXIV	(kk)	(r)	(m)
XXXVI	(nn)	(mm)	(m)
XXXVIII	(nn)	(pp)	(m)
XXXIX	(nn)	(ll)	(m)

AM class	CPL	PRG	H, P
XLIV	(mm)	(mm)	(m)
XLV	(ss)	(rr)	(m)
XLVI	(pp)	(p)	(m)
XLVII	(nn)	(uu)	(m)
XLVIII	(nn)	(p)	(m)
LVII	(n)	(v)	(m)
LVIII	(m)	(r)	(m)
LIX	(m)	(t)	(m)
LX	(f)	(t)	(m)
LXI	(m)	(u)	(m)
LXII	(m)	(pp)	(m)
LXXXIII	(xx)	(rr)	(m)

Distributional asymmetries among PN triplets

On average, a PN triplet figures in the definition of 3.2 AM classes.

Exponence in the SJQ Chatino system of tonal conjugation

This evidence suggests that the notion of exponence may be more richly varied than is standardly assumed. Canonically, exponence is the relation between the two parts of a Saussurean sign: *-s* is an exponent of {plural}. On one view, this relation is lexically listed; on another view, {plural} is realized by a rule that suffixes *-s*.

Exponence in the SJQ Chatino system of tonal conjugation

But in the conjugational system of SJQ Chatino, tones participate in a more nuanced pattern of exponence.

Exponence in the SJQ Chatino system of tonal conjugation

Example: the LH tone in the completive form

lyu^{LH} 'you (sg.) fell'

belongs to the PN triplet (bb): **H-LH-MS**

Although LH is an exponent of '2sg completive' in this form, it would be problematic to list this relation lexically or to portray it as the effect of a rule that realizes '2sg completive' as the LH tone:

- As a member of triplet (bb), LH also serves in the inflection of 2sg forms in the progressive, the habitual and the potential (depending on a verb's AM-class membership); and
- as a member of other triplets, it also serves to express other person/number combinations.

Exponence in the SJQ Chatino system of tonal conjugation

Instead, the exponence relation between LH and '2sg completive' in *lyu*^{LH} is complex.

- The membership of the verb 'fell' in AM class XXI entails that the property 'completive' will be realized by the triplet (bb).

completive

(bb)

LYU^{H} 'fell'

AM class XXI

Exponence in the SJQ Chatino system of tonal conjugation

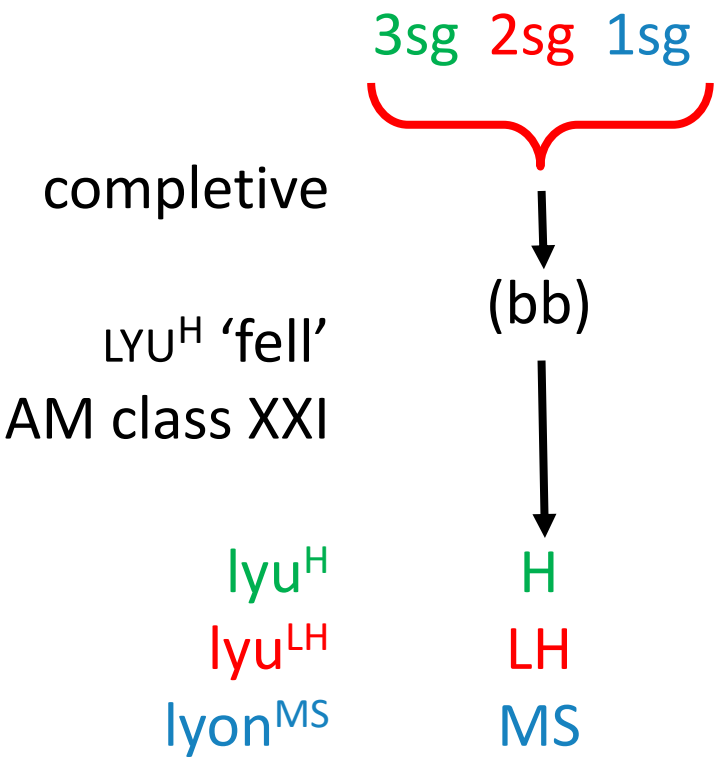
Instead, the exponence relation between LH and '2sg completive' in *lyu*^{LH} is complex.

- The membership of the verb 'fall' in AM class XXI entails that the property 'completive' will be realized by the triplet (bb).

Exponence in the SJQ Chatino system of tonal conjugation

Instead, the exponence relation between LH and '2sg completive' in *lyu*^{LH} is complex.

- Triplet (bb), in turn, entails that the property '2sg' will be realized by the LH tone.



Exponence in the SJQ Chatino system of tonal conjugation

A similarly complex exponence relation exists between LH and '2sg progressive' in the inflection of NKWI^{H} 'boiled', a member of AM class XVI:

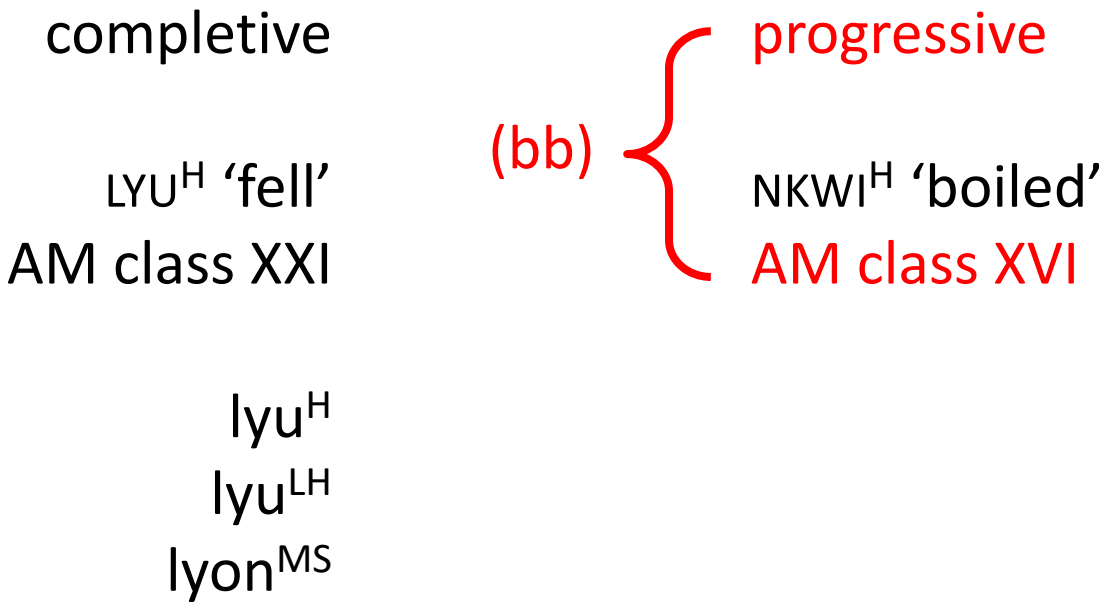
- The membership of the verb 'boiled' in AM class XVI entails that the property 'progressive' will be realized by the triplet (bb).

completive		progressive
LYU^{H} 'fell' AM class XXI	(bb)	NKWI^{H} 'boiled' AM class XVI
lyu^{H} lyu^{LH} lyon^{MS}		

Exponence in the SJQ Chatino system of tonal conjugation

A similarly complex exponence relation exists between LH and '2sg progressive' in the inflection of NKWI^{H} 'boiled', a member of AM class XVI:

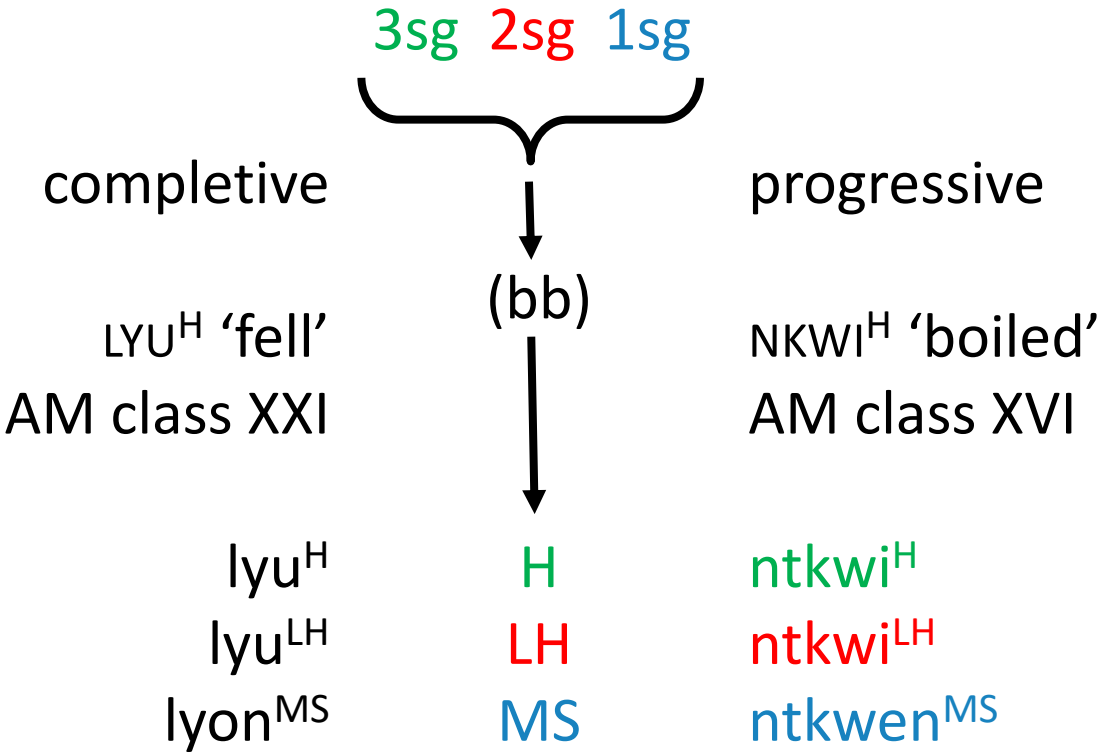
- The membership of the verb 'boiled' in AM class XVI entails that the property 'progressive' will be realized by the triplet (bb).



Exponence in the SJQ Chatino system of tonal conjugation

A similarly complex exponence relation exists between LH and '2sg progressive' in the inflection of NKWI^{H} 'boiled', a member of AM class XVI:

- As before, triplet (bb) entails that the property '2sg' will be realized by the LH tone.



Exponence in the SJQ Chatino system of tonal conjugation

That is, the LH tone in

lyu^{LH} ‘you (sg.) fell’

is an exponent of the property set ‘2sg completive’ because of this set’s layered interaction with two morphomic categories: that of AM class properties and that of PN triplets.

Theoretical and typological significance

The PN triplets central to this analysis of SJQ verb inflection have both theoretical and typological significance.

Metaconjugations

In a theoretical context, this analysis entails that several PN triplets are metaconjugations (Stump 2016: 202ff).

A **metaconjugation** is an inflection-class property that determines the realization of one class of morphosyntactic property sets in the inflection of one class of lexemes, but the realization of a distinct class of morphosyntactic property sets in the inflection of another class of lexemes.

Metaconjugations

In Sanskrit, there is a metaconjugation M that determines the imperfect inflection of one class of lexemes but the aorist inflection of a distinct class of lexemes.

Lexeme	singular imperfect active			singular aorist active		
	1st	2nd	3rd	1st	2nd	3rd
TUD ‘strike’	*a-tud-am*	*a-tud-as*	*a-tud-at*	*a-taut-sam*	*a-taut-sīs*	*a-taut-sīt*
Inflection class:	6th			s-aorist		
TUṢ ‘be happy’	*a-tuṣ-yam*	*a-tuṣ-yas*	*a-tuṣ-yat*	*a-tuṣ-am*	*a-tuṣ-as*	*a-tuṣ-at*
Inflection class:	4th			thematic		

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Inflection class:	M (“6th”)			s-aorist		
TUṢ ‘be happy’	*a-tuṣ-yam*	*a-tuṣ-yas*	*a-tuṣ-yat*	*a-tuṣ-am*	*a-tuṣ-as*	*a-tuṣ-at*
Inflection class:	4th			M (“thematic”)		

Metaconjugations

In SJQ Chatino, the PN triplet (bb) determines the completive inflection of one class of lexemes (e.g. LYU^{H} ‘fell’) but the progressive inflection of a distinct class of lexemes (e.g. NKWI^{H} ‘boiled’).

Lexeme	singular completive			singular progressive		
	1st	2nd	3rd	1st	2nd	3rd
LYU^{H} ‘fell’	*lyon*^{MS}	*lyu*^{LH}	*lyu*^{H}	*nlyon*^{MH}	*nlyu*^{LH}	*nlyu*^{H}
PN triplet:	(bb)			(cc)		
NKWI^{H} ‘boiled’	*nkwen*^{L}	*nkwi*^{LH}	*nkwi*^{H}	*ntkwen*^{MS}	*ntkwi*^{LH}	*ntkwi*^{H}
Inflection class:	(z)			(bb)		

Metaconjugations

Notwithstanding their similarity to Sanskrit metaconjugations, the metaconjugations in SJQ Chatino are remarkable for their centrality to the organization of the language's inflectional system. While there are only two metaconjugations in Sanskrit (Stump 2016: 202ff), there are 28 in SJQ Chatino–more than a third of all PN triplets.

Metaconjugational PN triplets

Nine appear in all aspect/mood categories, in one or another AM class.	28 metaconjugations
Ten appear in the completive and the progressive.	
Six appear in the completive and the habitual/potential.	
Three appear in the progressive and the habitual/potential.	
Twenty only appear in the completive.	46 simple conjugations
Fifteen only appear in the progressive.	
Eleven only appear in the habitual/potential.	

The complexity of the AM class system

In a typological context, the proposed analysis of SJQ verb inflection reveals a dimension of simplicity that is not immediately evident.

Stump & Finkel (2013: 381) characterize the complexity of an inflection-class system as the extent to which it inhibits motivated inferences about a given lexeme's full set of word forms from subsets of that set.

The complexity of the AM class system

One way of measuring the extent of this inhibition is with the information-theoretic measure of conditional entropy (see Ackerman & Malouf 2013 and their references).

In verb paradigms in SJQ Chatino, the average entropy of a cell's tone conditional on that of another cell is 1.15.

Strikingly, the average entropy of an aspect's PN triplet conditional on that of another aspect is 0.85. This suggests that in the inflection-class system of SJQ Chatino verb, organizing paradigms into PN triplets contributes to the system's simplicity.

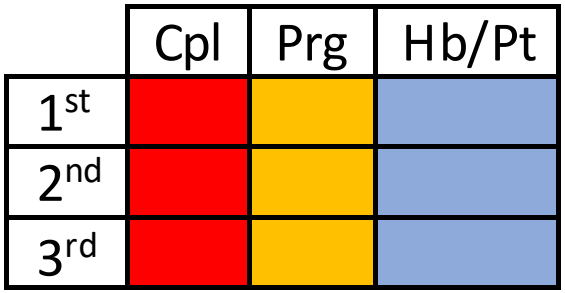
The complexity of the AM class system

One might question the significance of this difference on the assumption that the entropy of a tone triplet conditional on another tone triplet will inevitably be lower than the entropy of a single tone conditional on another single tone. But in fact, this assumption is false.

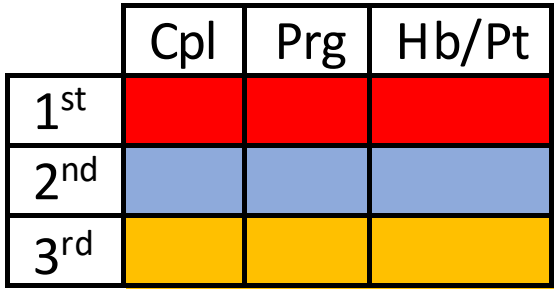
The complexity of the AM class system

Suppose that instead of using **PN triplets** (= tone triplets that express three different PN categories for the same aspect, as in (1)), we use **aspect triplets** (= tone triplets that express three different aspects for the same person/number combination, as in (2)).

(1)



(2)



The complexity of the AM class system

In SJQ Chatino verb paradigms, the average entropy of a person/number combination's aspect triplet conditional on that of another person/number combination is 1.26:

Conditional entropy	
of one cell's tone conditional on that of another cell	1.15
on one aspect's PN triplet conditional on that of another aspect	0.85
on one person/number's aspect triplet conditional on that of another person/number	1.26

Conclusion

Two kinds of morphomes are necessary for analyzing the SJQ Chatino system of tonal conjugation: AM classes and PN triplets.

The complex interaction of these two sorts of morphomes entails exponence relations that are not simple form-content pairings of the type "*-s* is the plural morpheme".

Even so, defining the system of AM classes in terms of PN triplets contributes to its simplicity.

References

Ackerman, Farrell & Robert Malouf. 2013. Morphological organization: The low conditional entropy conjecture. *Language* 89, 429–464.

Shannon, Claude E. 1948. A mathematical theory of communication. *Bell System Technical Journal* 27(3), 379–423.

Shannon, Claude E. 1951. Prediction and entropy of printed English. *Bell System Technical Journal* 30(1), 50–64.

Stump, Gregory. 2016. *Inflectional paradigms: Content and form at the syntax-morphology interface*. Cambridge: Cambridge University Press.

Stump, Gregory & Raphael Finkel. 2013. *Morphological typology: From word to paradigm*. Cambridge: Cambridge University Press.

Woodbury, Anthony C. To appear. Conjugational double-classification: The separate life cycles of prefix classes vs. tone ablaut classes in aspect/mood inflection in the Chatino languages of Oaxaca, Mexico. In Matthew Baerman, Timothy Feist & Enrique Palancar (eds.), *Amerindia 41, Inflection class complexity in the Otomanguean languages of Mexico.*