Appendix

This appendix includes data showing the interface between Phonology and Syntax illustrated by the verbal structure and its interaction with grammatical and lexical tone in three Bantu languages spoken in the DRC: Lɔmɔ́ngɔ (C.61), Cilubà (L.31a) and Nzadi (B.865).

Lɔmɔ́ngɔ

Below we briefly describe the vocalic and tonal system of Lɔmɔ́ngɔ, and the grammatical categories encoded in the verb form. The main sources available consulted are De Rop (1958); Hulstaert (1934); Nurse (2008).

Phonetics

Lɔmɔ́ngɔ has seven vowels: /i, e, ɛ, a, ɔ, o, u/. The close-mid vowels /e, o/ and open-mid /ɛ, ɔ/ have semantic contrasting function among pairs as illustrated in the verbal stems below:

(1) a. *-kota-* 'climb on'
     b. *-kɔta-* 'cut'
     c. *-kóta-* 'become older'
     d. *-kɔ́ta* 'close securely'

There is /o, e/, and /ɔ, ɛ/ vowel harmony of affixes with a word stem. The suffix *-áké-* is not affected by harmony (De Rop 1958):

(2) a. *-lel-*   'cry'   *tó-fó-lel-é*   'we don't cry' (p. 6)
     b. *-sɛk-*   'laugh' *tɔ́-fɔ́-sɛk-ɛ́*   'we are not laughing' (p. 6)
     c. *-tswá-* 'go'   *a-ta-tswá-áké* 'he can't go' (p. 64)
     d. *-ɔtsw-* 'enter' *a-ta-ɔtsw-áké* 'he can't enter' (p. 64)

Lɔmɔ́ngɔ has two tone levels H, L, which can be combined in contour tones:

(3) a. â (falling)   HL /áà/
     b. ǎ (raising)   LH /àá/
     c. ã (rising-falling)   LHL /àáà/
     d. â′ (falling-raising) HLH /áàá/

Tone has contrastive value for lexical stems and it further denotes a grammatical function. In the verbal examples below, tone is used to discriminate between two different past meanings: Hodiernal or current day past (-*akí*) (4), and hesternal or previous day past (-*ákí*) (5):

(4)   Hodiernal (current day) past P_1
        ókelakí
        ó-kel-**ak**-í
        2SG-do-P_1-FV
        H-L-L-H
        'You did (today)'

(5)   Hesternal (previous day) past P_2
        ókelákí
        ó-kel-**ák**-í
        2SG-do-P_2-FV
        H-L-H-H
        'You did (yesterday)'

Verb Structure

Lɔmóngɔ is an aspect-oriented language, as it is characteristic of Bantu languages (Nurse, 2019:82–83). Nurse reports that Hulstaert (1966) identifies 44 (absolute positive) aspectual forms. Six of those aspectual categories appear to have tense distinctions: Perfective, Imperfective, Habitual, Progressive, Anterior, and Reinforced. Tense distinctions seem to encode flexible graded points within the limits of the temporal working memory of the speaker/hearer. There are two tenses for past: P_1 refers to a point of time near the speaker's current day time (Hodiernal), P_2 describes an anterior point of time in relation to the speaker time (Hesternal), and two tenses for future:

(6)   Future Tenses
        F_1 (simple)   [-- + íf(o) + R + a]
        F_2 (immediate)   [´ + (o) + R + a]

The morphosyntactic sequential structure of the verbal form is represented in (7) (Nurse 2008):

(7)   Pre-stem-S-NEG-TAM-(O)-stem-EXT-pre-FV-FV #O[1]

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1   S, O refer to pronominal Subject and Object infixes, with variations depending on the follow-

The examples (8)–(11) below illustrate stative verbs *bétsi* ('lie down', 'sleep') and *tsíkal* ('stay') in present, progressive, and hodiernal and hesternal past. The source for the examples below is the grammar by De Rop (1958).

(8)   [L-ø-R-í] Stative, present
       abét(s)í
       a-ø-bét(s)-í
       3SG-NULL-sleep-FV
       L-H-H
       'She is asleep.'

(9)   [H-y(o)-R -i] Stative, continuous
       áyobét(s)i
       á-yo-bét(s)-i
       3SG-PROG-lieDown-FV
       H-L-H-L
       'He is sleeping.'

(10)   [H-ko-R-í] Stative Past P$_1$
       ókobét(s)í
       ó-ko-bét(s)-í
       2SG-P$_1$-sleep-FV
       H-L-H-H
       'You were asleep'

(11)   [H-kó-R-í] Stative Past P$_2$
       ákótsíkí
       á-kó-tsík-í
       3SG-P$_2$ -stay-FV
       H-H-H-H
       'She stayed'

The examples below illustrate the present and the continuous of the verb of movement /-kɛnd-/ 'go'.

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ing consonant or vowel phoneme. Stems have a syllabic structure CV, VC, CVC, CVVC, (C)VCV. EXT stands for derivative morphemes. FV refers to final vowel. *-a,* stands for the unmarked value; *-i* marks anterior, past and stative verbs; *-e* marks subjunctive, distant or continuative present. The pre-FV: *-ak-* has various meanings.

(12)   Present [H-ø-R-a] (de Rop: 43)
        tɔ́kɛnda
        tɔ́-ø-kɛnd-a
        1PL-NULL-go-FV
        H-L-L
        'We leave'

(13)   Present continuous [H-y(ó)-R-e/+έ] (de Rop: 43)
        tɔ́yɔ́kɛndέ
        tɔ́-yɔ́-kɛnd-έ
        1PL-PROG-go-FV
        H-H-L-H
        'We are going'

Lɔmɔ́ngɔ extensions may encode some increment or reduction of the valency of the verb: Applicative, causative, passive, reciprocal, reverse, augmentative. The examples below are taken from Hulstaert (1934)

(14)   Applicative *-ela-*
        sang 'say' *-sang-lela-* 'to say to somebody'

(15)   Causative, *-ya-*
        wá 'to die' *wê-ya* 'to kill'

(16)   Passive *-âma-, -ema-, -ana-*
        kel 'to make' *kel-ama* 'to be made'

(17)   Reciprocal *-ana-*
        lang 'to love' *lang-ana* 'to love one another'

(18)   Reverse *-ola-*
        komb 'to close' *komb-ola* 'to open'

Table 1 summarizes Lɔmɔ́ngɔ indicative affirmative verbal forms, and Table 2 negative ones.

TABLE 1   Afirmative verbal form: Subject-TAM-Root-Final Vowel

S	TAM	FV	Example	Grammatical value	Gloss (source: De Rop 1958)
H	-ø-	-a	tɔ́-ø≠kɛnd-a	Present	'Nous partons' p. 43
L	-(ó)-	-e	a-ó≠táng-e	Distant Present	'Il opine'
H	-y(ó)-	-e	tɔ́-yɔ́≠kɛnd-ɛ́	Continuative	'Nous marchons' p. 45
L	-ifo-	-a	n-ífo≠kel-a	Future F_1	'Je ferai' p. 48
H	-o-	-a	tɔ́-ɔ̌≠kɛnd-a	Future F_2	'Nous allons partir' p. 48
H		-ak-í	á≠téfel-ak-í	Past P_1	'Il parlait' p. 47
H		-ák-í	á≠kol-ák-í	Past P_2	'Il prenait' p. 47
LH	-o(l)-	-a	bǎ-o≠kanel-a	Anterior hodiernal	'Ils ont pensé' p. 45
H	-ó(l)-	-a	á-ɔ́-l≠ɛ́n-ak-a	Anterior hesternal	'Il a vu' p. 46
L		-ak-a	a≠y-ak-a	HAB (costume)	'He used to come'
H	y(ǒ)-	-ak-a	ɔ́-yɔ̌≠ɛ́n-ak-a	HAB (souvent)	'Tu vois souvent' p. 50
H	-(ó)-	-ák-á	á-ó≠yá-ák-á	HAB (toujours)	'Il vient comme toujours' p. 51
H	-k(o)-	-i	ó-ko≠bét(s)-í	Stative, P_1	'Elle est couchée' p. 52
H	-k(ó)-	-i	á-kó≠tsík-í	Stative, P_2	'Elle était restée' p. 52

TABLE 2   Negative verbal form: Pre-Subject-NEG-TAM-Root-Final Vowel

S	NEG-TAM	FV	Example	Value	Gloss (source: De Rop 1958)
H	-f(ó)-	-e	m̀-pɔ́≠kɛnd-ɛ́	PRS	'Je ne pars pas' p. 60
H	-fóy(ó)-	-e	á-fóyɔ́≠kɛnd-ɛ́	Continuative	'Il ne marche pas' p. 60
H	-fa(ó)-	-a	ló-faó≠kel-a	FUT F_2	'Vous ne ferez pas' p. 62
L	-t(á)-	-ak-í	n-tsí≠lang-ak-í	PST P_1	'Je ne voulais pas' p. 62
L	-t(á)-	-ák-í	n-tsí≠lang-ák-í	PST P_2	'Je n'aimais pas' p. 62
L	-t(á)-	-a	n-tá≠ok-a	ANT hod	'Elle n'a pas entendu' p. 61
L	-t(á)-	-á	lo-tá≠ɔtsw-á	ANT hest	'Vous n'êtes pas entrés' p. 60
L	-ták(ó)-	-i	ba-tákó≠túng-i	Stative, P_2	'Ils n'étaient pas liés' p. 65

Cilubà

Two verbal inflection structures have been reported for Cilubà: agglutinative and synthetic complex verbal form. The agglutinative verbal structure is the form of the language variety described by Yukawa (1992). The synthetic complex structure is the

language variety described in the work by Phelps (2017). An important difference in both language varieties is the gradation of time. In the tense category of the language described in Phelps (2017) there is no graded past time. But in the language variety described by Yukawa (1992) past time is scaled in three grades:

– Remote past: Action occurs before or within a year: P_3
– Proximal past: Action occurs from 1 year to now: P_2
– Hodiernal past: On the day of speaking: P_1

The examples below illustrate these time grades:

(19) P_3, Remote past: [S-a-ka-(O)-stem-a] (Yukawa: 309, 2.1.1)
        twáakábabiikílá
        twá-a-ká-ba≠biikíl-á
        1SG-a-P_3-3PL-call-IPFV
        'I called them long ago'

(20) P_2 Proximal past: [S-a-ku-(O)-stem-a] (Yukawa: 311, 2.1.2)
        twáakúbabiikílá
        twá-a-kú-ba≠biikíl-á
        1SG-a-P_2-3PL-call-IPFV
        'I called them this year'

(21) P_1 Hodiernal past [S-a-(O)-stem-a] (Yukawa: 312, 2.1.3)
        twáábabiikílá
        twá-á-ba≠biikíl-á
        1SG-P_1-3PL-call-IPFV
        'I called them today'

Yukawa (1992) describes also as agglutinative verbal forms that contain an AUX preceded by a subject mark prefix (S-AUX) which express TA categories:

(22)   Present Progressive [S-*di*-S-(O)-stem-*a*] (Yukawa: 315, 2.1.4)
        túdítúyá
        tú≠di-tú≠yá
        1PL-BE.PRS-1PL-go-IPFV
        'We are going now'

(23)   Present Habitual [S-*tu*-S-(O)-stem-*a*] (Yukawa: 316, 2.1.5)
        utúuyá
        u-tú-u≠yá
        2SG-AUX.HAB-2SG-go-IPFV
        'You are used to going'

In the Cilubà variety described by Phelps (2017), TA categories are expressed by a synthetic verbal form. The S of the AUX verb agrees in person and number but the S prefixed to the main verb agrees only partially in class (number and gender) but not in person. Tense is expressed in the Auxiliary verb for present (PRS) and non-graded past (PST). The progressive present is used to express future time. Grammatical aspect categories are (im)perfective, progressive, habitual, persistive, completive, anterior.

– Perfective: -*a*; Imperfective -*e*
– Persistive: -*tʃi*- 'still': [S-tʃi≠AUX ...]
– Completive: -*ka*- 'already': [S-ka≠AUX ...]
– Habitual: -*tu*: [S≠tu ...]
– Anterior: -*aku*-: [S-aku≠stem-(I)PFV]

The sentences below illustrate those verbal structures.

(24)   Present (Phelps 2017, ex. 9)
         ndʒi ɲi:mba pindʒeju
         N≠dʒi   N≠i:mb-a   pindʒeju
         1SG.VA-AUX.PRS 1SG.VA-sing-IPFV now
         'I am singing now'

(25)   Past (Phelps 2017, ex. 8)
         mʋwa mukaŋule tʃibi
         N≠vwa   mu≠kaŋul-e   tʃi-bi
         1SG.VA-AUX.PST 1.AA-open-PTV 7-door
         'I opened the door'

(26)   Anterior (Phelps 2017, ex. 15)
         ŋakuʃipa mita:nda
         N-aku≠ʃip-a   mi-ta:nda
         1SG.VA-ANT-kill-IPFV 4-spider
         'I have killed the spiders'

(27)   Persistive (Phelps 2017, ex. 11)
         utʃidʒi udʒila
         u-tʃi≠dʒi   u≠dʒil-a
         1.VA-PER-AUX.PRS 1.VA-cry-IPFV
         'He is still crying now'

(28)   Completive (Phelps 2017, ex. 13)
         tukavwa badʒa
         tu-ka≠vwa   ba≠dʒ-a
         1PL.VA-COMPL-AUX.PST   2.AA-eat-IPFV
         'We have already eaten'

(29)   Habitual (Phelps 2017, ex. 14)
         Uvwa utu uloŋa
         u≠vwa   u≠tu   u≠loŋ-a
         1.VA-AUX.PST   1.VA-AUX.HAB   1.VA-study-IPFV
         'She used to study (Habitually)'

The studies of Yukawa (1992) and Phelps (2017) evidence important differences between the two varieties of Cilubà. The variety described by Yukawa (1992) seems to ease the melodic flow of tones. Is the complex synthetic verbal structure described in Phelps a Bantu innovation, an influence of the French verbal system, or a simplification of an older variety of Cilubà?

Nzadi

Nzadi has 7 contrastive quantity vowels: /i iː, u uː, e eː, o oː, ɛ ɛː, ɔ ɔː, a aː/. Syllables are mainly monosyllabic stems: CV, CVC, CVV, CVVC, and there is a systematic shortening of stems. Nzadi tone has grammatical and lexical value. There are two contrastive tone levels H, L, and combinations HL, LH, LHL.

Nzadi sentences are inflected by means of auxiliary morphemes and grammatical tone for TAM and Negation. There is no person or number subject agreement. The sequential structure of a simple sentence is (Crane et al. 2011: chap. 8):

(30)   a. (In)transitive sentence (Crane et al. 2011: § 8.2)
           S AUX V (DO) NEG
       b. Ditransitive sentence (Crane et al. 2011: § 8.3)
           S V IO DO NEG
           S V DO Obl NEG

The sentences below illustrate those sentences structures with verbs of movement ('go', 'come') and ditransitive 'give'.

(31) a. Itive intransitive (Crane: 163 ex 8.64)

    muur é kɛ búún

muur	é	kɛ	búún
person	AUX.PRS	go	Buun

    'the person is going to Buun'

  b. Ventive intransitive (Crane: 163, 3x 8.64)

    muur ê fé búún

muur	ê	fé	búún
person	AUX.PRS	come.from	Buun

    'the person is coming from Buun'

(32) a. Ditransitive (Crane: ex 8.6)

    bi ó pé bàán fufú

bi	ó	pé	bàán	fufú
1PL	AUX.PST	give	children	fufu

    'We gave the children fufu'

  b. Ditransitive negated (Crane: ex 8.99)

    mǐ ke pá ya fufú bɔ

mǐ	ke	pá	ya	fufú	bɔ
1SG	NEG.AUX.PST	give	you	fufu	NEG

    'I didn't give you fufu'

The subject is obligatory, either expressed by a lexical NP or by a pronoun. The AUX-ILIAR mark for TAM is also obligatory. TAM may be expressed by simple or complex periphrastic constructions.

    TENSES: Past, present, future. There are no degrees of past time. However, near and distant past can be expressed periphrastically (Crane, Table 7.1 p. 120).

    [*ó*-PST]: Examples for past tense sentences with AUX /ó/ are in (33a) for the affirmative, and (33b) for negative (Crane, § 7.2.1).

(33) a. *ó*-PAST: AUX mark: ó Stem: HL (Crane: ex 7.2, p. 122)

    mi ó kê   'I went'   kɛ

    mi ó dzâ   'I eat'   dzá

    mi ó báántsa   'I thought'   báántsa

  b. NEGATIVE PAST: S ko stem bɔ (Crane: ex 7.3)

    mǐ ko kɛ bɔ   'I didn't go'   kɛ

    mǐ ko dzá bɔ   'I didn't eat'   dzá

    mǐ ko bánta bɔ 'I din't think' báántsa

[*à*-PRS]. Examples of present tense sentences with AUX L-toned /a/ are in (34a) for the affirmative, and in (34b) for the negative.

(34) a. *a*-PRESENT (habitual or progressive): AUX mark: a Stem HL (Crane: ex 7.9, p. 125)
          mi a dzâ   'I eat/ I'm eating'   dzá
          mi a lyáà   'I cry/ I'm crying'   lyaa
          mi ó báántsa   'I thought'   báántsa
      b. NEGATIVE a-PRESENT
          mǐ ka lyáá bɔ   'I don't cry; I'm not crying'   lyaa
          mǐ ka dzá bɔ   'I'm not eating'   dzá

[FUT]. Future tense examples are in (35).

(35)   FUTURE: [a C-î-C]: AUX mark: a; stem: C-î-C (Crane: ex. 7.27, p. 129)
          mi a dzîdzá   'I'll eat'   dzá
          mi a lílyàà   'I'll cry'   lyaa
          mi a lîláá   'I cook'   láà
          mi a bíbáńtsa   'I think'   báántsa

[*éè*-PRS]. Examples of present tense sentences with aspectual progressive reading expressed by AUX /éè/ are in (36a) and (36b).

(36) a. *ê*-PRESENT (progressive): AUX mark: ê (éè) (Crane: ex 7.10, p. 125)
          mi ê dzé   'I'm eating'   dzá
          mi é lìí   'I'm crying'   lyaa
          mi é bálul   'I'm turning'   balul
          mi ê báńtsa   'I'm thinking'   báántsa
      b. ê-PRESENT negative (Crane, ex 7.12, p. 126)
          mǐ kê dzé bɔ   'I'm not eating' szá
          mǐ ké lìí bɔ   'I'm not crying' lyaa

ASPECT: Anterior ('perfect' aspect) is expressed by an explicit mark. Habitual and progressive are semantic values of the present. Examples of anterior aspect sentences with AUX /áà/ are in (37).

(37)   *â*-ANTERIOR: AUX mark: â stem: basic (Crane: ex 7.4, p. 123)
          mi á ɬyaa   'I have cried'   *ɬyaa*
          mi â dzá   'I have eaten'   *dzá*

Abbreviations

1SG	first person singular
2SG	second person singular
3SG	3rd person singular
1PL	first person plural
SG	singular
PL	plural
NEG	negation
V	verb
AUX	auxiliary verb
R	root
TA	tense, aspect
TAM	tense, aspect, mode
PFV	perfective aspect
IPFV	imperfective aspect
PROG	progressive aspect
HAB	habitual
COMPL	completive
ANT	anterior
PRS	present
PST	past
INF	infinitive
IMP	imperative
P_1	hodiernal past (current day)
P_2	hesternal past (day before)
P_3	remote past
F_1	future simple
F_2	future immediate
STAM	subject, tense, aspect, mode
SVO	subjects, verb, object
S	subject
O	object
DO	direct object
IO	indirect object
Obl	oblique
VA	verbal subject agreement prefix
AA	adjectival subject agreement prefix