

Udi Infixation in Information-based Morphology

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The paradoxical status of Udi subject agreement

- ▶ Udi subject agreement constitutes a famous analytical paradox at the syntax-morphology interface:
 - ▶ Phrasal affixation to focused constituents supports clitic status, cf. (1)
 - ▶ Realisation on the verb provides very strong evidence for lexical status:
 - ▶ infixation, cf. (2)
 - ▶ trapping
 - ▶ Morphological properties, e.g. allomorphy, is shared between lexical and phrasal attachment

(1) met'in-al burim sa yärävgä q'əzəl-*le* aq'sa
 this.ERG-AND apparently one bag.ABS gold.ABS-3SG take
 'She also apparently takes a BAG OF GOLD.' (Harris, 2002)

(2) äyel-en a-*t'u*-k'-e k'uč'an-ax
 child-ERG see₁-3SG.INV-see₂-AORII puppy-DAT
 'The child saw the puppy.' (Harris, 2002)

- ▶ Crysmann & Luís (2025) have addressed the morphosyntactic interface
- ▶ This talk addresses the treatment of morphology proper

Udi subject agreement

	General	Question	Inversion	Possession
1	-zu, -z		-za	-bez, -bes
SG 2	-nu, -n, -ru, -lu		-va	-vi
3	-ne, -re, -le	-a	-t'u	-t'a
1	-yan		-ya	-beš
PL 2	-nan, -ran, -lan		-va, -vaṇ	-eḟ
3	-q'un		-q'o	-q'o

Table: Udi subject agreement markers (Harris, 2002, p. 28)

- ▶ Three sets of markers: Allomorphic largely determined lexically
 - ▶ Inversion:
conditioned by a class of verbs that show alternate dative marking for subjects
 - ▶ Possession: used in possessive constructions (with copula) and with the verb *köfil* 'like'
 - ▶ General set used otherwise
- ▶ Allomorphy shared between lexical and phrasal realisation

Verbal attachment: Morphotactic patterns

- ▶ First inventory of placement patterns provided by Schulze (1982)

Placement of agreement can be

- ▶ verb-final
- ▶ preceding final TAM marker
- ▶ infixes into the root
- ▶ infixes into complex stem

1. V-T-Agr	pi-ne	‘he said’
2. V-T ¹ -Agr-T ²	pe-ne-i	‘he has said’
3. V ¹ -Agr-V ² -T	ba-ne-k-i	‘he was
4. Vn-Agr-Aux/V-T	aš-ne-biq’-e	‘he took work
5. Vn-Aux/V-T-Agr	lašq’o-bak-a-nan	‘you (pl) should marry’

Table: Morphotactic placement patterns for Udi subject agreement (Schulze, 1982, 169)

- ▶ Harris (2000, 2002) provides discussion about relative strength of placement factors

Morphotactics & TAM marking

- ▶ Primary TAM markers distinguish seven categories

- (e)sa* PRESENT

- i* AORIST1

- e* AORIST2

- a* SBJV

- o* FUTURE1

- al* FUTURE2

- a* IMPERATIVE

- ▶ Final past marker -*y* may combine with primary TAM markers to form secondary categories, e.g. -*esa* (PRS) ... -*y* (PST) = IMPERFECTIVE
- ▶ PST marker appears final
- ▶ FutureII marker (as well as Subjunctive and Imperative) immediately precede agreement marker
- ▶ Other primary TAM markers
 - ▶ generally follow agreement
 - ▶ occur between agreement and sub-minimal (C or CV) roots

Morphotactics & TAM marking

- (3) ič turinlek'er-ax nut' tämiz-b-al-*le*
self's shoe-DAT NEG clean-DO-FUTII-3SG
'She won't clean her shoes.' (Harris, 2002, 96)
- (4) gel-enk' ek'a yaq'a-b-al-*lu*
Gela-for what.ABSL road-DO-FUTII-2SG
'What will you send to Gela.' (Harris, 2002, 118)

► Factors determining morphotactics of agreement:

► TAM marking:

- Future II and subjunctive markers enforce placement to their immediate right
⇒ preempts infixation
⇒ preempts phrasal affixation
- Other TAM markers tend to follow (caveat: subminimal roots)
⇒ compatible with infixation
⇒ compatible with phrasal affixation

► Shape and complexity of stem

Morphotactics & complex bases

- ▶ Many Udi verbs are formed by incorporation of nouns and adjectives into light verbs
- ▶ Harris (2002, ch. 4.4) shows that these complex verbs are words (=syntactic atoms)
- ▶ Agreement markers are placed just before the rightmost light verb

- (5) a. zavod-a aš-*ne*-b-sa
factory-DAT work-3SG-DO-PRES
'She works in a factory.'
- b. me pasčay-en eč-es-*ne*-st'a ... kul
this king-ERG bring-INF-3SG-CAUS.PRES earth.ABS
cip-es-*ne*-st'a pak-i
spread-INF-3SG-CAUS.PRES garden-DAT
'This king has earth brought ...; he has it spread in the garden.'

Morphotactics & simple bases

► Suffixation

► Subminimal roots (C or CV)

- Primary TAM occurs between root and agreement (prosodically motivated)
- agreement suffixed to TAM marker

► Infixation

INTRA		INTER	
a- <i>t'u</i> -k'-sa	'sees (TR)'	ak'- <i>ne</i> -sa	'is visible (INTR)'
bi- <i>ne</i> -t'-sa	'sows (TR)'	bit'- <i>t'e</i> -sa	'is sown (INTR)'
bo- <i>ne</i> -x-sa	'boils (TR)'	box- <i>ne</i> -sa	'boils (INTR)'
u- <i>ne</i> -k-sa	'eats (TR)'	uk- <i>ne</i> -sa	'is edible (INTR)'

Table: Intra- and intermorphemic agreement (Harris, 2000, 127)

- Agreement infixed before last C of simple roots (CVC); cf. INTRA above for intramorphemic placements with transitives
- Intramorphemic placement is non-optimising, cf. Yu (2007)
- Intermorphemic placement, cf. INTER with intransitives may involve complex stems (Harris, 2002):

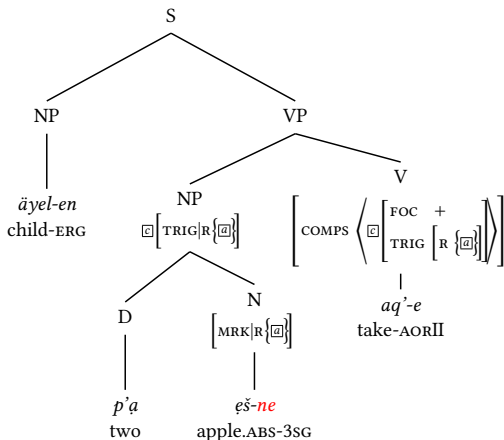
FutureII (*box-ey-al-le*) and AoristII (*box-ne-c-e*) witness a light verb

Discussion

- ▶ Harris (2002)
 - ▶ advocates an analysis as “endoclititics”
 - ▶ proposes an OT account in terms of alignment
- ▶ Problems:
 - ▶ Highly marked option, combining
 - ▶ infixation (cross-linguistically dispreferred) with
 - ▶ violation of lexical integrity (Lapointe, 1981)
 - ▶ Syntactic status of PM clitic unclear
 - ▶ weak pronoun analysis conflicts with doubling of lexical subjects
 - ▶ Non-modular: alignment constraints require full access to syntactic and morphological structure!

Morphosyntax (Crysmann & Luís, 2025)

- ▶ Udi subject agreement primarily lexical
- ▶ Phrasal affixation treated as displaced morphology
- ▶ Builds on Salehi & Koenig (2023) for Sorani
 - ▶ delegation of inflectional features to complement XP
 - ▶ realisation as edge inflection



Analysis

-2	-1	0	1	2	3	4	5	6
STM4	STM3	STM2	TNS1	OPT	AGR	STM1	TNS2	PST

Figure: Udi verb position classes

- ▶ Placement within the cluster is strict (e.g. optative precedes agreement)
 - ▶ Placement identical for all agreement markers
 - ▶ Variable morphotactics are determined by
 - ▶ type of TAM category
 - ▶ complexity/identity of stem
- ⇒ Placement of agreement marker is fixed (cf. Crysmann & Bonami, 2016)
- ⇒ Tense markers may precede/follow agreement
- ⇒ Stem material may wrap around agreement

Position classes

-2	-1	0	1	2	3	4	5	6
STM4	STM3	STM2	TNS1	OPT	AGR	STM1	TNS2	PST

Figure: Udi verb position classes

- ▶ PST marker assigned to final slot 6
- ▶ Agreement marker assigned fixed position 3:
 - ▶ preceded and followed by positions for TAM marking
- ▶ FutureII (and Imperative/Subjunctive) TAM assigned to fixed position 1
 - ▶ always precede agreement
- ▶ Other TAM markers show variable placement
 - ▶ position 1 (conditioned by stem phonology)
 - ▶ position 5 (default)
- ▶ Stem position
 - ▶ Presuffixal positions (0 or less)
 - ▶ Inter-suffixal position (4): light verbs and floating coda consonant

Sample analyses

-2	-1	0	1	2	3	4	5	6
		p	i		ne			

(a) Pattern 1, Table 2

-2	-1	0	1	2	3	4	5	6
		p	e		ne			i

(b) Pattern 2, Table 2

-2	-1	0	1	2	3	4	5	6
		ba			ne	k	i	

(c) Pattern 3, Table 2

-2	-1	0	1	2	3	4	5	6
		aš			ne	biq'	e	

(d) Pattern 4, Table 2

-2	-1	0	1	2	3	4	5	6
	yaq'a	b	al		lu			

(e) Pattern 5, ex. (4)

Figure: Position class analysis of Udi surface patterns

- ▶ Inferential-realisational model of morphology cast in typed-feature structure (Crysmann & Bonami, 2016)
- ▶ Neo-templatic approach to morphotactics
 - ▶ linear structure of segmentable morphs
 - ▶ indexed for position
- ▶ Words are pairings of
 - ▶ set of morphosyntactic properties (MS)
 - ▶ sequence of realising morphs (MPS)
 - ▶ set of delegated properties (DLS); (Aguila-Multner & Crysmann, 2024)
- ▶ Rules specify recipes for realisation
 - ▶ MUD picks out properties from MS,
 - ▶ contributing a list of morphs MPH to MPS,
 - or
 - ▶ delegating a set of features DEL for periphrastic realisation (DLS)

$$\begin{array}{c}
 \text{word} \rightarrow \\
 \left[\begin{array}{l}
 \text{PH} \quad \boxed{p_1} \oplus \dots \oplus \boxed{p_n} \\
 \left[\begin{array}{l}
 \text{MPS} \quad \boxed{e} \left(\boxed{e_1} \left[\text{PH} \quad \boxed{p_1} \right] \circ \dots \circ \boxed{e_n} \left[\text{PH} \quad \boxed{p_n} \right] \right) \\
 \text{MS} \quad \boxed{0} \left(\boxed{m_1} \uplus \dots \uplus \boxed{m_n} \right) \\
 \text{INFL} \quad \text{RR} \quad \left\{ \begin{array}{l} \left[\begin{array}{l} \text{MPH} \quad \boxed{e_1} \\ \text{MPS} \quad \boxed{e} \\ \text{MUD} \quad \boxed{m_1} \\ \text{MS} \quad \boxed{0} \\ \text{DEL} \quad \boxed{d_1} \\ \text{DLS} \quad \boxed{d} \end{array} \right] \dots \left[\begin{array}{l} \text{MPH} \quad \boxed{e_n} \\ \text{MPS} \quad \boxed{e} \\ \text{MUD} \quad \boxed{m_n} \\ \text{MS} \quad \boxed{0} \\ \text{DEL} \quad \boxed{d_n} \\ \text{DLS} \quad \boxed{d} \end{array} \right] \end{array} \right\} \\
 \text{DLS} \quad \boxed{d} \left(\boxed{d_1} \cup \dots \cup \boxed{d_n} \right)
 \end{array} \right]
 \end{array}
 \end{array}$$

Figure: Well-formedness

Exponence: subject agreement

- ▶ Exponence rules for agreement insert morphs in a fixed suffixal position, cf. (6)

Inflection class (choice agreement set) is a property of agreement, lexically assigned

$$(6) \left[\begin{array}{l} \text{MUD} \left\{ \begin{array}{l} \left[\begin{array}{l} agr \\ PER \quad 3 \\ NUM \quad sg \\ SET \quad inv \end{array} \right] \end{array} \right\} \\ \text{MPH} \left\langle \begin{array}{l} \left[\begin{array}{l} PH \quad t'u \\ PC \quad 3 \end{array} \right] \end{array} \right\rangle \\ \text{DEL} \quad \{\} \end{array} \right]$$

$$(7) \left[\begin{array}{l} \text{MUD} \quad \{\boxed{a} \ agr\} \\ \text{MS} \quad \left\{ \left[\begin{array}{l} TNS \quad aor \vee \quad prs \end{array} \right] \right\} \\ \text{MPH} \quad \langle \rangle \\ \text{DEL} \quad \{\boxed{a}\} \end{array} \right]$$

- ▶ Alternately, in certain tenses, agreement can be delegated to an external host, cf. (7)

Exponence: TAM

- ▶ Exponence rule for TAM minimally constrain shape (PH)

$$(8) \quad \text{a.} \begin{bmatrix} \text{MUD} \left\{ \left[\text{TNS } \textit{prs} \right] \right\} \\ \text{MPH} \left\langle \left[\text{PH } (\textit{e})\textit{sa} \right] \right\rangle \end{bmatrix} \quad \text{b.} \begin{bmatrix} \text{MUD} \left\{ \left[\text{TNS } \textit{fut2} \right] \right\} \\ \text{MPH} \left\langle \left[\text{PH } \textit{al} \right] \right\rangle \end{bmatrix}$$

- ▶ Variable position:
 - ▶ Class-specific assignment to position 1: *futureII* etc.
 - ▶ Adjacency to subminimal stem
 - ▶ Default (position 5)

$$(9) \quad \begin{bmatrix} \text{MUD} \left\{ \left[\text{TNS } \top \right] \right\} \\ \text{MPS} \left\langle \dots \left[\text{PC } \boxed{n} - 1 \right], \boxed{t} \dots \right\rangle \\ \text{MPH} \left\langle \boxed{t} \left[\text{PC } \boxed{n} 1 \vee 5 \right] \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{MPH} \left\langle \left[\text{PC } 5 \right] \right\rangle \right] \begin{bmatrix} \text{MPS} \left\langle \dots \left[\text{PH } \textit{C(V)}, \boxed{t} \dots \right] \right\rangle \\ \text{MPH} \left\langle \boxed{t} \left[\text{PC } 1 \right] \right\rangle \end{bmatrix} \begin{bmatrix} \text{MUD} \left\{ \left[\text{TNS } \textit{fut2} \vee \textit{subj} \vee \textit{imp} \right] \right\} \\ \text{MPH} \left\langle \left[\text{PC } 1 \right] \right\rangle \end{bmatrix}$$

Stem representation and selection

- ▶ Simple and complex stems are lexically represented in stem spaces (Bonami & Boye, 2001; Bonami & Crysmann, 2018)
- ▶ Complex bases representable as stem lists (Crysmann, 2021)

$$(10) \quad \left[\begin{array}{l} pid \\ STM \quad [] \\ STMS \quad \left[\begin{array}{l} PRS-ST \quad \left\langle \left[\boxed{b} \right] [PH \text{ box}], \right. \\ \left. [PH \text{ " "}] \right\rangle \\ AOR-ST \quad \left\langle \left[\boxed{b} \right], [PH \text{ c}] \right\rangle \\ FUT-ST \quad \left\langle \left[\boxed{b} \right], [PH \text{ (e)y}] \right\rangle \end{array} \right] \end{array} \right]$$

$$(11) \quad \left[\begin{array}{l} MUD \quad \left\{ [TNS \text{ } \textit{prs}] \right\} \\ MS \quad \left\{ \left[\begin{array}{l} STM \quad [\boxed{s}] \\ STMS \quad [PRS-ST \quad [\boxed{s}]] \end{array} \right], \dots \right\} \\ MPH \quad \left\langle [PH \text{ (e)sa}] \right\rangle \end{array} \right]$$

- ▶ Stem selection can be effected as a constraint on the exponence rules controlling the allomorphy (here: TAM), cf. Aguila-Multner & Crysmann (2024)

Stem introduction

- ▶ Stem introduction rules control stem placement and stem discontinuity
- ▶ Sub-minimal stems are presuffixal

$$(12) \left[\begin{array}{l} \text{MUD} \left\{ \left[\text{STM} \left\langle \boxed{s} [\text{PH } C(V)] \right\rangle \right\} \right\} \\ \text{MPH} \left\langle \boxed{s} [\text{PC } 0] \right\rangle \end{array} \right]$$

- ▶ Simple stems may split: distribute stem phonology onto separate morphs

$$(13) \left[\begin{array}{l} \text{MUD} \left\{ \left[\text{STM} \left\langle \boxed{s} [\text{PH } \boxed{i} \text{ } nestring + \boxed{f} \text{ } \text{“C”}] \right\rangle \right\} \right\} \\ \text{MPH} \left\langle \left[\begin{array}{l} \text{PH } \boxed{i} \\ \text{PC } 0 \end{array} \right], \left[\begin{array}{l} \text{PH } \boxed{f} \\ \text{PC } 4 \end{array} \right] \right\rangle \end{array} \right]$$

- ▶ Complex stems distributed across presuffixal and the intersuffix positions

$$(14) \left[\begin{array}{l} \text{MUD} \left\{ \left[\text{STM} \left[\boxed{s} \oplus \left\langle \boxed{p}, \boxed{f} \right\rangle \right] \right\} \right\} \\ \text{MPH} \left[\boxed{s} \oplus \left\langle \left[\boxed{p} [\text{PC } -1] \right], \left[\boxed{f} [\text{PC } 0 \vee 4] \right] \right\rangle \right] \end{array} \right]$$

Conclusion

- ▶ Present analysis of Udi agreement morphology complements the morphosyntactic treatment in Crysmann & Luís (2025)
- ▶ Infixation patterns in Udi
 - ▶ non-optimising
 - ▶ dependent on internal morphological structure
- ▶ Morphological take on infixation strengthens the view of hybrid lexical/phrasal affixation
- ▶ Morphology-syntax Interface for lexical and phrasal affixation builds on recent account of periphrasis (Salehi & Koenig, 2023; Aguila-Multner & Crysmann, 2024)

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