

Rule composition in morphology

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- A. The micromorphology hypothesis
- B. Rule composition
- C. Some explanations and interpretations
 - i. Anomalies in the sequence of rule applications
 - ii. Anomalies of nonmonotonicity
 - iii. Parallelisms between single rules and sequences of rules
- D. Conclusion

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The micromorphology hypothesis

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Affix-oriented version:

In the most adequate description of a language's morphology, an affix may be morphologically complex, i.e. a combination of other affixes.

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Rule-oriented version:

In the most adequate description of a language's morphology, a morphological rule may be morphologically complex, i.e. the composition of other morphological rules.

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Affix-oriented version:

In the most adequate description of a language's morphology, an affix may be morphologically complex, i.e. a combination of other affixes.

Rule-oriented version:

In the most adequate description of a language's morphology, a morphological rule may be morphologically complex, i.e. the composition of other morphological rules.

Descriptive grammars often tacitly assume the micromorphology hypothesis.

Example:

Soukka, Maria. 2000. *A descriptive grammar of Noon: A Cangin language of Senegal*. Munich: LINCOM Europa.

The micromorphology hypothesis

The inflection of the Noon adjective YAK 'big'

			Noun class	Indefinite	Definite		
					Location 1	Location 2	Location 3
Nondiminutive	Inanimate	sg	1	<i>wiyak</i>	<i>wiyakwii</i>	<i>wiyakwum</i>	<i>wiyakwaa</i>
			2	<i>fiyak</i>	<i>fiyakfii</i>	<i>fiyakfum</i>	<i>fiyakfaa</i>
			3	<i>miyak</i>	<i>miyakmii</i>	<i>miyakmum</i>	<i>miyakmaa</i>
			4	<i>kiyak</i>	<i>kiyakkii</i>	<i>kiyakkum</i>	<i>kiyakkaa</i>
			5	<i>piyak</i>	<i>piyakpii</i>	<i>piyakpum</i>	<i>piyakpaa</i>
			6	<i>jiyak</i>	<i>jiyakjii</i>	<i>jiyakjum</i>	<i>jiyakjaa</i>
	pl	1–3	<i>ciyak</i>	<i>ciyakcii</i>	<i>ciyakcum</i>	<i>ciyakcaa</i>	
		4–6	<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>	
	Animate	sg	<i>yiyak</i>	<i>yiyakyii</i>	<i>yiyakyum</i>	<i>yiyakyyaa</i>	
		pl	<i>biyak</i>	<i>biyakbii</i>	<i>biyakbum</i>	<i>biyakbaa</i>	
Diminutive	sg	<i>jiyak</i>	<i>jiyakjii</i>	<i>jiyakjum</i>	<i>jiyakjaa</i>		
	pl	<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>		

(Soukka 2000: 86ff)

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The inflection of the Noon adjective YAK 'big'

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Noun class					Location 1	Location 2	Location 3
Nondiminutive	Inanimate	sg	1	<i>wiyak</i>	<i>wiyakwii</i>	<i>wiyakwum</i>	<i>wiyakwaa</i>
			2	<i>fiyak</i>	<i>fiyakfii</i>	<i>fiyakfum</i>	<i>fiyakfaa</i>
			3	<i>miyak</i>	<i>miyakmii</i>	<i>miyakmum</i>	<i>miyakmaa</i>
			4	<i>kiyak</i>	<i>kiyakkii</i>	<i>kiyakkum</i>	<i>kiyakkaa</i>
			5	<i>piyak</i>	<i>piyakpii</i>	<i>piyakpum</i>	<i>piyakpaa</i>
			6	<i>jiyak</i>	<i>jiyakjii</i>	<i>jiyakjum</i>	<i>jiyakjaa</i>
	pl	1–3	<i>ciyak</i>	<i>ciyakcii</i>	<i>ciyakcum</i>	<i>ciyakcaa</i>	
		4–6	<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>	
	Animate	sg		<i>yiyak</i>	<i>yiyakyii</i>	<i>yiyakyum</i>	<i>yiyakyyaa</i>
		pl		<i>biyak</i>	<i>biyakbii</i>	<i>biyakbum</i>	<i>biyakbaa</i>
Diminutive	sg		<i>jiyak</i>	<i>jiyakjii</i>	<i>jiyakjum</i>	<i>jiyakjaa</i>	
	pl		<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>	

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			2	<i>fiyak</i>	<i>fiyakfii</i>	<i>fiyakfum</i>	<i>fiyakfaa</i>
			3	<i>miyak</i>	<i>miyakmii</i>	<i>miyakmum</i>	<i>miyakmaa</i>
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	pl	1–3	<i>ciyak</i>	<i>ciyakcii</i>	<i>ciyakcum</i>	<i>ciyakcaa</i>	
		4–6	<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>	
	Animate	sg		<i>yiyak</i>	<i>yiyakyii</i>	<i>yiyakyum</i>	<i>yiyakyyaa</i>
		pl		<i>biyak</i>	<i>biyakbii</i>	<i>biyakbum</i>	<i>biyakbaa</i>
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	pl	1–3	<i>ciyak</i>	<i>ciyakcii</i>	<i>ciyakcum</i>	<i>ciyakcaa</i>	
		4–6	<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>	
	Animate	sg		<i>yiyaak</i>	<i>yiyaakyii</i>	<i>yiyaakyum</i>	<i>yiyaakyaak</i>
		pl		<i>biyak</i>	<i>biyakbii</i>	<i>biyakbum</i>	<i>biyakbaa</i>
Diminutive	sg		<i>jiyak</i>	<i>jiyakjii</i>	<i>jiyakjum</i>	<i>jiyakjaa</i>	
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The micromorphology hypothesis

Noon adjectival inflections

			Noun class	Class marker
Nondiminutive	Inanimate	sg	1	<i>w-</i>
			2	<i>f-</i>
			3	<i>m-</i>
			4	<i>k-</i>
			5	<i>p-</i>
			6	<i>j-</i>
	Animate	sg	1–3	<i>c-</i>
			4–6	<i>t-</i>
		pl		<i>y-</i>
				<i>b-</i>
Diminutive	sg		<i>j-</i>	
		pl	<i>t-</i>	

Prefixal formative:

i-

Suffixal formatives:

Location 1

-ii

Location 2

-um

Location 3

-aa

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			Noun class	Class marker
Nondiminutive	Inanimate	sg	1	<i>w-</i>
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			3	<i>m-</i>
			4	<i>k-</i>
			5	<i>p-</i>
			6	<i>j-</i>
	Animate	sg	1–3	<i>c-</i>
			4–6	<i>t-</i>
			sg	<i>y-</i>
			pl	<i>b-</i>
Diminutive	sg		<i>j-</i>	
		pl	<i>t-</i>	

Prefixal formative:

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Suffixal formatives:

Location 1

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Nondiminutive	Inanimate	sg	1	<i>w-</i>
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			3	<i>m-</i>
			4	<i>k-</i>
			5	<i>p-</i>
			6	<i>j-</i>
	Animate	sg	1–3	<i>c-</i>
			4–6	<i>t-</i>
			sg	<i>y-</i>
			pl	<i>b-</i>
Diminutive	sg		<i>j-</i>	
		pl	<i>t-</i>	

Prefixal formative: *i-*

Suffixal formatives:

Location 1 *-ii*

Location 2 *-um*

Location 3 *-aa*

The micromorphology hypothesis

Noon adjectival inflections

			Noun class	Class marker
Nondiminutive	Inanimate	sg	1	<i>w-</i>
			2	<i>f-</i>
			3	<i>m-</i>
			4	<i>k-</i>
			5	<i>p-</i>
			6	<i>j-</i>
	Animate	sg	1–3	<i>c-</i>
			4–6	<i>t-</i>
		pl		<i>y-</i>
				<i>b-</i>
Diminutive	sg		<i>j-</i>	
		pl	<i>t-</i>	

Prefixal formative:

i-

Suffixal formatives:

Location 1 *-ii*

Location 2 *-um*

Location 3 *-aa*

The micromorphology hypothesis

The inflection of the Noon adjective YAK 'big'

		Noun class	Indefinite	Definite				
				Location 1	Location 2	Location 3		
Non-diminutive	Inanimate	sg	1	<i>wiyak</i>	<i>wiyakwii</i>	<i>wiyakwum</i>	<i>wiyakwaa</i>	
			2	<i>fiyak</i>	<i>fiyakfii</i>	<i>fiyakfum</i>	<i>fiyakfaa</i>	
			3	<i>miyak</i>	<i>miyakmii</i>	<i>miyakmum</i>	<i>miyakmaa</i>	
			4	<i>kiyak</i>	<i>kiyakkii</i>	<i>kiyakkum</i>	<i>kiyakkaa</i>	
			5	<i>piyak</i>	<i>piyakpii</i>	<i>piyakpum</i>	<i>piyakpaa</i>	
			6	<i>jiyak</i>	<i>jiyakjii</i>	<i>jiyakjum</i>	<i>jiyakjaa</i>	
		pl	1–3	<i>ciyak</i>	<i>ciyakcii</i>	<i>ciyakcum</i>	<i>ciyakcaa</i>	
			4–6	<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>	
		Animate	sg		<i>yiyak</i>	<i>yiyakyii</i>	<i>yiyakyum</i>	<i>yiyakya</i>
			pl		<i>biyak</i>	<i>biyakbii</i>	<i>biyakbum</i>	<i>biyakbaa</i>
Diminutive		sg		<i>jiyak</i>	<i>jiyakjii</i>	<i>jiyakjum</i>	<i>jiyakjaa</i>	
		pl		<i>tiyak</i>	<i>tiyaktii</i>	<i>tiyaktum</i>	<i>tiyaktaa</i>	

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The inflection of the Noon adjective YAK 'big'

			Noun class	Definite Location 2
Non-diminutive	Inanimate	sg	1	<i>wiyakwum</i>
			2	<i>fiyakfum</i>
			3	<i>miyakmum</i>
			4	<i>kiyakkum</i>
			5	<i>piyakpum</i>
			6	<i>jiyakjum</i>
	pl	1-3	<i>ciyakcum</i>	
		4-6	<i>tiyaktum</i>	
	Animate	sg	<i>yiakyum</i>	
		pl	<i>biyakbum</i>	
Diminutive	sg	<i>jiyakjum</i>		
	pl	<i>tiyaktum</i>		

The micromorphology hypothesis

The inflection of the Noon adjective YAK 'big'

			Noun class	Definite Location 2				
				-2	-1	Stem	1	2
Non- diminutive	Inanimate	sg	1	<i>w-</i>	<i>i-</i>	yak	<i>-w</i>	<i>-um</i>
			2	<i>f-</i>	<i>i-</i>	yak	<i>-f</i>	<i>-um</i>
			3	<i>m-</i>	<i>i-</i>	yak	<i>-m</i>	<i>-um</i>
			4	<i>k-</i>	<i>i-</i>	yak	<i>-k</i>	<i>-um</i>
			5	<i>p-</i>	<i>i-</i>	yak	<i>-p</i>	<i>-um</i>
			6	<i>j-</i>	<i>i-</i>	yak	<i>-j</i>	<i>-um</i>
	pl	1-3	<i>c-</i>	<i>i-</i>	yak	<i>-c</i>	<i>-um</i>	
		4-6	<i>t-</i>	<i>i-</i>	yak	<i>-t</i>	<i>-um</i>	
	Animate	sg	<i>y-</i>	<i>i-</i>	yak	<i>-y</i>	<i>-um</i>	
		pl	<i>b-</i>	<i>i-</i>	yak	<i>-b</i>	<i>-um</i>	
Diminutive	sg	<i>j-</i>	<i>i-</i>	yak	<i>-j</i>	<i>-um</i>		
	pl	<i>t-</i>	<i>i-</i>	yak	<i>-t</i>	<i>-um</i>		

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			Noun class	Definite Location 2				
				-2	-1	Stem	1	2
Non- diminutive	Inanimate	sg	1	w-	i-	yak	-w	-um
			2	f-	i-	yak	-f	-um
			3	m-	i-	yak	-m	-um
			4	k-	i-	yak	-k	-um
			5	p-	i-	yak	-p	-um
			6	j-	i-	yak	-j	-um
	pl	1-3	c-	i-	yak	-c	-um	
		4-6	t-	i-	yak	-t	-um	
	Animate	sg	y-	i-	yak	-y	-um	
		pl	b-	i-	yak	-b	-um	
Diminutive	sg	j-	i-	yak	-j	-um		
	pl	t-	i-	yak	-t	-um		

Prefixal
formative



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The inflection of the Noon adjective YAK 'big'

			Noun class	Definite Location 2					
				-2	-1	Stem	1	2	
Non-diminutive	Inanimate	sg	1	w-	i-	yak	-w	-um	
			2	f-	i-	yak	-f	-um	
			3	m-	i-	yak	-m	-um	
			4	k-	i-	yak	-k	-um	
			5	p-	i-	yak	-p	-um	
			6	j-	i-	yak	-j	-um	
			pl	1-3	c-	i-	yak	-c	-um
				4-6	t-	i-	yak	-t	-um
			Animate	sg	y-	i-	yak	-y	-um
				pl	b-	i-	yak	-b	-um
Diminutive			sg	j-	i-	yak	-j	-um	
			pl	t-	i-	yak	-t	-um	

Suffixal
formative



The micromorphology hypothesis

The inflection of the Noon adjective YAK 'big'

			Noun class	Definite Location 2				
				-2	-1	Stem	1	2
Non-diminutive	Inanimate	sg	1	w-	i-	yak	-w	-um
			2	f-	i-	yak	-f	-um
			3	m-	i-	yak	-m	-um
			4	k-	i-	yak	-k	-um
			5	p-	i-	yak	-p	-um
			6	j-	i-	yak	-j	-um
	pl	1-3	c-	i-	yak	-c	-um	
		4-6	t-	i-	yak	-t	-um	
	Animate	sg	y-	i-	yak	-y	-um	
		pl	b-	i-	yak	-b	-um	
Diminutive	sg	j-	i-	yak	-j	-um		
	pl	t-	i-	yak	-t	-um		

Class
markers

The micromorphology hypothesis

The inflection of the Noon adjective YAK 'big'

			Noun class	Prefixal concord	Stem	Definite suffix
Non-diminutive	Inanimate	sg	1	<i>w-i-</i>	<i>yak</i>	<i>-w-um</i>
			2	<i>f-i-</i>	<i>yak</i>	<i>-f-um</i>
			3	<i>m-i-</i>	<i>yak</i>	<i>-m-um</i>
			4	<i>k-i-</i>	<i>yak</i>	<i>-k-um</i>
			5	<i>p-i-</i>	<i>yak</i>	<i>-p-um</i>
			6	<i>j-i-</i>	<i>yak</i>	<i>-j-um</i>
	pl	1–3	<i>c-i-</i>	<i>yak</i>	<i>-c-um</i>	
		4–6	<i>t-i-</i>	<i>yak</i>	<i>-t-um</i>	
Animate	sg		<i>y-i-</i>	<i>yak</i>	<i>-y-um</i>	
	pl		<i>b-i-</i>	<i>yak</i>	<i>-b-um</i>	
Diminutive	sg		<i>j-i-</i>	<i>yak</i>	<i>-j-um</i>	
	pl		<i>t-i-</i>	<i>yak</i>	<i>-t-um</i>	

The micromorphology hypothesis

The inflection of the Noon adjective YAK 'big'

			Noun class	Prefixal concord	Stem	Definite suffix
Non-diminutive	Inanimate	sg	1	<i>w-i-</i>	yak	<i>-w-um</i>
			2	<i>f-i-</i>	yak	<i>-f-um</i>
			3	<i>m-i-</i>	yak	<i>-m-um</i>
			4	<i>k-i-</i>	yak	<i>-k-um</i>
			5	<i>p-i-</i>	yak	<i>-p-um</i>
			6	<i>j-i-</i>	yak	<i>-j-um</i>
	pl	1–3	<i>c-i-</i>	yak	<i>-c-um</i>	
		4–6	<i>t-i-</i>	yak	<i>-t-um</i>	
	Animate	sg		<i>y-i-</i>	yak	<i>-y-um</i>
		pl		<i>b-i-</i>	yak	<i>-b-um</i>
Diminutive		sg		<i>j-i-</i>	yak	<i>-j-um</i>
		pl		<i>t-i-</i>	yak	<i>-t-um</i>

The micromorphology hypothesis

Affix-oriented version:

In the most adequate description of a language's morphology, an affix may be morphologically complex, i.e. a combination of other affixes.

Rule-oriented version:

In the most adequate description of a language's morphology, a morphological rule may be morphologically complex, i.e. the composition of other morphological rules.

The micromorphology hypothesis

Affix-oriented version:

In the most adequate description of a language's morphology, an affix may be morphologically complex, i.e. a combination of other affixes.

Rule-oriented version:

In the most adequate description of a language's morphology, a morphological rule may be morphologically complex, i.e. the composition of other morphological rules.

Rule composition

Function composition

a. $f(n) = n \times 2$ (2 → 4)

b. $g(n) = n + 1$ (4 → 5)

c. $(g \circ f)(n) = (n \times 2) + 1$ (2 → 5)

Rule composition

a. $X\text{-ate} = V$ (*hyphen, valid* → *hyphenate, validate*)

b. $V\text{-ion} = N$ (*hyphenate, validate* → *hyphenation, validation*)

c. $X\text{-at-ion} = N$ (*hyphen, valid* → *hyphenation, validation*)

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Rule composition

The precise effects of rule composition (here represented as an operator ‘@’) depend on whether the rules involved are rules of inflectional realization or rules of derivation.

In addition, rules of affixation (whether they are inflectional or derivational) afford two possible conceptions of composition.

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The precise effects of rule composition (here represented as an operator ‘©’) depend on whether the rules involved are rules of inflectional realization or rules of derivation.

In addition, rules of affixation (whether they are inflectional or derivational) afford two possible conceptions of composition.

Rule composition

Consider first the case of realizational rules of **inflectional** affixation.

Rule A. $\{\alpha\}$: prefix $x-$

Rule B. $\{\beta\}$: suffix $-y$

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Consider first the case of realizational rules of **inflectional** affixation.

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Stem-centric
approach

Rule (B © A). $\{\alpha\} \cup \{\beta\}$: x -Stem- y

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Affix-centric
approach

Rule (B © A). $\{\alpha\} \cup \{\beta\}$: x - y -Stem

Rule composition

Consider now the case of rules of **derivational** affixation.

	Form	Category	Content
Rule A.	$X \rightarrow aX$	$C_1 \rightarrow C_2$	$[[X]] \rightarrow [[f(X)]]$
Rule B.	$X \rightarrow Xb$	$C_2 \rightarrow C_3$	$[[X]] \rightarrow [[g(X)]]$

Rule composition

Consider now the case of rules of **derivational** affixation.

	Form	Category	Content	
Rule A.	$X \rightarrow aX$	$C_1 \rightarrow C_2$	$\llbracket X \rrbracket \rightarrow \llbracket f(X) \rrbracket$	
Rule B.	$X \rightarrow Xb$	$C_2 \rightarrow C_3$	$\llbracket X \rrbracket \rightarrow \llbracket g(X) \rrbracket$	
Stem-centric approach	Rule (B © A).	$X \rightarrow aXb$	$C_1 \rightarrow C_3$	$\llbracket X \rrbracket \rightarrow \llbracket g(f(X)) \rrbracket$

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	Rule B.	$X \rightarrow Xb$	$C_2 \rightarrow C_3$	$\llbracket X \rrbracket \rightarrow \llbracket g(X) \rrbracket$
Stem-centric approach	Rule (B © A).	$X \rightarrow aXb$	$C_1 \rightarrow C_3$	$\llbracket X \rrbracket \rightarrow \llbracket g(f(X)) \rrbracket$
Affix-centric approach	Rule (B © A).	$X \rightarrow abX$	$C_1 \rightarrow C_3$	$\llbracket X \rrbracket \rightarrow \llbracket g(f(X)) \rrbracket$

Rule composition

Rule composition in Noon adjectival inflection

			Noun class	Class marker	
Nondiminutive	Inanimate	sg	1	<i>w-</i>	
			2	<i>f-</i>	
			3	<i>m-</i>	
			4	<i>k-</i>	
			5	<i>p-</i>	
			6	<i>j-</i>	
			pl	1–3	<i>c-</i>
				4–6	<i>t-</i>
	Animate	sg	<i>y-</i>		
		pl	<i>b-</i>		
Diminutive	sg	<i>j-</i>			
	pl	<i>t-</i>			

Prefixal formative: *i-*

Suffixal formatives:

Location 1	<i>-ii</i>
Location 2	<i>-um</i>
Location 3	<i>-aa</i>

Rule composition

Rule composition in Noon adjectival inflection

			Noun class	Class marker	Prefixal concord
Nondiminutive	Inanimate	sg	1	<i>w-</i>	Prefixal formative: <i>i-</i>
			2	<i>f-</i>	
			3	<i>m-</i>	
			4	<i>k-</i>	
			5	<i>p-</i>	
			6	<i>j-</i>	
	Animate	sg	1–3	<i>c-</i>	Suffixal formatives: Location 1 <i>-ii</i> Location 2 <i>-um</i> Location 3 <i>-aa</i>
			4–6	<i>t-</i>	
		pl			
Diminutive	sg		<i>j-</i>		
		pl		<i>t-</i>	

Rule composition

Rule composition in Noon adjectival inflection

Noun
class

Class
marker

Prefixal concord

Nondiminutive

Adjective inflection

Rule A. {inanimate sg 1} : prefix *w-*

Rule B. {} : prefix *i-*

Rule (A © B). {inanimate sg 1} : prefix *wi-*

If they compete, (A © B) overrides A, B.

i-

-ii
-um
-aa

Diminutive

sg
pl

j-
t-

Rule composition

Rule composition in Noon adjectival inflection

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Nondiminutive	Inanimate	sg	1	<i>w-</i>	Prefixal formative:	<i>i-</i>			
			2	<i>f-</i>					
			3	<i>m-</i>					
			4	<i>k-</i>					
			5	<i>p-</i>					
			6	<i>j-</i>					
	Animate	sg	1-3	<i>c-</i>	Suffixal formatives:	Location 1	<i>-ii</i>		
			4-6	<i>t-</i>				Location 2	<i>-um</i>
		pl		<i>y-</i>				Location 3	<i>-aa</i>
				<i>b-</i>					
Diminutive	sg		<i>j-</i>	Definite suffixes					
		pl	<i>t-</i>						

Rule composition

Rule composition in Noon adjectival inflection

Noun
class

Class
marker

Prefixal
concord

Nondi

Adjective inflection

Rule A. {inanimate sg 1} : prefix *w-*

Rule C. {def loc1} : suffix *-ii*

Rule (A © C). {def loc1 inanimate sg 1} : suffix *-wii*

If they compete, (A © C) overrides A, C.

i-

-ii

-um

-aa

Diminutive

sg
pl

j-
t-

Definite suffixes

Some explanations and interpretations

Some explanations and interpretations

The micromorphology hypothesis makes it possible to explain several otherwise puzzling phenomena and additionally affords new interpretations of various phenomena. The phenomena at issue include

- apparently anomalous sequences of rule application
- apparent instances of nonmonotonicity in morphology
- parallelisms between the application of single rules and that of sequences of rules

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Some explanations and interpretations

Anomalies in the sequence of rule applications

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Anomalous with respect to what?

In the canonical case, the expectation is that each morphological rule applies in a particular position in the sequence of rule applications defining a word form's morphology.

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{3 pl imperf ind pass}				
	<i>laudā-</i>	<i>-ba</i>	<i>-nt</i>	<i>-ur</i>
		↑	↑	↑
		realizes {imperf ind}	realizes {3 pl}	realizes {pass}
Rule block		I	II	III

Some explanations and interpretations

Anomalies in the sequence of rule applications

- a. A rule's order of application apparently depends on whether or not another rule applies.

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Fula

- *mball-u-mi-be-*'
help-TNS-1SG.SBJ-3PL.CL2.OBJ-FG
'I helped them'
- *mball-u-daa-mO-*'
help-TNS-2SG.SBJ-3SG.CL1.OBJ-FG
'you (sg.) helped him'

(Stump 1993: 165)

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help-TNS-2SG.OBJ-1SG.SBJ-FG
'I helped you (sg.)'
- *mball-u-daa-mO-*'
help-TNS-2SG.SBJ-3SG.CL1.OBJ-FG
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- *mball-u-mO-mi-*'
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By default, rules of **object suffixation** compose
with rules of **subject suffixation**;

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help-TNS-3SG.CL1.OBJ-1SG.SBJ-FG
'I helped him'

(Stump 1993: 165)

By default, rules of **object suffixation** compose
with rules of **subject suffixation**;
but {1 sg subj} : suffix *-mi* composes
with {2 sg obj} : suffix *-mA* and {3 sg cl.1 obj} : suffix *-mO*.

- a. A rule's order of application apparently depends on whether or not another rule applies.

Latin passives

- *audi -ō* 'I hear'
hear 1SG
 - *audī -s* 'you hear'
hear 2SG
 - *audi -o -r* 'I am heard'
hear 1SG PASS
 - *audī -r -is* 'you are heard'
hear PASS 2SG
-

- a. A rule's order of application apparently depends on whether or not another rule applies.

Latin passives

(i) {pass} : suffix *-r*

(i) composes with
{1 sg} : suffix *-ō*

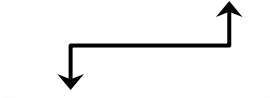
{2 sg} : suffix
composes with (i)

- *audi -ō* 'I hear'
hear 1SG
 - *audī -s* 'you hear'
hear 2SG
 - *audi*

<i>-ō</i>	<i>-r</i>
1SG	PASS

 'I am heard'
hear
 - *audī*

<i>-r</i>	<i>-is</i>
PASS	2SG

 'you are heard'
hear
- 

Some explanations and interpretations

Anomalies in the sequence of rule applications

- a. A rule's order of application apparently depends on whether or not another rule applies.
- b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

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Swahili relative affixes

Gender	1/2	3/4	5/6	7/8	9/10	11/10
sg	<i>ye</i>	<i>o</i>	<i>lo</i>	<i>cho</i>	<i>yo</i>	<i>o</i>
pl	<i>o</i>	<i>yo</i>	<i>yo</i>	<i>vyo</i>	<i>zo</i>	<i>zo</i>

(Ashton 1944:110ff)

b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

- *vitabu* *a-vi-soma-vyo* *Hamisi*
books.CL.8 SBJ:CL.1-OBJ:CL.8-read-REL:CL.8 Hamisi.CL.1
'the books which Hamisi reads'

b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

- *vitabu* *a-vi-soma-vyo* *Hamisi*
 books.CL.8 SBJ:CL.1-OBJ:CL.8-read-REL:CL.8 Hamisi.CL.1
 'the books which Hamisi reads'
- *vitabu* *a-na-vyo-vi-soma* *Hamisi*
 books.CL.8 SBJ:CL.1-TNS- REL:CL.8- OBJ:CL.8-read Hamisi.CL.1
 'the books which Hamisi is reading'

b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

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 books.CL.8 SBJ:CL.1-OBJ:CL.8-read-REL:CL.8 Hamisi.CL.1
 'the books which Hamisi reads'

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 books.CL.8 SBJ:CL.1-TNS- REL:CL.8- OBJ:CL.8-read Hamisi.CL.1
 'the books which Hamisi is reading'

- *vitabu* *a-si-vyo-vi-soma* *Hamisi*
 books.CL.8 SBJ:CL.1-NEG- REL:CL.8- OBJ:CL.8-read Hamisi.CL.1
 'the books which Hamisi doesn't read'

- b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

Swahili relative concord

III	II	A	I	STEM	A	
<i>a-</i>			<i>vi-</i>	<i>soma</i>	<i>-vyo</i>	'(books [<i>vi-tabu</i>]) that he reads'
SBJ			OBJ	read	REL	
<i>a-</i>	<i>na-</i>	<i>vyo-</i>	<i>vi-</i>	<i>soma</i>		'(books [<i>vi-tabu</i>]) that he is reading'
SBJ	TNS	REL	OBJ	read		
<i>a-</i>	<i>si-</i>	<i>vyo-</i>	<i>vi-</i>	<i>soma</i>		'(books [<i>vi-tabu</i>]) that he doesn't read'
SBJ	NEG	REL	OBJ	read		

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III	II	A	I	STEM	A	
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SBJ			OBJ	read	REL	
<i>a-</i>	<i>na-</i>	<i>-vyo</i>	<i>vi-</i>	<i>soma</i>		'(books [<i>vi-tabu</i>]) that he is reading'
SBJ	TNS	REL	OBJ	read		
<i>a-</i>	<i>si-</i>	<i>-vyo</i>	<i>vi-</i>	<i>soma</i>		'(books [<i>vi-tabu</i>]) that he doesn't read'
SBJ	NEG	REL	OBJ	read		

- b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

Relative concord rules such as

$\{\text{REL:}\{\text{CLASS:8}\}\}$: suffix *-vyo*

compose with Block II rules such as

$\{\text{pres}\}$: prefix *na-*
and

$\{\text{neg}\}$: prefix *si-*.

III	II	A
<i>a-</i>		
SBJ		
<i>a-</i>	<i>na-</i>	<i>-v</i>
SBJ	TNS	RE
<i>a-</i>	<i>si-</i>	<i>-v</i>
SBJ	NEG	RE

reads'

is reading'

doesn't read'

- b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

When they compete, the composed rules

{REL:{CLASS:8} pres} : prefix *na-vyo-*
and
{REL:{CLASS:8} neg} : prefix *si-vyo-*

override the simple rules

{pres} : prefix *na-*
and
{neg} : prefix *si-*.

III	II	A
<i>a-</i>		
SBJ		
<i>a-</i>	<i>na-</i>	<i>-v</i>
SBJ	TNS	RE
<i>a-</i>	<i>si-</i>	<i>-v</i>
SBJ	NEG	RE

reads'

is reading'

doesn't read'

- b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

Partial paradigms of two verbs in Fula

	'washed'			'was/were seated'		
	Relative past active			Stative (i) middle		
	SBJ stem	PRET	SBJ	SBJ	PRET	stem
1sg	<i>lootu</i>	<i>-nO</i>	<i>-mi</i>	<i>mi-don-</i>	<i>nO-</i>	<i>joodii</i>
2sg	<i>lootu</i>	<i>-nO</i>	<i>-daa</i>	<i>'a-don-</i>	<i>nO-</i>	<i>joodii</i>
3sg	<i>'o-</i>	<i>looti</i>	<i>-nO</i>	<i>'o-don-</i>	<i>nO-</i>	<i>joodii</i>
1pl	<i>min-</i>	<i>looti</i>	<i>-nO</i>	<i>min-don-</i>	<i>nO-</i>	<i>joodii</i>
2pl incl	<i>lootu</i>	<i>-nO</i>	<i>-den</i>	<i>'en-don-</i>	<i>nO-</i>	<i>joodii</i>
2pl excl	<i>lootu</i>	<i>-nO</i>	<i>-don</i>	<i>'on-don-</i>	<i>nO-</i>	<i>joodii</i>
3pl	<i>be-</i>	<i>looti</i>	<i>-nO</i>	<i>be-don-</i>	<i>nO-</i>	<i>joodii</i>

(Arnott 1970: 217f)

- b. Whether an affixation rule places its affix as a prefix or a suffix apparently depends on whether another rule applies.

Partial paradigms of two verbs in Fula

	‘washed’ Relative past active	‘was/were seated’ Stative (i) middle
	SBJ stem PRET SBJ	SBJ PRET stem
1sg	<i>lootu -nO -mi</i>	<i>mi-don- nO- joodii</i>
2sg	<i>lootu -nO -daa</i>	<i>'a-don- nO- joodii</i>
3sg	<i>'o- looti -nO</i>	<i>'o-don- nO- joodii</i>
1pl	<i>min- looti -nO</i>	<i>min-don- nO- joodii</i>
2pl incl	<i>lootu -nO -den</i>	<i>'en-don- nO- joodii</i>
2pl excl	<i>lootu -nO -don</i>	<i>'on-don- nO- joodii</i>
3pl	<i>be- looti -nO</i>	<i>be-don- nO- joodii</i>

(Arnott 1970: 217f)

Some explanations and interpretations

Anomalies in the sequence of rule applications

- a. A rule's order of application apparently depends on whether or not another rule applies.
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Past-tense forms of Pengo HUR 'see'

Agr	Singular	Plural
1 st	<i>hur-t-an</i>	EXCL. <i>hur-t-ap</i> , INCL. <i>hur-t-as</i>
2 nd	<i>hur-t-ay</i>	<i>hur-t-ader</i>
3 rd	m. <i>hur-t-an</i>	<i>hur-t-ar</i>
	f. <i>hur-t-at</i>	<i>hur-t-ik</i>
	n. <i>hur-t-in</i>	<i>hur-t-in</i>

(Burrow & Bhattacharya 1970: 62–70)

- c. The same rule apparently applies in various positions in the sequence of rule applications.

Past-tense forms of Pengo HUR 'see'

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1 st	<i>hur-t-aŋ</i>	EXCL. <i>hur-t-ap</i> , INCL. <i>hur-t-as</i>
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3 rd	m. <i>hur-t-an</i>	<i>hur-t-ar</i>
	f. <i>hur-t-at</i>	<i>hur-t-ik</i>
	n. <i>hur-t-iŋ</i>	<i>hur-t-iŋ</i>

(Burrow & Bhattacharya 1970: 62–70)

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2 nd		<i>hur-t-ay-na</i>	<i>hur-t-ader-na</i>
3 rd	m.	<i>hur-t-an-na</i>	<i>hur-t-ar-na</i>
	f.	<i>hur-t-at-na</i>	<i>hur-t-ik-n-ik</i>
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	f. <i>hur-t-at-na</i>	<i>hur-t-ik-n-ik</i>
	n. <i>hur-t-in-n-in</i>	<i>hur-t-in-n-in</i>

The rules {

- {1 sg} : suffix -an
- {3 pl fem} : suffix -ik
- {3 pl neut} : suffix -in

}

compose with the rule {perf} : suffix -na.

- c. The same rule apparently applies in various positions in the sequence of rule applications.

When they compete, the composed rules

{1 sg perf} : suffix *-n(a)-aŋ*

{3 pl fem perf} : suffix *-n(a)-ik*

{3 pl neut perf} : suffix *-n(a)-iŋ*

override the simple rule

{perf} : suffix *-na*.

Agr

1st

2nd

3rd

m.

f.

n.

hur-t-ah-na

(Burrow & Bhattacharya 1970: 62–70)

The rules

{1 sg} : suffix *-aŋ*

{3 pl fem} : suffix *-ik*

{3 pl neut} : suffix *-iŋ*

compose with the rule {perf} : suffix *-na*.

Some explanations and interpretations

Anomalies in the sequence of rule applications

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Huave (Huavean; Mexico)

t-e-kohč-ay-os

PAST-THEME-cut-REFL-1

'I cut (past) myself'

**t-e-kohč-as-ay*

PAST-THEME-cut-1-REFL

(Embick & Noyer 2001:576f)

- d. Two rules' order of application apparently depends on their interaction with a third rule.

Huave (Huavean; Mexico)

t-e-kohč-ay-os

PAST-THEME-cut-REFL-1

'I cut (past) myself'

**t-e-kohč-as-ay*

PAST-THEME-cut-1-REFL

t-e-kohč-as-ay-on

PAST-THEME-cut-1-REFL-PL

'we cut (past) ourselves'

**t-e-kohč-ay-as-on*

PAST-THEME-cut-REFL-1-PL

(Embick & Noyer 2001:576f)

- d. Two rules' order of application apparently depends on their interaction with a third rule.

Hua One suffixal block of rules:

t-e- (i) {pl} : suffix *-on*

PAST (ii) {refl} : suffix *-ay*

'I cu (iii) {1st} : suffix *-os*

t-e- (i) © (ii) {refl pl} : suffix *-ay-on*

PAST (iii) © (ii) {1st refl} : suffix *-ay-os*

'we [(i) ©(ii)] © (iii) {1st refl pl} : suffix *-as-ay-on*

(Embick & Noyer 2001:576f)

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Verbal affixes in Wolof

- *Gàllaay togg-al-e-na Faatu yàpp diwtiir*
 Gallaay cook-BEN-INST-FIN Faatu meat palm.oil
 “Gallaay cooked Faatu some meat with palm oil”
- *Gàllaay dóór-e-loo-na Faatu xeer b-i (ag) bant*
 Gallaay hit-INSTR-CAUS-FIN Faatu stone CL-the with stick
 “Gallaay made Faatu hit the stone with a stick”
- *Gàllaay bind-loo-al-na gan g-i xale y-i taalif*
 Gallaay write-CAUS-BEN-FIN guest CL-the child CL.PL-the poem
 “Gallaay made the children write the visitor a poem”

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Verbal affixes in Wolof

- *Gàllaay togg-d* *diwttiir*
 Gallaay cook-BEN palm.oil
 “Gallaay cooked palm oil”

(i) {ben} : suffix *-al*
 (ii) {inst} : suffix *-e*
 (iii) {caus} : suffix *-loo*
- *Gàllaay dóór-e* *b-i (ag) bant*
 Gallaay hit-INST CL-the with stick
 “Gallaay made a stick”

(ii) © (i)
 (iii) © {ii}
 (i) © (iii)
- *Gàllaay bind-loo-al-na gan g-i xale y-i taalif*
 Gallaay write-CAUS-BEN-FIN guest CL-the child CL.PL-the poem
 “Gallaay made the children write the visitor a poem”

Some explanations and interpretations

Anomalies of nonmonotonicity

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Anomalies of nonmonotonicity

The expectation is that a rule of morphology possesses the same intrinsic properties whether it applies alone or in combination with other rules. But there are anomalous cases in which this does not hold true.

Anomalies of nonmonotonicity

I will attribute such anomalies to a crucial difference between function composition in the mathematical domain and its counterpart in the formulation of a language's morphology.

The composition c of the mathematical functions f and g is such that for any x in the domain of f , $c(x) = g(f(x))$ by definition.

The “composition” c of two morphological rules r_1 and r_2 can become grammaticalized, allowing c to take on properties not directly stemming from r_1 and r_2 . In this way, the properties exhibited by a rule applying in isolation may not always be preserved when it is composed with other rules.

Anomalies of nonmonotonicity

I have therefore been distinguishing the mathematical function composition operator ‘ \circ ’ (which is rigid in its interpretation) from the morphological rule composition operator ‘ \textcircled{C} ’ (which signals a default interpretation subject to override).

Some explanations and interpretations

Anomalies of nonmonotonicity

- f. A rule's domain apparently depends on whether a particular rule applies subsequently.

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By default: rule $(r_2 \text{ } \textcircled{c} \text{ } r_1)$ applies to exactly the same stems as r_1 .

But once it is grammaticalized, $(r_2 \text{ } \textcircled{c} \text{ } r_1)$ may come to have a domain distinct from that of r_1 .

On one hand, $(r_2 \text{ } \textcircled{c} \text{ } r_1)$ may apply where r_1 does not.

<i>X</i>	<i>Xic</i>	<i>Xical</i>
<i>history</i>	<i>historic</i>	<i>historical</i>
<i>cycle</i>	<i>cyclic</i>	<i>cyclical</i>
<i>whimsy</i>	<i>*whimsic</i>	<i>whimsical</i>
<i>nonsense</i>	<i>*nonsensic</i>	<i>nonsensical</i>

On the other hand, r_1 may apply where $(r_2 \text{ } \textcircled{c} \text{ } r_1)$ does not.

<i>ion</i>	<i>ionic</i>	<i>*ionical</i>
<i>base</i>	<i>basic</i>	<i>*basical</i>

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Anomalies of nonmonotonicity

- f. A rule's domain apparently depends on whether a particular rule applies subsequently.
- g. A rule's productivity apparently depends on whether a particular rule applies subsequently.

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$$\begin{bmatrix} /X/ \\ V \\ Z \end{bmatrix} \leftrightarrow \begin{bmatrix} /Xable/ \\ A \\ \text{ABLE to be Zed} \end{bmatrix} \quad (\text{Bochner 1993: 91})$$

$$\begin{bmatrix} /X/ \\ A \\ Z \end{bmatrix} \leftrightarrow \begin{bmatrix} /Xity/ \\ N \\ \text{STATE of being Z} \end{bmatrix} \quad (\text{p. 88})$$

$$\begin{bmatrix} /X/ \\ V \\ Z \end{bmatrix} \leftrightarrow \begin{bmatrix} /Xability/ \\ N \\ \text{STATE of being ABLE to be Zed} \end{bmatrix} \quad (\text{p. 94})$$

- g. A rule's productivity apparently depends on whether a particular rule applies subsequently.

In the newspaper texts in the Corpus of Contemporary American English (COCA; Davies 2008–):

	Suffix	Productivity*
	<i>-ity</i>	.002
	<i>-able</i>	.008
	<i>-abil-ity</i>	.012
Cf.	<i>-ic</i>	.007
	<i>-ic-ity</i>	.004

- *i. e. potential productivity (Baayen 2003, 2009):
hapaxes with morphology m / tokens with m

- g. A rule's productivity apparently depends on whether a particular rule applies subsequently.

Citing examples of this sort noted by Aronoff 1976, Williams 1981 refers to this phenomenon as (e.g.) the *potentiation* of *-ity* by *-able*.

In our terms, the potentiation of *-ity* by *-able* refers to the fact that the composition of *-ity* with *-able* is more productive than *-ity* is on its own.

Some explanations and interpretations

Anomalies of nonmonotonicity

- f. A rule's domain apparently depends on whether a particular rule applies subsequently.
- g. A rule's productivity apparently depends on whether a particular rule applies subsequently.
- h. Two rules apparently realize less content separately than they do together.

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Finite conjugation of Old English SCIERAN 'cut, shear'

		Present	Past
Indicative	1 st -person singular	<i>scier-e</i>	<i>scear</i>
	2 nd -person singular	<i>scier-e-st</i>	<i>scēar-e</i>
	3 rd -person singular	<i>scier-e-þ</i>	<i>scear</i>
	Plural	<i>scier-aþ</i>	<i>scēar-o-n</i>
Subjunctive	Singular	<i>scier-e</i>	<i>scēar-e</i>
	Plural	<i>scier-e-n</i>	<i>scēar-e-n</i>
Imperative	Singular:	<i>scier</i>	
	Plural:	<i>scier-aþ</i>	

- h. Two rules apparently realize less content separately than they do together.

The rules

$\{pl\}$: suffix *-n* and $\{\}$: suffix *-e*

are composed as

$\{pl\}$: suffix *-e-n*,

which may be grammaticalized as

$\{sbjv\ pl\}$: suffix *-e-n*.

Finite co

Indicativ

Subjunct

Imperati

t, shear'

past

cear

cēar-e

cear

cēar-o-n

cēar-e

cēar-e-n

Some explanations and interpretations

Parallelisms between single rules and sequences of rules

Some explanations and interpretations

Parallelisms between single rules and sequences of rules

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.

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Swahili relative affixes

Gender	1/2	3/4	5/6	7/8	9/10	11/10
sg	<i>ye</i>	<i>o</i>	<i>lo</i>	<i>cho</i>	<i>yo</i>	<i>o</i>
pl	<i>o</i>	<i>yo</i>	<i>yo</i>	<i>vyo</i>	<i>zo</i>	<i>zo</i>

(Ashton 1944:110ff)

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.

Swahili relative affixes arising from verbal concords

	Verbal concords			Relative affix		
	Sg	Pl		Sg	Pl	
Class 1/2	sbj. <i>a-</i>	obj. <i>m-</i>	<i>wa-</i>	<i>o</i> (default)		<i>ye</i>
3/4	<i>u-</i>		<i>i-</i>	<i>o</i> (← <i>u-o</i>)		<i>yo</i> (← <i>i-o</i>)
5/6	<i>li-</i>		<i>ya-</i>	<i>lo</i> (← <i>li-o</i>)		<i>yo</i> (← <i>ya-o</i>)
7/8	<i>ki-</i>		<i>vi-</i>	<i>cho</i> (← <i>ki-o</i>)		<i>vyo</i> (← <i>vi-o</i>)
9/10	<i>i-</i>		<i>zi-</i>	<i>yo</i> (← <i>i-o</i>)		<i>zo</i> (← <i>zi-o</i>)
11/10	<i>u-</i>		<i>zi-</i>	<i>o</i> (← <i>u-o</i>)		<i>zo</i> (← <i>zi-o</i>)

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.

Swahili relative concord

III	II	A	I	STEM	A	
<i>a-</i>			<i>vi-</i>	<i>soma</i>	<i>-vyo</i>	'(books [<i>vi-tabu</i>]) that he reads'
SBJ			OBJ	read	REL	
↓						
<i>a-</i>	<i>na-</i>	<i>-vyo</i>	<i>vi-</i>	<i>soma</i>		'(books [<i>vi-tabu</i>]) that he is reading'
SBJ	TNS	REL	OBJ	read		
↓						
<i>a-</i>	<i>si-</i>	<i>-vyo</i>	<i>vi-</i>	<i>soma</i>		'(books [<i>vi-tabu</i>]) that he doesn't read'
SBJ	NEG	REL	OBJ	read		

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.

Swahili relative concord

III	II	A	I	STEM	A	
<i>wa-</i>			<i>vi-</i>	<i>soma</i>	<i>-ye</i>	'who read them (books [<i>vi-tabu</i>])'
SBJ			OBJ	read	REL	
<i>wa-</i>	<i>na-</i>	<i>-ye</i>	<i>vi-</i>	<i>soma</i>		'who are reading them (books [<i>vi-tabu</i>])'
SBJ	TNS	REL	OBJ	read		
<i>wa-</i>	<i>si-</i>	<i>-ye</i>	<i>vi-</i>	<i>soma</i>		'who don't read them (books [<i>vi-tabu</i>])'
SBJ	NEG	REL	OBJ	read		

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.

Swahili negation

V	IV	III	II	I	STEM	
<i>ha-</i>	<i>tu-</i>	<i>ta-</i>		<i>vi-</i>	<i>soma</i>	'we will not read them (= books [<i>vi-tabu</i>])'
NEG	SBJ	TNS		OBJ	read	
	<i>si-</i>	<i>ta-</i>		<i>vi-</i>	<i>soma</i>	'I will not read them (= books [<i>vi-tabu</i>])'
	NEG+SBJ	TNS		OBJ		

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.

Latin
passives

- *audi -ō* 'I hear'
hear 1SG
- *audi -o -r* 'I am heard'
hear 1SG PASS
- *audī -tis* 'you hear'
hear 2PL
- *audī -minī* 'you are heard'
hear 2PL.PASS

Some explanations and interpretations

Parallelisms between single rules and sequences of rules

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.
- j. A morphotactic restriction seems sensitive to a nonadjacent affix.

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Second-person singular imperative active forms in Sanskrit
(thematic conjugations)

Present-system conjugation	Member lexeme	Inflectional realization			
		C__	V__	—	portmanteau -āna
1 st (a)	BHŪ 'be'	-dhi	-hi		<i>bhava</i>
4 th (ya)	NAH 'bind'				<i>nahya</i>
6 th (á)	VIŚ 'enter'				<i>viśa</i>
10 th (aya)	CINT 'think'				<i>cintaya</i>

j. A morphotactic restriction seems sensitive to a nonadjacent affix.

Second-person singular imperative active forms in Sanskrit
(athematic conjugations)

Present-system conjugation	Member lexeme	Inflectional realization		
		C__ -dhi	V__ -hi	— portmanteau -āna
2 nd (root)	। 'go'		<i>i-hi</i>	
	DVIṢ 'hate'	<i>dviḍ-dhi</i>		
3 rd (redupl.)	BHṚ 'carry'		<i>bibhṛ-hi</i>	
5 th (<i>no</i>)	ĀP 'obtain'		<i>āpnu-hi</i>	
	SU 'press out'			<i>sunu</i>
7 th (-na- infix)	YUJ 'join'	<i>yuṅg-dhi</i>		
8 th (<i>o</i>)	KṚ 'do'			<i>kuru</i>
9 th (<i>nā</i>)	KRĪ 'buy'		<i>krīṇī-hi</i>	
	AŚ 'eat'			<i>aś-āna</i>

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Second-person singular imperative active forms in Sanskrit
(athematic conjugations)

Present-system conjugation	Member lexeme	Inflectional realization		
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2 nd (root)	I 'go'		<i>i-hi</i>	
	DVIṢ 'hate'	<i>dviṣ-dhi</i>		
3 rd (redupl.)	BHṚ 'carry'		<i>bibhṛ-hi</i>	
5 th (<i>no</i>)	ĀP 'obtain'		<i>āpnu-hi</i>	
	SU 'press out'			<i>sunu</i>
7 th (<i>-na-</i> infix)	YUJ 'join'	<i>yuñg-dhi</i>		
8 th (<i>o</i>)	KṚ 'do'			<i>kuru</i>
9 th (<i>nā</i>)	KRĪ 'buy'		<i>krīṇī-hi</i>	
	AŚ 'eat'			<i>aś-āna</i>

j. A morphotactic restriction seems sensitive to a nonadjacent affix.

Second-person singular imperative active forms in Sanskrit
(5th and 9th conjugations)

	ROOT	PRs-STEM SUFFIX	2SG	
5 th conjugation	<i>āp</i>	<i>-nu</i>	<i>-hi</i>	'obtain!'
	<i>su</i>	<i>-nu</i>		'press out!'
9 th conjugation	<i>krī</i>	<i>-ṇī</i>	<i>-hi</i>	'buy!'
	<i>aś</i>	<i>-āna</i>		'eat!'

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Second-person singular imperative active forms in Sanskrit
(5th and 9th conjugations)

PRS-STEM

The phonological conditions involve a root's final segment and an adjacent composed affix.

5 th conjugation	<i>ap</i>	<i>-na</i>	<i>-hi</i>	'press out!'
	<i>su</i>	<i>-nu</i>		
9 th conjugation	<i>krī</i>	<i>-ṇī</i>	<i>-hi</i>	'buy!'
	<i>aś</i>	<i>-āna</i>		'eat!'

j. A morphotactic restriction seems sensitive to a nonadjacent affix.

Chichewa

a-ku-máng-il-an-i:ts-a

~ *a-ku-máng-its-il-a:n-a*

3PL-PROG-tie-APPL-REC-CAUS-FV

‘they make each other tie with (a rope)’

(Ryan 2010: 762; Hyman 2003: 273)

Mapuche

lëllipu-ñma-fal-ye-nge-me-y

~ *lëllipu-ye-ñma-fal-nge-me-y*

request-IND.OBJ-FORCE-PL-PASS-TH-AGR

‘they have to be requested many things’

(Ryan 2010: 762; Smeets 1989: 361)

Chumbivilcas Quechua

kiki-la-n-kuna ~ *kiki-n-kuna-la*

self-just-3-PL

‘just themselves’

(Ryan 2010: 762; Muysken 1981: 295)

- j. A morphotactic restriction seems sensitive to a nonadjacent affix.

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a-ku-máng-il-an-i:ts-a

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self-just-3-PL

'just themselves'

(Ryan 2010: 762; Muysken 1981: 295)

In each of these cases, a composed rule and an adjacent simple rule reverse their order of application.

Some explanations and interpretations

Parallelisms between single rules and sequences of rules

- i. A simple rule seems to stand in paradigmatic opposition to a sequence of rules.
- j. A morphotactic restriction seems sensitive to a nonadjacent affix.
- k. Two affixes are partially alike.

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Primary and secondary agreement suffixes in Sanskrit
(active voice suffixes)

		Singular	Dual	Plural
Primary endings	1 st	<i>-mi</i>	<i>-vas</i>	<i>-mas</i>
	2 nd	<i>-si</i>	<i>-thas</i>	<i>-tha</i>
	3 rd	<i>-ti</i>	<i>-tas</i>	<i>-anti</i>
Secondary endings	1 st	<i>-m</i>	<i>-va</i>	<i>-ma</i>
	2 nd	<i>-s</i>	<i>-tam</i>	<i>-ta</i>
	3 rd	<i>-t</i>	<i>-tām</i>	<i>-an</i>

k. Two affixes are partially alike.

Pre-Sanskrit I:

- (i) {1 sg} : suffix *-m*
- (ii) {ind nonpast} : suffix *-i*

Pre-Sanskrit II:

- (i) {1 sg} : suffix
- (ii) {ind nonpast} : suffix
- (iii) (ii) © (i) - {1 sg ind nonpast} : suffix -

Sanskrit:

- (i) {1 sg} : suffix
- (ii) {ind nonpast} : suffix
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Sanskrit:

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Sanskrit:

- (i) {1 sg} : suffix *-m*
- (ii) {ind nonpast} : suffix *-i*
- (iii) (ii) © (i) - {1 sg ind nonpast} : suffix *-mi*

Conclusion

The evidence for rule composition suggests that an adequate theory of morphotactics requires a richer algebra than is generally assumed in current morphology.

Conclusion

A widespread assumption is that affixes are morphologically unanalyzable and therefore combine only with stems. The evidence discussed here suggests that an affix may combine with another affix to form a more complex affix.

Moreover, this is not clearly just an observation about affixes, but about rules: that is, the evidence suggests that morphological rules do not invariably apply directly to stems, but may compose with one another to produce more specific rules. Thus, the algebra of morphotactics should perhaps more accurately be called an algebra of “regulatactics”.

Conclusion

Other enrichments of current approaches to morphotactics seem similarly motivated. For example, certain kinds of evidence suggest that exponence relations are of two kinds. Consider, for example, the follow pair of Swahili sentences.

Vi-tabu *vi-me-anguka.*
 CL8-book **SBJ:CL8**-COMPL-fall.down
 'The books have fallen down.'

U-me-vi-ona *vi-tabu?*
 SBJ:2SG-COMPL-**OBJ:CL8**-see CL8-book
 'Have you seen the books?'

Conclusion

Other enrichments of current approaches to morphotactics seem similarly motivated. For example, certain kinds of evidence suggest that exponence relations are of two kinds.

Cor *vi-* intrinsic exponence: {{CLASS:8}} S.

positional exponence:	{SBJ:{}}	[position III]
	{OBJ:{}}	[position I]

The books have fallen down.

U-me-vi-ona

SBJ:2SG-COMPL-OBJ:CL8-see

'Have you seen the books?'

vi-tabu?

CL8-book

Conclusion

Consider likewise the following examples.

- *ni-ta-soma* 'I will read'
1SG-FUT-read
- *ha-tu-ta-soma* 'we will not read'
NEG-1PL-FUT-read
- *si-ta-soma* 'I will not read'
NEG.1SG-FUT-read
- *ni-si-some* 'that I may not read'
1SG-NEG.SBJV-read

Conclusion

Consider likewise the following examples.

<i>si-</i>	intrinsic exponence: {neg}	
	positional exponence: {SBJ:{1 sg} ind}	[position III]
		{sbjv} [position II]

- *si-ta-soma* 'I will not read'
NEG.1SG-FUT-read
- *ni-si-some* 'that I may not read'
1SG-NEG.SBJV-read

Conclusion

Intrinsic exponence, positional exponence and rule composition belong together in a carefully articulated theory of morphotactics.

Thank you;
your comments and
suggestions are welcome!