IGRA 02: Morphology IV

Leading Forms

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General idea:
Some member of a paradigm may act as a "leading form" in the sense that it determines properties of another member of the paradigm.

1. Wurzel on Leading Forms

Lit.: Wurzel (1984; 1987; 1990; 1998)

Wurzels Annahme:
Es gibt in komplexen Flexionsparadigmen sog. *Kennformen* (engl. *leading forms*).

- Kennformen sind gegenüber anderen Wortformen eines Paradigmas privilegiert.
- Kennformen signalisieren (relativ) eindeutig die Zugehörigkeit zu Flexionsklassen.
- Wenn man eine (oder mehrere) Kennformen kennt, kann man dan Rest des Formenbestand des Paradigmas erschließen, mit Hilfe von *Paradigmenstrukturbedingungen*.
- Kennformen sind also im Lexikon gespeichert; alle anderen Formen können durch Regeln abgeleitet werden. Die Endung der Kennform wirkt als *Flexionsklassenmerkmal*.
- Kennformen können, müssen aber *nicht* per se *Nominativformen* (und auch nicht Singularformen) sein.

Vgl. auch Carstairs-McCarthy (1994), Blevins (2004).

(1) *Starke feminine Flexionsklassen im Isländischen*

	Fa *vél* ('Maschine')	Fa′ *drottning* ('Königin')	Fi *mynd* ('Bild')	Fc1 *geit* ('Ziege')	Fc2 *vík* ('Bucht')
nom sg	vél-Ø	drottning-Ø	mynd-Ø	geit-Ø	vík-Ø
acc sg	vél-Ø	drottning-u	mynd-Ø	geit-Ø	vík-Ø
dat sg	vél-Ø	drottning-u	mynd-Ø	geit-Ø	vík-Ø
gen sg	vél-ar	drottning-ar	mynd-ar	geit-ar	vík-ur
nom pl	vél-ar	drottning-ar	mynd-ir	geit-ur	vík-ur
acc pl	vél-ar	drottning-ar	mynd-ir	geit-ur	vík-ur
dat pl	vél-um	drottning-um	mynd-um	geit-um	vík-um
gen pl	vél-a	drottning-a	mynd-a	geit-a	vík-a

Was sind die Kennformen?

Die Kennformen sind (v.a.) Nominativ- und Akkusativ-Plural-Formen, in einem Fall auch Genitiv-Singular-Formen.
Analyse der starken femininen Deklinationen bei Wurzel
Generalisierungen:

- Fi braucht keine lexikalische Spezifikation (kein Flexionsklassenmerkmal).
- Fa braucht /ar/ für Nom./Akk.Pl. als lexikalische Spezifikation.
- Fc1 braucht /ur/ für Nom./Akk.Pl. als lexikalische Spezifikation.
- Fc2 braucht /ur/ für Gen.Sg. als lexikalische Spezifikation (d.h., die Genitiv-Singularform ist die Kennform der Flexionsklasse).

(2) *Paradigmenstrukturbedingungen*

a. (i) [+subst] → [*um*/Dat.Pl.]
(ii) [+subst,-K-V] → [*a*/Gen.Pl.]
(iii) [+subst,+fem,#σ#] → [Ø/Dat./Akk.Sg.]
(i) [*ir*/Nom/Akk.Pl.] → [*ar*/Gen.Sg.]
(ii) [*ar*/Nom/Akk.Pl.] → [*ar*/Gen.Sg.]
(iii) [*ur*/Gen.Sg.] → [*ur*/Nom/Akk.Pl.]

Bemerkung: [-K] = auf Konsonant endend; [-V] = auf schweren Vokal endend; #σ# = Einsilbigkeit

Probleme

(3) *Alle Flexionsklassen*

	1 Ma	2 Na	3 Fa(′)	4 Mi	5 Fi	6 Mu	7 Mc	8 Fc1	9 Fc2	10 Mw	11 Nw	12 Fw
nom sg	ur	Ø	Ø	ur	Ø	ur	ur	Ø	Ø	i	a	a
acc sg	Ø	Ø	Ø (u)	Ø	Ø	Ø	Ø	Ø	Ø	a	a	u
dat sg	i	i	Ø (u)	Ø	Ø	i	i	Ø	Ø	a	a	u
gen sg	s	s	ar	ar	ar	ar	ar	ar	ur	a	a	u
nom pl	ar	Ø	ar	ir	ir	ir	ur	ur	ur	ar	u	ur
acc pl	a	Ø	ar	i	ir	i	ur	ur	ur	a	u	ur
dat pl	um	um	um	um	um	um	um	um	um	um	um	um
gen pl	a	a	a	a	a	a	a	a	a	a	(n)a	(n)a

Gibt es hier zuverlässige Kennformen?

Problem:
More generally, the assumption seems to be untenable that one will always find morphological exponents that are inflection-class specific. (This also argues against the constraints on paradigm economy suggested by Carstairs-McCarthy (1994) (No Blur Principle) and Noyer (2005) (Interclass Syncretism Constraint).)

Question:
Where do the Kennformen come from? How can the learner identify them?

2. McCarthy on Optimal Paradigms

Lit.: McCarthy (2005)

(4) *Paradigm*:
A paradigm is a set of inflected forms based on a common lexeme or stem, e.g., <*lighten, lightens, lightened, lightening*>.

(5) *Candidates*:
Candidates consist of entire paradigms. Every output realization of a lexeme stands in correspondence with every other output realization of that lexeme. (There is an intraparadigmatic correspondence relation R_{OP} on PxP.)

(6) *Optimal paradigm (OP) constraints*:
There are output/output faithfulness constraints for members of a paradigm.

(7) Predictions:
a. *Attraction to the unmarked*
b. *Overapplication only*
c. *Majority rules*

(8) *Constraints*:
a. *$\mu\mu\mu_\sigma$:
No trimoraic syllables
b. App-σ:
Do not link a coda consonant directly to the σ node as an appendix.
c. OP-Id-Wt:
No vowel length alternation in a paradigm.
d. IO-Id-Wt:
Preserve the vowel length of the input.

(9) *Arabic verbs and optimal paradigms: Vowel length*:

/faʕaːl/ + {a, tu, ...}	*$\mu\mu\mu_\sigma$	*App-σ	OP-Id-Wt	IO-Id-Wt
☞O_1: <faʕala, faʕaltu, ...>				**
O_2: <faʕaːla, faʕaːl$_\sigma$tu, ...>		*!		
O_3: <faʕala, faʕal$_\mu$tu, ...>	*!			
O_4: <faʕala, faʕaltu, ...>			*!	*

Note:
Here the leading form (which determines the properties of other forms in the same paradigm) is not stipulated. It is picked by the two high-ranked markedness constraints (which require a short *a* for the *-tu* form: attraction to the unmarked), and the ranking OP-Id-Wt ≫ IO-Id-Wt then ensures that this property spreads to the *-a* form where it is not intrsinsically motivated (overapplication of vowel shortening).

(10) *Arabic verbs and optimal paradigms: Epenthesis*:

/faʕl/ + {a, tu, ...}	*$\mu\mu\mu_\sigma$	*App-σ	OP-Dep-V	IO-Dep-V
☞O_1: <faʕila, faʕiltu, ...>				**
O_2: <faʕla, faʕl$_\sigma$tu, ...>		*!		
O_3: <faʕla, faʕl$_\mu$tu, ...>	*!			
O_4: <faʕla, faʕiltu, ...>			*!	*

"Epenthesis metastasizes throughout the paradigm, even in forms where it is not required for markedness reasons."

(11) *Moroccan Arabic verbs: Majority rules*:

/ʃərb/ + {t, na, ti, tu, u, ət}	*ə]$_\sigma$	*CCC	OP-Max-V	SonCon	IO-Max-V	IO-Dep-V
☞O_1: <ʃrəb, ʃrəbt, ʃrəbna, ʃrəbti, ʃrəbtu, ʃərbu, ʃərbet>			20x*	*	5x*	5x*
O_2: <ʃərb, ʃrəbt, ʃrəbna, ʃrəbti, ʃrəbtu, ʃərbu, ʃərbet>			24x*!		4x*	4x*
O_3: <ʃrəb, ʃrəbt, ʃrəbna, ʃrəbti, ʃrəbtu, ʃrəbu, ʃrəbet>	*!*			*	7x*	7x*
O_4: <ʃərb, ʃərbt, ʃərbna, ʃərbti, ʃərbtu, ʃərbu, ʃərbet>		*!***				

Note:
Completely uniform candidates (O_3, O_4) fatally violate high-ranked markedness constraints. These constraints are satisfied by O_1, O_2, which only differ with respect to *3.masc.sg.* forms (the first member of the paradigm). O_1 wins because "the CCəC pattern is better represented in the reset of the paradigm" than the CəCC pattern. (Note: Low ranking of IO-faithfulness implies that the input could also have been different. Also note: 20 = 5x2x2, 24 = 4x3x2: All stems are equally important for this constraint, i.e., OP-Max-V is violated for *ər* stems by *rə* stems, and for *rə* stems by *ər* stems).

Also note:
Majority rules can only become relevant here because of a low ranking for the markedness constraint SonCon. Otherwise, there would be attraction to the unmarked.

3. Albright on Leading Forms

Lit.: Albright (2002; 2008), Albright & Hayes (2002)

Case study (Albright (2008)): Nominal paradigms in Yiddish.

(12) a. Middle High German (MHG):
/bund/, /bundə/ → [bunt], [bundə]

b. Yiddish (NEY):
/bund/, /bundə/ → [bund], [bundə]

Problem for Optimal Paradigms model:
The Yiddish change is unexpected since the model relies on overapplication only (of devoicing, in the case at hand).

(13) *Optimal Paradigms: Overapplication only*

a. *No OP effect*

/bund/, /bund-ə/	FinDevoi	IO-Id(voi)	OP-Id(voi)
☞O_1: [bunt], [bundə]		*	*
O_2: [bunt], [buntə]		*!*	
O_3: [bund], [bundə]	*!		

b. *OP effect*

/bund/, /bund-ə/	OP-Id(voi)	FinDevoi	IO-Id(voi)
O_1: [bunt], [bundə]	*!		*
☞O_2: [bunt], [buntə]			**
O_3: [bund], [bundə]		*!	

(14) *Final devoicing in MHG*:

a. Voiced obstruents

Stem	NomSg	GenSg	NomPl	gloss
lob-	lop	lobes	lobe	'praise'
rad-	rat	rades	reder	'wheel'
wëg	wëc	wëges	wëge	'way'

b. Voiceless obstruents

Stem	NomSg	GenSg	NomPl	gloss
blat-	blat	blates	bleter	'leaf'
roc-	roc	rockes	röcke	'overcoat'
schif-	schif	schifes	schiffe	'ship'

(15) *Analogical leveling in Modern Northeast Yiddish (NEY)*:

Stem	Sg	Pl	gloss	MHG Sg
loyb-	loyb	loybən	'praise'	lop
rɔd-	rɔd	reder	'wheel'	rat
veg-	veg	vegən	'way'	wëc
hoyz-	hoyz	hayzər	'house'	huːs

(16) *Persistence of devoicing outside the paradigm in NEY*:

Sg.	Pl.	derivationally related word
veg	vegən	a-vek ('away')
faynd	faynd	faynt hɔbən ('come to hate')

(17) *Persistence of devoicing in word-final obstruent clusters*:

1sg	lib	1pl	libən
2sg	lipst	2pl	lipt
3sg	lipt	3pl	libən

Note:
This implies that the absence of devoicing in (15) in NEY is a paradigmatic (morphophonological) effect, not a genuine phonological effect, and that it does not go hand in hand with a change in inputs.

(18) *Constraints*:

a. Faithfulness constraints:
(i) Ident(voi):
Preserve underlying voicing value.
(ii) $\text{Ident}_{\text{Onset}}$(voi):
Preserve voicing in onset position.
(iii) $\text{Ident}_{\text{LexCat}}$(voi):
Preserve voicing within roots of lexical categories.

b. Markedness constraints:
(i) $\text{FinDevoi}_{\text{O}}$:
No faithfully voiced obstruents in coda position.
(ii) $\text{FinDevoi}_{\text{N}}$:
No derived (new) voiced obstruents in coda position.
(iii) *DD#:
No word-final sequences of voiced obstruents.
(iv) Agree:
Consecutive obstruents may not have conflicting [voice] specifications.
(v) Agree/__#:
Consecutive obstruents may not have conflicting [voice] specifications at the ends of words.

(19) *Ranking* (in stochastic OT):
Agree/__# ≫ $\text{Ident}_{\text{Onset}}$(voi), *DD# ≫ $\text{FinDevoi}_{\text{N}}$, Agree, $\text{Ident}_{\text{LexCat}}$(voi) ≫ $\text{FinDevoi}_{\text{O}}$ ≫ Ident(voi)

Note:
In (19), "≫" stands for no (or hardly any) overlapping domains of constraints, "," stands for overlapping domains, with the relative (non-categorical) ranking corresponding to the order presentation.

(20) *Crucial partial ranking for MHG and NEY*:

a. MHG:
$\text{FinDevoi}_{\text{O}}$ ≫ $\text{Ident}_{\text{LexCat}}$(voi), Ident(voi)

b. NEY:
IDENT$_{\text{LexCat}}$(VOI) ≫ FINDEVOI$_{\text{O}}$ ≫ IDENT(VOI)

(21) *Absence of final devoicing in Yiddish: Conspiracy of regular constraints*

/bund/, /bund-ə/	IDENT$_{\text{LexCat}}$(VOI)	FINDEVOI$_{\text{O}}$	IDENT(VOI)
O$_1$: [bunt], [bundə]	*!		*
O$_2$: [bunt], [buntə]	*!*		**
☞O$_3$: [bund], [bundə]		*	

Note:
This simple analysis seems to work well for Yiddish; by taking into account all the other constraints, all other data where one can or must have devoicing after all can be accomodated.

(22) *Blocking of final voiced+voiced sequences in Yiddish*:

/lib-t/	*DD#	AGREE	IDENT$_{\text{LexCat}}$(VOI)	FINDEVOI$_{\text{O}}$	IDENT(VOI)
O$_1$: [libt]		*!		*	
O$_2$: [libd]	*!			**	*
☞O$_3$: [lipt]			*		*

Another case: (Variation in) regressive devoicing.

(23) a. *Regressive devoicing in /abta/*

/abta/	IDENT$_{\text{Onset}}$(VOI)	FINDEVOI$_{\text{N}}$	AGREE	IDENT$_{\text{LexCat}}$(VOI)	FINDEVOI$_{\text{O}}$	IDENT(VOI)
O$_1$: [abta]			*!		*	
O$_2$: [abda]	*!			*	*	*
☞O$_3$: [apta]				*		*

b. *No regressive voicing in /apta/*

/apda/	IDENT$_{\text{Onset}}$(VOI)	FINDEVOI$_{\text{N}}$	AGREE	IDENT$_{\text{LexCat}}$(VOI)	FINDEVOI$_{\text{O}}$	IDENT(VOI)
☞O$_1$: [apda]			*			
O$_2$: [abda]		*!		*		*
O$_3$: [apta]	*!			*		*

Situation so far:
The analysis works technically. However: At no point does the concept of a *leading form* (a "base", in Albright's terminology) play a role in the analysis. This changes in the last five pages of the paper, where an alternative (?) analysis is presented that is based on the model developed in Albright (2002). The new approach replaces IDENT$_{\text{LexCat}}$(VOI) with BASEIDENT$_{\text{pl}}$ which requires faithfulness to a *preselected plural base form*.

(24) *Absence of final devoicing in Yiddish: Paradigmatic leveling*

a. Plural form without devoicing:

/bund-ə/	BASEIDENT$_{\text{pl}}$	FINDEVOI$_{\text{O}}$	IDENT(VOI)
☞O$_1$: [bundə]			
O$_2$: [buntə]			*!

b. Singular form without devoicing (so as to match the plural form):

/bund/	BASEIDENT$_{\text{pl}}$	FINDEVOI$_{\text{O}}$	IDENT(VOI)
☞O$_1$: [bund]		*	
O$_2$: [bunt]	*!		*

Question:
How is the plural form selected as the base form (leading form)?

Answer:
The plural form is the most informative part of the paradigm. It is "the form that most clearly exhibits lexical contrasts and extending the plural variant does the least violence to recoverability" (p. 300). "See Albright (2002) for details and algorithmic implementation." (Crucial concepts: reliability score of rules (hits divided by scope), adjustment by confidence scores, etc.)

Hunch:
It might in principle be possible (though perhaps less plausible) to carry out leading form determination in inflectional morphology in OT *within* OT (rather than by invoking some algorithm like the Minimal Generalization Learner of Albright (2002)). As a matter of fact, there is already such a proposal: Sympathy theory (McCarthy (1999)).

4. McCarthy on Sympathy Theory

Lit.: McCarthy (1999)

Problem:
Instances of opaque rule application in derivational phonology (counter-bleeding, counter-feeding) cannot straightforwardly be accounted for in representational optimality-theoretic phonology ("harmonic parallelism").

(25) *Counter-bleeding in Tiberian Hebrew*:

a. Epenthesis into final clusters:
/melk/ → mel̲ex "king"

b. ʔ-Deletion outside onsets:
/qaraʔ/ → qārā_ "he called"

c. Interaction – Epenthesis → ʔ-Deletion:
/dešʔ/ → dešḛʔ → deše_ "tender grass"

Note:
Standard (parallel) optimality theoretic can only produce the result of transparent rule application: **deš*.

McCarthy's (1999) idea:
The intermediate stage of the derivation in (25-c), viz., *dešẹ̲*ʔ, corresponds to a candidate that competes with (and loses against) the optimal form *deše_*, but that is more faithful to the input /dešʔ/ in one respect – it maintains the ʔ. *deše_* blocks *deš* because it is more faithful to the candidate that corresponds to the intermediate step in a derivational approach. This latter instance of faithfulness is called sympathy.

(26) *Basic tenets of sympathy theory*:

a. Certain (input/output faithfulness) constraints F_i divide the candidate set C into two non-overlapping subsets: C_{+Fi} is the class of candidates that respect F_i, and C_{-Fi} is the class of candidates that violate F_i. F_i is called a "selector".

b. The optimal member of C_{+Fi} is called $\bullet_{Fi}$. This is the ❁-candidate selected by F_i. $\bullet_{Fi}$ does not have to be optimal in C.

c. There are ❁-faithfulness constraints that demand faithfulness (sympathy) to $\bullet_{Fi}$ candidates, rather than to the input itself. If high-ranked, these ❁-faithfulness constraints can render non-transparent candidates optimal and thereby account for opacity effects like counter-bleeding.

T_1: Counter-bleeding and sympathy in Tiberian Hebrew in McCarthy (1999)

Input: /dešʔ/	❁Max-V$_{Max-C}$	*Complex	Anchor	CodaCond	Max-C	Dep-V
☞O$_1$: dešẹ̲					*	*
☛O$_2$: deš	*!				*	
O$_3$: dešʔẹ̲			*!			*
❁ O$_4$: dešẹ̲ʔ				*!		*
O$_5$: dešʔ	*!	*		*		

Note:
Sympathy theory identifies leading forms and ensures that properties of these leading forms (❁ candidates) can be transported to other forms in the same candidate set. Normally the selector is a faithfulness constraint, but perhaps this does not have to be the case (see, e.g., Müller (2002) on sympathy in syntax). In principle, it might be possible to extend this to paradigmatic leveling; the only technical issue would be that if paradigms (rather than word forms) are subject to optimization, it looks as though the ❁ optimization would have to take place within the paradigm first (cyclically, or in a separate stratum).

Yet another alternative?
Harmonic serialism: Leading forms as outputs of prior optimizations can somehow be the *inputs* for subsequent optimization, so that regular faithfulness constraints derive analogical leveling. (In the case of Yiddish, singular forms must be derived from plural forms.)

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