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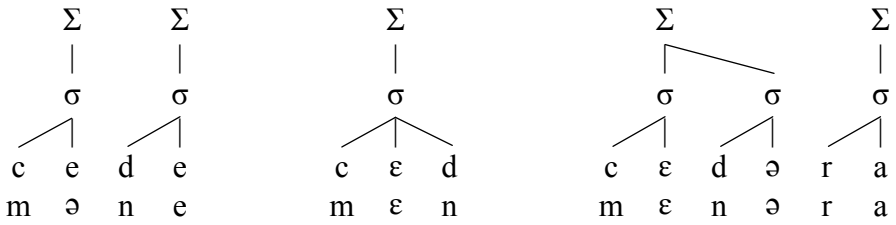
PORTRAIT OF A PHONOLOGICAL CRIPPLE: WHAT SCHWA CAN(NOT) DO TO PRECEDING VOWELS IN FRENCH AND ELSEWHERE

Prelude: Selkirk (1978)

(1) Selkirk (1978)
this is how binary feet crept into French
a. THE argument: three for one
"The standard approach allows for no unified account of the behaviour of schwa." (last sentence of the paper, p150)
b. at that time, promotion of autosegmentalism
"The prosodic approach is clearly more promising than a conventional standard approach, according to which a phonological representation is simply a linear sequence of segments." (p150)
==> we want an autosegmental, not a linear solution
==> but autosegmental instruments were rather rudimentary then
==> Selkirk was just about to introduce the Prosodic Hierarchy into phonological theory

(2) three for one I: the one
a. in French, all syllables project a foot, except schwa syllables which adjoin as a dependent syllable to the preceding foot.
Exception: schwa monosyllables project a foot of their own.
b.



(3) three for one II: the three
a. schwa deletion
1. souvEnir, promEner, promènE
description: everywhere except after more than one consonant: exactEment
2. je ne te le redemande pas
sequences of schwa (across words): any schwa can be deleted, but not two schwas in a row
"delete vowels in dependent syllables"
==> two schwas in a row can never be deleted because two adjacent schwas can never sit in dependent syllables.

(3) three for one II: the three

b. word stress
stress the last vowel, except in case it is a schwa, in which case stress the vowel to its left.
ouvrir vs. ouvrE
==> "stress the last foot"

c. Closed Syllable Adjustment (CSA)
1. schwa → ɛ in closed syllables: mEner - mène
2. e → ɛ in closed syllables: céder - cède
BUT
"schwa to the right does not seem to open the syllable on the left"
1. célébrErez
2. cèdEriez, célèbrE

==> CSA applies to /schwa, e/ "if followed by something else inside the foot"
something else = a C or a dependent syllable

all this falls under one obvious generalisation:

schwa behaves as if it were not there

1. Roadmap

(4) alternatives

a. Selkirk (1978) is the FIRST autosegmental account of French schwa
==> why conditioning an entire field based on a first try?
==> instruments were rudimentary then

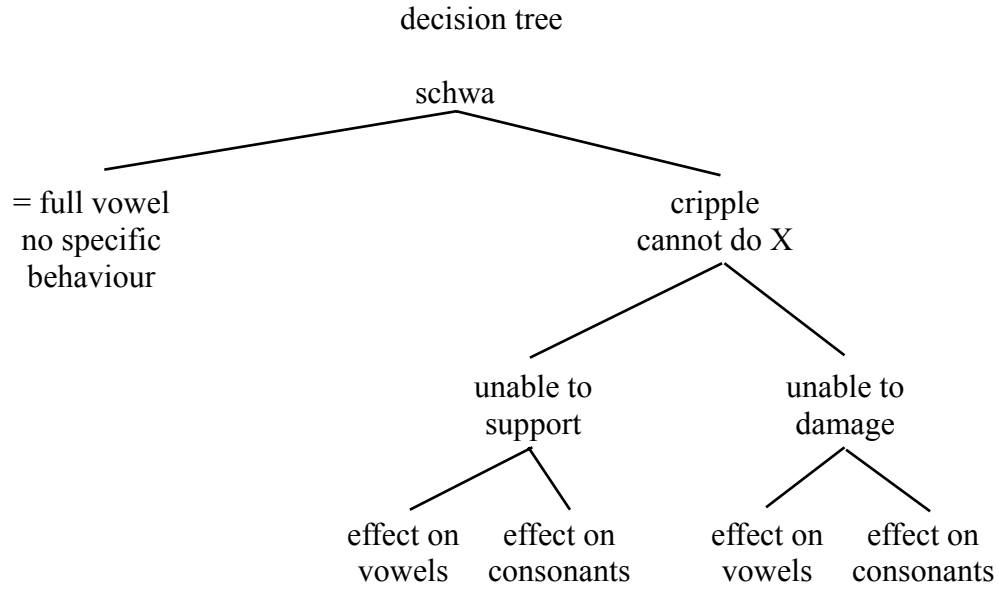
b. there are alternatives
(with more developed autosegmental instruments)
1. empty nuclei and coda capture (Anderson 1982)
2. floating nuclei and coda capture (Hall 1992:210f)
3. lateral relations instead of arboreal structure: government & licensing

(5) argument for the lateral solution

a. a broader picture of how schwa behaves across languages

b. the analysis needs to be able to express not just the fact that schwa is different and "unable to act as a real vowel": it is different in two different ways
1. either it fails to support a big guy, which therefore **falls prey** to damage. Example: vowel shortening in closed syllables AND in open syllables if the following vowel is schwa.
2. or it fails to diminish a big guy, which therefore will **escape** damage. Example: vowel-zero alternations, i.e. where a zero appears in open syllables, against a vowel in closed syllables AND in open syllables if the following vowel is schwa.

(5) argument for the lateral solution



2. Definition of schwa

(6) what is a schwa?

a. definition according to its effect: a vowel that does not have the same effect as other vowels. In particular, one which "cannot do" things that full vowels do. I shall call vowels that correspond to this definition **cripples**.

b. on many occasions, cripples are indeed central articulations, for example in French:
"-ATR vowels in closed syllables and in open syllables if followed by schwa, +ATR in open syllables if followed by a non-schwa"

closed syllable				open syllable			
internal		final		before schwa		before a non-schwa	
pɛrdy	perdu	bɛt	bête	bɛtəmã	bêtement	bet-iz	bêtise

c. but they may also be peripheral vowels, as for example in Slavic vowel-zero alternations:
e.g. Polish: "vowels in closed syllables and in open syllables if followed by schwa, zero in open syllables if followed by a non-schwa"

closed syllable		open syllable	
internal	final	before schwa	before a non-schwa
p**ie**s-ka	p**ie**s	p**ie**s-ek	p**ø**s-a

d. hence: all cripples are phonetically central - WRONG
but also: all phonetically central vowels are cripples - WRONG
e.g. Polish, where spelt <y> is [ɨ], but which behaves like regular vowels, not like a cripple: p**ø**s-y, not *p**ie**s-y.
Significantly, <y> does not alternate with zero.

(6) what is a schwa?
e. the only definition of schwa is according to its behaviour, not to its physical properties:
all and only those vowels that alternate with zero are cripples,
i.e. may produce different effects in regard of full vowels.

3. Schwa is unable to do X in a number of languages

(7) data review
a. phonological processes where schwa has a specific (non-)bearing on neighbours.
b. all cases that I have come across concern preceding segments;
this is the direction of most phonological processes anyway.
I do not expect to find cases where schwa has a specific effect on the environment to its right.
c. two families: the effect is visible on
- a preceding consonant
- a preceding vowel

recurrent disjunction to be reduced to a non-disjunctive statement:

in closed syllables and before schwa

3.1. Effect on consonants

(8) distribution of [ŋg] and [ŋ] in German:
"[ŋ] in closed syllables and in open syllables if followed by schwa, [ŋg] in open syllables if followed by a non-schwa".
E.g. Dressler (1981), Hall (1992:199ff), Wiese (1996:224ff), Féry (2003:222ff).
Premise: the German as much as the English velar nasal derives from underlying /Ng/.
distribution of German [ŋ] and [ŋg] in monomorphemic environments

a. occurrence of [ŋ]						b. occurrence of [ŋg]	
__#		__C		__ə		__V	
[ ]	spelling	[ ]	spelling	[ ]	spelling	[ ]	spelling
laŋ	lang	ʔaŋst	Angst	ʔɪŋə	Inge	ʔɪŋgoo	Ingo
dʁaŋ	Drang	pɪŋpɔŋ	Pingpong	ʔaŋəl	Angel	taŋgoo	Tango
dɪŋ	Ding	hɛŋst	Hengst	fɪŋɐ	Finger	ʔaŋgiinaa	Angina
ʔɛŋ	eng	ʔaŋʃtχøm	Angström	maŋəl	Mangel	zɪŋgʊlaa	Singular
ʁɪŋ	Ring	bɛŋt	Bengt	hʊŋɐ	Hunger	ʔʊŋgaan	Ungarn
				bɛŋəl	Bengel	ʔɛfaŋgeelɪʃ	evangelisch
						ʔaŋgeelɪka	Angelika

(9) but English:
schwa behaves like a regular vowel
German: [ŋ] before schwa - Finger [ŋ]
English: [ŋg] before schwa - finger [ŋg]

(10) Dutch schwa-epenthesis:
"sonorant-obstruent clusters are broken up by a schwa in final closed syllables and in open syllables if followed by schwa, while no schwa-epenthesis occurs in open syllables if followed by a non-schwa".
N.B.: before schwa, epenthesis is only optional, while it is obligatory in R__T#.
E.g. Kager (1989:214), Cyran (2003:108f)

closed syllable			open syllable				
internal	final		before schwa		before a non-schwa		
—	harəp	*harp* "harp"	karəpər	*karper* "carp"	[harpun], *[harəpun]	*harpoen* "harpoon"	

3.2. Effect on vowels

(11) vowel-zero alternations in modern Slavic languages (e.g. Czech, Polish):
"vowels in closed syllables and in open syllables if followed by schwa, zero in open syllables if followed by a non-schwa".[1]

	closed syllable		open syllable	
	internal	final	before schwa	before a non-schwa
Russian	d'en'-øk-á	d'én'	d'en'-ók	dn'-á
Czech	dom-eč-øk-u	dom-ek	dom-eč-ek	dom-øk-u
Slovak	kríd-el-øc-e	kríd-el	kríd-el-iec	kríd-øl-o
Polish	buł-ecz-øk-a	buł-ek	buł-ecz-ek	buł-øk-a

(12) but Old Czech, Old Polish, French, German:
schwa behaves like a regular vowel
Modern Polish: pies-ek
Old Polish: ps-ek
German: /innərə/ → inn'rə

(13) ATR of French mid vowels:
"-ATR vowels in closed syllables and in open syllables if followed by schwa, +ATR in open syllables if followed by a non-schwa".
N.B.: only true for Southern varieties ("Midi French"), the North has typically free variation of +ATR and -ATR mid vowels in open syllables before a real vowel.
E.g. Dell (1973:209ff), Tranel (1987, 1988)

closed syllable				open syllable			
internal		final		before schwa		before a non-schwa	
pɛrdy	perdu	bɛt	bête	bɛtəmã	bêtement	bet-iz	bêtise

[1] Examples are drawn from Czech, Slovak, Polish and Russian. Rowicka (1999) for example offers an informed discussion of literature and facts regarding Polish, Czech is discussed in Scheer (2004:§§411ff) and Ziková (2008). Lightner (1965), Isačenko (1970), Melvold (1989), Farina (1991) and Yearley (1995) describe the Russian situation, while Rubach (1993) (Slovak) and Hristova (1994) (Bulgarian) discuss other languages. The general Slavic picture is exposed for example in Bethin (1998:205ff).

(14) distribution of [ɛ] and [ə] in French:
"[ɛ] in closed syllables and in open syllables if followed by schwa, [ə] in open syllables if followed by a non-schwa".
E.g. Dell (1973:198ff), Schane (1968:30ff), Tranel (1987, 1988), Charette (1991:172ff)

closed syllable				open syllable			
internal		final		before schwa		before a non-schwa	
—	apɛl	appelle		apɛləʁa	appellera	apəle	appeler

(15) vowel length in Czech:
"short vowels in closed syllables and in open syllables if followed by schwa, long vowels in open syllables if followed by a non-schwa".

closed syllable				open syllable			
internal		final		before schwa		before a non-schwa	
ʒap-ka	žába	ʒap	žab	ʒab-ɛk	žabek	ʒaab-a	žába

(16) o-u and ą-ę (nasal vowels) alternations in Western Slavic (Polish, Czech, Slovak, Sorbian):
"u,ą in closed syllables and in open syllables if followed by schwa, o,ę in open syllables if followed by a non-schwa".
N.B.:
1. the modern alternations are a transposition into vowel quality of a former alternation in vowel quantity: Polish ó, ą are former long vowels (Polish has lost vowel length since then).
2. additional condition: this alternation occurs only before voiced consonants.
"hence VV in closed syllables and in open syllables if followed by schwa, V in open syllables if followed by a non-schwa".
spelling:
ů - long u in Czech
ó - [u] in Polish
ą, ę - nasal [a] and nasal [ɔ] in Polish
E.g. Gussmann (1980:53f,113ff), Szpyra (1989:160ff, 1992:288ff), Grzegorczykowa et al. (1999:114ff), Lamprecht et al. (1986:113), Trávníček (1935:82ff, 268ff).

	closed syllable		open syllable	
	internal	final	before schwa	before a non-schwa
Czech ů-o	n**ů**žk-y	n**ů**ž	n**ů**ž-ek	n**o**ž-e
Polish ó-o	kr**ó**vk-a	kr**ó**v	kr**ó**v-ek	kr**o**v-a
Polish ą-ę	z**ą**bk-a	z**ą**b	z**ą**b-ek	z**ę**b-a

(17) Romance diphthongisation (diachronic) in Italian:
"original Latin short stressed e,o in closed syllables (both internal and final) and in open syllables if followed by schwa, ie,uo in open syllables if followed by a non-schwa".
E.g. Bourciez (1910:483f).
N.B.: there is good evidence that already in Latin the post-tonic vowel of proparoxytons (héd**e**ra, móbilis, póp**u**lus) was a phonetic schwa:
a. the vocalic distribution in this position is deficient: only [i] and [u] occur (or mid vowels if lowered by a following [r]).
b. this can be seen in so-called internal apophony = the reduction of internal short vowels:
f**a**cio - conf**i**cio

(17) Romance diphthongisation (diachronic) in Italian:
c. floating spelling: opt**i**mus - opt**u**mus.

closed syllable			open syllable			
internal		final	before schwa		before a non-schwa	
fésta	festa	—	hédera	**e**dera,	sedet	siede
córpus	corpo		móbilis	m**o**bile	fele	fiele
			pópulus	p**o**pulo	petra	pietra
					novum	nuovo
					*morit	muore
					*potet	puo

(18) summary: there are two patterns in nature
a. strong alternant in closed syllables and before schwa
==> schwa is unable to cause damage

	object occurring in		example	
		closed syll		closed syll
alternation	__CV	+ __Cə	__CV	+ __Cə
Slavic vowel-zero	zero	vowel	dom-**ø**k-u	dom-**e**k, dom-**e**č-ek, dom-**e**č-øk-u
French schwa - [ɛ]	schwa	[ɛ]	[apəle] appeler	[apɛl] appelle
Polish o-ó	V	VV	kr**o**w-a	kr**ó**w, kr**ó**w-ek, kr**ó**w-øk-a
Czech o-ů	V	VV	n**o**ž-e	n**ů**ž, n**ů**ž-øk-y, n**ů**ž-ek
Polish ą-ę	V	VV	z**ę**b-a	z**ą**b, z**ą**b-ek, z**ą**b-øk-a

b. weak alternant in closed syllables and before schwa
==> schwa is unable to support

	object occurring in		example	
		closed syll		closed syll
alternation	__CV	+ __Cə	__CV	+ __Cə
Czech vowel length	VV	V	ž**á**b-a	ž**a**b, ž**a**k-ek, ž**a**b-øk-a
French ATR	+ATR	-ATR	[fete] fêter	[fɛt] fête
German velar nasal	ŋg	ŋ	Ingo [ŋg]	lang, Inge [ŋə], Angst
Dutch clusters	RT#	RəT#	harpoen	har[ə]p, kar[ə]p[ə]r

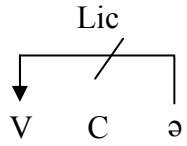
4. Analysis

(19) question 1
in which way is schwa different ?
answer: it is weak.
What are the traces of its weakness ?
1. the fact that it alternates with zero
2. its inability to do what other vowels do: govern and license.
==> there is a causal relation between the fact that schwa alternates with zero and "misbehaves".
Recall that the only property shared by all "schwas" is their alternating character.

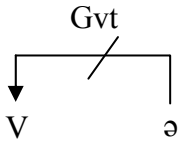
a. there are two patterns in nature
identical contextual and melodic conditions may have opposite effects on their targets, damage and support. Since all other parameters are invariable, there must be two forces in nature:
- one supportive (Licensing)
- one damaging (Government)

b. the regular pattern, i.e. the one where nothing special happens, is encountered when full vowels appear to the right of the alternating object. The behaviour of schwa is deviating from normal. Schwa is defective: it cannot do what full vowels do. Hence if full vowels sometimes support (license ==> produce the big guy) and at other times damage (govern ==> produce the small guy), schwa cannot do these things. That is, in the languages considered it cannot govern/ license - as a consequence, we observe their deviant behaviour in regard of full vowels.

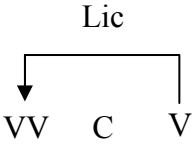
schwa produces the small guy



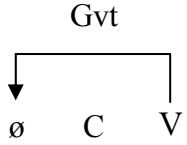
schwa produces the big guy



regular vowels produce the big guy



regular vowels produce the small guy



(20) question 2
in case schwa "misbehaves", why does it produce the same effect as a closed syllable?

a. answer:
because it is unable to be the head of a lateral relation (Government or Licensing). In CVCV, the definition of a closed syllable is "before an empty Nucleus".
CVCV = "syllable structure boils down to a strict sequence of non-branching Onsets and non-branching Nuclei."

a. vowel in an open syllable: followed by a phonetically expressed Nucleus

```
C   V   C   V
|   |   |   |
C   V   C   V
```

b. vowel in a closed syllable: followed by an empty Nucleus

final

```
C   V   C   V
|   |   |
C   V   C       #
```

internal

```
C   V   C   V   C   V
|   |   |       |   |
C   V   R       T   V
```

b. ground rule in Government Phonology:
empty Nuclei are unable to dispense lateral relations. Only phonetically expressed Nuclei are good governors/ licensors.

c. hence the disjunction "in closed syllables and before schwa" is reduced:
- in closed syllables
- before schwa in languages where schwa is laterally disabled

} before a laterally disabled Nucleus ==> the target vowel will be neither licensed nor governed

(21) hence, the strategy is to reduce "before schwa" to "in closed syllables"
[note that the occurrence of schwa in all languages quoted is unpredictable: it could not be inserted by rule]

a. here: "in closed syllables" = vowel is not the target of either Gvt or Lic.

b. positive side-effect: the lateral weakness/ infirmity of schwa is correlated to its definitorial property, i.e. the fact of alternating with zero = weakness. We know independently that "in closed syllables" is a weak context.

(22) same strategy: Anderson (1982)

a. Coda capture by rule:
1. resyllabification rule: "make the consonant(s) before schwa the Coda of the preceding syllable"
2. run Closed Syllable [Shortening, ATR, etc.]

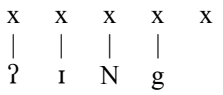
b. trouble
overgeneration: no causal relation between schwa and Coda capture.
Why should Codas be captured before schwas, rather than before any other vowel?
Nothing in this approach rules out grammars where closed syllable effects are observed in open syllables before any arbitrary subset of vowels,
e.g.
"in closed syllables and in open syllables if the following vowel is rounded"
or "if the following vowel is an [u]"
or "if the following vowel is non-high" etc.
These situations do not appear to occur in natural language. The fact that schwa is singled out as producing the same effect like closed syllables would be purely accidental.
==> theory must somehow relate the weakness of schwa and the weakness of closed syllables. Coda capture gets the mechanics right, but fails to explain the facts observed. The only reason to capture before schwa is precisely the result that needs to be produced.

(23) same strategy: Hall (1992:210f)

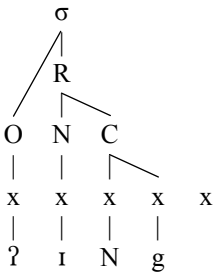
a. 1. lexical entries are attached to x-slots
2. schwa is a floating x-slot that is later filled in by default
3. consonant(s) cannot be syllabified as the Onsets of a floating Nucleus. Hence the consonant(s) before schwa must syllabify as the Coda of the preceding vowel.

derivation of *Inge* "female first name"

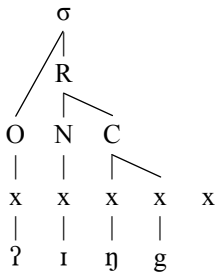
a. lexical representation



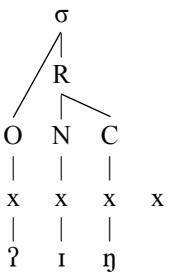
b. first pass



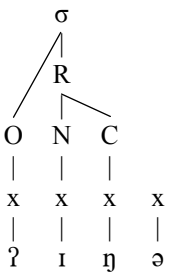
c. assimilation



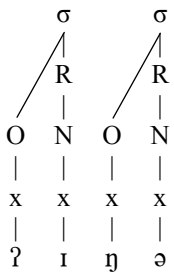
d. g-deletion:
g → ø / [+nasal] __]σ



e. schwa insertion



f. second pass and resyllabification of ŋ



(23) same strategy: Hall (1992:210f)

b. trouble

does better than Anderson (1982) because there is a causal relation between the fact that intervocalic consonants only become Codas before schwa and the fact that only schwa alternates with zero:

- schwa is weak: it alternates with zero
- schwa is weak: its skeletal slot floats, a fact that automatically induces the syllabification of the preceding consonant(s) as a Coda.

(24) arguments in favour of the lateral solution

a. coda capture (all versions) cannot express the opposition "schwa fails to support" vs. "schwa fails to cause damage"

the arboreal strategy of making pre-schwa consonants a Coda cannot express the antagonistic effects of schwa or of the codahood of the preceding consonants: in this perspective one has to live with the fact that the same object (a Coda/ a schwa) produces visible, but opposite effects on preceding vowels.
==> Lateral relations can be twofold, Codas/ schwas cannot.

b. general argument: direct vs. indirect coding of the facts

1. syllable structure is about the **relative** sonority of adjacent consonants (segments). Hence about the relation that C_1 and C_2 in VC_1C_2V contract in terms of sonority. The lateral approach encodes this relation directly:
   - C_1 and C_2 do contract a relation (Infrasegmental Gvt) ==> tautosyllabic
   - C_1 and C_2 contract no relation ==> heterosyllabic
   segmental effects are the result of these lateral relations:
   - e.g., a Coda consonant is ungoverned and unlicensed and therefore weak.
2. regular approaches to syllable structure encode this relation indirectly:
   - the sonority slope is converted into arboreal structure (Coda vs. Onset)
   - segmental effects are then held to be the result of this arboreal structure
   e.g. lenition in Codas.
3. arboreal structure is not the default. Direct coding of lateral relations is the default. The burden of proof is on the arboreal side since arborescence introduces one extra conceptual tool (lateral relations are needed anyway).
4. in the case of "in closed syllables and before schwa": Hall's solution encodes the effect of schwa only indirectly **via arborescence**:
   - first pre-schwa consonants are resyllabified as Codas
   - then the effect on the preceding vowel is ascribed to their codahood
   ==> schwa → Coda → effect on preceding vowel
   the lateral alternative is direct:
   schwa → effect on preceding vowel.

(25) Government and Licensing are multifunctional
they are not made for the purpose discussed here, but also determine syllable structure in general (Scheer 2004, Ségéral & Scheer 2001, 2005, 2008)

a. __{#,C} = Coda = a consonant that is unlicensed and ungoverned
b. {#,C}__ = Coda Mirror, the Strong Position = a consonant that is licensed but ungoverned
c. V__V = intervocalic = a consonant that is both licensed and governed
d. a vowel in a closed syllable = a vowel that occurs before a governed empty Nucleus (definition slightly more evolved than the one given earlier).

5. Conclusion

(26) conclusion

a. the disjunction

"in closed syllables and before schwa"

should not be approached with a special computation (resyllabification, Coda capture). Rather, it is the result of a specific lexical property of schwa: its lateral infirmity.

b. argument: only lateral relations can express the two opposite patterns that occur when schwa is not behaving like a full vowel:
1. it fails to support somebody ==> unable to license
2. it fails to damage somebody ==> unable to govern

c. …and what about Selkirk and her "3 for 1"?
1. Closed Syllable Adjustment:
the disjunction reduced by the lateral infirmity of schwa
2. don't delete two schwas in a row
comes for free with empty nuclei and government
3. stress assignment
schwa cannot be stressed in the language: another infirmity that is found in many other languages

d. binary feet in French
1. were a first autosegmental attempt to make sense of schwa
2. concerned only a small subset of feet: those with schwas
3. are a local French analysis of a much larger pattern
4. have viable competitors that fare better

==>
the evidence reviewed by Selkirk (1978) today is certainly not a good argument for binary feet in French,

==>
and for sure there is no reason to generalize binary feet to non-schwa syllables based on Selkirk's evidence

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