

Rationalism and empiricism in syllabification

M. Gagnon & C. Reiss

Concordia University

CUNY Phonology Forum, Syllable Conference
Jan., 2008

Outline

- 1 Basics—justifying rationalism
- 2 An intriguing pattern—need for empiricism
- 3 Some approaches
- 4 Conclusions

Outline

- 1** Basics—justifying rationalism
- 2 An intriguing pattern—need for empiricism
- 3 Some approaches
- 4 Conclusions

Nature/Goals of phonology

- **Phonology is symbolic computation**
 - Not accounting for variation in output (of the body or grammar)
 - Not probabilistic
- Lack of acoustic grounding of syllables is not a problem. . .

Nature/Goals of phonology

- Phonology is symbolic computation
 - Not accounting for variation in output (of the body or grammar)
 - Not probabilistic
 - Lack of acoustic grounding of syllables is not a problem. . .

Nature/Goals of phonology

- Phonology is symbolic computation
 - Not accounting for variation in output (of the body or grammar)
 - **Not probabilistic**
 - Lack of acoustic grounding of syllables is not a problem. . .

Nature/Goals of phonology

- Phonology is symbolic computation
 - Not accounting for variation in output (of the body or grammar)
 - Not probabilistic
- Lack of acoustic grounding of syllables is not a problem. . .

The priority of phonology—RATIONALISM

- Hammarberg (1976): Phonology is logically prior to phonetics. Phonetics could not exist without the segment [or feature or syllable]. But phonetics does not give us the segment. Rather it is the segment that gives us phonetics.
- Can't talk about 'fronted [k]' or 'backed [k]' w/o category [k]
 - For H 'we' is the linguist—we adopt the 'little linguist' view
- Phonological generalizations cannot be ultimately based on phonetic notions, since the phonetic notions are defined in terms of phonological categories (cf. structures and relation to Coetzee and McGowan, 1:30PM???)

The priority of phonology—RATIONALISM

- Hammarberg (1976): Phonology is logically prior to phonetics. Phonetics could not exist without the segment [or feature or syllable]. But phonetics does not give us the segment. Rather it is the segment that gives us phonetics.
- Can't talk about 'fronted [k]' or 'backed [k]' w/o category [k]
 - For H 'we' is the linguist—we adopt the 'little linguist' view
 - Phonological generalizations cannot be ultimately based on phonetic notions, since the phonetic notions are defined in terms of phonological categories (cf. structures and relation to Coetzee and McGowan, 1:30PM???)

The priority of phonology—RATIONALISM

- Hammarberg (1976): Phonology is logically prior to phonetics. Phonetics could not exist without the segment [or feature or syllable]. But phonetics does not give us the segment. Rather it is the segment that gives us phonetics.
- Can't talk about 'fronted [k]' or 'backed [k]' w/o category [k]
 - For H 'we' is the linguist—we adopt the 'little linguist' view
- Phonological generalizations cannot be ultimately based on phonetic notions, since the phonetic notions are defined in terms of phonological categories (cf. structures and relation to Coetzee and McGowan, 1:30PM???)

The priority of phonology—RATIONALISM

- Hammarberg (1976): Phonology is logically prior to phonetics. Phonetics could not exist without the segment [or feature or syllable]. But phonetics does not give us the segment. Rather it is the segment that gives us phonetics.
- Can't talk about 'fronted [k]' or 'backed [k]' w/o category [k]
 - For H 'we' is the linguist—we adopt the 'little linguist' view
- Phonological generalizations cannot be ultimately based on phonetic notions, since the phonetic notions are defined in terms of phonological categories (cf. structures and relation to Coetzee and McGowan, 1:30PM???)

Hammarberg 1976: 354

Chomskian linguistics is explicitly anti-empiricist, and all indications are that current philosophy of science is moving toward a rejection of the empiricist programme (Fodor 1968, pp. xiv ff). A key feature of the new programme is exactly a reevaluation of the concept of observation. Observations are now held to be judgments, and these judgments are made in terms of the criteria provided by the paradigm. Thus the taxonomy of a discipline is to be regarded as imposed from above, rather than emerging from below, i.e., rather than emerging in the form of brute facts before the unprejudiced eyes or ears of the researcher. The relevance of this to the study of phonetics and phonology should be obvious: the concept of the segment, which is indispensable to phonetics and phonology, is a creature of the paradigm, not of the raw data.

Rationalism and the segment

Hammarberg 1976:354

[I]t should be perfectly obvious by now that segments do not exist outside the human mind. [354]

Instrumentalism and realism

Hammarberg 1976:355

there would be little value in such an approach. Science aims for a theory of the real, and to base one's descriptions and generalizations on a fictional taxonomy could only lead to one's theories being fictional as well.
[355]

This conference

- We *like* precedence relations (Gagnon, 2008; Mailhot & Reiss, 2007), . . . but
 - We will argue for some structure—perhaps not standard σ -structure (cf. non-exhaustivity in Shaw, 10:30AM)
 - OT gets variable syllabification by reranking; other models have tried to support Universal Core Syllabification and Sonority Sequencing Principle
 - We think variability can be independent of rule/OT distinction (cf. Ringen & Vago, 10:00AM)
 - Haven't had a chance to consider interlude theory (Steriade, 11:15AM)

This conference

- We *like* precedence relations (Gagnon, 2008; Mailhot & Reiss, 2007), . . . but
- We will argue for some structure—perhaps not standard σ -structure (cf. non-exhaustivity in Shaw, 10:30AM)
- OT gets variable syllabification by reranking; other models have tried to support Universal Core Syllabification and Sonority Sequencing Principle
- We think variability can be independent of rule/OT distinction (cf. Ringen & Vago, 10:00AM)
- Haven't had a chance to consider interlude theory (Steriade, 11:15AM)

This conference

- We *like* precedence relations (Gagnon, 2008; Mailhot & Reiss, 2007), . . . but
- We will argue for some structure—perhaps not standard σ -structure (cf. non-exhaustivity in Shaw, 10:30AM)
- OT gets variable syllabification by reranking; other models have tried to support Universal Core Syllabification and Sonority Sequencing Principle
- We think variability can be independent of rule/OT distinction (cf. Ringen & Vago, 10:00AM)
- Haven't had a chance to consider interlude theory (Steriade, 11:15AM)

This conference

- We *like* precedence relations (Gagnon, 2008; Mailhot & Reiss, 2007), . . . but
- We will argue for some structure—perhaps not standard σ -structure (cf. non-exhaustivity in Shaw, 10:30AM)
- OT gets variable syllabification by reranking; other models have tried to support Universal Core Syllabification and Sonority Sequencing Principle
- We think variability can be independent of rule/OT distinction (cf. Ringen & Vago, 10:00AM)
- Haven't had a chance to consider interlude theory (Steriade, 11:15AM)

This conference

- We *like* precedence relations (Gagnon, 2008; Mailhot & Reiss, 2007), . . . but
- We will argue for some structure—perhaps not standard σ -structure (cf. non-exhaustivity in Shaw, 10:30AM)
- OT gets variable syllabification by reranking; other models have tried to support Universal Core Syllabification and Sonority Sequencing Principle
- We think variability can be independent of rule/OT distinction (cf. Ringen & Vago, 10:00AM)
- Haven't had a chance to consider interlude theory (Steriade, 11:15AM)

Outline

- 1 Basics—justifying rationalism
- 2 An intriguing pattern—need for empiricism**
- 3 Some approaches
- 4 Conclusions

Old Icelandic (Reiss 1994 *TLR*—full of (my) typos!)

Assimilation of *-r* to coronal sonorant

	'home'	'stone'
ACC	/heim-∅/ → <i>heim</i>	/stein-∅/ → <i>stein</i>
NOM	/heim-r/ → <i>heimr</i>	/stein-r/ → <i>steinn</i>

Notes: stress is initial; long vowels and diphthongs are restricted to initial position; *r* assimilates to *l*, too.

Old Icelandic (Reiss 1994 *TLR*—full of (my) typos!)

Assimilation of *-r* to coronal sonorant

	'home'	'stone'
ACC	/heim-∅/ → <i>heim</i>	/stein-∅/ → <i>stein</i>
NOM	/heim-r/ → <i>heimr</i>	/stein-r/ → <i>steinn</i>

Notes: stress is initial; long vowels and diphthongs are restricted to initial position; *r* assimilates to *l*, too.

Old Icelandic (Reiss 1994 *TLR*—full of (my) typos!)

Assimilation of *-r* to coronal sonorant

	'home'	'stone'
ACC	/heim-∅/ → <i>heim</i>	/stein-∅/ → <i>stein</i>
NOM	/heim-r/ → <i>heimr</i>	/stein-r/ → <i>steinn</i>

Notes: stress is initial; long vowels and diphthongs are restricted to initial position; *r* assimilates to *l*, too.

Old Icelandic (Reiss 1994 *TLR*—full of (my) typos!)

Assimilation of *-r* to coronal sonorant

	'home'	'stone'
ACC	/heim-∅/ → <i>heim</i>	/stein-∅/ → <i>stein</i>
NOM	/heim-r/ → <i>heimr</i>	/stein-r/ → <i>steinn</i>

Notes: stress is initial; long vowels and diphthongs are restricted to initial position; *r* assimilates to *l*, too.

Assimilation of *-r* to coronal sonorant

CONTEXT	stressed V: / VG	unstressed V	stressed V
NOM	'stone'	'sky'	'friend'
	/stein-r/ → <i>steinn</i>	/himin-r/ → <i>himinn</i>	/vin-r/ → <i>vinr</i>

Is there one rule?

a. $r \rightarrow n / \forall n \underline{\quad}$

b. $r \rightarrow n / \forall n \underline{\quad}$

c. $r \not\rightarrow n / \forall n \underline{\quad}$

Is there one rule?

a. $r \rightarrow n / \forall n \underline{\quad}$

b. $r \rightarrow n / \forall n \underline{\quad}$

c. $r \not\rightarrow n / \forall n \underline{\quad}$

Is there one rule?

a. $r \rightarrow n / \forall n \underline{\quad}$

b. $r \rightarrow n / \forall n \underline{\quad}$

c. $r \not\rightarrow n / \forall n \underline{\quad}$

Outline

- 1 Basics—justifying rationalism
- 2 An intriguing pattern—need for empiricism
- 3 Some approaches**
- 4 Conclusions

Linear order

- $r \rightarrow n / \{V:, V\}n_$
 - Advantages: none
 - Disadvantages: doesn't actually give us an environment

Linear order

- $r \rightarrow n / \{V:, V\}n_$
 - Advantages: none
 - Disadvantages: doesn't actually give us an environment

Linear order

- $r \rightarrow n / \{V:, V\}n_$
 - Advantages: none
 - Disadvantages: doesn't actually give us an environment

Moras

■ Assume this:

- in *steinn* and *himinn* the stem-final [n] is not moraic;
- in *vinr* the [n] is moraic

μ μ
 | |
 s t e i n - r

μ
 |
 (h i m) i n - r

μ μ
 | |
 v i n - r

Moras

- Assume this:
 - in *steinn* and *himinn* the stem-final [n] is not moraic;
 - in *vinr* the [n] is moraic

μ μ
 | |
 s t e i n - r

μ
 |
 (h i m) i n - r

μ μ
 | |
 v i n - r

Moras

- Assume this:
 - in *steinn* and *himinn* the stem-final [n] is not moraic;
 - in *vinr* the [n] is moraic

μ μ
 | |
 s t e i n - r

μ
 |
 (h i m) i n - r

μ μ
 | |
 v i n - r

■ Rule: $r \rightarrow n$ / non-moraic-n__

- Advantages: we now have a class of environments where assimilation occurs
- Disadvantages: is this actually an environment? We used NON-moraic

■ How to represent? Can /n/ mean n but NOT μ ?

|
n

- Rule: $r \rightarrow n$ / non-moraic-n__

- Advantages: we now have a class of environments where assimilation occurs

- Disadvantages: is this actually an environment? We used NON-moraic

- How to represent? Can /n/ mean n but NOT μ ?

- Rule: $r \rightarrow n$ / non-moraic-n__

- Advantages: we now have a class of environments where assimilation occurs
 - Disadvantages: is this actually an environment? We used NON-moraic

- How to represent? Can /n/ mean n but NOT

$$\begin{array}{c} \mu \\ | \\ n \end{array}$$

?

- Rule: $r \rightarrow n$ / non-moraic- n ___

- Advantages: we now have a class of environments where assimilation occurs
 - Disadvantages: is this actually an environment? We used NON-moraic

- How to represent? Can / n / mean n but NOT

$$\begin{array}{c} \mu \\ | \\ n \end{array}$$

?

Structure—first try

Assume that structure-building is available (RATIONALISM)

- Some sequences behave alike and others behave differently (EMPIRICISM)
 - Assume that the stem final [n] is not grouped with the vowel in *steinn* and *himinn*
 - $st < ei > nr$ & $him < i > nr$
 - Assume that the stem final [n] is grouped with the vowel in *vinr*: $v < i n > r$
 - Then $r \rightarrow n$ / not-grouped-with-preceding-vowel-n___

Structure—first try

Assume that structure-building is available (RATIONALISM)

- Some sequences behave alike and others behave differently (EMPIRICISM)
 - Assume that the stem final [n] is not grouped with the vowel in *steinn* and *himinn*
 - $st < ei > nr \& \text{him} < i > nr$
 - Assume that the stem final [n] is grouped with the vowel in *vinr*: $v < in > r$
 - Then $r \rightarrow n$ / not-grouped-with-preceding-vowel-n___

Structure—first try

Assume that structure-building is available (RATIONALISM)

- Some sequences behave alike and others behave differently (EMPIRICISM)
 - Assume that the stem final [n] is not grouped with the vowel in *steinn* and *himinn*
 - $st < ei > nr \ \& \ \ hi m < i > nr$
 - Assume that the stem final [n] is grouped with the vowel in *vinr*: $v < in > r$
 - Then $r \rightarrow n$ / not-grouped-with-preceding-vowel-n___

Structure—first try

Assume that structure-building is available (RATIONALISM)

- Some sequences behave alike and others behave differently (EMPIRICISM)
 - Assume that the stem final [n] is not grouped with the vowel in *steinn* and *himinn*
 - $st < ei > nr$ & $him < i > nr$
 - Assume that the stem final [n] is grouped with the vowel in *vinr*: $v < in > r$
 - Then $r \rightarrow n$ / not-grouped-with-preceding-vowel-n___

Structure—first try

Assume that structure-building is available (RATIONALISM)

- Some sequences behave alike and others behave differently (EMPIRICISM)
 - Assume that the stem final [n] is not grouped with the vowel in *steinn* and *himinn*
 - $st < ei > nr \ \& \ \ hi m < i > nr$
 - Assume that the stem final [n] is grouped with the vowel in *vinr*: $v < in > r$
 - Then $r \rightarrow n$ / not-grouped-with-preceding-vowel-n___

Structure—first try, cont.

- Advantages: same as moraic theory—an apparent generalization
- Disadvantages: same as moraic theory—need negation

Structure—first try, cont.

- Advantages: same as moraic theory—an apparent generalization
- Disadvantages: same as moraic theory—need negation

More structure

a. $st \langle\langle ei \rangle nr \rangle \quad him \langle\langle i \rangle nr \rangle \quad v \langle\langle in \rangle r \rangle$ or

The n and the r have to be 'close'

b. $st \langle\langle ei \rangle n \rangle r \quad him \langle\langle i \rangle n \rangle r \quad v \langle\langle in \rangle r \rangle$

The n must be in a certain position—to be discovered

More structure

- a. $st \langle\langle ei \rangle nr \rangle$ him $\langle\langle i \rangle nr \rangle$ v $\langle\langle in \rangle r \rangle$ or
 The n and the r have to be 'close'
- b. $st \langle\langle ei \rangle n \rangle r$ him $\langle\langle i \rangle n \rangle r$ v $\langle\langle in \rangle r \rangle$
 The n must be in a certain position—to be discovered

'Cross-syllable' assimilation

CONTEXT	stressed V: / VG	unstressed V	stressed V
	'stone'	'sky'	'friend'
GEN PL	/stein-ra/ → <i>steinna</i>	/himin-ra/ → <i>himinna</i>	/vin-ra/ → <i>vinra</i>

Structure conclusions—support (b)

- The /r/ does not need to be grouped with the /n/
- The /n/ needs to be grouped with the segments that precede, but not directly with the vowel, if assimilation is to occur

Structure conclusions—support (b)

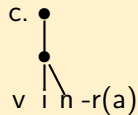
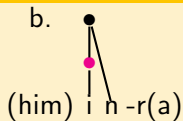
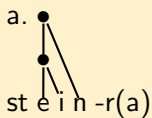
- The /r/ does not need to be grouped with the /n/
- The /n/ needs to be grouped with the segments that precede, but not directly with the vowel, if assimilation is to occur

A particular structure

b. $st \langle \langle ei \rangle n \rangle r$ $him \langle \langle i \rangle n \rangle r$ $v \langle \langle in \rangle r \rangle$

Bare σ -structure?

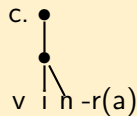
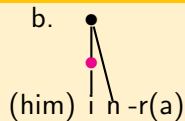
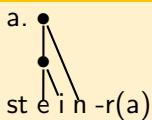
No labels



That magenta node in b. is kind of fishy.

Bare σ -structure?

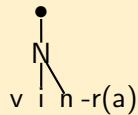
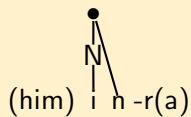
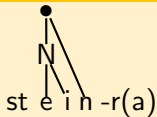
No labels



That **magenta** node in b. is kind of fishy.

Just structure is not enough

Label some constituents



So...

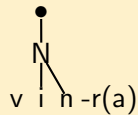
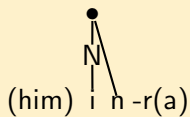
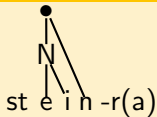
a. $r \rightarrow n / \text{not-in-N-n}$ **BAD**

b. $r \rightarrow n / \text{n-that-c-commands-N}$??

or ...

Just structure is not enough

Label some constituents



So...

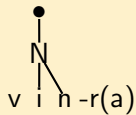
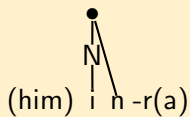
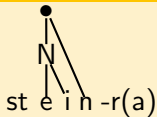
a. $r \rightarrow n$ / not-in-N-n **BAD**

b. $r \rightarrow n$ / n-that-c-commands-N ??

or ...

Just structure is not enough

Label some constituents



So...

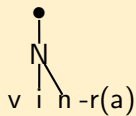
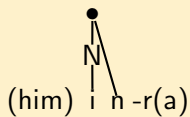
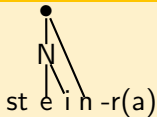
a. $r \rightarrow n$ / **not-in-N-n** **BAD**

b. $r \rightarrow n$ / n-that-c-commands-N ??

or ...

Just structure is not enough

Label some constituents



So...

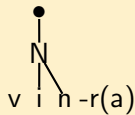
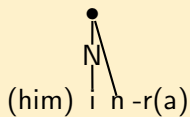
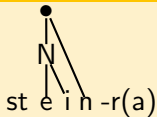
a. $r \rightarrow n$ / not-in-N-n ___ **BAD**

b. $r \rightarrow n$ / n-that-c-commands-N ___ ??

or ...

Just structure is not enough

Label some constituents



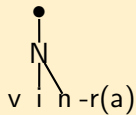
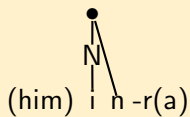
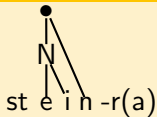
So...

- a. $r \rightarrow n$ / not-in-N-n ___ **BAD**
- b. $r \rightarrow n$ / n-that-c-commands-N ___ ??

or ...

Just structure is not enough

Label some constituents



So...

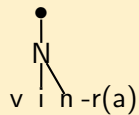
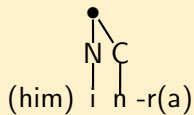
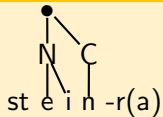
a. $r \rightarrow n$ / not-in-N-n **BAD**

b. $r \rightarrow n$ / n-that-c-commands-N ??

or ...

More labels

Why not have a C?

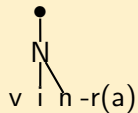
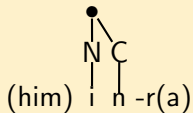
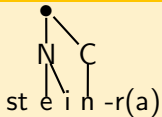


So, the rule is ...

$$r \rightarrow n / n _ _$$

More labels

Why not have a C?



So, the rule is ...

$$r \rightarrow n / n \begin{array}{c} \text{C} \\ | \\ _ \end{array}$$

- Linear order does not work
 - Moras don't work
 - Bare structure does not work
 - Labelled structure appears to be needed
 - Thus, we need labels AND structure

- Linear order does not work
- Moras don't work
- Bare structure does not work
- Labelled structure appears to be needed
- Thus, we need labels AND structure

- Linear order does not work
- Moras don't work
- Bare structure does not work
 - Labelled structure appears to be needed
 - Thus, we need labels AND structure

- Linear order does not work
- Moras don't work
- Bare structure does not work
- Labelled structure appears to be needed
- Thus, we need labels AND structure

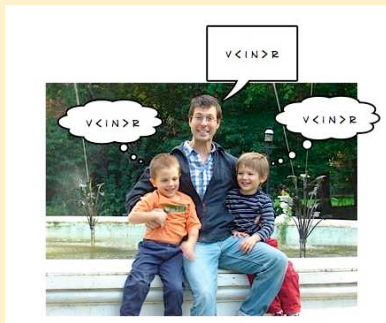
- Linear order does not work
- Moras don't work
- Bare structure does not work
- Labelled structure appears to be needed
- Thus, we need labels AND structure

Outline

- 1 Basics—justifying rationalism
- 2 An intriguing pattern—need for empiricism
- 3 Some approaches
- 4 Conclusions**

Rationalism and empiricism

The linguist/child can discover what needs to be bracketed



- Not necessarily full syllabification—it may be that strings are not exhaustively grouped/syllabified
- Induction over the data—EMPIRICISM
 - No need for Core Syllabification Algorithm
 - No need for Universal Sonority Sequencing Principle

- Not necessarily full syllabification—it may be that strings are not exhaustively grouped/syllabified
- Induction over the data—EMPIRICISM
 - No need for Core Syllabification Algorithm
 - No need for Universal Sonority Sequencing Principle

- Not necessarily full syllabification—it may be that strings are not exhaustively grouped/syllabified
- Induction over the data—EMPIRICISM
 - No need for Core Syllabification Algorithm
 - No need for Universal Sonority Sequencing Principle

- Not necessarily full syllabification—it may be that strings are not exhaustively grouped/syllabified
- Induction over the data—EMPIRICISM
 - No need for Core Syllabification Algorithm
 - No need for Universal Sonority Sequencing Principle

Anticipating

Stronger empiricism

- “The *n*’s of *steinn* and *himinn* are phonetically different from that of *vinr*”
- Response: Maybe, but if we want a unified analysis, we need a way to refer to the *n*’s that have certain phonetic properties as opposed to others
- Back to Hammarberg: We need the category /*n*/, we need subcategories, too, in order to make the phonetic generalizations—the ones in codas group together

Anticipating

Stronger empiricism

- “The *n*’s of *steinn* and *himinn* are phonetically different from that of *vinr*”
- Response: Maybe, but if we want a unified analysis, we need a way to refer to the *n*’s that have certain phonetic properties as opposed to others
- Back to Hammarberg: We need the category /*n*/, we need subcategories, too, in order to make the phonetic generalizations—the ones in codas group together

Anticipating

Stronger empiricism

- “The *n*’s of *steinn* and *himinn* are phonetically different from that of *vinr*”
- Response: Maybe, but if we want a unified analysis, we need a way to refer to the *n*’s that have certain phonetic properties as opposed to others
- Back to Hammarberg: We need the category $/n/$, we need subcategories, too, in order to make the phonetic generalizations—the ones in codas group together

thanks