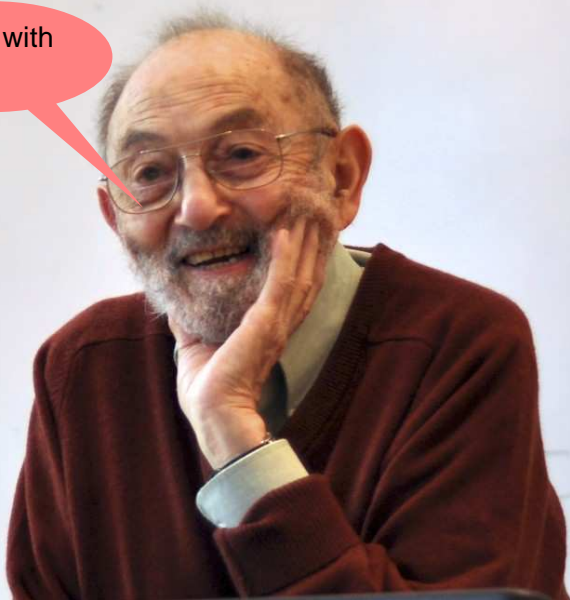
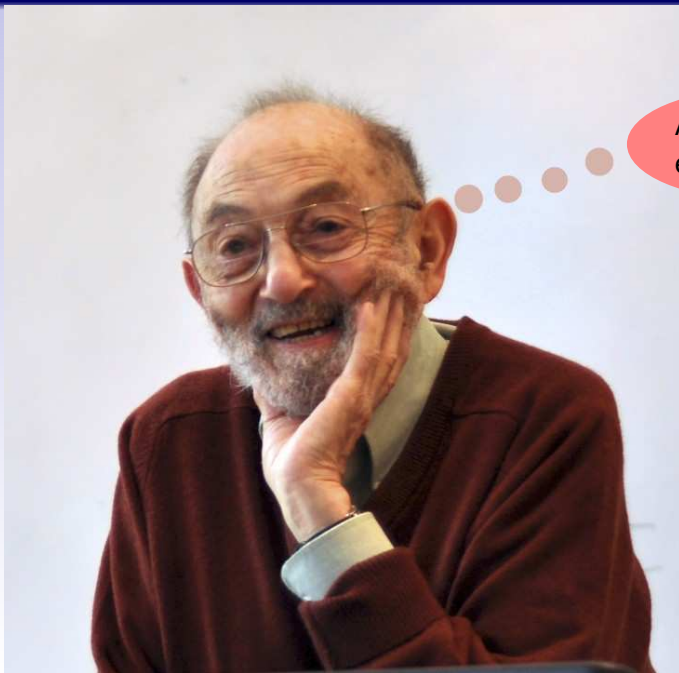


Derivations

Paul Kiparsky

Argue with
me!





And with
each other!

Derivations in phonology: a brief history

- 1 Pāṇini (ca. 500 B.C.), Chomsky (1951), Halle (1962): ordered rules derive phonetic representations from underlying representations.
- 2 Stanley (1967): ordered rules plus morpheme structure constraints (well-formedness conditions).
 - Argument 1: rules impose an arbitrary direction of dependence on co-occurrence restrictions.
 - Argument 2: rule ordering is not needed for phonotactics.
- Kisseberth (1970): proposed to solve the CONSPIRACIES PROBLEM by OUTPUT CONSTRAINTS, allowing the shared context of rules be factored out.

Derivations in phonology: a brief history

- 1 Pāṇini (ca. 500 B.C.), Chomsky (1951), Halle (1962): ordered rules derive phonetic representations from underlying representations.
- 2 Stanley (1967): ordered rules plus morpheme structure constraints (well-formedness conditions).
 - Argument 1: rules impose an arbitrary direction of dependence on co-occurrence restrictions.
 - Argument 2: rule ordering is not needed for phonotactics.
- 3 Kisseberth (1970): proposed to solve the CONSPIRACIES PROBLEM by OUTPUT CONSTRAINTS, allowing the shared context of rules be factored out.

Derivations in phonology: a brief history

- 1 Pāṇini (ca. 500 B.C.), Chomsky (1951), Halle (1962): ordered rules derive phonetic representations from underlying representations.
- 2 Stanley (1967): ordered rules plus morpheme structure constraints (well-formedness conditions).
 - Argument 1: rules impose an arbitrary direction of dependence on co-occurrence restrictions.
 - Argument 2: rule ordering is not needed for phonotactics.
- 3 Kisseberth (1970): proposed to solve the CONSPIRACIES PROBLEM by OUTPUT CONSTRAINTS, allowing the shared context of rules be factored out.

Derivations in phonology: a brief history

- 1 Pāṇini (ca. 500 B.C.), Chomsky (1951), Halle (1962): ordered rules derive phonetic representations from underlying representations.
- 2 Stanley (1967): ordered rules plus morpheme structure constraints (well-formedness conditions).
 - Argument 1: rules impose an arbitrary direction of dependence on co-occurrence restrictions.
 - Argument 2: rule ordering is not needed for phonotactics.
- 3 Kisseberth (1970): proposed to solve the CONSPIRACIES PROBLEM by OUTPUT CONSTRAINTS, allowing the shared context of rules be factored out.

Derivations in phonology: a brief history

- 1 Pāṇini (ca. 500 B.C.), Chomsky (1951), Halle (1962): ordered rules derive phonetic representations from underlying representations.
- 2 Stanley (1967): ordered rules plus morpheme structure constraints (well-formedness conditions).
 - Argument 1: rules impose an arbitrary direction of dependence on co-occurrence restrictions.
 - Argument 2: rule ordering is not needed for phonotactics.
- 3 Kisseberth (1970): proposed to solve the CONSPIRACIES PROBLEM by OUTPUT CONSTRAINTS, allowing the shared context of rules be factored out.

Derivations in phonology: a brief history

- 1 Kisseberth's translation of “functional unity” into formal simplicity was only partially successful, because
 - you can't simplify rules which are *triggered* by a constraint,
 - rules *can* create prohibited configurations *if the output is repaired by a subsequent rule*, and
 - there was no substantive theory of targets.
- Stampe (1972/1979): back to a strictly processual account, even of phonotactics. Distinguish RULES (learned) and PROCESSES (innate). Conflicts between them resolved by limitation, suppression, and ordering.
- Constraint-driven serial derivations: constraints and repair processes (Paradis 1987, 1988), Calabrese 1995, Harmonic Phonology (Goldsmith 1991), Harmonic Serialism (McCarthy 2007).

Derivations in phonology: a brief history

- 1 Kisseberth's translation of "functional unity" into formal simplicity was only partially successful, because
 - you can't simplify rules which are *triggered* by a constraint,
 - rules *can* create prohibited configurations *if the output is repaired by a subsequent rule*, and
 - there was no substantive theory of targets.
- 2 Stampe (1972/1979): back to a strictly processual account, even of phonotactics. Distinguish RULES (learned) and PROCESSES (innate). Conflicts between them resolved by limitation, suppression, and ordering.
- Constraint-driven serial derivations: constraints and repair processes (Paradis 1987, 1988), Calabrese 1995, Harmonic Phonology (Goldsmith 1991), Harmonic Serialism (McCarthy 2007).

Derivations in phonology: a brief history

- 1 Kisseberth's translation of "functional unity" into formal simplicity was only partially successful, because
 - you can't simplify rules which are *triggered* by a constraint,
 - rules *can* create prohibited configurations *if the output is repaired by a subsequent rule*, and
 - there was no substantive theory of targets.
- 2 Stampe (1972/1979): back to a strictly processual account, even of phonotactics. Distinguish RULES (learned) and PROCESSES (innate). Conflicts between them resolved by limitation, suppression, and ordering.
- 3 Constraint-driven serial derivations: constraints and repair processes (Paradis 1987, 1988), Calabrese 1995, Harmonic Phonology (Goldsmith 1991), Harmonic Serialism (McCarthy 2007).

Derivations in phonology: a brief history

- 1 Kisseberth's translation of "functional unity" into formal simplicity was only partially successful, because
 - you can't simplify rules which are *triggered* by a constraint,
 - rules *can* create prohibited configurations *if the output is repaired by a subsequent rule*, and
 - there was no substantive theory of targets.
- 2 Stampe (1972/1979): back to a strictly processual account, even of phonotactics. Distinguish RULES (learned) and PROCESSES (innate). Conflicts between them resolved by limitation, suppression, and ordering.
- 3 Constraint-driven serial derivations: constraints and repair processes (Paradis 1987, 1988), Calabrese 1995, Harmonic Phonology (Goldsmith 1991), Harmonic Serialism (McCarthy 2007).

Derivations in phonology: a brief history

- 1 Kisseberth's translation of "functional unity" into formal simplicity was only partially successful, because
 - you can't simplify rules which are *triggered* by a constraint,
 - rules *can* create prohibited configurations *if the output is repaired by a subsequent rule*, and
 - there was no substantive theory of targets.
- 2 Stampe (1972/1979): back to a strictly processual account, even of phonotactics. Distinguish RULES (learned) and PROCESSES (innate). Conflicts between them resolved by limitation, suppression, and ordering.
- 3 Constraint-driven serial derivations: constraints and repair processes (Paradis 1987, 1988), Calabrese 1995, Harmonic Phonology (Goldsmith 1991), Harmonic Serialism (McCarthy 2007).

Derivations in phonology: a brief history

- 1 Kisseberth's translation of "functional unity" into formal simplicity was only partially successful, because
 - you can't simplify rules which are *triggered* by a constraint,
 - rules *can* create prohibited configurations *if the output is repaired by a subsequent rule*, and
 - there was no substantive theory of targets.
- 2 Stampe (1972/1979): back to a strictly processual account, even of phonotactics. Distinguish RULES (learned) and PROCESSES (innate). Conflicts between them resolved by limitation, suppression, and ordering.
- 3 Constraint-driven serial derivations: constraints and repair processes (Paradis 1987, 1988), Calabrese 1995, Harmonic Phonology (Goldsmith 1991), Harmonic Serialism (McCarthy 2007).

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.

- 2 Constraints are violable, but violation is minimal.

- 3 Constraints can both “trigger” and “block” processes.

Schematically:

■ $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$.

■ $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.

- 4 The constraint system evaluates *output* representations.

(Under Harmonic Serialism, it evaluates each step in a derivation.)

- 5 A ranking determines a grammar, the possible rankings determine the typological space.

- 6 To the extent that constraints are grounded and universal, OT is a theory of naturalness.

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.
- 2 Constraints are violable, but violation is minimal.
- 3 Constraints can both “trigger” and “block” processes.
Schematically:

- $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$,
- $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.

- The constraint system evaluates *output* representations. (Under Harmonic Serialism, it evaluates each step in a derivation.)
- A ranking determines a grammar, the possible rankings determine the typological space.
- To the extent that constraints are grounded and universal, OT is a theory of naturalness.

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.
- 2 Constraints are violable, but violation is minimal.
- 3 Constraints can both “trigger” and “block” processes.

Schematically:

- $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$,
 - $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.
- 4 The constraint system evaluates *output* representations. (Under Harmonic Serialism, it evaluates each step in a derivation.)
- A ranking determines a grammar, the possible rankings determine the typological space.
 - To the extent that constraints are grounded and universal, OT is a theory of naturalness.

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.
- 2 Constraints are violable, but violation is minimal.
- 3 Constraints can both “trigger” and “block” processes.

Schematically:

- $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$,
 - $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.
- 4 The constraint system evaluates *output* representations. (Under Harmonic Serialism, it evaluates each step in a derivation.)
 - 5 A ranking determines a grammar, the possible rankings determine the typological space.
- To the extent that constraints are grounded and universal, OT is a theory of naturalness.

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.
- 2 Constraints are violable, but violation is minimal.
- 3 Constraints can both “trigger” and “block” processes.

Schematically:

- $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$,
 - $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.
- 4 The constraint system evaluates *output* representations. (Under Harmonic Serialism, it evaluates each step in a derivation.)
 - 5 A ranking determines a grammar, the possible rankings determine the typological space.
 - 6 To the extent that constraints are grounded and universal, OT is a theory of naturalness.

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.
- 2 Constraints are violable, but violation is minimal.
- 3 Constraints can both “trigger” and “block” processes.

Schematically:

- $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$,
 - $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.
- 4 The constraint system evaluates *output* representations. (Under Harmonic Serialism, it evaluates each step in a derivation.)
 - 5 A ranking determines a grammar, the possible rankings determine the typological space.
 - 6 To the extent that constraints are grounded and universal, OT is a theory of naturalness.

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.
- 2 Constraints are violable, but violation is minimal.
- 3 Constraints can both “trigger” and “block” processes.
Schematically:
 - $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$,
 - $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.
- 4 The constraint system evaluates *output* representations.
(Under Harmonic Serialism, it evaluates each step in a derivation.)
- 5 A ranking determines a grammar, the possible rankings determine the typological space.
- 6 To the extent that constraints are grounded and universal, OT is a theory of naturalness.

Optimality Theory

- 1 Prince & Smolensky (1993): ranked constraints uniquely determine the processes that implement them.
- 2 Constraints are violable, but violation is minimal.
- 3 Constraints can both “trigger” and “block” processes.
Schematically:
 - $P \rightarrow Q$ is triggered in the context X_Y if $*XPY \gg *Q$,
 - $P \rightarrow Q$ is blocked in the context X_Y if $*XQY \gg *P$.
- 4 The constraint system evaluates *output* representations.
(Under Harmonic Serialism, it evaluates each step in a derivation.)
- 5 A ranking determines a grammar, the possible rankings determine the typological space.
- 6 To the extent that constraints are grounded and universal, OT is a theory of naturalness.

The “derivational residue”

1 Two major problems

- Opacity
- Cyclicity

2 Two types of solutions

- Introduce transderivational faithfulness constraints (Sympathy, O/O) and/or transderivational constraints formulated over faithfulness relations (OT-CC).
- Modularity: level-ordered cascade of classic OT constraint systems (Stratal OT). Expressions are interpreted incrementally as they are built up, so morphology and phonology are intrinsically cyclic and local. (Interleaving now also in DM, Embick 2010).

The “derivational residue”

1 Two major problems

- Opacity
- Cyclicity

2 Two types of solutions

- Introduce transderivational faithfulness constraints (Sympathy, O/O) and/or transderivational constraints formulated over faithfulness relations (OT-CC).
- Modularity: level-ordered cascade of classic OT constraint systems (Stratal OT). Expressions are interpreted incrementally as they are built up, so morphology and phonology are intrinsically cyclic and local. (Interleaving now also in DM, Embick 2010).

The “derivational residue”

1 Two major problems

- Opacity
- Cyclicity

2 Two types of solutions

- Introduce transderivational faithfulness constraints (Sympathy, O/O) and/or transderivational constraints formulated over faithfulness relations (OT-CC).
- Modularity: level-ordered cascade of classic OT constraint systems (Stratal OT). Expressions are interpreted incrementally as they are built up, so morphology and phonology are intrinsically cyclic and local. (Interleaving now also in DM, Embick 2010).

The “derivational residue”

1 Two major problems

- Opacity
- Cyclicity

2 Two types of solutions

- Introduce transderivational faithfulness constraints (Sympathy, O/O) and/or transderivational constraints formulated over faithfulness relations (OT-CC).
- Modularity: level-ordered cascade of classic OT constraint systems (Stratal OT). Expressions are interpreted incrementally as they are built up, so morphology and phonology are intrinsically cyclic and local. (Interleaving now also in DM, Embick 2010).

The “derivational residue”

1 Two major problems

- Opacity
- Cyclicity

2 Two types of solutions

- Introduce transderivational faithfulness constraints (Sympathy, O/O) and/or transderivational constraints formulated over faithfulness relations (OT-CC).
- Modularity: level-ordered cascade of classic OT constraint systems (Stratal OT). Expressions are interpreted incrementally as they are built up, so morphology and phonology are intrinsically cyclic and local. (Interleaving now also in DM, Embick 2010).

The “derivational residue”

1 Two major problems

- Opacity
- Cyclicity

2 Two types of solutions

- Introduce transderivational faithfulness constraints (Sympathy, O/O) and/or transderivational constraints formulated over faithfulness relations (OT-CC).
- Modularity: level-ordered cascade of classic OT constraint systems (Stratal OT). Expressions are interpreted incrementally as they are built up, so morphology and phonology are intrinsically cyclic and local. (Interleaving now also in DM, Embick 2010).

Andrew Nevins

- *Locality in Vowel Harmony* (2010)
- (with Karlos Arregi) *Morphotactics: Basque Auxiliaries and the Structure of Spellout* (in press)

Leading ideas:

- 1 Locality, restrictiveness.
- 2 Phonetic grounding, naturalness, markedness.
- 3 Modularity: separate morphology and syntax.
- 4 Cross-modular structural parallelism: phonology is *not* different.

Andrew Nevins

- *Locality in Vowel Harmony* (2010)
- (with Karlos Arregi) *Morphotactics: Basque Auxiliaries and the Structure of Spellout* (in press)

Leading ideas:

- 1 Locality, restrictiveness.
- 2 Phonetic grounding, naturalness, markedness.
- 3 Modularity: separate morphology and syntax.
- 4 Cross-modular structural parallelism: phonology is *not* different.

Andrew Nevins

- *Locality in Vowel Harmony* (2010)
- (with Karlos Arregi) *Morphotactics: Basque Auxiliaries and the Structure of Spellout* (in press)

Leading ideas:

- 1 Locality, restrictiveness.
- 2 Phonetic grounding, naturalness, markedness.
- 3 Modularity: separate morphology and syntax.
- 4 Cross-modular structural parallelism: phonology is *not* different.

Andrew Nevins

- *Locality in Vowel Harmony* (2010)
- (with Karlos Arregi) *Morphotactics: Basque Auxiliaries and the Structure of Spellout* (in press)

Leading ideas:

- 1 Locality, restrictiveness.
- 2 Phonetic grounding, naturalness, markedness.
- 3 Modularity: separate morphology and syntax.
- 4 Cross-modular structural parallelism: phonology is *not* different.

How to achieve this?

1 Nevins' proposal

- Rules plus (i) constraints that block rules, (ii) constraints that trigger rules.
- Functional submodules in the morphology: Feature and node deletion → Linearization → Vocabulary Insertion → Movement and Copying

2 Stratal OT

- Only constraints, cyclically evaluated.
- Structural submodules in the morphology: Stems and Words.
- Beyond cross-modular parallelism: constraint-based approaches in phonetic implementation (Flemming), metrics, processing.

How to achieve this?

1 Nevins' proposal

- Rules plus (i) constraints that block rules, (ii) constraints that trigger rules.
- Functional submodules in the morphology: Feature and node deletion → Linearization → Vocabulary Insertion → Movement and Copying

2 Stratal OT

- Only constraints, cyclically evaluated.
- Structural submodules in the morphology: Stems and Words.
- Beyond cross-modular parallelism: constraint-based approaches in phonetic implementation (Flemming), metrics, processing.

How to achieve this?

1 Nevins' proposal

- Rules plus (i) constraints that block rules, (ii) constraints that trigger rules.
- Functional submodules in the morphology: Feature and node deletion → Linearization → Vocabulary Insertion → Movement and Copying

2 Stratal OT

- Only constraints, cyclically evaluated.
- Structural submodules in the morphology: Stems and Words.
- Beyond cross-modular parallelism: constraint-based approaches in phonetic implementation (Flemming), metrics, processing.

How to achieve this?

1 Nevins' proposal

- Rules plus (i) constraints that block rules, (ii) constraints that trigger rules.
- Functional submodules in the morphology: Feature and node deletion → Linearization → Vocabulary Insertion → Movement and Copying

2 Stratal OT

- Only constraints, cyclically evaluated.
- Structural submodules in the morphology: Stems and Words.
- Beyond cross-modular parallelism: constraint-based approaches in phonetic implementation (Flemming), metrics, processing.

How to achieve this?

1 Nevins' proposal

- Rules plus (i) constraints that block rules, (ii) constraints that trigger rules.
- Functional submodules in the morphology: Feature and node deletion → Linearization → Vocabulary Insertion → Movement and Copying

2 Stratal OT

- Only constraints, cyclically evaluated.
- Structural submodules in the morphology: Stems and Words.
- Beyond cross-modular parallelism: constraint-based approaches in phonetic implementation (Flemming), metrics, processing.

How to achieve this?

1 Nevins' proposal

- Rules plus (i) constraints that block rules, (ii) constraints that trigger rules.
- Functional submodules in the morphology: Feature and node deletion → Linearization → Vocabulary Insertion → Movement and Copying

2 Stratal OT

- Only constraints, cyclically evaluated.
- Structural submodules in the morphology: Stems and Words.
- Beyond cross-modular parallelism: constraint-based approaches in phonetic implementation (Flemming), metrics, processing.

How to achieve this?

1 Nevins' proposal

- Rules plus (i) constraints that block rules, (ii) constraints that trigger rules.
- Functional submodules in the morphology: Feature and node deletion → Linearization → Vocabulary Insertion → Movement and Copying

2 Stratal OT

- Only constraints, cyclically evaluated.
- Structural submodules in the morphology: Stems and Words.
- Beyond cross-modular parallelism: constraint-based approaches in phonetic implementation (Flemming), metrics, processing.

Nevins' procedural theory of vowel harmony

- 1 *Search procedure*: a value-seeking (“needy”) element initiates a search for the feature it needs, stops as soon as it finds the closest element bearing the relevant feature, and copies the value of that feature. If it can’t find a feature within the search domain, it defaults to a parametrically specified value.
- 2 *Relativization parameter* determines what values of the harmonic feature count as “relevant”: (a) all values, (b) contrastive values, (c) marked values.
- 3 *Identity requirement* may be imposed on the source and target of feature-copying.
- 4 *Bounding parameters*: (a) limits on search distance, (b) blocking by high-sonority elements.

Nevins' procedural theory of vowel harmony

- 1 *Search procedure*: a value-seeking (“needy”) element initiates a search for the feature it needs, stops as soon as it finds the closest element bearing the relevant feature, and copies the value of that feature. If it can’t find a feature within the search domain, it defaults to a parametrically specified value.
- 2 *Relativization parameter* determines what values of the harmonic feature count as “relevant”: (a) all values, (b) contrastive values, (c) marked values.
- 3 *Identity requirement* may be imposed on the source and target of feature-copying.
- 4 *Bounding parameters*: (a) limits on search distance, (b) blocking by high-sonority elements.

Nevins' procedural theory of vowel harmony

- 1 *Search procedure*: a value-seeking (“needy”) element initiates a search for the feature it needs, stops as soon as it finds the closest element bearing the relevant feature, and copies the value of that feature. If it can’t find a feature within the search domain, it defaults to a parametrically specified value.
- 2 *Relativization parameter* determines what values of the harmonic feature count as “relevant”: (a) all values, (b) contrastive values, (c) marked values.
- 3 *Identity requirement* may be imposed on the source and target of feature-copying.
- 4 *Bounding parameters*: (a) limits on search distance, (b) blocking by high-sonority elements.

Nevins' procedural theory of vowel harmony

- 1 *Search procedure*: a value-seeking (“needy”) element initiates a search for the feature it needs, stops as soon as it finds the closest element bearing the relevant feature, and copies the value of that feature. If it can't find a feature within the search domain, it defaults to a parametrically specified value.
- 2 *Relativization parameter* determines what values of the harmonic feature count as “relevant”: (a) all values, (b) contrastive values, (c) marked values.
- 3 *Identity requirement* may be imposed on the source and target of feature-copying.
- 4 *Bounding parameters*: (a) limits on search distance, (b) blocking by high-sonority elements.

An OT theory of vowel harmony

- 1 Phonology negotiates the conflicting claims of syntagmatic and paradigmatic markedness constraints and faithfulness constraints.

- Harmony: $*[\alpha F][-\alpha F]$
- Paradigmatic markedness: $*[\mu F]$
- Faithfulness: IDENT-STEM(F), IDENT- σ_1 (F)...

- Constraints may be conjoined.
- Cyclic evaluation.

Kiparsky & Pajusalu 2003

An OT theory of vowel harmony

- 1 Phonology negotiates the conflicting claims of syntagmatic and paradigmatic markedness constraints and faithfulness constraints.

- Harmony: $*[\alpha F][-\alpha F]$

- Paradigmatic markedness: $*[\mu F]$

- Faithfulness: IDENTSTEM(F), IDENT- σ_1 (F)...

- 2 Constraints may be conjoined.

- Cyclic evaluation.

Kiparsky & Pajusalu 2003

An OT theory of vowel harmony

- 1 Phonology negotiates the conflicting claims of syntagmatic and paradigmatic markedness constraints and faithfulness constraints.

- Harmony: $*[\alpha F][-\alpha F]$
- Paradigmatic markedness: $*[\mu F]$
- Faithfulness: IDENT_{STEM}(F), IDENT- σ_1 (F)...

- 2 Constraints may be conjoined.

- 3 Cyclic evaluation.

Kiparsky & Pajusalu 2003

An OT theory of vowel harmony

- 1 Phonology negotiates the conflicting claims of syntagmatic and paradigmatic markedness constraints and faithfulness constraints.
 - Harmony: $*[\alpha F][-\alpha F]$
 - Paradigmatic markedness: $*[\mu F]$
 - Faithfulness: IDENTSTEM(F), IDENT- σ_1 (F)...
- 2 Constraints may be conjoined.
- 3 Cyclic evaluation.

Kiparsky & Pajusalu 2003

An OT theory of vowel harmony

- 1 Phonology negotiates the conflicting claims of syntagmatic and paradigmatic markedness constraints and faithfulness constraints.
 - Harmony: $*[\alpha F][-\alpha F]$
 - Paradigmatic markedness: $*[\mu F]$
 - Faithfulness: IDENTSTEM(F), IDENT- σ_1 (F)...
- 2 Constraints may be conjoined.
- 3 Cyclic evaluation.

Kiparsky & Pajusalu 2003

An OT theory of vowel harmony

- 1 Phonology negotiates the conflicting claims of syntagmatic and paradigmatic markedness constraints and faithfulness constraints.
 - Harmony: $*[\alpha F][-\alpha F]$
 - Paradigmatic markedness: $*[\mu F]$
 - Faithfulness: IDENTSTEM(F), IDENT- σ_1 (F)...
- 2 Constraints may be conjoined.
- 3 Cyclic evaluation.

Kiparsky & Pajusalu 2003

Finnish

- järje-st-el-mä-llis-ty-ttä-mä-ttöm-yyde-llä-nsä-kään-kö-hän
'maybe not-even with his failure to have systematized?'
- suunn-it-el-ma-llis-tu-tta-ma-ttom-uude-lla-nsa-kaan-ko-han
'maybe not-even with his failure to have caused planning to be introduced?'
- es-it-el-mä-llis-ty-ttä-mä-ttöm-yyde-llä-nsä-kään-kö-hän
'maybe not-even with his failure to have lecturing caused to be introduced ?'

The vowel system

	u	o	a	y	ö	ä	i	e
Back	+	+	+	—	—	—	—	—
Round	+	+	—	+	+	—	—	—
High	+	—	—	+	—	—	+	—
Low	—	—	+	—	—	+	—	—

■ Harmony: *u, o, a* and *y, ö, ä* don't co-occur.

- Stems: *pouta* 'fair weather', *pöytä* 'table', **poutä*, **poytä*, **poyta*, **pöuta* . .
- Suffixes: *maa-ta* 'land' (Part.Sg.), *pää-tä* 'head' (Part.Sg.)

The vowel system

	u	o	a	y	ö	ä	i	e
Back	+	+	+	—	—	—	—	—
Round	+	+	—	+	+	—	—	—
High	+	—	—	+	—	—	+	—
Low	—	—	+	—	—	+	—	—

■ Harmony: *u, o, a* and *y, ö, ä* don't co-occur.

■ Stems: *pouta* 'fair weather', *pöytä* 'table', **poutä*, **poytä*, **poyta*, **pöuta*...

■ Suffixes: *maa-ta* 'land' (Part.Sg.), *pää-tä* 'head' (Part.Sg.)

The vowel system

	u	o	a	y	ö	ä	i	e
Back	+	+	+	—	—	—	—	—
Round	+	+	—	+	+	—	—	—
High	+	—	—	+	—	—	+	—
Low	—	—	+	—	—	+	—	—

- Harmony: *u, o, a* and *y, ö, ä* don't co-occur.
 - Stems: *pouta* 'fair weather', *pöytä* 'table', **poutä*, **poytä*, **poyta*, **pöuta*...
 - Suffixes: *maa-ta* 'land' (Part.Sg.), *pää-tä* 'head' (Part.Sg.)

The neutral vowels *i*, *e* in Finnish

- Unpaired in the underlying vowel inventory.
Do not undergo suffixal harmony.
- Transparent to suffixal harmony, e.g. *tarina* ‘tale’, *tärinä* ‘vibration’ (**tarinä*, **tärina*)
- Freely co-occur with back vowels in stems, e.g. *piina* ‘torture’, *viitta* ‘cloak’
- Trigger front harmony in suffixes, e.g. *pii-nä* ‘silicon’ (Ess.Sg.), *viit-tä* ‘five’ (Part.Sg.)

The neutral vowels *i*, *e* in Finnish

- Unpaired in the underlying vowel inventory.
Do not undergo suffixal harmony.
- Transparent to suffixal harmony, e.g. *tarina* ‘tale’, *tärinä* ‘vibration’ (**tarinä*, **tärina*)
- Freely co-occur with back vowels in stems, e.g. *piina* ‘torture’, *viitta* ‘cloak’
- Trigger front harmony in suffixes, e.g. *pii-nä* ‘silicon’ (Ess.Sg.), *viit-tä* ‘five’ (Part.Sg.)

The neutral vowels *i*, *e* in Finnish

- Unpaired in the underlying vowel inventory.
Do not undergo suffixal harmony.
- Transparent to suffixal harmony, e.g. *tarina* ‘tale’, *tärinä* ‘vibration’ (**tarinä*, **tärina*)
- Freely co-occur with back vowels in stems, e.g. *piina* ‘torture’, *viitta* ‘cloak’
- Trigger front harmony in suffixes, e.g. *pii-nä* ‘silicon’ (Ess.Sg.), *viit-tä* ‘five’ (Part.Sg.)

The neutral vowels *i*, *e* in Finnish

- Unpaired in the underlying vowel inventory.
Do not undergo suffixal harmony.
- Transparent to suffixal harmony, e.g. *tarina* ‘tale’, *tärinä* ‘vibration’ (**tarinä*, **tärina*)
- Freely co-occur with back vowels in stems, e.g. *piina* ‘torture’, *viitta* ‘cloak’
- Trigger front harmony in suffixes, e.g. *pii-nä* ‘silicon’ (Ess.Sg.), *viit-tä* ‘five’ (Part.Sg.)

a, o, u, i, e are unmarked for [Back]

Text frequency of Finnish vowels

i	27	24.97%
a	23	22.88%
e	16	15.49%
u	10	11.91%
o	10	10.67%
<hr/>		
ä	9	7.60%
y	3	4.75%
ö	1	1.78%

Finnish constraint ranking

1 *i, *ʏ

2 MARKEDHARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$ & * $[\mu\text{Back}]$: a domain cannot contain both a disharmonic vowel and a marked vowel.

3 FAITHFULNESS:

- IDENTSTEM(BACK): An input $[\alpha\text{Back}]$ vowel in a Stem must be $[\alpha\text{Back}]$ in the output.
- IDENT- σ_1 (Back): An initial input $[\alpha\text{Back}]$ vowel must be $[\alpha\text{Back}]$ in the output.

■ HARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$

This ranking gives Finnish, others generate an empirically supported factorial typology.

Finnish constraint ranking

- 1 * ɨ , * ʉ
- 2 MARKEDHARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$ & * $[\mu\text{Back}]$: a domain cannot contain both a disharmonic vowel and a marked vowel.
- 3 FAITHFULNESS:
 - IDENTSTEM(BACK): An input $[\alpha\text{Back}]$ vowel in a Stem must be $[\alpha\text{Back}]$ in the output.
 - IDENT- σ_1 (Back): An initial input $[\alpha\text{Back}]$ vowel must be $[\alpha\text{Back}]$ in the output.
 - HARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$

This ranking gives Finnish, others generate an empirically supported factorial typology.

Finnish constraint ranking

- 1 *i, *ʏ
- 2 MARKEDHARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$ & * $[\mu\text{Back}]$: a domain cannot contain both a disharmonic vowel and a marked vowel.
- 3 FAITHFULNESS:
 - IDENTSTEM(BACK): An input $[\alpha\text{Back}]$ vowel in a Stem must be $[\alpha\text{Back}]$ in the output.
 - IDENT- σ_1 (Back): An initial input $[\alpha\text{Back}]$ vowel must be $[\alpha\text{Back}]$ in the output.
- 4 HARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$

This ranking gives Finnish, others generate an empirically supported factorial typology.

Finnish constraint ranking

- 1 *i, *ʏ
- 2 MARKEDHARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$ & * $[\mu\text{Back}]$: a domain cannot contain both a disharmonic vowel and a marked vowel.
- 3 FAITHFULNESS:
 - IDENTSTEM(BACK): An input $[\alpha\text{Back}]$ vowel in a Stem must be $[\alpha\text{Back}]$ in the output.
 - IDENT- σ_1 (Back): An initial input $[\alpha\text{Back}]$ vowel must be $[\alpha\text{Back}]$ in the output.
- 4 HARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$

This ranking gives Finnish, others generate an empirically supported factorial typology.

Finnish constraint ranking

- 1 *i̯, *ʏ
- 2 MARKEDHARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$ & * $[\mu\text{Back}]$: a domain cannot contain both a disharmonic vowel and a marked vowel.
- 3 FAITHFULNESS:
 - IDENTSTEM(BACK): An input $[\alpha\text{Back}]$ vowel in a Stem must be $[\alpha\text{Back}]$ in the output.
 - IDENT- σ_1 (Back): An initial input $[\alpha\text{Back}]$ vowel must be $[\alpha\text{Back}]$ in the output.
- 4 HARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$

This ranking gives Finnish, others generate an empirically supported factorial typology.

Finnish constraint ranking

- 1 *i̯, *ʏ
- 2 MARKEDHARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$ & * $[\mu\text{Back}]$: a domain cannot contain both a disharmonic vowel and a marked vowel.
- 3 FAITHFULNESS:
 - IDENTSTEM(BACK): An input $[\alpha\text{Back}]$ vowel in a Stem must be $[\alpha\text{Back}]$ in the output.
 - IDENT- σ_1 (Back): An initial input $[\alpha\text{Back}]$ vowel must be $[\alpha\text{Back}]$ in the output.
- 4 HARMONY: * $[\alpha\text{Back}][-\alpha\text{Back}]$

This ranking gives Finnish, others generate an empirically supported factorial typology.

Stems are subject only to MARKEDHARMONY

MARKEDHARMONY: a domain cannot contain both a marked vowel and a disharmonic vowel.

* [a_D ä_{DM}]_α

✓ [i_D a_D]_α

✓ [i ä_M]_α

✓ [a_D i_D a_D]_α

* [a_D i_D ä_M]_α

* [ä_{DM} i_D a_D]_α

✓ [ä_M i ä_M]_α

Suffixes undergo also HARMONY

Input	Candidates	*i, *ʏ	MARKEDHARMONY	IDENTSTEM(B)	HARMONY
[i]a	ia				*
	☞ iä				
[ia]	☞ ia				*
	iä			*	
[iä]	ia			*	*
	☞ iä				
[ai]a	☞ aia				**
	aiä		*		*
	aia	*		*	
aia	☞ aia				**
	aiä		*		*
	aia	*		*	
aiä	☞ aia				**
	aiä			*	*
	aia	*		*	

- 1 Harmony applies in suffixes and within roots.
- 2 A needy vowel seeks a contrastive feature to its left ('needy' \approx 'unspecified').
- 3 Transparent *i*, *e* are excluded from the search.
- 4 If the search fails, default [–Back] is assigned.
- 5 Non-initial stem syllables also undergo harmony (evidence from language games). Disharmony handled by specifying vowels as non-needy.

- 1 Harmony applies in suffixes and within roots.
- 2 A needy vowel seeks a contrastive feature to its left ('needy' \approx 'unspecified').
- 3 Transparent *i*, *e* are excluded from the search.
- 4 If the search fails, default [–Back] is assigned.
- 5 Non-initial stem syllables also undergo harmony (evidence from language games). Disharmony handled by specifying vowels as non-needy.

- 1 Harmony applies in suffixes and within roots.
- 2 A needy vowel seeks a contrastive feature to its left ('needy' \approx 'unspecified').
- 3 Transparent *i*, *e* are excluded from the search.
- 4 If the search fails, default [–Back] is assigned.
- 5 Non-initial stem syllables also undergo harmony (evidence from language games). Disharmony handled by specifying vowels as non-needy.

- 1 Harmony applies in suffixes and within roots.
- 2 A needy vowel seeks a contrastive feature to its left ('needy' \approx 'unspecified').
- 3 Transparent *i*, *e* are excluded from the search.
- 4 If the search fails, default [–Back] is assigned.
- 5 Non-initial stem syllables also undergo harmony (evidence from language games). Disharmony handled by specifying vowels as non-needy.

- 1 Harmony applies in suffixes and within roots.
- 2 A needy vowel seeks a contrastive feature to its left ('needy' \approx 'unspecified').
- 3 Transparent *i*, *e* are excluded from the search.
- 4 If the search fails, default [–Back] is assigned.
- 5 Non-initial stem syllables also undergo harmony (evidence from language games). Disharmony handled by specifying vowels as non-needy.

Argument 1: stem harmony

- 1 Non-standard speakers nativize disharmonic stems:
Peugeot → *pösö*, *trotyyli* → *rotuli* ‘TNT’, *olympia-* → *olumpia-*, *pulityyri* → *pulituuri* ‘furniture polish’.
Never *Kiina* → **Kiinä* ‘China’, *metro* → **metrö*.
- 2 Ranking MH \gg IDSTEM(B) \gg H excludes *Peugeot*, *trotyyli*, but not *Kiina*, *metro*.
- 3 The search-and-copy approach doesn't have a harmony constraint. It must specify the distribution of neediness by a lookahead rule: “a stem vowel is needy only if its needs will be satisfied by copying, not by default assignment.”

Argument 1: stem harmony

- 1 Non-standard speakers nativize disharmonic stems:
Peugeot → *pösö*, *trotyyli* → *rotuli* ‘TNT’, *olympia-* → *olumpia-*, *pulityyri* → *pulituuri* ‘furniture polish’.
Never *Kiina* → **Kiinä* ‘China’, *metro* → **metrö*.
- 2 Ranking MH ≫ IDSTEM(B) ≫ H excludes *Peugeot*, *trotyyli*, but not *Kiina*, *metro*.
- 3 The search-and-copy approach doesn't have a harmony constraint. It must specify the distribution of neediness by a lookahead rule: “a stem vowel is needy only if its needs will be satisfied by copying, not by default assignment.”

Argument 1: stem harmony

- 1 Non-standard speakers nativize disharmonic stems:
Peugeot → *pösö*, *trottyli* → *rotuli* ‘TNT’, *olympia-* → *olumpia-*, *pulityyri* → *pulituuri* ‘furniture polish’.
Never *Kiina* → **Kiinä* ‘China’, *metro* → **metrö*.
- 2 Ranking MH ≫ IDSTEM(B) ≫ H excludes *Peugeot*, *trottyli*, but not *Kiina*, *metro*.
- 3 The search-and-copy approach doesn’t have a harmony constraint. It must specify the distribution of neediness by a lookahead rule: “a stem vowel is needy only if its needs will be satisfied by copying, not by default assignment.”

Argument 2: *i,e* don't trigger harmony from monosyllabic C-roots

<i>itk-u</i>	'crying'	<i>itke-sk-el-y</i>	'crying' (durative)
<i>hiill-os</i>	'embers'	<i>piene-nn-ös</i>	'reduction'
<i>tek-o</i>	'deed'	<i>tee+sk+ent+el+y</i>	'pretending'
<i>pit-uus</i>	'length'	<i>pid-emm-yys</i>	'greater length'
<i>pien-uus</i>	'small size'	<i>pien-emm-yys</i>	'smaller size'

Analysis: the minimal stem is disyllabic, so the Root+Suffix combination is the first cyclic constituent.

- $(itk-u)_{\omega}$ (like monomorphemic *letku* 'hose')
- $((itk-esk-el)_{\omega-y})_{\omega}$

Argument 3: feature-changing VH

Non-needy (fully specified) vowels can harmonize, as predicted by constraint-based theory.

moinen	‘such’	<i>moinen</i> has underlying [+Back] /o/
kum+moinen	‘which kind of?’	[+Back] after [+Back]
mim+moinen	‘what kind of’	[+Back] after neutral [–Back]
täm+möinen	‘this kind of’	[–Back] after harmonic [–Back]

- Similar examples in Hungarian VH (Vago).
- Consonant assimilation is also applicable to fully specified vowels (Wetzels & Mascaró 2001).
- Constraint-based theory unifies VH with other assimilation processes.

Argument 4: Seto/Võru

- Harmony like Finnish, but with two extra vowels /ĩ/, /ʏ/

	u	o	a	ĩ	ʏ	ü	ö	ä	i	e
Back	+	+	+	+	+	—	—	—	—	—
Round	+	+	—	—	—	+	+	—	—	—
High	+	—	—	+	—	+	—	—	+	—
Low	—	—	+	—	—	—	—	+	—	—

- /ĩ/ back harmonic, occurs only in initial syllables.
- /ʏ/ occurs in any syllable, reduced to [ə] non-initially.
- /e/ is a neutral in initial syllables, front harmonic elsewhere.
- /o/ is opaque.
- /ö/ occurs only in initial syllables.

Argument 4: Seto/Võru

- Harmony like Finnish, but with two extra vowels /ĩ/, /ʏ/

	u	o	a	ĩ	ʏ	ü	ö	ä	i	e
Back	+	+	+	+	+	—	—	—	—	—
Round	+	+	—	—	—	+	+	—	—	—
High	+	—	—	+	—	+	—	—	+	—
Low	—	—	+	—	—	—	—	+	—	—

- /ĩ/ back harmonic, occurs only in initial syllables.
- /ʏ/ occurs in any syllable, reduced to [ə] non-initially.
- /e/ is a neutral in initial syllables, front harmonic elsewhere.
- /o/ is opaque.
- /ö/ occurs only in initial syllables.

Argument 4: Seto/Võru

- Harmony like Finnish, but with two extra vowels /ĩ/, /ʏ/

	u	o	a	ĩ	ʏ	ü	ö	ä	i	e
Back	+	+	+	+	+	—	—	—	—	—
Round	+	+	—	—	—	+	+	—	—	—
High	+	—	—	+	—	+	—	—	+	—
Low	—	—	+	—	—	—	—	+	—	—

- /ĩ/ back harmonic, occurs only in initial syllables.
- /ʏ/ occurs in any syllable, reduced to [ə] non-initially.
- /e/ is a neutral in initial syllables, front harmonic elsewhere.
- /o/ is opaque.
- /ö/ occurs only in initial syllables.

Argument 4: Seto/Võru

- Harmony like Finnish, but with two extra vowels /ĩ/, /ʏ/

	u	o	a	ĩ	ʏ	ü	ö	ä	i	e
Back	+	+	+	+	+	—	—	—	—	—
Round	+	+	—	—	—	+	+	—	—	—
High	+	—	—	+	—	+	—	—	+	—
Low	—	—	+	—	—	—	—	+	—	—

- /ĩ/ back harmonic, occurs only in initial syllables.
- /ʏ/ occurs in any syllable, reduced to [ə] non-initially.
- /e/ is a neutral in initial syllables, front harmonic elsewhere.
- /o/ is opaque.
- /ö/ occurs only in initial syllables.

Argument 4: Seto/Võru

- Harmony like Finnish, but with two extra vowels /ĩ/, /ʏ/

	u	o	a	ĩ	ʏ	ü	ö	ä	i	e
Back	+	+	+	+	+	—	—	—	—	—
Round	+	+	—	—	—	+	+	—	—	—
High	+	—	—	+	—	+	—	—	+	—
Low	—	—	+	—	—	—	—	+	—	—

- /ĩ/ back harmonic, occurs only in initial syllables.
- /ʏ/ occurs in any syllable, reduced to [ə] non-initially.
- /e/ is a neutral in initial syllables, front harmonic elsewhere.
- /o/ is opaque.
- /ö/ occurs only in initial syllables.

Argument 4: Seto/Võru

- Harmony like Finnish, but with two extra vowels /ĩ/, /ʏ/

	u	o	a	ĩ	ʏ	ü	ö	ä	i	e
Back	+	+	+	+	+	—	—	—	—	—
Round	+	+	—	—	—	+	+	—	—	—
High	+	—	—	+	—	+	—	—	+	—
Low	—	—	+	—	—	—	—	+	—	—

- /ĩ/ back harmonic, occurs only in initial syllables.
- /ʏ/ occurs in any syllable, reduced to [ə] non-initially.
- /e/ is a neutral in initial syllables, front harmonic elsewhere.
- /o/ is opaque.
- /ö/ occurs only in initial syllables.

Initial /i/ and /ĩ/ are distinctive, /ĩ/ triggers harmony

- 1 *sĩna* ‘word’, *klĩbisɣ-ma* ‘to rattle’
sinä ‘you’, *libise-mä* ‘to flutter’, *silmä* ‘eye’s’, *hinneq* ‘fiber’
ilma ‘without’, *minnu* ‘me’, *hinnɣq* ‘grade’
**CĩCä*, **CĩCö*, **CĩCe...*
- 2 MH predicts this. Search procedure has a problem with identifying the source.
 - Search for distinctive values excludes grammatical *CiCa*, *CiCu*, *CiCɣ*.
 - Search for marked values fails to exclude either **CuCä*, **CaCü*, **CɣCe...*, or **CäCu*, **CüCa*, **CöCɣ...*, both ungrammatical.

Initial /i/ and /ĩ/ are distinctive, /ĩ/ triggers harmony

- 1 *sĩna* ‘word’, *klĩbisɣ-ma* ‘to rattle’
sinä ‘you’, *libise-mä* ‘to flutter’, *silmä* ‘eye’s’, *hinneq* ‘fiber’
ilma ‘without’, *minnu* ‘me’, *hinnɣq* ‘grade’
**CĩCä*, **CĩCö*, **CĩCe...*
- 2 MH predicts this. Search procedure has a problem with identifying the source.
 - Search for distinctive values excludes grammatical *CiCa*, *CiCu*, *CiCɣ*.
 - Search for marked values fails to exclude either **CuCä*, **CaCü*, **CɣCe...*, or **CäCu*, **CüCa*, **CöCɣ...*, both ungrammatical.

Initial /i/ and /ĩ/ are distinctive, /ĩ/ triggers harmony

- 1 *sĩna* ‘word’, *klĩbisɣ-ma* ‘to rattle’
sinä ‘you’, *libise-mä* ‘to flutter’, *silmä* ‘eye’s’, *hinneq* ‘fiber’
ilma ‘without’, *minnu* ‘me’, *hinnɣq* ‘grade’
**CĩCä*, **CĩCö*, **CĩCe...*
- 2 MH predicts this. Search procedure has a problem with identifying the source.
 - Search for distinctive values excludes grammatical *CiCa*, *CiCu*, *CiCɣ*.
 - Search for marked values fails to exclude either **CuCä*, **CaCü*, **CɣCe...*, or **CäCu*, **CüCa*, **CöCɣ...*, both ungrammatical.

Initial /i/ and /ĩ/ are distinctive, /ĩ/ triggers harmony

- 1 *sĩna* ‘word’, *klĩbisɣ-ma* ‘to rattle’
sinä ‘you’, *libise-mä* ‘to flutter’, *silmä* ‘eye’s’, *hinneq* ‘fiber’
ilma ‘without’, *minnu* ‘me’, *hinnɣq* ‘grade’
**CĩCä*, **CĩCö*, **CĩCe...*
- 2 MH predicts this. Search procedure has a problem with identifying the source.
 - Search for distinctive values excludes grammatical *CiCa*, *CiCu*, *CiCɣ*.
 - Search for marked values fails to exclude either **CuCä*, **CaCü*, **CɣCe...*, or **CäCu*, **CüCa*, **CöCɣ...*, both ungrammatical.

The domain of harmony is the prosodic word

	Harmony (local cases)	-t-Deletion in Part.Pl.		
	[+Back]	total hits	-i-Del.	total hits
kúvernemèntti	80.25%	3,595	100.00%	248
káramèlli	71.44%	9,843	100.00%	112,100
árkkitèhti	55.42%	39,978	100.00%	219,800
háarakìri	20.11%	2,496	100.00%	1508
kúriiri	100.00%	103,553	90.26%	7,747
bákteeri	99.99%	65,498	37.69%	353,802
fákiiri	99.89%	1,755	84.93%	3,532
kálenteri	98.78%	1,541,814	52.99%	181,743
ártikkeli	99.21%	2,380,926	16.78%	2,048,650

- \acute{V} , \grave{V} : lexical accents. Analysis: monomorphemic words consisting of two full feet are optionally prosodic compounds, e.g. (kúverne)_ω(mèntti)_ω, (kára)_ω(mèlli)_ω (Kiparsky 2003).

Conceptual advantages

- 1 The computation need not refer to “distinctiveness”, an inherently global property.
- 2 Unifies harmony with other assimilation processes.
- 3 Relies on independently motivated prosodic domains.

Conceptual advantages

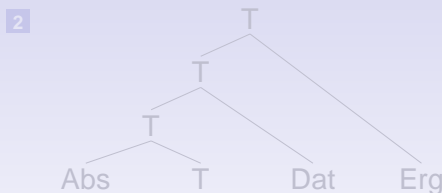
- 1 The computation need not refer to “distinctiveness”, an inherently global property.
- 2 Unifies harmony with other assimilation processes.
- 3 Relies on independently motivated prosodic domains.

Conceptual advantages

- 1 The computation need not refer to “distinctiveness”, an inherently global property.
- 2 Unifies harmony with other assimilation processes.
- 3 Relies on independently motivated prosodic domains.

Basque clitics

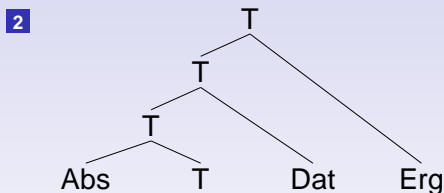
- 1 Basic order of clitics in the auxiliary is Abs – T – Dat – Erg, the reverse of the normal Subject – Indirect Object – Direct Object order of arguments.



- 3 CASEALIGNMENT
A clitic C_1 c-commands C_2 iff C_1 's Th-role outranks C_2 's Th-role.

Basque clitics

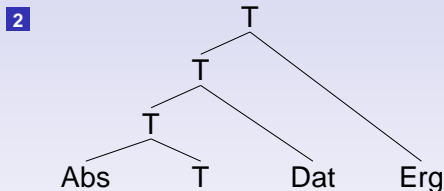
- 1 Basic order of clitics in the auxiliary is Abs – T – Dat – Erg, the reverse of the normal Subject – Indirect Object – Direct Object order of arguments.



- 3 CASEALIGNMENT
A clitic C_1 c-commands C_2 iff C_1 's Th-role outranks C_2 's Th-role.

Basque clitics

- 1 Basic order of clitics in the auxiliary is Abs – T – Dat – Erg, the reverse of the normal Subject – Indirect Object – Direct Object order of arguments.



- 3 CASEALIGNMENT
A clitic C_1 c-commands C_2 iff C_1 's Th-role outranks C_2 's Th-role.

Second position requirement

1 NONINITIALITY:

T in a finite verb cannot be the leftmost morpheme within the word.

2 ENCLISIS:

Clitics are adjoined to the right of their host T.

Second position requirement


1 NONINITIALITY:

T in a finite verb cannot be the leftmost morpheme within the word.

2 ENCLISIS:

Clitics are adjoined to the right of their host T.

	NONINITIALITY	ENCLISIS	CASEALIGNMENT
--	---------------	----------	---------------

Pres + Abs.1Sg + Erg.2Sg			
a.	* <i>a-t-su</i> T-1Sg-2Sg	*	
b. 	<i>n-a-su</i> 1Sg-T-2Sg	*	
c.	* <i>n-su-a</i> 1Sg-2Sg-T	**	
d.	* <i>a-su-t</i> T-2Sg-1Sg	*	*
e.	* <i>s-a-t</i> 2Sg-T-1Sg	*	*
f.	* <i>s-n-a</i> 2Sg-1Sg-T	**	*

Morphological dissimilation

Delete 1pl.Abs/1pl.Dat in context of 2.Erg (Ondarru)

1 *2/1PL

An auxiliary cannot contain both a first plural clitic and a second person clitic.

2 MAX-2P

A second person argument must correspond to a clitic (or: it must agree).

Morphological dissimilation

Delete 1pl.Abs/1pl.Dat in context of 2.Erg (Ondarru)

1 *2/1PL

An auxiliary cannot contain both a first plural clitic and a second person clitic.

2 MAX-2P

A second person argument must correspond to a clitic (or: it must agree).

Tense

- 1 The proclitic morpheme *d(o)-* is assumed to mark present indicative (Trask 1977, 1997, Donohue 2004); the T head to which it is attached is unspecified for tense.
- 2 A&N treat it as a featureless epenthetic clitic, inserted to satisfy a morphological constraint which requires that Tense must not begin a word. *d*-insertion is led by a rule which moves an ergative clitic to the beginning of the auxiliary (Enclitic Metathesis). By stipulation, Enclitic Metathesis only applies in the past tense; so *d*-insertion only applies in the present tense.

Tense

- 1 The proclitic morpheme *d(o)-* is assumed to mark present indicative (Trask 1977, 1997, Donohue 2004); the T head to which it is attached is unspecified for tense.
- 2 A&N treat it as a featureless epenthetic clitic, inserted to satisfy a morphological constraint which requires that Tense must not begin a word. *d*-insertion is bleeded by a rule which moves an ergative clitic to the beginning of the auxiliary (Enclitic Metathesis). By stipulation, Enclitic Metathesis only applies in the past tense; so *d*-insertion only applies in the present tense.

do-su ‘Present-2.Sg.’ is multiply ambiguous

- 1 Su-k gu-Ø ikus-i do-su (Present + ~~Abs.1Pl~~ + Erg.2Sg)
you.Sg-E us-A see-Prf Present-2Sg
‘You(Sg) have seen us.’
- 2 Su-k gu-ri emo-n do-su (Present + ~~Dat.1Pl~~ + Erg.2Sg)
you.Sg-E us-D give-Prf Present-2Sg
‘You(Sg) have given it to us.’
- 3 Gu-ri su-Ø gusta-ten do-su (Present + Abs.2Sg + ~~Dat.1Pl~~)
We-Dat you.Sg.Abs like-Perf Pres-2Sg
‘We like you(Sg.)’


do-su ‘Present-2.Sg.’ is multiply ambiguous

- 1 Su-k gu-Ø ikus-i do-su (Present + ~~Abs.1Pl~~ + Erg.2Sg)
you.Sg-E us-A see-Prf Present-2Sg
‘You(Sg) have seen us.’
- 2 Su-k gu-ri emo-n do-su (Present + ~~Dat.1Pl~~ + Erg.2Sg)
you.Sg-E us-D give-Prf Present-2Sg
‘You(Sg) have given it to us.’
- 3 Gu-ri su-Ø gusta-ten do-su (Present + Abs.2Sg + ~~Dat.1Pl~~)
We-Dat you.Sg.Abs like-Perf Pres-2Sg
‘We like you(Sg.)’

do-su ‘Present-2.Sg.’ is multiply ambiguous

- 1 Su-k gu-Ø ikus-i do-su (Present + ~~Abs.1Pl~~ + Erg.2Sg)
you.Sg-E us-A see-Prf Present-2Sg
‘You(Sg) have seen us.’
- 2 Su-k gu-ri emo-n do-su (Present + ~~Dat.1Pl~~ + Erg.2Sg)
you.Sg-E us-D give-Prf Present-2Sg
‘You(Sg) have given it to us.’
- 3 Gu-ri su-Ø gusta-ten do-su (Present + Abs.2Sg + ~~Dat.1Pl~~)
We-Dat you.Sg.Abs like-Perf Pres-2Sg
‘We like you(Sg.)’


dosu 'we-Dat (like) you-Abs' (Present)

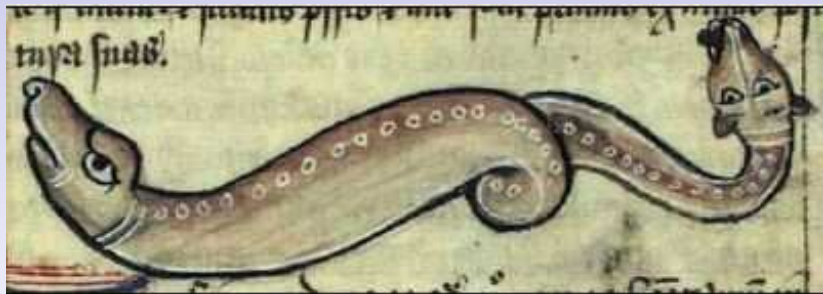
			NONINITIALITY	ENCLISIS	CASEALIGNMENT	*2/1PL	MAX-2P	FAITHENSE
Present + Abs.2Sg + Dat.1PI → <i>d-o-su</i>								
1a.	* <i>s-a-sku</i>	2Sg-T-Dat.1PI		*		*		*
1b.	* <i>a-sku</i>	T-Dat.1PI	*				*	*
1c.	* <i>a-su</i>	T-2Sg	*					*
1d.	 <i>do-su</i>	Pres-T-2Sg		*				
1e.	* <i>sku-a</i>	Dat.1PI-T		*			*	*
1f.	* <i>s-a</i>	2Sg-T		*				*
1g.	* <i>do-su-a</i>	Pres-2Sg-T		**				
1h.	* <i>do-sku-su</i>	Pres-T-Dat.1PI-2Sg		*	*	*		

sendun ‘~~we-Dat~~ (like)-d you-Abs’

			NONINITIALITY	ENCLISIS	*2/1PL	MAX-2P	FAITH TENSE
Past + Abs.2Sg + Dat.1PI → <i>s-endu-n</i>							
1a.	* <i>s-endu-sku-n</i>	2Sg-T-Dat.1PI		*	*		
1b.	* <i>endu-sku-n</i>	Past-Dat.1PI	*			*	
1c.	* <i>endu-su-n</i>	Past-2Sg	*				
1d.	* <i>d-endu-su-n</i>	Pres-Past-2Sg		*			*
1e. ☞	<i>s-endu-n</i>	2Sg-Past		*			
1f.	* <i>d-endu-sku-n</i>	Pres-Past-Dat.1PI		*		*	*

sendu(n) ‘you-Erg (saw) ~~us-Abs~~’

	NONINITIALITY	ENCLISIS	*2/1PL	MAX-2P	FAITH TENSE
Past + Abs.1PI + Erg.2Sg → <i>s-endu(-n)</i> ‘you -ed us’					
1a. * <i>g-endu-su-n</i> 1PI-Past-2Sg		*	*		
1b. * <i>endu-su-n</i> Past-2Sg	*				
1c. * <i>endu-gu-n</i> Past-1PI	*			*	
1d. * <i>d-endu-su-n</i> Pres-Past-2Sg		*			*
1e.  <i>s-endu-n</i> 2Sg-Past		*			
1f. * <i>g-endu-n</i> 1PI-Past		*		*	
1g. * <i>d-endu-gu-n</i> Pres-Past-1PI		*		*	*



y is translucent

Elativ *-sta/-stä*, Inessiv *-ssa/-ssä*, Allative *-lla/-llä*, Ablative *-lta/-ltä*. Google hits from Finnish pages.

	[+Back]	total hits
trotyyli	58.71%	1,669
marttyyri	56.35%	3,110
vampyyri	44.06%	32,692
kalkyyli	20.66%	1,113
analyysi	17.65%	1,414,089
karikatyyri	4.63 %	9,572

Other vowels are opaque

	[+Back]	total hits
monttööri	0.00%	142
jonglööri	0.04%	970
amatööri	0.27%	68,941
kuvernööri	0.01%	10,234
miljardööri	0.00%	14,553
vulgääri	1.02%	683
afääri	0.79%	511
karriääri	0.24%	837
atmosfääri	0.05%	18,819
miljonääri	0.00%	33,532
syaani	100.00%	2,027
tyranni	99.98%	11,730