

A Constraint-based Approach to Finnish CV Spoonerisms¹

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This paper provides a comprehensive Optimality Theoretic formalization of a Finnish language game. In opposition to earlier rule-based studies, the present analysis motivates the sometimes arbitrary-looking patterns of the game and brings together various phenomena under a unified set of universal constraints. The paper also demonstrates the close relationship between language games and natural languages by showing how the patterns of the game are analysable with the help of constraints of ordinary languages, or constraints that deviate only minimally from the original ones. The analysis of the game offers valuable external evidence for the phonology of Finnish with respect to the internal structure of long segments, vowel harmony, syllable markedness and the integrity of diphthongs.

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1. INTRODUCTION

Various types of spoonerisms (tongue slips) and language games have been the focus of numerous studies, such as Fromkin (1971, 1973, 1980), Laycock (1972), Hombert (1973), Campbell (1977, 1980, 1981, 1986), Shattuck-Hufnagel (1980, 1982, 1983), Cutler (1982), McCarthy (1982), Sherzer (1982), Yip (1982), Stemberger (1983), Lehiste (1985), Vago (1985), Bagemihl (1988, 1989, 1995), Davis (1988) and Itô et al. (1996). Tongue slips and language games supply a type of external evidence that often provides useful insights into the phonological structure of a language. In this paper, I present an analysis of one type of language game in Finnish, the so-called “CV spoonerisms”, in which the initial CV sequences of two adjacent words are swapped.² Earlier, rule-based accounts of this game have been phonologically unmotivated (Campbell 1980, Seppänen 1981, Anttila 1989) and their explanatory power has been weak. The switching of the initial CV sequences has been analysed in a purely descriptive way, as the reordering of segments, as demonstrated by /paksu kirja/ ‘a thick book’ in (1).

- (1) Input: [p₁ a₂ k₃ s₄ u₅] [k₆ i₇ r₈ j₉ a₁₀] /paksu kirja/
Output: [k₆ i₇ k₃ s₄ u₅] [p₁ a₂ r₈ j₉ a₁₀] [kiksi parja]

This paper differs from earlier rule-based studies notably because of the constraint-based Optimality Theoretic (OT) approach (Prince & Smolensky 1993, McCarthy & Prince 1993). I provide a comprehensive OT formalization for the CV game by suggesting clear motivations for various, sometimes arbitrary-looking phenomena of the game. The analysis brings together numerous patterns, which might appear as unrelated in the surface, under a unified set of constraints. The formal account relies on the two basic tenets of OT: constraint ranking and minimal violation, as well as on the universality principle of OT, by which the employed constraints are cross-linguistically attested in ordinary languages. Furthermore, I demonstrate how game-specific patterns which lack a direct correspondent in normal Finnish show certain similarities with phenomena of ordinary languages, thus being analysable by slightly extended parallel constraints, which do not pose a problem for the universality principle of OT. This paper thus illustrates how the analysis and patterns of this game are closely related to those of natural language. Consequently, the analysis is able to provide certain insights into the phonological behaviour of Finnish, such as that of vowel length, syllable markedness, vowel harmony and the integrity of diphthongs.

The remainder of this paper is structured as follows: section 2 describes the data and the generalizations thereof, while section 3 concentrates on giving a comprehensive OT analysis of CV spoonerisms, which accounts for all attested patterns of the game. Finally, section 4 summarizes the results of this paper and discusses further implications of the analysis.

2. DATA DESCRIPTION AND GENERALIZATIONS

This section describes the patterns of the game. The data given in (2) come from earlier studies (Campbell 1980, Seppänen 1981, Anttila 1989) as well as from my own research.³ The titles, such as ‘short vowel – short vowel’, refer to the beginning sequences of each word; in this case, both words include a short vowel in the first (target) syllable. Most spoonerisms here have no lexical meaning, and consequently, glosses refer to inputs.⁴ Furthermore, long vowels are indicated with two graphemes, and the pipe indicates word-boundaries in a compound, which patterns just like any sequence of two adjacent words.

(2) Input	Output	Gloss
short vowel – short vowel		
(a) / s ininen p allo/	[p aninen s illo]	‘a blue ball’
(b) / p aksu k irja/	[k iksu p arja]	‘a thick book’
long vowel – long vowel		
(c) / s aara h uutaa/	[h uura s aataa]	‘Saara shouts’

(d) /kuuma maa/	[maama kuu]	‘a hot country’
short vowel – long vowel		
(e) /kova tuuli/	[tuva kooli]	‘strong wind’
(f) /sooda vesi/	[veeda sosi]	‘seltzer’
short vowel – closing diphthong ⁵		
(g) /ruma paita/	[pama ruita]	‘an ugly shirt’
(h) /kaunis piha/	[piunis kaha]	‘a beautiful yard’
long vowel – closing diphthong		
(i) /suuri koivu/	[koo <u>ri</u> su <u>ivu</u>]	‘a large birch’
(j) /kuiva maali/	[ma <u>iva</u> ku <u>uli</u>]	‘dry paint’
closing diphthong – closing diphthong		
(k) /kaunis poika/	[pounis kaika]	‘a beautiful boy’
(l) /kaikki housut/	[ho <u>ikki</u> kau <u>sut</u>]	‘all pants’
short vowel – opening diphthong ^{6, 7}		
(m) /mika kuolee/	[kuka mie <u>lee</u>]	‘Mika dies’
(n) /hieno talo/	[taeno hi <u>lo</u>]	‘a fine house’
long vowel – opening diphthong		
(o) /liisa kuoli/	[kuusa lie <u>li</u>]	‘Liisa died’
(p) /väärä työ ⁸ /	[tyy <u>rä</u> vä <u>ö</u>]	‘a wrong job’
(q) /kieli tyyppi/	[ty <u>ö</u> li k <u>i</u> ppi]	‘a language type’
opening diphthong – opening diphthong		
(r) /pieni tuoli/	[tu <u>o</u> ni pi <u>eli</u>]	‘a small chair’
(s) /hiekkä kuorma/	[ku <u>o</u> kk <u>a</u> hi <u>e</u> rma]	‘a load of sand’
opening diphthong – closing diphthong		
(t) /tuore maito/	[ma <u>o</u> re tu <u>i</u> to]	‘fresh milk’
(u) /kaunis mies/	[mi <u>u</u> nis ka <u>e</u> s]	‘a beautiful man’

The data can be generalized as follows. Basically, the initial CV sequences of two adjacent words are switched, as in (2a) and (2b) but when the first syllable contains a long vowel, the entire long vowel moves,⁹ as exemplified in (2c) and (2d). However, examples (2e) and (2f) demonstrate how the quality and quantity of long vowels are separated and only the elements of the quality tier are swapped, while quantity remains in its original position. In the case of closing diphthongs, only the first component of the nucleus is switched (2k) and (2l)), causing the separation of the components. The situation involving opening diphthongs is, however, more complicated. Switching the initial CV sequences describes the situation insufficiently; therefore further featural adjustment is required, as shown by underlining in (2m), (2o), (2q), (2r) and (2s). In some cases, however, no diphthongal adjustment occurs, as illustrated in (2n), (2p), (2t) and (2u). Furthermore, in examples with two opening diphthongs, such as (2r) and (2s), it seems that the entire

diphthong is switched. The role of the onset of the first syllable is inactive in this game; if the syllable contains an onset, it will be switched together with the vowel.

Finally, two additional patterns of formation need to be mentioned. First, spoonerisms must not violate vowel harmony, and second, the basic switching pattern is sometimes violated when only the onsets are swapped. I will return to these restrictions after proposing the core analysis.

3. SPOONERISMS IN OPTIMALITY THEORY

Let us now turn to the formal Optimality Theoretic account of CV spoonerisms. The analysis will show how numerous patterns of spoonerisms are adequately accounted for by the interaction of a game-specific constraint and various cross-linguistically attested faithfulness constraints. The analysis follows the tenets of traditional input-output OT (Prince & Smolensky 1993, McCarthy & Prince 1993), assuming the representational properties of Correspondence Theory (McCarthy & Prince 1995).¹⁰

3.1. *The basic mechanism*

The basic mechanism of spoonerisms is the reordering of segments, which violates an input-output faithfulness, expressed by the constraint in (3).

(3) LINEARITY (McCarthy & Prince 1995:371)

S_1 is consistent with the precedence structure of S_2 , and vice versa.

Let $x, y \in S_1$, and $x', y' \in S_2$.

If $x \mathcal{R} x'$ and $y \mathcal{R} y'$, then

$x < y$ iff $\neg (y' < x')$.

LINEARITY, which has been used to analyse metathesis by, for example, McCarthy (1995) and Hume (1997), is violated whenever the precedence structure of the output segments does not correspond to that of the input. The evaluation criterion of LINEARITY is thus categorical such that the order of the output segments is either identical to the input order or not. However, a categorical evaluation of LINEARITY is insufficient in the case of CV spoonerisms, since, as I will show below, the number of segments that are reordered is relevant. Consequently, this analysis follows Hume (1997) and employs a gradient evaluation of LINEARITY, given in (4).

(4) LINEARITY (gradient) (Hume 1997:21)

A violation is incurred whenever a segment in the output does not occupy the same position in the string as its correspondent in the input.¹¹

The fact that spoonerisms exist suggests that LINEARITY must be dominated by a constraint, which requires the switching to take place. I suggest that the driving force behind the spoonerisms is a constraint which is closely related to patterns of cross-linguistic reduplication (McCarthy & Prince 1993, 1994), in which the reduplicant (= R) is a copy (or a partial copy) of the input word or base (= B). This pattern is expressed by the constraint in (5).

(5) ANCHORING (McCarthy & Prince 1994:8)

Correspondence preserves alignment in the following sense: the left (right) peripheral element of R corresponds to the left (right) peripheral element of B, if R is to the left (right) of B.

The constraint ANCHORING can also be applied to the correspondence relations of segments in the spoonerisms, in which the leftmost CV sequences of two adjacent words are switched. Consequently, the left edge – and essentially the leftmost (= root-initial) vowel – of the PrWd₂ (= prosodic word) in the output representation corresponds to the left edge of Wd₁¹² in the input representation, and vice versa. I therefore extend the idea of ANCHORING to the spoonerisms by the constraint given in (6). The constraint correctly emphasizes the crucial role of the root-initial vowel, and expresses the inactive position of the preceding onset consonant, which will be swapped only if the leftmost vowel is switched.

(6) L(EFT)-ANCHOR-V₁¹³

The root -initial vowel of PrWd₂ in the output representation corresponds to the root-initial vowel of Wd₁ in the input representation.

The root-initial vowel of PrWd₁ in the output representation corresponds to the root-initial vowel of Wd₂ in the input representation.

The constraint L(EFT)-ANCHOR-V₁ thus ensures that the leftmost vowels (and their onsets) in the output representation correspond to the leftmost vowels of the input words with the differently-subscripted numbers. The tableau in (7) demonstrates the evaluation of /paksu kirja/ ‘a thick book’, based on the interaction of L-ANCHOR-V₁ and LINEARITY. I indicate the

words within inputs and outputs by numbers and the switched sequences by underlining.

(7) L-ANCHOR-V₁ ≫ LINEARITY

I: /paksu _(w_{d1}) kirja _(w_{d2}) /	L-ANCHOR-V ₁	LINEARITY
a. [paksu] _{Prw_{d1}} [kirja] _{Prw_{d2}}	**	✗
b. [kiksu] _{Prw_{d1}} [parja] _{Prw_{d2}}		✓
c. [pakja] _{Prw_{d1}} [kirsu] _{Prw_{d2}}	* *	✗
d. [kaksu] _{Prw_{d1}} [pirja] _{Prw_{d2}}	* *	✗

The evaluation in (7) shows how any candidate that fails to undergo the swapping of the initial CV sequences loses the competition under L-ANCHOR-V₁. Candidate (a) fails because of its complete faithfulness to the input (i.e. nothing is switched); candidate (c), because the *right* edges are switched; and finally, candidate (d), since it undergoes switching of the initial consonants only. Thus, the output in (b), the one with the swapping of the leftmost CV sequences, is selected as the winner. The simple ranking of L-ANCHOR-V₁ over LINEARITY therefore correctly predicts the attested output [kiksu parja].

However, the question now arises: why is the CV sequence the most optimal structure to be switched? The informal answer might lie in the unmarked nature of the CV syllable: in the cross-linguistic syllable markedness hierarchy (McCarthy 1979, Cairns & Feinstein 1982, Hyman 1985, Hayes 1989), the CV syllable is inarguably the least marked syllable structure. One may follow this reasoning, and suggests that in language games, universally unmarked patterns emerge.¹⁴ Under formal analysis, however, the preference for the CV sequence is ensured by L-ANCHOR-V₁ and LINEARITY; because of L-ANCHOR-V₁, swapping of onsets only is prohibited (i.e. *[kaksu pirja]), while LINEARITY ensures that no more than the initial consonant and vowel are moved (i.e. *[kirsu pakja] (six violations of LINEARITY). Therefore, the optimal size of the element to be switched is CV, which is captured in the basic ranking, so outputs violating this pattern do so with fatal consequences.

In summary, I have shown how the basic pattern of CV spoonerisms is formally captured by the interaction of the game-specific constraint L-ANCHOR-V₁ (which, however, only minimally deviates from the ANCHORING constraint of ordinary languages) and the faithfulness constraint LINEARITY. This pair of constraints is able to capture the essential facts of the game: the switching of the left edges, particularly the leftmost vowels, and the size of the switched element, namely the CV sequence.

Let us now turn to other cases, such as those containing long vowels and various types of diphthongs in the initial syllable, and discuss the predictions that the ranking makes about them.

3.2. Long vowels and skeletal stability

Introducing the basic analysis relied on an example with a short vowel in the initial syllable of each word. This analysis, however, is accurate in cases of long vowels as well, as shown by /saara huutaa/ ‘Saara shouts’ in (8). Long vowels are represented monosegmentally (i.e. based on the Obligatory Contour Principle (OCP, Leben 1973, 1980, McCarthy 1979, 1986)),¹⁵ the heaviness of which is indicated by two subscripted moras.¹⁶

(8)

I:	/sa _(μ) ra _(wδ)	hu _(μ) ta _{(μ)wδ} /	L-ANCHOR-V ₁	Linearity
a.	h ₂ a _(μ) ra	ʃ ₁ u _(μ) ta _(μ)	* *	***
b.	hu _(μ) ra	sa _(μ) ta _(μ)		****
c.	hu _(μ) ta	sa _(μ) ta _(μ)		*****

The tableau in (8) shows how the proper ranking of L-ANCHOR-V₁ and LINEARITY selects the correct output in this case as well, the candidate with the switched initial CV sequences, candidate (b). However, problems arise with examples in which only one of the words contains a long vowel, while the other includes a short vowel, such as /kova tuuli/ ‘strong wind’. In these cases only the segmental (melodic) material is switched, while the properties of the skeletal (timing) tier remain in their position. Thus, the segmental tier and the skeletal tier are faithful to different representations: the melody is faithful to the companion word in the game (a result achieved by L-ANCHOR-V₁), while the skeletal tier maintains the patterns of the word with which it was originally associated. The ranking established so far is too powerful, since it cannot distinguish between these two levels, but forces a segment to move with all its features and prosodic properties. In order to capture the separation of the quality and quantity formally, I suggest that GEN produces two types of correspondence relations, as shown in (9).¹⁷

(9) Input: [p₁ a₂ k₃ s₄ u₅] [k₆ i₇ r₈ j₉ a₁₀]
 Output: [k_{1,6} i_{2,7} k_{3,8} s_{4,9} u_{5,10}] [p_{6,1} a_{7,2} r_{8,3} j_{9,4} a_{10,5}]

The representation in (9) implies two types of correspondence: between the word and its input correspondent, and between the target word and

the companion word in the game. Every output segment thus has two correspondents, one in its own word (ordinary input-output correspondence) and one in the word involved in the switching (the game-specific correspondence). The prohibition of the quantitative transfer results from the interaction of these two types of faithfulness, which I formalize in (10).

- (10) WT-IDENT (based on McCarthy 1995:31)
- Let α be a segment in the input representation of Wd_1 .
 - Let β be a segment in the input representation of Wd_2 .
 - Let γ be a correspondent of α in the output representation of $PrWd_1$.
 - Let δ be a correspondent of β in the output representation of $PrWd_2$.
- Then
- The moraic representations of α and γ are identical.
 - The moraic representations of β and δ are identical.
- GAME-WT-IDENT
- Let α be the leftmost vowel in the input representation of Wd_1 .
 - Let β be the leftmost vowel in the input representation of Wd_2 .
 - Let γ be the leftmost vowel in the output representation of $PrWd_1$.
 - Let δ be the leftmost vowel in the output representation of $PrWd_2$.
- Then
- The moraic representations of α and δ are identical.
 - The moraic representations of β and γ are identical.

The ordinary constraint WT-IDENT requires the skeletal faithfulness to the original word, resulting in the maintenance of the prosodic pattern, while GAME-WT-IDENT requires the skeletal properties of the segment to be switched together with the melody (thus following the patterns of L-ANCHOR-V₁). When WT-IDENT is crucially ranked above GAME-WT-IDENT, the desired result emerges: the elements of the skeletal tier remain in their position, while the melody is swapped. I demonstrate the effects of the ranking of WT-IDENT over GAME-WT-IDENT by the evaluation of /kova tuuli/ ‘strong wind’ in (11).

- (11) WT-IDENT \gg GAME-WT-IDENT, L-ANCHOR-V₁ \gg LINEARITY

I:	/kova _(w_{d1})	tu _(tu) li _(w_{d2}) /	WT-IDENT	GAME-WT-IDENT	L-ANCHOR-V ₁	LINEARITY
⊗	a. tu ₂ va	ko _(tu) li		**		***
	b. tu _{(tu)2} va	ko _i li	* *			***

The tableau in (11) illustrates how the candidate with both qualitative

and quantitative transfer, candidate (b), fails to satisfy the higher-ranked WT-IDENT, thus making the output in (a) optimal. The ranking of WT-IDENT over GAME-WT-IDENT thus provides an adequate formalization for distinguishing the skeletal level from the melodic one, and captures their different behaviour with respect to faithfulness in the swapping pattern, which then results in the prohibition of quantitative transfer.

3.3. Closing diphthongs

Now that I have covered cases with both short and long vowels, I will turn to the analysis of different types of diphthongs. I will first demonstrate how the basic ranking L-ANCHOR-V₁ over LINEARITY successfully makes correct predictions in the cases with closing diphthongs as well. Since all examples of closing diphthongs (e.g. /ruma paita/ ‘an ugly shirt’ (a short vowel and a closing diphthong), /suuri koivu/ ‘a large birch’ (a long vowel and a closing diphthong), and /kaunis poika/ ‘a beautiful boy’ (two closing diphthongs)) lead to the same result, in other words, to the same violation pattern, I illustrate all cases in one tableau, in (12).

(12)

I: /ruma _(w₁) paita _(w₂) /	L-ANCHOR-V ₁	LINEARITY
a. p ₂ u ₁ na r ₁ a ₂ ita	* *	***
b. p ₂ a ₂ ma ru ₁ i ₁ ta		****
c. p ₂ a ₁ i ₂ ma ru ₁ i ₁ ta		*****
I: /su _{(uu)_(l)ri_(w₁) koivu_(w₂)/}	L-ANCHOR-V ₁	LINEARITY
a. k ₂ u ₁ ri s ₁ o ₂ ivu	* *	***
b. k ₂ o ₂ ri s ₁ u ₁ ivu		****
c. k ₂ o ₁ ri s ₁ u ₁ i ₂ vu		*****
I: /kaunis _(w₁) poika _(w₂) /	L-ANCHOR-V ₁	LINEARITY
a. p ₂ a ₂ unis k ₁ o ₁ ika	* *	***
b. p ₂ o ₂ unis k ₂ a ₁ i ₁ ka		****
c. p ₂ o ₁ 2nis k ₂ a ₁ i ₁ ka		***** *

Briefly, the tableau in (12) shows how each case follows the basic violation pattern: candidate (a) is regularly ruled out by L-ANCHOR-V₁, while candidate (c) loses the competition under LINEARITY. Thus, the output in (b), the one with CV switching, is the optimal form. The constraint ranking thus correctly predicts the cases with closing diphthongs,

and demonstrates how these vowel sequences are broken up in the formation of spoonerisms, resulting in the switch of the first component only.

3.4. Opening diphthongs – featural adjustment

Let us now turn to the final type of example, namely cases in which one (or both) of the input words contains an opening diphthong, such as /ie/, /yö/, or /uo/. Recall from previous generalizations that simply switching initial CV sequences is often insufficient to achieve the correct output in these cases, so additional featural adjustment is required. I will show next how the patterns in which opening diphthongs participate emerge from the interaction of syllable markedness with different types of faithfulness constraints, some of which are segmental and featural, and some of which are specifically concerned with diphthongs. However, I first demonstrate the predictions that the basic ranking of L-ANCHOR-V₁ over LINEARITY makes about examples with short vowels and opening diphthongs, such as /mika kuolee/ ‘Mika dies’, in the tableau in (13).

(13)

I: /mika _(w₁) kuole _(w₂) /	L-ANCHOR-V ₁	LINEARITY
a. k ₂ ika m ₁ uole _(w₁)	* *	**
∅: b. k ₁ u ₂ ka m ₁ i ₁ ole _(w₁)		****
c. ku ₁ o ₂ ka m ₁ i ₁ le _(w₁)		*****!

The evaluation in (13) follows the now familiar pattern, making the output with the switched CV sequences optimal. However, this form, [kuka miolee], is not the attested form (as indicated by ↯). Instead, the actual form is [kuka mielee], an output that cannot be predicted in the tableau in (13). The basic mechanism thus makes incorrect predictions, an undesirable result for which I now propose a solution.

The relevant difference between the two outputs, the incorrectly selected *[kuka miolee] and the attested output [kuka mielee] (i.e. the difference between the vowel sequences [io] and [ie]), is the syllabification of the segments. The unattested form *[ku.ka mi.o.lee] contains a highly marked syllable type, according to universal syllable markedness, namely an onsetless syllable. The actual output, [ku.ka mie.lee], includes no such syllable structure. The difference in the syllabification of the vowel sequences [.ie.] and [i.o] is indicated phonetically by acoustic measurements (Karlsson 1970), as well as by native speaker intuition. In order to clarify the division between monosyllabic diphthongs and bisyllabic vowel combinations, I have listed all existing two-vowel sequences

of Finnish in (14) (Karlsson 1983). Bisyllabic vowel combinations are regularly the result of deleting an intervening consonant, with the pre-deletion syllabification maintained (i.e. [li.ka] ‘dirt’, [li.a-n] ‘of dirt’). (This is presumably through some faithfulness mechanism, such as OO correspondence (Benua 1995, 1997) or Sympathy (McCarthy 1997, 1998, 1999)).¹⁸

(14) Diphthongs (monosyllabic) Vowel combinations (bisyllabic)

[.äi.]	[.au.]	[.äy.]	[.ie.]	[a.e]	[o.e]
[.ei.]	[.ou.]	[.öy.]	[.yö.]	[a.o]	[u.a]
[.oi.]	[.eu.]	[.ey.]	[.uo.]	[e.a]	[u.e]
[.ui.]	[.iu.]	[.iy.]		[e.o]	[y.e]
[.äi.]				[i.a]	[y.ä]
[.öi.]				[i.o]	[ä.e]
[.yi.]				[i.ä]	[ä.ö]
				[o.a]	[ö.ä]

Because it is bisyllabic, the vowel sequence [i.o] contains an onsetless syllable, which is penalized under the universal markedness constraint given in (15). Furthermore, the attested featural adjustment from /io/ to [ie] incurs violations of featural faithfulness, violations which, however, remain irrelevant. I capture these featural relationships by the two IDENT constraints, also in (15), the effects of which are demonstrated in the re-evaluation of /mika kuolee/ ‘Mika dies’ in the tableau in (16).

(15) ONSET (Prince & Smolensky 1993:25)

A syllable must have an onset.

IDENT-IO (back) (McCarthy & Prince 1995:264)

Output correspondents of an input [γ back] segment are also [γ back].

IDENT-IO (round)

Output correspondents of an input [γ round] segment are also [γ round].

(16) L-ANCHOR-V₁ \gg LINEARITY, ONSET \gg IDENT-IO (back), IDENT-IO (round)

I:	/mika _(wa) kuole _{(mu)(wa)z/}	L-ANCHOR-V ₁	LINEARITY	ONSET	IDENT-IO (back)	IDENT-IO (round)
a.	ku ₂ ka mi ₁ o.le _(au)		****	*	*	*
b.	ku ₂ ka mi ₁ e.le _(au)		****		*	*

The evaluation in (16) demonstrates how the higher-ranking position of ONSET rules out the featurally faithful candidate, the output in (a), thus

making candidate (b) optimal, despite the violations of IDENT-IO (back) and IDENT-IO (round). The constraint ranking L-ANCHOR- $V_1 \gg$ LINEARITY, ONSET \gg IDENT-IO (back), IDENT-IO (round) thus correctly accounts for the featural adjustments that occur when opening diphthongs are involved.

One more issue, however, needs to be taken into account: why the result of the diphthongal adjustment is [ie.] and not some other monosyllabic sequence, such as [iu.]. Both [ie.] and [iu.] incur the same number of crucial violations (i.e. under LINEARITY and ONSET), but, unlike the attested [ie.], the unattested [iu.] incurs no violations of IDENT-IO (back) and IDENT-IO (round); thus it should be more optimal. I suggest, however, that the vowel sequence [ie.] is in fact more optimal in one respect: it maintains an opening diphthong in its input position (despite the output features of the diphthong being different from its input correspondent), while [iu.] fails to maintain an opening diphthong in its input position, as it is not an opening diphthong, but a closing one. This difference in diphthongal faithfulness is expressed by the constraint given in (17).

- (17) IDENT(diph) (based on McCarthy & Prince 1995)
- (a) Let α be a vowel sequence of increasing sonority.
 Let γ be a position in the input (output) and δ an output (input) correspondent of γ .
 If γ contains α , then δ must contain α .
 (= No deletion/insertion of opening diphthongs.)
 - (b) Let α be a vowel sequence of decreasing sonority.
 Let γ be a position in the input (output) and δ an output (input) correspondent of γ .
 If γ contains α , then δ must contain α .
 (= No deletion/insertion of closing diphthongs.)

The constraint IDENT(diph) is to be understood as follows: if the input contains a vowel sequence of increasing/decreasing sonority in a certain position, the output must also include a similar vowel sequence in the corresponding position. This prohibits the deletion of diphthongs. Furthermore, this constraint deals not only with input-to-output faithfulness, but with output-to-input faithfulness as well, militating against the insertion of diphthongs. Thus, if an output contains a sequence of increasing/decreasing sonority in some position, the input must also contain a similar type of vowel sequence in the corresponding position. This type of intrinsic integrity of diphthongs is also attested elsewhere in Finnish phonology: for example, opening diphthongs pattern with intrinsically coherent long vowels in certain morphophonological alternations

(Karlsson 1983).¹⁹ The tableau in (18) demonstrates the effects of IDENT(diph) in the evaluation of /mika kuolee/ ‘Mika dies’.

(18) LINEARITY, ONSET, IDENT(diph) ≫ IDENT-IO (back), IDENT-IO (round)

I:	/mika _(w41)	kuole _{(μ1)(w42)ʔ}	LINEARITY	ONSET	IDENT (diph)	IDENT-IO (back)	IDENT-IO (round)
☞	a. <u>ku</u> ₂ .ka	<u>mi</u> ₁ e.le _(μ1)	****			*	*
	b. <u>ku</u> ₂ .ka	<u>mi</u> ₁ u.le _(μ1)	****		**	*	*
	c. <u>ku</u> ₂ .ka	<u>mi</u> ₁ .o.le _(μ1)	****	*	*	*	*

The tableau in (18) illustrates how candidate (c) loses the competition under ONSET. The form with the crucial [.iu.] sequence twice fails to satisfy IDENT(diph), since it fails to realize an opening diphthong in its input position, and it includes a closing diphthong, which lacks an input correspondent. Consequently, the output in (a) is correctly selected as optimal.²⁰ Thus, the correct output results from diphthongal faithfulness, which is expressed by the constraint IDENT (diph).

Next, I will illustrate how cases with one long vowel and one opening diphthong follow the same pattern as the previous example. The evaluation of /liisa kuoli/ ‘Liisa died’ is demonstrated in the tableau in (19) in which the basic ranking of L-ANCHOR-V₁ over LINEARITY now expectedly fails to make the correct prediction, while the tableau in (20) shows the success of the more comprehensive ranking.

(19)

I:	/li _{(μ1)sa_(w41)}	kuoli _{(w42)ʔ}	L-ANCHOR-V ₁	LINEARITY
	a. <u>ku</u> _{(μ1)sa}	li <u>o</u> li	**	**
☞	b. <u>ku</u> _{(μ1)sa}	li <u>i</u> oli		****
	c. <u>ku</u> ₂ sa	li _{(μ1)li}		*****

(20)

I:	/li _{(μ1)sa_(w41)}	kuoli _{(w42)ʔ}	LINEARITY	ONSET	IDENT (Diph)	IDENT-IO (back)	IDENT-IO (round)
☞	a. <u>ku</u> _{(μ1)sa}	li <u>i</u> e li	****			*	*
	b. <u>ku</u> _{(μ1)sa}	li <u>i</u> u. li	****		* *	*	*
	c. <u>ku</u> _{(μ1)sa}	li <u>i</u> .o.li	****	*	*	*	*

The ranking in (19) predicts the unattested output *[kuusa lioli] to be optimal, even though the actual output is [kuusa lieli], the one with featural adjustment. However, the correct result arises through the crucial

ranking of ONSET and IDENT(diph) over IDENT-IO (back) and IDENT-IO (round), as shown in the tableau in (20). The featurally faithful output, the output in (c), is ruled out by ONSET, while candidate (b) incurs two violations of IDENT(diph) due to the facts that it fails to maintain the opening diphthong of the input and that it contains a closing diphthong, which has no input correspondent. It follows that the attested output (a) is selected as optimal.

The final example of diphthongal adjustment is the case with an opening diphthong in both words, such as /pieni tuoli/ ‘a small chair’. As expected, this example follows the now familiar pattern: the failure of the basic ranking L-ANCHOR-V₁ over LINEARITY, and the success of the extended ranking, as shown in the tableaux in (21) and (22).

(21)

I:	/pieni _(w₁)	tuoli _(w₂) /	L-ANCHOR-V ₁	LINEARITY
a.	t ₂ ieni	p ₁ uoli	* *	**
b.	t ₂ eni	p ₁ oli		****
c.	t ₂ o ₂ ni	pie ₁ li		***** *

The basic mechanism predicts the featurally most faithful output, *[tueni pioli], to be the optimal form, even though the actual spoonerism surfaces as [tuoni pie₁li]. The constraint ranking LINEARITY, ONSET, IDENT(diph) ≫ IDENT-IO (back), IDENT-IO (round), however, makes the correct prediction, as illustrated in the tableau in (22).

(22)

I:	/pieni _(w₁)	tuoli _(w₂) /	LINEARITY	ONSET	IDENT (diph)	IDENT-IO (back)	IDENT-IO (round)
a.	t ₂ o ₂ ni	pie ₁ li	****			**	**
b.	t ₂ ni	pi ₁ u ₁ li	****		* ***	*	*
c.	t ₂ e ₁ ni	pi ₁ o ₁ li	****	* *	**	*	*

Similar to previous cases, the featurally faithful output, (c), loses the competition under ONSET. Furthermore, this output violates IDENT(diph) twice, since both opening diphthongs in the input fail to surface in this candidate. Candidate (b) incurs four violations of IDENT(diph) because, in addition to failing to realize the opening diphthongs of the input, it also contains two closing diphthongs that lack input correspondents. Thus, candidate (a) is correctly selected as optimal.

To summarize this section, I have shown how the cases with opening diphthongs, which are not captured by the basic analysis, L-ANCHOR-V₁ over LINEARITY, are adequately accounted for by the extended constraint

ranking LINEARITY, ONSET, IDENT(diph) \gg IDENT-IO (back), IDENT-IO (round). The markedness constraint ONSET ensures that the featurally most faithful candidate loses the competition, while the dominant position of IDENT(diph) over IDENT-IO (back) and IDENT-IO (round) monitors the featural adjustment.

3.5. Opening diphthongs – no featural adjustment

Let us finally turn to examples with opening diphthongs, which now unexpectedly do not undergo featural adjustment. This section will illustrate that in certain cases, ONSET violations are preferred due to the high-ranking position of two types of faithfulness. First, I demonstrate the evaluation of the case with a short vowel and an opening diphthong, /hieno talo/ ‘a fine house’, based on the constraint ranking L-ANCHOR-V₁ over LINEARITY, in the tableau in (23).

(23)

I:	/hieno _(w₁) talo _(w₂) /	L-ANCHOR-V ₁	LINEARITY
a.	t ₂ ie.no h ₁ alo	*!*	**
b.	t ₂ e.no hi ₁ .lo		****
c.	t ₂ .no hi ₁ e.lo		*****!

The evaluation in (23) shows how the basic ranking unexpectedly makes the correct prediction, since now the featurally most faithful candidate is the attested output as well. However, despite this desirable result, one must ensure that the more comprehensive constraint ranking, including especially the markedness constraint ONSET, which is violated in the attested output, does not make any undesirable predictions. In fact, this case requires identifying the crucial relationship between LINEARITY and ONSET. The attested output incurs a violation of ONSET, while suboptimal (23c) violates LINEARITY only. This further development, however, has no negative effects on the cases discussed earlier in this paper. The ranking of LINEARITY over ONSET is shown in (24).

(24)

I:	/hieno _(w₁) talo _(w₂) /	LINEARITY	ONSET
a.	t ₂ e.no hi ₁ .lo	****	*
b.	t ₂ .no hi ₁ e.lo	*****!	

The tableau in (24) illustrates how the candidate with an ONSET violation is correctly chosen as the most optimal. Next, this example is tested

in (25), with the more comprehensive constraint ranking, where the crucial ranking of IDENT(diph) over ONSET is also established.

(25)

I:	/hi ₂ e ₁ no ₁ /	ta ₂ lo ₁ /	LINEARITY	IDENT (diph)	ONSET	IDENT-IO (back)	IDENT-IO (round)
∅	a. ta ₂ e ₁ no	hi ₁ lo	****	*	*		
	b. ta ₂ o ₁ no	hi ₁ lo	****	*	*	*!	*
	c. ta ₂ o ₁ no	hi ₁ lo	****	*	*		*!
	d. ta ₂ i ₁ no	hi ₁ lo	****	**!			
	e. ta ₂ u ₁ no	hi ₁ lo	****	**!			

The evaluation in (25) demonstrates the crucial role of the diphthongal faithfulness, as well as that of the featural faithfulness. Candidates (d) and (e) lose the competition under IDENT(diph), since they both fail to maintain the opening diphthong of the input and they both contain a closing diphthong, which lacks an input correspondent, while candidates (b) and (c) incur fatal violations of IDENT-IO (back) and IDENT-IO (round). It follows that the output in (a), the one with an ONSET violation, is selected as optimal. Thus, by establishing the crucial dominance relation of LINEARITY and IDENT(diph) over ONSET, the lack of featural adjustment here is captured.

The last example to be discussed is one that contains both an opening diphthong and a closing one, such as /tuore maito/ 'fresh milk'. The tableau in (26) shows the evaluation of this example by the basic constraint ranking.

(26)

I:	/tuore ₁ ma ₂ ito ₁ /	tu ₂ o ₁ re ₁ ma ₂ ito ₁ /	L-ANCHOR-V ₁	LINEARITY
	a. m ₂ uore	t ₁ aito	*!*	**
∅	b. ma ₂ ore	tu ₁ ito		****
	c. ma ₁ re	tu ₂ ito		*****

As in the example above, the attested output is correctly predicted in (26) by the ranking L-ANCHOR-V₁ over LINEARITY. Furthermore, the more comprehensive ranking in (27) demonstrates how the ONSET violation of the optimal output remains irrelevant.

(27)

I:	/tuore _{wd1} maito _{wd2} /	LINEARITY	IDENT (diph)	ONSET	IDENT-IO (back)	IDENT-IO (round)
a.	ma ₂ o.re tu ₁ i.to	****	*			
b.	ma ₂ i.re tuo ₁ .to	*****!	****			
c.	ma ₂ u.re tu ₁ i.to	****	**!			
d.	ma ₂ i.re tu ₁ i.to	****	**!			

In the evaluation in (27), candidate (b) incurs too many violations of LINEARITY, while candidates (c) and (d) lose the competition due to their two violations of IDENT(diph). Both candidates fail to preserve the opening diphthong of the input, and each contains an additional closing diphthong that has no input correspondent. Consequently, the output in (a), the form with an ONSETless syllable, is the optimal output.

In conclusion, this section has demonstrated how outputs with ONSET violations are sometimes selected as optimal. Earlier in the analysis it was illustrated how the violation of ONSET regularly resulted in featural adjustment. However, in the cases here, a violation of ONSET remains a less serious violation, given the crucial ranking of faithfulness (i.e. IDENT(diph) and LINEARITY) and markedness (i.e. ONSET).

3.6. Two additional patterns

Now that I have introduced the core analysis, I will account for the last two remaining patterns of spoonerism formation described in the data section. First, spoonerisms must obey vowel harmony, and second, the basic pattern of CV-switching is violated in certain cases where only the initial consonants are swapped.

3.6.1. The switching of onsets

The main analysis has emphasized the unexceptional switching of the initial CV sequences, which is followed by additional featural adjustments in certain cases. However, examples exist in which only the initial consonants are swapped, thus violating the most profound pattern of the game (i.e. the constraint L-ANCHOR-V₁). For example, /huono koti/ ‘a bad home’ surfaces as [kuono hoti], not as *[koono huti]. The practical reason for this unexpected result lies in the use of the language game. Switching the initial CV sequences would yield a long vowel which has no input correspondent, and when an additional long vowel is created, the spoonerism cannot be returned back to the original form: it would result as *[huuno koti] instead of the original [huono koti]. In other words, there is no *recovery* of the input form. This is crucial, since the

listener must be able to switch the spoonerism back to the input form in order to understand the speaker.

The formalization of this restriction relies on the well-known Obligatory Contour Principle (OCP, Leben 1973, 1980, McCarthy 1979, 1986), which militates against adjacent identical elements. It follows that a long vowel which results from the switching, such as [oo] in *[koono hutɪ] from /huono koti/ ‘a bad home’, cannot surface because of the OCP, given the assumption that the faithfulness constraint against the coalescence of segments, UNIFORMITY (McCarthy & Prince 1995, Appendix A), is undominated. Consequently, a long vowel that is the result of the swapping must appear as a sequence of two vowels, not as a single segment associated with two skeletal units. The definitions of the OCP constraint and UNIFORMITY are given in (28) and the tableau in (29) demonstrates the effects of the OCP in the evaluation of /huono koti/ ‘a bad home’. Moreover, UNIFORMITY is assumed to occupy a high-ranking position in the hierarchy, thus ruling out any candidates in which the components of the long vowel have merged.

(28) OCP (Leben 1973, 1980, McCarthy 1979, 1986)

Adjacent identical elements are prohibited.

UNIFORMITY (McCarthy & Prince 1995, Appendix A)

No element of S_2 has multiple correspondents in S_1 . (No coalescence)

(29) OCP \gg L-ANCHOR-V₁ \gg LINEARITY

I:	/huono _(wɔ1) koti _(wɔ2) /	OCP	L-ANCHOR-V ₁	LINEARITY
a.	k _{ɔ2} ono hu ₁ ti	*!	***	***
☞ b.	k ₂ uono h ₁ oti		**	**

The evaluation in (29) demonstrates how the high-ranking position of the OCP over L-ANCHOR-V₁ makes the correct prediction: despite the violation of L-ANCHOR-V₁, only the initial consonants are swapped, as in candidate (b), because of the crucial violation of the OCP by candidate (a). This example thus demonstrates how the resistance to the sequences of identical elements results in switching only the initial consonant in certain cases, even if the most basic pattern of the game, switching the initial CV sequences, must be violated.

3.6.2. Vowel harmony

The final additional pattern to be addressed concerns the obedience of the vowel harmony rule in the formation of spoonerisms. In Finnish, a

native word contains either back vowels (/a/, /o/ and /u/) or harmonic front vowels (/ä/, /ö/ and /y/), but not both.²¹ Furthermore, there are two neutral vowels, /e/ and /i/, which can occur with both back vowels and front vowels.²² I express this requirement by a cover constraint, in (30) the purpose of which is simply to demonstrate the position of vowel harmony in the constraint hierarchy. This constraint is violated by every disharmonic word. The evaluation of /kaunis pöytä/ ‘a beautiful table’ in (31) shows strict obedience to vowel harmony and the crucial ranking of vowel harmony with respect to the relevant faithfulness constraint IDENT-IO(back).

(30) VHARM

Do not have disharmonic words.

(31) VHARM \gg IDENT-IO(back)

I:	/kaunis _(wa) pöytä _(woz) /	VHARM	IDENT-IO(back)
a.	pö ₂ unis ka ₁ y ₁ tä	*!*	
b.	pö ₂ y ₁ nis ka ₁ u ₁ ta		*!*

The featurally most faithful candidate, candidate (a), violates the higher-ranked constraint VHARM, since neither word is harmonic. Candidate (b), however, follows the patterns of vowel harmony by adjusting vowel features, in other words, by changing the feature [back] three times. Given the crucial ranking of VHARM over IDENT-IO(back), the output in (b) is correctly selected as optimal.

4. SUMMARY

This paper has provided a complete constraint-based OT analysis of Finnish CV spoonerisms by bringing together a variety of generalizations under a unified set of constraints. The explanatory power of this analysis lies in the motivation of numerous patterns of the game, the motivation which is grounded in cross-linguistically attested phonological patterns and which is expressed through universal constraints. The basic mechanism, the switching of the initial CV sequences, is captured by the constraint ranking L-ANCHOR-V₁ over LINEARITY (e.g. /paksu kirja/ ‘a thick book’ – [kiksu parja]), which is then extended by the ranking of WT-IDENT over GAME-WT-IDENT in order to account for the stability of the skeletal tier; in other words, to account for the fact that only qualitative material is swapped (e.g. /kova tuuli/ ‘strong wind’ – [tuva kooli], *[tuu-va koli]). The ranking of these four constraints is able to capture the formation of spoonerisms in which short vowels and long vowels, as well

as closing diphthongs, are involved. The analysis of opening diphthongs, however, requires additional mechanisms, which express the required featural adjustment. The dominant position of the markedness constraint ONSET over IDENT-IO(round) and IDENT-IO(back) ensures that the most featurally faithful candidate loses the competition to the one with no onsetless syllables, but where certain featural adjustment has taken place (e.g. /mika kuolee/ ‘Mika dies’ – [ku.ka mie.lee], *[ku.ka mi.o.lee]). Furthermore, due to the high-ranking diphthongal faithfulness constraint IDENT(diph), the result of the featural adjustment is strictly monitored (i.e. /mika kuolee/ ‘Mika dies’ – [ku.ka mie.lee], *[ku.ka miu.lee]). Moreover, the obedience to the Obligatory Contour Principle (together with UNIFORMITY) is responsible for the most profound violation of the game, namely that in certain environments only the onset consonants are swapped instead of the initial CV sequences (e.g. /huono koti/ ‘a bad home’ – [kuono hoti], *[koono hut]). Finally, the ranking of VHARM over IDENT-IO(back) results in the obedience of vowel harmony throughout the game (i.e. /kaunis pöytä/ ‘a beautiful table’ – [pöynis kauta], *[pöunis kaytä]).

To summarize the analysis, I present all the constraints and their crucial rankings in (32). The two lower rankings act independently in this analysis.

- (32) OCP \gg L-ANCHOR- V_1 \gg LINEARITY, IDENT(diph) \gg ONSET \gg
 IDENT-IO (back), IDENT-IO (round)
 WT-IDENT \gg GAME-WT-IDENT
 VHARM \gg IDENT-IO(back)

The basic mechanism of this game is also extendable to games in other languages. Various studies have evidenced similar types of games (see references in section 1), which can be accounted for by the basic ranking of L-ANCHOR- V_1 over LINEARITY. Furthermore, this analysis can be modified, for example, with respect to the ANCHOR constraint, which can be limited to concern the left edge only: the interaction of L-ANCHOR and LINEARITY would then result in switching of initial consonants only. However, the further prosodic restrictions for which this analysis accounts are language-dependent, requiring a language-specific analysis, stemming from re-rankings of universal constraints.

This spoonerism analysis also provides further insights into the phonological organization of Finnish. First, the analysis suggests the preference for the monosegmental representation of long segments in Finnish (based on the Obligatory Contour Principle (OCP), Leben 1973, 1980, McCarthy 1979, 1986). This assumption has been independently supported by other studies of Finnish, such as Prince (1984) and Harrikari

(1999). Second, the analysis implies a disfavour of word-internal onsetless syllables. Such a pattern is also attested in ordinary Finnish, since certain types of word-medial vowel sequences, which necessarily contain an onsetless syllable, are strictly prohibited, unless they result from the deletion of an intervening consonant. (For an analysis of this in Sympathy Theory (McCarthy 1997, 1998, 1999), see Harrikari (forthcoming b).) Third, this analysis implies a specific integrity of diphthongs, particularly of opening ones, which maintain their coherence throughout the game via featural adjustment. The integrity of opening diphthongs can be observed in other areas of Finnish as well: in certain morphophonological alternations, opening diphthongs, which historically emerged from long mid vowels, pattern with long vowels. Fourth, spoonerisms strictly follow the vowel harmony of the ordinary language, and undergo featural adjustment when needed. Thus, many phonological connections exist between spoonerisms and natural language, suggesting that the patterns of the language game may provide useful information about the structure of the ordinary language.

Finally, the spoonerism analysis has further theory-internal implications. A potential criticism of the analysis is that the universality of OT is lost because of its game-specific constraint, L-ANCHOR-V₁, which is not attested in ordinary language. However, language games necessarily contain patterns that lack correspondents in natural languages, thus suggesting that slight modifications simply cannot be avoided in the formalization. These modifications, however, must deviate minimally from the original constraints, which is also the situation in the analysis presented in this paper; the game-specific constraint is closely connected to other phenomena such as reduplication, which employs a similar type of copying and faithfulness. Thus, this constraint has a basis in cross-linguistically attested patterns, and can be considered merely an extension of that pattern, thus maintaining the universality principle of Optimality Theory.

NOTES

- 1 I thank Patrik Bye, Steve McCartney, Scott Myers, Jan-Ola Östman, and two anonymous reviewers for valuable comments on earlier versions of this paper and discussion on related topics. Parts of this study were presented at the doctoral seminar of linguistics at the University of Helsinki in the spring of 1998 and 1999, at the 10th Conference of Nordic and General Linguistics at the University of Reykjavík, in the Phonology Reading Group at UMass Amherst in the fall of 1998 and at the 18th West Coast Conference of Formal Linguistics at the University of Arizona. I am grateful to the audiences for various suggestions. Any shortcomings are solely my own. Excerpts of this study will appear in the Proceedings of WFFCL 18. This research was supported by a scholarship from the Kone Foundation, a Young Researcher's Grant from the University of Helsinki, a grant from the Finnish Concordia Alliance and a grant from The Academy of Finland.

- 2 This game is closely related to another Finnish language game, *konttikieli*, ‘kontti-language’ (Campbell 1977, 1980, 1981, 1986, Vago 1985, McCarthy 1986, Bertinetto 1988). However, differences do exist between these two games. Consequently, the analysis I propose in this paper does not account for *konttikieli*. While the game here resembles a general type of spoonerism, speakers produce these particular types of spoonerisms as a game as well, which is the focus of this paper. For any linguistic analysis of pure tongue slips, statistical analyses would be needed in order to determine the frequency of this type of error among all others. Such analyses are beyond the scope of this paper.
- 3 Briefly, eight native speakers of Finnish were given pairs of words and an example of a spoonerism. The speakers were told to give the first possible output they could think of, and were not given time to consider other possibilities. Some of the examples in (2) represent the results of this inquiry. Some of the speakers were linguistically trained. However, they were not specialists in this game, and not consciously aware of the rules of the game.
- 4 Occasionally, speakers bend rules in order to achieve output forms with funny lexical meanings (Anttila 1989).
- 5 A closing diphthong consists of two vowels, the second of which is either /i/, /y/, or /u/.
- 6 Finnish has three opening diphthongs: /ie/, /yö/, and /uo/.
- 7 Spoonerisms that include opening diphthongs in their inputs often have multiple outputs. Every spoonerism, however, has a preferred output, which is what I have given in this paper.
- 8 The grapheme *ä* refers to the low, front, unrounded vowel [æ]; the grapheme *ö* refers to the mid, front, rounded vowel; and [y] indicates the high, front, rounded vowel [ü].
- 9 See Niemi & Laine (1997) for a different generalization based on similar types of tongue slips.
- 10 Recent literature has evidenced the crucial role of output-output (OO) correspondence (Benua 1995, 1997) in some language games as well, such as Japanese argot (Itô et al. 1996). These games rely on the reorganization of units at the prosodic level, which are present only in the output (e.g. foot structure). The analysis in this paper, however, does not require information about the correspondence of such prosodic structures; consequently, traditional input-output OT adequately captures the patterns of this game.
- 11 According to Hume’s (1997) gradient definition of LINEARITY, a violation is assigned for every precedence relation in the output that lacks an input correspondent. In this paper, the number of segments occupying different positions in the output compared to the input is so large that it becomes impractical to illustrate every single precedence relation. A logical assumption is that the greater the number of segments moved, the more the precedence relations are changed.
- 12 I employ the general term Word (= Wd) in order to refer to morphological words in the input, since usually inputs contain no prosodic words.
- 13 See Itô et al.’s (1996) study of a Japanese argot for a similar type of constraint, CROSSANCHOR. Although the basic idea of CROSSANCHOR is reminiscent of L(EFT)-ANCHOR-V₁, the patterns of the two games are crucially different, thus requiring separate constraints. See Bagemihl (1988, 1989) for a pre-OT treatment of crossanchoring.
- 14 Some studies, such as Shattuck-Hufnagel (1980, 1983), have, however, evidenced the rarity of CV spoonerisms, by stating that only a small percentage of language games exhibit the switching of CV sequences.
- 15 The implications that spoonerisms have on the phonological representation of long vowels have been discussed in an earlier study (Harrikari, forthcoming a).
- 16 In subsequent tableaux, the switched elements are underlined and indicated with subscript numerals. The subscript ₁ indicates that the switched element is from the input Wd₁, and the subscript ₂ refers to the input Wd₂.
- 17 Thanks to an anonymous reviewer for suggesting this idea.
- 18 For an analysis of Finnish vowel combinations that result from the deletion of an intervening consonant and their sympathetic faithfulness to forms that maintain the consonant, see Harrikari (forthcoming b).

- 19 Historically, opening diphthongs arose out of long mid vowels (i.e. /ie/ < /ee/, /yö/ < /öö/, and /uo/ < /oo/).
- 20 There is an output that incurs the same number of violations as the optimal candidate, namely [ku.ka myö.lee]. This candidate is, however, ruled out by some positional faithfulness constraint, which militates against changing features of root-initial vowels (Beckman 1998).
- 21 For adjusting loan words to conform to the patterns of vowel harmony, see Ringen & Heinämäki (1999).
- 22 The first harmonic vowel in the word defines the harmony of the word.

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