

Source similarity in loanword adaptation: Correspondence Theory and the posited source-language representation

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Abstract

Source-similarity effects in loanword adaptation are formalized in Correspondence Theory (McCarthy and Prince, 1995). A correspondence relation holds between the loanword and the *pLs representation*, the borrower's posited representation of the source-language form; including the *pLs* representation in the model allows a consistent account of the interaction between phonological adaptation processes and factors such as perception and orthography. Empirical support is provided for the Correspondence Theory approach, which predicts multiple phonological adaptation strategies for loanwords.

1 Introduction

Evidence from loanword adaptation (LWA) has been influential in phonological argumentation, especially in constraint-based frameworks. LWA is the process of taking a form from the source language (L_s) and incorporating it into the borrowing language (L_b), performed by an L_b speaker with at least limited exposure to L_s. This paper contributes to debates about the nature of LWA and its relationship to phonology, perception, and other factors.

One position supported here is that *LWA cannot be attributed to the L_b-internal phonological grammar alone*. Certainly, L_b constraints are involved in LWA. Loanwords are typically adapted to comply with certain L_b phonotactic restrictions, so some of the constraints that enforce phonotactics in non-loans also affect loanwords (Yip, 1993; Paradis and LaCharité, 1997; Broselow, 2000; Jacobs and Gussenhoven, 2000). However, there are aspects of LWA that the L_b-internal grammar cannot account for. For example, some languages have a loanword-specific adaptation strategy that differs from default L_b-internal phonological processes (§3).

This paper also demonstrates that *LWA cannot be attributed to speech perception alone*. Again, this is not to deny that perception affects LWA. Perceptual similarity can influence the choice of adaptation strategy (Yip, 2002; Kang, 2003). Moreover, some adaptation “repairs” arise when L_b listeners misperceive L_s forms (Silverman, 1992; Peperkamp and Dupoux, 2003). However, examples presented here show that LWA processes cannot all be reduced to misperception. In Japanese (§3), the *pLs* representation sometimes contains L_b-illicit segments contributed by orthographic information. These segments trigger epenthesis, but the epenthesis cannot have a perceptual basis since the triggering segments have no perceptual basis. In Finnish, Hmong, and Sranan (§4), highly salient segments undergo deletion in LWA, despite phonological evidence that they are perceived. As misperception cannot account for these epenthesis and deletion effects, they must be part of the phonological (production) grammar.

§2 develops a formal model of LWA, extending the insights of recent work applying Correspondence Theory (McCarthy and Prince, 1995) to source-similarity effects like those responsible for LWA-specific phonological processes. An explicit proposal is made concerning the L_s-based phonological string that stands in correspondence with the adapted loanword. This string, the *posited L_s (pLs) representation*, is part of the L_b speaker's phonological system, serving as a repository for all information the L_b speaker has about the L_s form. The *pLs*

representation allows for a consistent formal treatment of effects on LWA by perception, orthography, knowledge of Ls grammar, and other factors (§3). Additional support for a correspondence-based approach to LWA comes from the fact that *multiple strategies* are available for adapting loanwords (§§3--4), as expected given a full set of rankable Ls-Lb faithfulness constraints. Conclusions and implications for LWA and phonological argumentation are discussed in §5.

2 Modeling adaptation

This section presents the SB-correspondence model of LWA:¹ The SB (Ls-to-Lb) correspondence relation (§2.1) holds between an Lb loanword and the pLs representation of its source form (§2.2). The predictions of the model are compared to those of other approaches in §2.3, setting the stage for the analyses in §§3--4.

2.1 Source similarity as correspondence

Certain aspects of LWA require a mechanism beyond the non-loan Lb phonology. This is true for cases of *importation*, where Lb-illicit structures persist in loanwords even though they would be actively avoided in non-loans (Haugen, 1950; Karvonen, 1998; Smith, 2006a). Another adaptation-specific effect is seen when loanwords surface unfaithfully in order to conform to Lb phonotactics, but the adaptation strategy used differs from the default non-loan phonological process (Yip, 2002; Kenstowicz and Suchato, 2006; Smith, 2006b; see §3).

Loanwords differ from non-loans in another respect as well: They have Ls source forms, to which they often remain similar after adaptation, within phonological or sociolinguistic limits (Haugen, 1950: 216; Kim, 1982: 446; Lovins, 1975: 38). A formal appeal to source similarity can account for many of the aspects of LWA that go beyond Lb-internal phonology, including the preservation of Lb-illicit structures and the existence of adaptation-specific strategies.²

Within Optimality Theory (OT; Prince and Smolensky, 1993/2004), the dominant framework for modeling similarity between two representations is Correspondence Theory (McCarthy and Prince, 1995). Faithfulness constraints demand identity, along some phonological dimension, between elements of phonological strings that stand in a *correspondence relation*.

- (1) Given two strings S_1 and S_2 , **correspondence** is a relation \mathfrak{R} from the elements of S_1 to those of S_2 . Elements α S_1 and β S_2 are referred to as **correspondents** of one another when $\alpha\mathfrak{R}\beta$. (McCarthy and Prince, 1995: 262; original emphasis)

Correspondence relations have been proposed for various S_1 - S_2 pairs, including input-output and base-reduplicant (McCarthy and Prince, 1995), output-(derivationally related) output (Benua, 1997), and segments showing long-distance featural agreement (S. Rose and Walker, 2004). A faithfulness constraint such as MAX ‘No deletion: Every segment of S_1 has a correspondent in S_2 ’ (McCarthy and Prince, 1995: 264) has an instantiation for each correspondence relation, giving MAX-IO, MAX-BR, MAX-OO, etc. Each version of MAX is a distinct constraint, separately rankable from the others. Thus, a language can prohibit the deletion of underlying segments (MAX-IO ranked high) while tolerating imperfect copying in reduplication (MAX-BR ranked low).

Because Correspondence Theory is designed to model phonological similarity, it is straightforward to formalize loanword-source similarity effects by defining a new

correspondence relation. When faithfulness constraints on this correspondence relation are ranked high, Ls characteristics persist in Lb loanwords even when they would not survive in the Lb-internal phonology. Proposals to extend Correspondence Theory to loanword-source similarity include Kawu (1999), Kang (2003), Adler (2006), Kenstowicz and Suchato (2006), Y. Rose and Demuth (2006), and Smith (2006a-b); Alber and Plag (2001: 820) invoke an output-output correspondence relation for source-similarity effects in a creole. However, prior accounts have typically not been explicit about the nature of the source-language form involved in the relation.

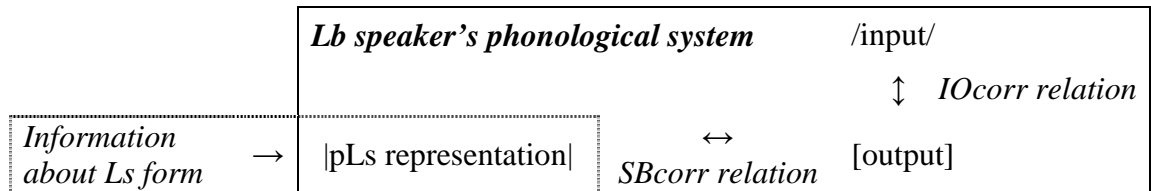
Here, the correspondence relation involved in LWA is formalized as the *SB correspondence (SBcorr)* relation, which relates the Lb loanword, not to the Ls underlying form or surface form directly, but to the pLs representation.

2.2 The pLs representation

The *pLs representation* is the Lb speaker’s posited representation of a loanword’s Ls form. Formally, the pLs representation is a necessary component of the SBcorr model. Any string standing in correspondence must be phonologically represented by the Lb speaker. Therefore, a source-similarity correspondence relation cannot directly involve a physical Ls surface form, unfiltered by the Lb speaker’s perceptual system and (meta)linguistic knowledge. Conceptually, the pLs form represents the Lb speaker’s awareness that a word from another linguistic system is being borrowed. It is formally distinct from an underlying representation; it is an Ls model for the Lb loanword, not a lexical entry in Lb (although during the adaptation process, the pLs form may determine the input for the IO relation as well; see §3.2).

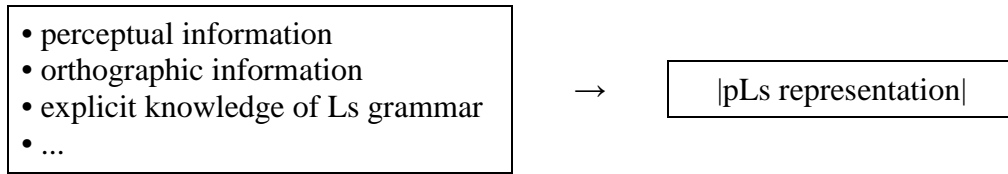
The representations and correspondence relations involved in LWA are summarized in (2). As the diagram suggests, the role of the pLs representation (demarcated ‘|...|’) is similar to that of the morphological base in an output-output relation (Benua, 1997).

(2) Correspondence relations in LWA



The pLs representation provides a way to reconcile prior proposals about factors that can influence the outcome of LWA. For example, discussions of loanword phonology sometimes debate whether Lb speakers are sensitive to “phonological” (Hyman, 1970; Paradis and LaCharité, 1997, 2001; LaCharité and Paradis, 2005) or “phonetic” (Silverman, 1992; Yip, 2002) aspects of Ls forms. Realistically, both types of influence can occur (see also Kang, 2003; Y. Rose and Demuth, 2006). Depending on the kind of exposure Lb speakers have to Ls, multiple sources of information may contribute to the pLs representation (3).

(3) Potential influences on the pLs representation



When spoken language serves as the input to LWA, the Lb speaker obtains information about the Ls form through speech perception; this information is then encoded in the pLs representation. Aspects of the Ls form that are veridically perceived make the pLs form similar to the Ls surface form, creating the potential for phonetic-level perceptual similarity effects in LWA (Yip, 2002; Kang, 2003). On the other hand, the perception of a non-native form may be distorted by the native speech-perception system’s inventory of segments (Werker and Tees, 1984) or prosodic structures (Dupoux, Kakehi, Hirose, Pallier, and Mehler, 1999). Accordingly, several researchers have proposed that “repairs” to loanwords are partly (Silverman, 1992; Yip, 2002) or wholly (Peperkamp and Dupoux, 2003) caused by phonotactically driven misperception of Ls forms. §§3–4 show that LWA cannot be entirely reduced to misperception. Still, in cases where perceptual distortion occurs, it is the pLs representation that formally models those effects, sometimes serving as the starting point for further—phonological—adaptation processes.³

Orthography is another factor that can influence an Lb speaker’s knowledge of an Ls form (Haugen, 1950; Lovins, 1975; Dohlus, 2005; Vendelin and Peperkamp, 2006). The written form of an Ls word may provide clues to its phonological or phonetic content that the Lb speaker would not have perceived auditorily, so access to orthographic information can make the pLs representation more like the actual Ls form than an auditory borrowing would have been. Conversely, an orthographic representation can also be misinterpreted by the Lb speaker, causing the pLs representation to contain entirely different segmental categories from the Ls surface form, as with [u] for expected *[a] in Japanese [buz̥a:] < English *buzzer* (Miura, 1993: 126).

Other sources of information may also affect the pLs representation. Yip (2002) speculates that Cantonese speakers assign Lb vowel categories in loanwords from English partly based on visual information about lip rounding and jaw height. Additionally, many cases of borrowing involve at least some degree of bilingualism on the part of Lb speakers; explicit knowledge of Ls phonology (Paradis and LaCharité, 1997) or morphology and syntax (Silverman, 1992: 292) can influence adaptation.

Under the model of LWA presented here, the pLs representation is a unified repository for the Lb speaker’s knowledge of the Ls form, even when multiple sources of information contribute to that knowledge.

2.3 Predictions of the SBcorr model

In the SBcorr model, source-similarity constraints are faithfulness constraints on a new correspondence relation. This relation involves the pLs representation, which allows multiple sources of information about the Ls form to be involved in similarity effects. Taken together, these characteristics make predictions that distinguish the SBcorr model from other approaches to LWA.

2.3.1 *Loanword-specific adaptation strategies*

Including loanword-specific faithfulness constraints in the SBcorr model predicts that adaptation and the default Lb phonology need not invoke the same phonological processes. The strategy used to avoid a markedness violation depends on the ranking among faithfulness constraints, and including SBcorr constraints creates the potential for different rankings on the SBcorr and IOcorr relations (§3). This prediction distinguishes the SBcorr model from models in which LWA is driven entirely by the Lb-internal phonology, with no loanword-specific phonological apparatus (Jacobs and Gussenhoven, 2000; Broselow, 2000).⁴ Languages with LWA-specific phonological processes have been identified, including Korean (Kim, 1982; Kang, 2003), Swahili (Kraska-Szlenk, 1999), Maori (Yip, 2002), and Thai (Kenstowicz and Suchato, 2006). The case of Japanese (Peperkamp, 2004; Smith, 2006b) is discussed in §3.

2.3.2 *Flexibility of adaptation strategies*

The SBcorr model formalizes source-similarity constraints in Correspondence Theory, a general approach to faithfulness constraints. SBcorr constraints, like all faithfulness constraints, are violable and may be differently ranked in different languages. This predicts that all types of phonological processes are available for adapting loanwords, not only the cross-linguistically common epenthesis strategy. The SBcorr model therefore differs from approaches to LWA that restrict the range of available adaptation strategies, such as those that encode the epenthesis preference into the formal model of LWA (Paradis and LaCharité, 1997, 2001; Karvonen, 1998; Yip, 2002), and those that link all adaptation effects directly to perceptual distortion (Peperkamp and Dupoux, 2003; Peperkamp, 2004).

§4 presents cases of LWA that involve deletion of [s] and other highly perceptually salient segments. It is not plausible for the deletion of such salient segments to stem from misperception (a claim that is reinforced by phonological or phonetic evidence from each language discussed). Thus, misperception cannot be the only factor at work in LWA in general, nor can misperception be the only explanation for deletion in adaptation. A phonological model of LWA is necessary, and it must allow deletion as well as epenthesis. Such flexibility in phonological adaptation strategies is strong evidence in favor of the Correspondence Theory approach. (See Kenstowicz and Suchato, 2006: 936 for related discussion; on factorial typology and the cross-linguistic epenthesis preference, see §5.2.)

3 Orthographic influence and loanword-specific adaptation strategies in Japanese

According to the SBcorr model, LWA involves more than an input-output mapping in the Lb grammar. The Lb speaker also sets up a pLs representation and establishes SBcorr constraints that demand phonological similarity to that representation. This section demonstrates the SBcorr model as applied to Japanese loanwords from English. Japanese has a loanword-specific adaptation strategy, which motivates the distinction between SBcorr and IOcorr constraints (Smith, 2006b). Japanese also shows that the pLs representation can be influenced by orthography as well as by perception.

In the non-loan phonology of Japanese, unsyllabifiable consonants are avoided through deletion, not epenthesis (McCawley, 1968), as seen in morphological alternations like /kak+ru/ → [ka.k_u] ‘write-NONPAST’; this indicates that DEP-IO dominates MAX-IO. However, loanwords typically undergo epenthesis, and epenthesis-based adaptation is highly productive.

(4) Epenthesis in Japanese loanwords (Arakawa, 1977; Smith, 2006b)

<u>gu</u> .ri.se.rin	< English	[gl]ycerine
po.ke <u>t</u> .to		pocke[t]
dʒi <u>t</u> .ta.ba <u>g</u> . <u>gu</u>		jitterbu[g]

Before addressing these examples in a phonological model of LWA (§3.2), it is necessary to confirm that they show *phonological* unfaithful mappings rather than perceptual distortion (§3.1). Japanese-speaking listeners have difficulty distinguishing certain [VC₁.C₂V] / [V.C₁u.C₂V] nonce pairs in which C₁C₂ is an illegal coda-onset sequence (Dupoux et al., 1999), so some inserted vowels in Japanese loanwords may arise from misperception. However (contra Peperkamp and Dupoux, 2003), this cannot be true for all epenthetic vowels. Some Japanese loanwords are adapted from a pLs representation in which consonants that trigger epenthesis are present for orthographic, not perceptual, reasons. Epenthesis triggered by such consonants cannot arise from misperception; it must reflect an unfaithful phonological mapping.

3.1 Orthographic influence on the pLs representation

Evidence that some consonants in pLs representations come from orthography is provided by Japanese loanwords with doublet forms that show deletion instead of the more widespread epenthesis; compare (4) and (5).

(5) Deletion in Japanese loanwords (Ichikawa, 1929; Arakawa, 1977; Smith, 2006b)

_ri.s <u>u</u> .rin	< English	[gl]ycerine
pok.ke_		pocke[t]
dʒi.ru.ba_		jitterbu[g]

For such doublets, it can often be shown that the deletion loanword is an auditory borrowing, while the epenthesis loanword has been borrowed under heavy orthographic influence. For example, deletion loans are more likely to have [u] for English unstressed vowels, while their epenthesis doublets tend to have “spelling pronunciation” vowels; compare [ri.su.rin] and [gu.ri.se.rin] < *glycerine*. Also, deletion loans are more likely to have [ɾ] for American English flapped /t,d/, as in [dʒi.ru.ba] versus [dʒit.ta.bag.gu] < *jitterbug*. (See Smith, 2006b for additional examples and discussion.)

The fact that deletion tends to correlate with other evidence of auditory borrowing indicates that for these doublets, it is deletion, not epenthesis, that results from perceptual assimilation. With an auditory loanword, a Japanese Lb speaker may not perceive certain non-salient consonants (and certainly would not “perceive” the underlying representation of a reduced vowel). On the other hand, when Ls orthography is available, it gives the Lb speaker information about codas, consonant clusters, and non-reduced forms of vowels, which are used to establish the segmental content of the pLs form (see Dohlus, 2005; Vendelin and Peperkamp, 2006 on the use of orthography to determine vowel categories in adaptation). So the pLs

representation of *jitterbug* as an orthographic loanword is something like |dʰitəbʌg|, while the pLs representation of the auditory version is something like |dʰirəbʌ|.⁵

LWA in Japanese is overwhelmingly based on written materials (Lovins, 1975; Miura, 1993). Therefore, acknowledging orthographic influence on the pLs form accounts for the striking prevalence of epenthesis in the face of perceptual deletion, and the pervasive “phonemic” treatment of reduced vowels and /t,d/ in flapping contexts, in loanwords from English. This is not to say that perceptual epenthesis never occurs for Japanese speakers; the deletion misperceptions discussed above are in different phonological environments than the epenthesis misperceptions of Dupoux et al. (1999), and perceptual epenthesis has been experimentally confirmed in other languages (e.g., Kabak, 2003). The point here is that many Japanese pLs representations contain unsyllabifiable consonants that do not trigger perceptual epenthesis—or undergo perceptual deletion—because those pLs representations have been established wholly or partly on the basis of orthography. This confirms that the epenthesis triggered by such unsyllabifiable consonants is phonological. (See Shinohara, 2000, for additional evidence that some epenthesis in Japanese LWA is phonological, because it interacts with other phonological processes such as accent assignment.)

3.2 *The SBcorr model and loanword-specific adaptation strategies*

The epenthesis strategy used in adapting a Japanese pLs form with unsyllabifiable consonants, such as |qrɪserɪN| or |dʰitəbʌg|, differs from the default non-loan phonological process, which is deletion. The existence of a loanword-specific adaptation strategy shows that certain SBcorr constraints outrank the relevant IOcorr constraints, allowing a different unfaithful mapping to be chosen just in case a pLs form exists. (Non-loans, which have no associated pLs representation, vacuously satisfy SBcorr constraints, so only IOcorr constraints apply to them.)

Here is what happens when a Japanese speaker, having established a pLs representation like |qrɪserɪN|, goes on to adapt the form as a loanword. I assume that formally, LWA differs from an ordinary pass through the phonological production grammar only by including a pLs representation. This accounts for the fact that many aspects of the Lb-internal phonology are also relevant for LWA, as when Lb phonotactic restrictions drive adaptation; one example from Japanese is *COMPLEXONSET (Prince and Smolensky, 1993/2004), penalizing onset clusters, which is respected in loanwords like [qu.rɪserɪN] (*[qrɪserɪN]).

If LWA involves a superset of the mechanisms involved in the Lb-internal phonology, then there must be an IOcorr relationship in addition to the language-contact-driven SBcorr relationship. But what determines the “input” form, since by definition the loanword has not yet been adapted, and so has no lexical entry in Lb? By analogy to OT models of L1 phonological acquisition, where the learner’s input is the same as the adult output (Tesar and Smolensky, 2000), I suggest that the Lb adapter copies the pLs representation to create an input form.⁶

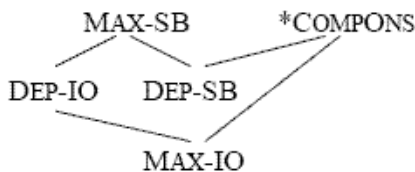
Thus, LWA for (orthographic) English *glycerine* in Japanese involves the pLs form |qrɪserɪN|, which is related to the output by SBcorr constraints, and the (identical) input form /qrɪserɪN/, which is related to the output by IOcorr constraints.

(6) Epenthesis in adaptation

/griserin/ pLs: griserin	MAX-SB	*COMPONS	DEP-SB	DEP-IO	MAX-IO
(a) gu.ri.se.rin			*	*	
(b) _ri.se.rin	*!				*
(c) gri.se.rin		*!			

The choice of epenthesis (a) over deletion (b) shows that some MAX constraint prevails. However, MAX-IO cannot be the high-ranked constraint; non-loans avoid unsyllabifiable consonants by deletion, giving DEP-IO >> MAX-IO. Because the epenthesis strategy is specific to LWA, it must be MAX-SB that dominates DEP-SB (and DEP-IO). Finally, because complex onsets are avoided both in LWA (c) and in the non-loan phonology, *COMPLEXONSET must dominate at least DEP-SB and MAX-IO.

(7) Ranking for LWA-specific epenthesis in Japanese



In a language with an adaptation-specific phonological process, like Japanese, at least one SBcorr constraint must outrank at least one IOcorr constraint. The existence of such languages therefore motivates the inclusion of the SB correspondence relation in the model. Languages without adaptation-specific strategies can be modeled as well: If all SBcorr constraints are crucially dominated, then LWA involves the same unfaithful mappings as the non-loan phonology.

4 Flexibility of adaptation strategies

Cross-linguistically, epenthesis is extremely common in LWA (Paradis and LaCharité, 1997). However, the SBcorr model predicts that other unfaithful mappings should also be available. To confirm this prediction, it is necessary to find languages with non-epenthesis adaptation strategies that are phonological processes, not effects of perceptual distortion.

This section examines LWA in Finnish, Hmong, and Sranan, in which adaptation strategies include deletion of [s]. Voiceless stridents are highly salient (Wright, 2004), so [s] deletion is not plausible as a misperception “repair.” Moreover, each of these languages has /s/ in its inventory, so these [s]-deletion cases are not exceptions facilitated by the unavailability of a sufficiently similar segment in Lb (as proposed by Adler, 2006 for Hawai’ian).

4.1 Finnish

In Finnish non-loan phonology, there are restrictions on syllable structure (Hakulinen, 1961; Karlsson, 1983; Sherer, 1994; Karvonen, 1998). Onset clusters are prohibited. Codas are allowed, but word-final codas must be coronal (Hakulinen, 1961: 8), and medial codas are subject to a

syllable-contact restriction against obstruent codas followed by sonorant onsets (Sherer, 1994: 118). The native segmental inventory includes one coronal sibilant, symbolized /s/; its realization varies between [s] and [ʃ], depending somewhat on vowel context (Hakulinen, 1961: 9--10; Karlsson, 1983: 17).

The prohibition on word-initial clusters in Finnish drives adaptation (although less-nativized loanwords show faithful importation of #(C)CC). Initial clusters are avoided by deletion of all but the pre-vocalic C (Campbell, 1998: 62). This pattern includes [#sC] clusters, which undergo deletion of [s]. Many of the loanwords showing [s] deletion are older loans from Swedish or Slavic, but [s]-deletion cases are also reported by Kolehmainen (1937) in loanwords specific to the Finnish community in the US. The US Finnish loanwords are described as “a large and increasing number” of items (Kolehmainen, 1937: 62), which suggests that borrowing and adaptation were ongoing when these loanwords were recorded.

(8) [#sC] clusters: [s]-deletion

(a) Finnish (Luthy, 1973: 6--7; Campbell 1998: 62)

<u>_</u> puola	< Swedish	[sp]ole	‘spool’
<u>_</u> tuoli		[st]ol	‘chair’
<u>_</u> tykki		[st]ycke	‘cannon’
<u>_</u> koulu		[sk]ola	‘school’
<u>_</u> räättäli		[skr]addare	‘tailor’
<u>_</u> ruuvi		[skr]uv	‘screw’
<u>_</u> nikkari		[sn]ickare	‘carpenter’

(b) US Finnish (Kolehmainen, 1937: 63)

<u>_</u> toori	< English	[st]ore
<u>_</u> touvi		[st]ove

In addition to the general perceptual salience of stridents, it is highly unlikely that the stridents in the forms in (8) are imperceptible to Lb speakers, since stridents in other contexts—including word-initial and pre-C contexts—survive.

(9) Stridents adapted as [s(s)] (Kolehmainen, 1937: 62)

<u>s</u> aitvooki	< English	[s]idewalk
p <u>s</u> ketti		ba[s]ket
ki <u>s</u> ti		ki[tʃ]en
h <u>au</u> ssi		hou[s]e
lun <u>s</u> si		lun[tʃ]

It is true that the cases of [s] in (9) are all adjacent to a vowel on at least one side, which differs from the #_C cases in (8). However, sibilants have robust internal cues (Wright, 2004), so detection of their presence is not as dependent on vowel transitions as is the case for other obstruents. Moreover, the fact that faithful importation of [#sC] forms occurs in less nativized loanwords also suggests that the [s] in such constructions is perceptible. Kolehmainen (1937: 63)

gives US Finnish *skeptikko* (< English *skeptic*); additional examples are provided by Luthy (1973) and Karvonen (1998).

Further evidence that deletion in Finnish LWA is phonological is the fact that this adaptation strategy is specific to word-initial position. In other contexts, unsyllabifiable consonants are avoided through epenthesis, often of [i]. For example, if an obstruent-sonorant (TR) sequence between vowels is treated unfaithfully, the output is [VTVRV] with epenthesis, not *[VT_V] or *[V_RV] with deletion.

(10) Epenthesis in illegitimate medial clusters

(a) Medial TR clusters: epenthesis (Kolehmainen, 1937: 62)

<i>äpy.liä</i>	< English	<i>apple</i> (+ <i>ä</i> PARTITIVE)
<i>peti.ruuma</i>		<i>bedroom</i> ⁷

(b) Compare medial TT, RR, RT clusters (Kolehmainen, 1937: 62)

<i>skep.tikko</i>	< English	<i>skeptic</i>
<i>kis.ti</i>		<i>kitchen</i>
<i>pas.ketti</i>		<i>basket</i>
<i>far.mari</i>		<i>farmer</i>
<i>kän.tiä</i>		<i>candy</i> (+ <i>ä</i> PARTITIVE)
<i>jaar.ti</i>		<i>yard</i> ‘lawn’

The unfaithful mapping in [VTRV] forms is driven by *COMPLEXONSET (Prince and Smolensky, 1993/2004), which disallows onset clusters, and SYLLABLECONTACT (Bat-El, 1996), which penalizes a sonority rise across a syllable boundary.

Epenthesis is also found in word-final position. Finnish and US Finnish loanwords nearly always end in a vowel, often [i], even when the final consonant of the Ls form is a phonotactically permissible final coda (Kolehmainen, 1937: 63; Hakulinen, 1961: 19; Karvonen, 1998: 30; Kiparsky, 2003: 147).

(11) Final codas: epenthesis (Kolehmainen, 1937: 62)

<i>saitvooki</i>	< English	<i>sidewalk</i>
<i>jaarti</i>		<i>yard</i> ‘lawn’
<i>pasketti</i>		<i>basket</i>
<i>farmari</i>		<i>farmer</i>

Kiparsky (2003: 146) attributes final epenthesis in loanwords to STEMCONSTRAINT, a markedness constraint requiring stems (although not words) to end in a vowel. This constraint would be satisfied equally well by deletion of the final consonant, but epenthesis is the chosen adaptation strategy.⁸

Thus, for both medial obstruent-sonorant clusters and word-final consonants, epenthesis is the preferred LWA process. US Finnish *petiruuma* ‘bedroom’ exemplifies the constraint rankings that produce this result.

(12) Epenthesis

/petruum/ pLs: petruum	*COMP ONS	SYLL CONTACT	STEM CONSTR	MAX- SB	DEP- SB
☞ (a) 'pe.ti.ruu.ma					**
(b) 'pe.truu.ma	*!				*
(c) 'pet.ruu.ma		*!			*
(d) 'pe_.ruu.ma				*!	*
(e) 'pe.ti.ruum			*!		*
(f) 'pe.ti.ruu_				*!	*

The choice of candidate (a) over candidates (b) and (c) shows that epenthesis into the [tr] sequence is preferred over an onset cluster (b) and a coda-onset sequence with rising sonority (c). This motivates the ranking $\{*\text{COMPONS}, \text{SYLLCONTACT}\} \gg \text{DEP-SB}$. The choice of (a) over (e) shows that epenthesis after word-final [m] is preferred to a faithful consonant-final form, which motivates $\text{STEMCONSTR} \gg \text{DEP-SB}$. Finally, the choice of (a) over (d, f) shows that epenthesis, not deletion, is the preferred adaptation strategy, so MAX-SB dominates DEP-SB (and DEP-IO).

(13) Interim ranking

$\{*\text{COMPONS}, \text{SYLLCONTACT}, \text{STEMCONSTR}, \text{MAX-SB}\} \gg \text{DEP-SB}$

But if epenthesis is the preferred strategy in Finnish LWA, then why do #CC clusters undergo deletion? As argued above, deletion cannot stem from failure to perceive the word-initial consonant, as even highly salient [s] is affected. On the other hand, there is a *phonological* explanation for why epenthesis has a different status for #CC cases. Finnish has initial stress, so if the leftmost vowel were epenthetic, main stress would fall on an epenthetic vowel—a configuration that is avoided in a number of languages (Alderete, 1999; Gouskova and Hall, this volume). Additionally, deletion in #CC is not specific to [s], which further supports the phonological character of this adaptation strategy. The examples of word-initial cluster simplification that he provides happen to involve [#sC] clusters, but Kolehmainen (1937: 63) explicitly refers to “[t]he rule that *no word can begin with two consonants* without dropping one or more letters” [emphasis added]. Examples of (older) Finnish loanwords in which non-[s] clusters are adapted by deletion of the first consonant are given in (14) for comparison.

(14) Initial #CC: deletion (Luthy, 1973: 6; Campbell, 1998: 62)

_risti	‘cross’	< Old Russian [kr]istī
_lukkari	‘chorister’	< Swedish [kl]ackare
_luostari	‘monastery’	[kl]oster
_lyijy	‘lead (carbon)’	[bl]y
_rouva	‘lady, Mrs.’	[fr]u
_ranska	‘French’	[fr]anska

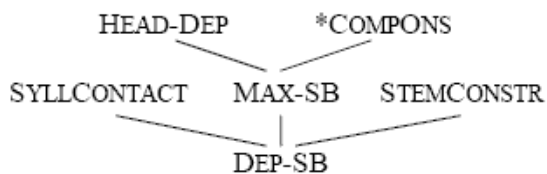
Formally, stress⁹ on an epenthetic vowel is penalized by the constraint HEAD-DEP (Alderete, 1999; there is no evidence to determine whether the HEAD-DEP constraint at work here is on the SB or IO relation, so the correspondence relation is left unspecified). The ranking of HEAD-DEP with respect to the constraints introduced above is exemplified with US Finnish *toori* ‘store’.

(15) Deletion in #CC clusters

/stoor/	*COMP ONS	SYLL CONTACT	STEM CONSTR	HEAD- DEP	MAX- SB	DEP- SB
☞ (a) 'too.ri					*	*
(b) 'stoo.ri	*!					*
(c) 'si.too.ri				*!		**
(d) 'is.too.ri				*!		**
(e) 'toor			*!		*	
(f) 'too					**!	

The initial [st] sequence undergoes deletion¹⁰ (a), not epenthesis (c,d), showing that HEAD-DEP dominates MAX-SB (and MAX-IO). The onset cluster is avoided (b), so *COMPONS dominates MAX-SB (and MAX-IO). However, only word-initial clusters trigger deletion (f); when HEAD-DEP is not at stake, the ranking of MAX-SB >> DEP-SB motivated in (12) leads to epenthesis.

(16) Ranking for Finnish LWA



In conclusion, the deletion of initial [s] in Finnish LWA is phonological. Evidence against a misperception account includes both the general salience of [s] and the fact that [s] deletion is grammatically determined, driven by a constraint against stressed epenthetic vowels. This result supports the SBcorr model, which predicts that phonological deletion is possible in LWA.

4.2 Hmong

Another language in which LWA involves deletion of [s] is (White) Hmong (Golston and Yang, 2001). In fact, unusually from a cross-linguistic perspective, deletion is the default adaptation strategy in Hmong (Golston and Yang, 2001: 50). Hmong has strict CV(V) syllable structure, but a large consonant inventory that includes affricates and prenasalized and laterally released stops. As in Finnish, [s] deletion occurs despite the inclusion of [s] in the native inventory. Ls [s] in

onset position is typically borrowed as [s], confirming the general perceptibility of this segment to Hmong speakers.

(17) [s] in onset position (Golston and Yang, 2001: 48, 49, 53)

sà.lò.mò̃	< French	[s]alomon ‘Solomon’
sì.dáì	< English	[s]edar
sǎ.lǎ		[s]alad
pě.sî		Pep[s]i

Ls codas, including [s], are avoided by deletion.

(18) [s] codas: deletion (Golston and Yang, 2001: 40, 46, 49, 53)

kʰĩ_.mǎ_	< English	Chri[s]tma[s]
^m bǎ_		bu[s]
^ŋ gě_		ga[s]
?ð.fĩ_		offi[s]
ⁿ dʒû_		jui[s]
?ái_		ice ([s])
pù.lǐ_		poli[s]

Golston and Yang (2001: 51) propose a phonological account of deletion adaptations for Ls codas, in which NOCODA (Prince and Smolensky, 1993/2004) and DEP(-SB, in terms of the SBcorr model) are ranked over MAX(-SB). The alternative would be a misperception account, according to which Hmong speakers do not perceive Ls consonants, including [s], in coda position; if this were the case, there would be no evidence for phonological deletion in Hmong LWA. However, beyond the general argument that [s] is too salient not to be perceived, there is additional evidence against a misperception account of coda [s] deletion in Hmong LWA: [#sC] clusters are adapted, not by deletion, but by epenthesis.

(19) [#sC] clusters: epenthesis (Golston and Yang, 2001: 48, 53)

sì.tǔ.pɛ	< English	[st]upid
sàì.kû		[sk]ool

Golston and Yang (2001) do not present any other examples of Hmong loanwords with onset clusters in the Ls forms, so it is unclear whether epenthesis occurs in all onset clusters, is restricted to word-initial onset clusters, or affects [#sC] clusters only. It would also be important to determine whether this epenthesis pattern is phonological or is the result of perceptual distortion adding a nucleus to the pLs representation (although the highly salient [ai̯] diphthong in the adapted form of *school* in (19) is not suggestive of perceptual epenthesis). Crucially, however, these [#sC] cases show that [s] is perceptible word-initially before a consonant, a context very similar to the V_.C (coda) context where [s] deletion occurs.¹¹

4.3 *Sranan*

A third example of adaptation by deletion involving Ls [s] is found in Sranan (Alber and Plag, 2001). Sranan is a creole, and the morphemes of interest here have source forms in the lexifier language, English. Arguably, the same phonological and perceptual factors that are involved in borrowing a loanword are also involved in lexifying a creole, so it is still appropriate to speak of phonological adaptation with reference to an Ls surface form and a pLs representation.

In Sranan, Ls [#sC] clusters are avoided by [s] deletion when C is an obstruent.

(20) [#s]+obstruent: [s]-deletion (Alber and Plag, 2001: 815)

<i>_piki</i>	< English	[sp]eak
<i>_pramaseti</i>		[sp]ermaceti
<i>_pori</i>		[sp]oil
<i>_tan</i>		[st]and
<i>_tori</i>		[st]ory
<i>_tranga</i>		[st]rong
<i>_krebi</i>		[sk]rape
<i>_kweri</i>		[sk]uare
<i>_krasi</i>		[sk]ratch

Here again, it is unlikely that the [s] deletion in (20) is caused by failure to perceive this segment. Instances of [s] from other phonological contexts in Ls forms are adapted faithfully or trigger epenthesis, as seen in (21).

(21) Examples retaining [s] (Alber and Plag, 2001: 816)

<i>masra</i>	< English	ma[s]ter
<i>nasi</i>		na[s]ty
<i>sis</i>		[s]i[s]ter
<i>fosi</i>		fir[s]t
<i>hesi</i>		ha[s]te

The choice between deletion (including [s]) as in (20) and other strategies as in (21) is driven by the phonological constraint ranking. For details, see Alber and Plag (2001: 826--7); in brief, deletion of initial [s] is driven by a contiguity constraint that is also responsible for other patterns in the data, such as the treatment of word-final consonants. Once again, it cannot be the case that [s] in Ls forms is generally imperceptible to Lb speakers. Instead, deletion of [s] is enforced by the phonological grammar of LWA.

4.4 *Conclusions: Deletion of highly perceptible segments*

Finnish, Hmong, and Sranan provide examples of [s], a highly perceptible segment, undergoing adaptation by deletion (see also Shinohara, 2006: 1061 on [s] deletion in Marshallese LWA). These examples show that not all instances of deletion in LWA can be attributed to Lb speakers' failure to perceive Ls segments. Jacobs and Gussenhoven (2000: 198) include [s] deletion in Hawai'ian loanword adaptation as part of their argument that perceptual factors are *never* relevant in LWA. As discussed in §2.2 above, the SBcorr model does not take that position; there is significant evidence that perceptual factors, including phonotactically driven misperception, do

play a role in LWA. However, the [s]-deletion cases demonstrate that misperception cannot be the *only* explanation for deletion in adaptation. These cases also serve as a counterexample to Adler's (2006: 1041) proposal that [s] deletion is only possible in LWA when Lb lacks strident fricatives, since Finnish, Hmong, and Sranan all have /s/ in their inventories.

Other examples of non-perceptual deletion in adaptation include post-tonic syllables in Huave (Ls=Spanish; Davidson and Noyer, 1997) and liquids in Cantonese (Ls=English; Silverman, 1992). In Huave, an SBcorr constraint (in current terms) preserving stress location, plus constraints on stress placement and foot form, drive deletion of entire syllables: Ls [i.ga.do] → Lb [ik] 'liver' (Davidson and Noyer, 1997: 68--70). It is unlikely that a whole [...VCV] sequence would fail to be perceived.¹² In Cantonese, the [pr] cluster is avoided by deletion in *printer*, but by epenthesis in *print*, because of word-minimality effects (Silverman, 1992: 290); since deletion is sensitive to non-local phonological factors, it is phonological, not perceptual.

These deletion cases confirm that even segments that persist into the pLs representation are potentially subject to phonological deletion. Therefore, a phonological model of LWA must allow for flexibility of adaptation strategies. This supports the SBcorr model, in which SB faithfulness constraints may be ranked differently in different languages.

5 Further implications

The findings discussed above, and the SBcorr model that they support, have additional implications for LWA and for phonological theory more generally.

5.1 *The non-universality of source-similarity constraints*

Using Correspondence Theory to model source-similarity constraints means that such constraints need not be universally present. SBcorr constraints are added to a speaker's grammar only if the speaker establishes an SB correspondence relation, preparing to adapt an Ls form.

There are precedents for recognizing different numbers of correspondence relations in different grammars. Urbanczyk (1995: 505) demonstrates that a language may include multiple reduplicative morphemes with distinct base-reduplicant (BR) correspondence relations, and distinct rankings for BR_icorr and BR_jcorr constraints. Similarly, Benua (1997: 25) allows for multiple output-output (OO) correspondence relations. In principle, there is no upper bound on the number of reduplicative morphemes or levels of "cyclic" affixes in a language. This requires that additional sets of BRcorr or OOCorr constraints be generated when needed. Correspondence Theory permits this, since each constraint type, such as MAX or DEP, is defined as a general schema (McCarthy and Prince, 1995: 264), to be relativized to any pair of strings S₁-S₂. We can assume that positing a new correspondence relation automatically invokes a set of faithfulness constraints on that relation. Therefore, general schemas for correspondence constraints are part of the universal constraint set, but the particular correspondence relations that determine concrete faithfulness constraints may differ by language. Accordingly, there are no SBcorr constraints in an Lb speaker's grammar until an SBcorr relation is established; then, a set of SB faithfulness constraints is supplied. Non-correspondence formalisms for source-similarity constraints would require either universally present loanword-specific constraints, or a novel mechanism for adding loanword-specific constraints to the grammar when needed.

Once SBcorr constraints are invoked, they must be ranked. But when rankings involved in adaptation are not attested in the Lb-internal phonology, how are they learned (Golston and Yang, 2001; Broselow, 2004; Kenstowicz and Suchato, 2006)? The SBcorr model provides a useful perspective on this problem. When a native speaker establishes an SBcorr relation, the pre-existing Lb ranking is unchanged except for the addition of SBcorr constraints. These new constraints can be arbitrarily ranked by the individual speaker; alternatively, the speaker can learn the Lb adaptation *conventions* and thus which SBcorr constraints are ranked high (similar to learning a language game). Indeed, adaptation strategies are often variable for early loanwords, later becoming highly conventionalized (Haugen, 1950). In any case, whether a speaker chooses to preserve certain Ls characteristics, or learns particular source-similarity effects from the community's adaptation conventions, the relevant SBcorr constraints will be ranked above any competing constraints. Further research is needed to determine how the SBcorr constraints that are not active in LWA are handled. They may be ranked by default, perhaps below relevant markedness constraints (Prince and Tesar, 2004) or below IOcorr constraints.

5.2 *Factorial typology and the epenthesis preference in LWA*

The SBcorr model predicts that LWA may involve unfaithful mappings besides epenthesis, because it includes a full set of faithfulness constraints (McCarthy and Prince, 1995: 370--372), any of which can be ranked low enough to be violated. The languages in §4 confirm that epenthesis is not the only option, because they use deletion, violating MAX-SB. Violations of other SBcorr constraints are attested as well. The violation of IDENT[*Feature*]-SB constraints would result in featural changes, which are common in LWA; misperception can distort feature values (Werker and Tees, 1984), but Lb-illicit segments can also be veridically perceived (Kabak, 2003), so some feature-change effects are probably phonological. Adaptation strategies violating UNIFORMITY-SB (coalescence) and INTEGRITY-SB (diphthongization) also seem to occur (Hyman, 1970; Lovins, 1975; but see Paradis and Prunet, 2000). Finally, faithfulness constraints on string edges (ANCHOR-SB) and string-element adjacency (CONTIGUITY-SB) are frequently violated when epenthesis or deletion occurs.

On the other hand, metathesis (violating LINEARITY-SB) is exceedingly rare in LWA (Gouskova, 2001; LaCharité and Paradis, 2005). Gouskova (2001: 183) suggests that this might be related to the strong cross-linguistic epenthesis preference in LWA (Paradis and LaCharité, 1997). Neither the avoidance of metathesis, nor the general epenthesis preference, is predicted by the SBcorr model. Some models of LWA build the epenthesis preference directly into the grammar (Paradis and LaCharité, 1997; Karvonen, 1998; Yip, 2002). However, such an approach is problematic for those languages that do use deletion in LWA. Moreover, deletion is more common than epenthesis in diachronic change (Crowley, 1997: 42) and child language acquisition (Bernhardt and Stemberger, 1998), suggesting that epenthesis is not a general default.

An alternative explanation for the epenthesis preference is that it is sociolinguistic. Sociolinguistic factors are known to influence LWA. For example, greater and lesser degrees of nativization (i.e., different constraint rankings) sometimes correlate with attitudes toward native and foreign cultures, or with the degree of cultural integration of the loanword's referent (Luthy, 1973: 12; Lovins, 1975: 6, 38; Mosel, 2004). The fact that LWA can become conventionalized (Haugen, 1950: 217; Hyman, 1970: notes 6--7; Lovins, 1975: 38) shows that a particular SBcorr ranking can spread through the Lb community. Epenthesis, deletion, and featural change all have the same *formal* status, being faithfulness violations, but it seems that people find a loanword to

be more similar to its source when it includes all of the Ls material (deletion dispreferred), in the original order (metathesis dispreferred), even if this leads to unfaithfulness in the form of epenthesis (Lovins, 1975: 38; Gouskova, 2001: 183). Access to Ls orthography may strengthen this reluctance to “leave things out” of loanwords, as pidgins and creoles seem less biased toward epenthesis strategies (Alber and Plag, 2001). Thus, the SBcorr model predicts that the anti-deletion constraint MAX-SB has no special *phonological* status in LWA; cross-linguistically, this constraint tends to be ranked high, perhaps for sociolinguistic reasons, but this is not required.

5.3 *LWA and phonological argumentation*

If LWA involved no mechanisms beyond the Lb-internal phonology, then the contribution of adaptation evidence to phonological argumentation would be straightforward (see, e.g., Hyman, 1970). However, both LWA-specific constraints and extra-phonological factors such as perception and orthography are relevant for adaptation as well, and this has certain implications. Before adaptation processes can be used as phonological evidence, it must be established that they are indeed phonological unfaithful mappings (see also de Lacy, this volume). Moreover, the fact that SBcorr constraints are involved in adaptation means that Lb-internal “hidden rankings” cannot conclusively be established on loanword evidence alone. On the other hand, evidence from adaptation can shed light on the architecture of the phonological system, as when Lovins (1975: 32) uses LWA to argue against highly abstract URs, or when constraint-based frameworks are shown to require fewer loanword-specific mechanisms than rule-based frameworks (Yip, 1993; Paradis and LaCharité, 1997; Broselow, 2000; Jacobs and Gussenhoven, 2000; Golston and Yang, 2001).

For example, the use of a correspondence relation, distinct from the IOcorr relation, to model source-similarity effects supports the inclusion of multiple correspondence relations in the grammar, which has implications for the treatment of cyclic or output-output effects in morphological derivation (Smith, 2006a).

The flexibility of adaptation strategies for loanwords also has implications for Correspondence Theory. Precisely how many different adaptation strategies are predicted depends on whether faithfulness constraints can be ranked in any order (McCarthy and Prince, 1995), or whether faithfulness constraints whose violations are more perceptually salient are necessarily higher ranked (as in the original P-map model of Steriade, 2001; see also Adler, 2006). The [s]-deletion cases in §4 show that, whatever role perceptual salience plays in Correspondence Theory, it cannot fix constraint rankings absolutely (a point also made by Steriade, 2004)—the phonological grammar must be free to choose something other than the perceptually minimal adaptation strategy, or salient segments like [s] would never be deleted.

In conclusion, although loanword adaptation provides less direct evidence about the grammar of individual languages than was once hoped, it still contributes to a broader understanding of universal grammar and phonological theory.

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Notes

1. Modeling adaptation is distinct from modeling the synchronic phonological system of a language whose lexicon includes etymological loanwords (adapted and imported by previous Lb speakers). If an etymological loanword was nativized during adaptation, it has become an Lb lexeme that conforms to Lb phonotactics. Subsequent Lb learners of this lexeme (not from Ls speakers) have no motivation to assume an Ls-like form and recapitulate the adaptation process. Alternatively, if an etymological loanword was not fully nativized during adaptation, then it has become an Lb lexeme with “foreign” characteristics. Such lexemes may cause Lb learners to develop a stratified lexicon (Fukazawa, Kitahara, and Ota, 1998; Ito and Mester, 1999; Ota, 2004; Pater, 2005) or to reanalyze the core Lb grammar (Rice, 2006), but these consequences are distinct from the original process of adapting loanwords.
2. Proposals have also been made for adaptation-specific or loanword-specific markedness constraints (Karvonen, 1998; Pater, 2004). A related scenario is one in which a language has a stratified lexicon (caused by the presence of etymological loanwords), but the least-marked stratum is not the one containing the native lexemes, but rather one containing a particular set of loanwords (Kawahara, Nishimura, and Ono, 2003). Examining the interaction between source-similarity constraints and loanword-specific markedness effects is left for future research.
3. Yip (2006: 951) proposes a “non-native percept” as an intermediate stage between the “perceptual module” and the “L1 grammar” in LWA. This is similar to the role played by the pLs representation in the model proposed here, but the pLs representation incorporates additional factors beyond speech perception.
4. Models such as those of Broselow (2004) and Peperkamp (2004) acknowledge LWA-specific effects, but attribute them to factors outside the production grammar.
5. This paper is concerned mainly with epenthesis and deletion, so the *segmental* categories shown in pLs representations are intended as plausible approximations. For example, it remains to be determined whether English [ɪ] is assimilated to Japanese [i] by perceptual distortion (Werker and Tees, 1984) and/or grapheme-to-phoneme conversion (Vendelin and Peperkamp, 2006), or whether [ɪ] persists into the pLs representation, subsequently to be mapped to [i] in the phonology; similarly for, e.g., stop voicing in Finnish (§4.1).
6. A conceivable alternative is that there is no input in LWA, only a pLs form; IOcorr constraints would be vacuously satisfied during LWA, and would not be crucially ranked with SBcorr constraints. But even under this assumption, a distinction between IOcorr and SBcorr constraints is necessary in order to account for loanword-specific adaptation strategies and the maintenance of Lb-illicit structures in loanwords.
7. Although Ls *bed+room* is a compound, it is unlikely that Lb *petiruuma* reflects the Ls morphological structure (*peti+ruuma*). A short word with a final stop like Ls *bed* would typically

have the final stop geminated, i.e., *petti* (Karvonen, 1998). Therefore, the [i] in *petiruuma* is classified as a case of medial epenthesis, not final epenthesis as in (11).

8. Kolehmainen's (1937: 62) list includes one form in which a final C has apparently been avoided through deletion: *kisti_ < kitchen_*. This might reflect failure to perceive the word-final [n] in the English source form, and therefore the absence of [n] in the pLs representation, but further investigation is needed.

9. Finnish has secondary stress, so the relevant HEAD-DEP constraint may refer to the head of the prosodic word rather than to all prosodic heads.

10. The winning deletion candidate is [_toori], not *[s_oori]; in Finnish LWA, #CC clusters undergo deletion of the first C, not the second. This might be due to a high-ranking CONTIGUITY constraint, penalizing deletion not at an edge (McCarthy and Prince, 1995), or it might have to do with preferential preservation of a consonant in the context _V as opposed to the context _C {Steriade, to appear}.

11. There are some differences in perceptibility between the two contexts, but each has advantages. Word-initial position is attentionally privileged in speech perception (Marslen-Wilson, 1984), but post-vocalic position generally provides better cues to consonant identification (Wright, 2004).

12. Broselow (2004: 8) proposes that Huave speakers perceive the Ls stress and assign a word boundary after the stress foot, which causes them to disregard subsequent segments. On this view, Huave truncation becomes a case of misperception. But this does not explain why Huave speakers fail to borrow the whole "phrase" corresponding to the Ls form. (Compare Golston and Yang, 2001: 55 on the phrase-like status of polysyllabic loanwords in Hmong.)

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