Learning ill-formed loanwords in

Optimality Theory

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Abstract

An under-studied phenomenon of lexical borrowing is the ill-formed, or partially assimilated loanword. Loans of this kind invite otherwise prohibited structures into the borrowing language, and in doing so contradict the native grammar. Because of this contradiction, ill-formed loans offer researchers a unique perspective on the nature of phonological generalizations that extend over only a subset of the lexicon. This study argues that ill-formed loans are not derivable in classical OT, and proposes a perception-learning model of loanword adaptation in which loans are adapted during perception, but adaptation can be blocked by factors of intense language contact and bilingualism. This proposal is claimed to account for (a) the full range of observed loanword adaptations, (b) the observed potential for difference between loan and native phonologies, (c) lexically partial phonological generalizations within the native vocabulary, and (d) the historical conditions of language contact that allow for ill-formed loans to appear.¹

¹This thesis would never have been completed without my advisor Emily Gasser and her incredible guidance, critique, and thought-provoking questions. I would also like to thank Jane Chandlee and Kate Riestenberg for their thoughtful contributions. I owe great thanks as well to my major advisor Brook Danielle Lillehaugen for her support and encouragement. Last but not least, I would like to thank my fellow linguistics seniors Ziv Stern and Aradia Jinsi for their valuable, considered feedback on earlier drafts.
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1 Introduction

Lexical borrowing (or simply “borrowing”) is a phenomenon of language contact in which a word is copied from a source language into the lexicon of a different language, called the host or borrowing language. Though borrowing can be accurately characterized as a process of copying, the resulting loanword is rarely a perfect copy. In fact, most loanwords show evidence of transformations relative to the original source word. These transformations, called loanword adaptations, might entail the adjustment, deletion, or insertion of sounds, features, or suprasegments (prosodic features), as shown in (1).

(1) Repair strategies in loanwords from English: (Peperkamp & Dupoux, 2003)

<table>
<thead>
<tr>
<th>Loanword</th>
<th>English</th>
<th>Host Lang.</th>
<th>Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [rəntən]</td>
<td>London</td>
<td>Korean</td>
<td>(segment adjustment)</td>
</tr>
<tr>
<td>b. [wɔkmán]</td>
<td>walkman</td>
<td>French</td>
<td>(prosodic adjustment)</td>
</tr>
<tr>
<td>c. [sɯɸiŋkɯsɯ]</td>
<td>sphinx</td>
<td>Japanese</td>
<td>(epenthesis)</td>
</tr>
<tr>
<td>d. [pesi]</td>
<td>Pepsi</td>
<td>White Hmong</td>
<td>(deletion)</td>
</tr>
</tbody>
</table>

These adaptations constitute the process by which a foreign word that does not conform to the phonological grammar of the host language can become a well-formed loanword. In fact, all loanword adaptations seem to be motivated by the limitations of the borrowing language’s phoneme inventory, syllable structure, and phonotactics (sound sequences), in that all adaptations target some non-native structure and produce a native-like structure. For this reason, it has often been assumed that spontaneous loan formation (when a speaker is asked to pronounce a novel foreign word as if it was a word in their language) can offer insight into a language’s productive phonological processes. However,
not all loanwords are completely adapted to the native phonology of the borrowing language. In fact, in many of the world’s languages there can be found classes of loanwords that preserve certain structures that are otherwise reliably avoided for all native words. This paper is a theoretical study of these ill-formed loanwords, in which I argue that they are best understood as products of collective phonological learning during the borrowing process.

In §1, I contextualize ill-formed loans in the literature of loanword adaptation, and I problematize them as conflicting constraint rankings that cannot be reconciled within classical Optimality Theory (Prince & Smolensky, 1993). In §2, I interrogate previously proposed OT formalizations of loanword phonology, and I argue that lexical stratification is a necessary theoretical addition to classical OT, but not sufficient on its own. In §3, I adopt the constraint cloning algorithm proposed in Becker (2009) and elaborate a theory of loanword adaptation that allows for the learning of conflicting constraint rankings, which represents the appearance of new ill-formed structures. §4 introduces the idea of a social-linguistic typology of ill-formed loans and suggests areas of future research, and §5 concludes.

1.1 Debates in loanword phonology

The major contention in phonological theory regarding loanword adaptations has centered on the relative roles of perception and the phonological grammar. Perception is the
process of a listener mapping an input acoustic signal to a surface phonetic representation (SR), and phonology is the mapping of an underlying phonological representation (UR) to a phonetic SR. Some linguists refer to the UR $\rightarrow$ SR mapping as “production”, but I will reserve this term to refer to the articulatory process of generating a speech signal, which must occur after phonological UR $\rightarrow$ SR processing.

Because adaptation tends to reproduce the L1 phonotactic and other structural patterns, much of the literature has tended to describe adaptation as an effect of L1 phonology. Even before Optimality Theory (Prince & Smolensky, 1993), it was recognized that adaptation processes tend to duplicate the requirements of L1 morpheme structure constraints, and linguists working in OT have argued that this is evidence of adaptation rooted in the borrowing L1 phonology. Linguists like Jacobs & Gussenhoven (2000), who take the phonology-only approach, argue that adaptations arise when a foreign word is processed under the same OT grammar that governs native vocabulary. In this framework, the source language phonetic form is faithfully abstracted to a borrowed underlying form prior to any adaptation. If this is the case, loanword adaptations arise only when the optimal output candidate (determined by the native grammar) is unfaithful to the original source language form.

Consider the example of coda consonant deletion in White Hmong from (1d). Based on the fact that the only White Hmong coda consonants, [ŋ] and [ʔ], are optional and conditioned by phonation and tonal categories, we know that the markedness constraint
NoCoda is high-ranked (Golston & Yang, 2001). Linguists who take the phonology-only approach see the deletion adaptation in the mapping of English [pepsi] to White Hmong [pesi] as a product of the pre-existing ranking NoCoda $\gg$ Max, as illustrated in (2).²

<table>
<thead>
<tr>
<th></th>
<th>pepsi</th>
<th>NoCoda</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pepsi</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. $\varepsilon$ pesi</td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

b. NoCoda: Assign a violation for each syllable that does not end in a vowel.

c. Max: Assign a violation for each segment in the input without a correspondent in the output. (Do not delete.)

However, other linguists have pushed back against the phonology-only model of loan-word adaptation in favor of a phonetic, perceptual explanation. Grounded in experimental data on language-specific speech processing biases, Peperkamp & Dupoux (2003) argue that adaptations arise only at the perceptual level. Under this framework, the case of coda [p] deletion in the White Hmong example (1d) is explained as a perceptual effect. There is no faithful abstraction of English [pepsi] to White Hmong /pesi/; rather, the English form is adapted during phonetic decoding, such that the non-native coda [p] is never perceived as such, and the resulting White Hmong UR is /pesi/. This approach predicts that L1 processing biases lead to frequent misperception of non-native segments and sound patterns such that segments and features can be omitted, adjusted, or inserted in the borrowed UR.

²English $[ɛ] \rightarrow$ Hmong $[ɛ]$ is an example of segment adjustment, where a non-native segment is replaced by a similar native sound in the loan form. Phonology-only theories of adaptation have difficulty explaining these specific adjustments within the L1 grammar.
Much has been discussed surrounding the nature of the input to loanword adaptation and the mechanisms of adaptation, with great contention surrounding the relative roles of phonological processing and perceptual phonetics. Both of the hard-line positions (phonology or perception as the only vehicle of adaptation) cannot account for ill-formed loanwords without modification, and linguists have attempted to synthesize elements of the two theories (Kang, 2003; Smith, 2006). However, I argue that there is a serious issue with how many of these previous studies have problematized loanword adaptation because they often disregard or exceptionalize loanwords that disobey phonotactic constraints that are otherwise active in the host language. It is therefore not enough to build a theory that can explain how source words are adapted to become well-formed words in the host language. Rather, our theory of lexical borrowing should account for all kinds of loanword adaptation, including lack thereof, and make explicit predictions about the mechanisms and conditions for partial and full nativization, with special attention paid to questions of language learning and language contact as a source of diachronic phonological change. To elaborate this theory, we must understand how ill-formed loanwords are not derivable within classical OT.

1.2 Ill-formed loanwords

As I use the term in this paper, ill-formed loanwords are borrowings exhibiting segmental, phonotactic, or prosodic structures otherwise avoided in the host language’s native
lexicon. I choose to avoid the phrase “unassimilated loans” because these borrowings can exhibit significant adaptation while still violating otherwise active constraints. For example, the Japanese loan *beddo* from English ‘bed’ is ill-formed with respect to a constraint against voiced geminate consonants, but still has undergone adaption through vowel insertion. These loanwords pose a specific challenge to an Optimality-Theoretic (Prince & Smolensky, 1993) approach to phonology precisely because they are non-optimal. To illustrate this point, consider the OT tableau in (3a), a mini-grammar that actively devoices final consonants as in the example /tab/ → [tap].

(3) a.  

<table>
<thead>
<tr>
<th></th>
<th>tab</th>
<th>MAX</th>
<th>Dep</th>
<th><em>[C,+voice]</em>#</th>
<th>IDENT[voice]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>ta</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>taba</td>
<td></td>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="image" /></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>tab</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>d.</td>
<td>tap</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

b. **Dep**: Assign a violation for each segment in the output without a correspondent in the input. (Do not epenthesize.)

c. ***[C,+voice]*#: Assign a violation for each word-final voiced consonant.

d. **IDENT[Feature]**: Assign a violation for each alteration in the value of [Feature].

Based on the ranking ***[C,+voice]*# ⇒ IDENT[voice]**, we understand that a word like [tag] should never be the optimal output selected by this grammar. How should we then handle the appearance of hundreds of loans with word-final voiced consonants in this fictitious language, even as native words continue to devoice? This simple thought experiment makes clear the theoretical problem posed by ill-formed loanwords. Although I do
not know of a language exactly like that in (3) which reliably devoices final consonants within the native lexicon but allows a voicing distinction in loanwords, it is not difficult to find a real example of conflicting constraint rankings for native and loan vocabulary. Japanese is one such example:

\[(4)\]

<table>
<thead>
<tr>
<th></th>
<th>mat + i + masu</th>
<th>*T[+high]</th>
<th>IDENT[strong]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>matimasu</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>mat‘imasu</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

b. *T[+high]: Assign one violation for each alveolar stop before a [+high] segment.

In (4), an OT tableau for the Japanese verb [matʻimasu] ‘wait-POLITE-PRES’, we see that there is an active markedness constraint militating against any alveolar stop before a high vowel, resulting in a stridency alternation. Not only is this constraint ranking observable in a phonological process across a morpheme boundary; it can also be observed as a covert generalization (per Ito & Mester, 2001) in the absence of morpheme-internal *[ti], *[tui], *[di], and *[dui] across the native Japanese lexicon.

However, the constraint ranking of *T[+high] \(\gg\) IDENT[strong], which remains a necessary analysis for native words, is directly contradicted by a class of loanwords like [paːtʰi] ‘party’, which allow [t] and [d] to appear before any vowel.

\[(5)\]

<table>
<thead>
<tr>
<th></th>
<th>paːti</th>
<th>*T[+high]</th>
<th>IDENT[strong]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>paːti:</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>paːti:</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
In the case of (5), the candidate violating the higher-ranked constraint is actually the winner, and our OT grammar falls apart. Some might argue that the appearance of alveolar stop + high vowel sequences anywhere in the lexicon means that our analysis should omit the stop $\rightarrow$ palatal affricate alternation of alveolars. They would argue that because /t/ now contrasts with /tᶝ/ before any vowel, the alternation no longer exists and is relegated to the history of Japanese. If this is the case, the correct UR in (4) must be /matᶝ + i + masu/, with a different underlying stem than that of other inflectional forms such as /mat + ana + i/ ‘wait-NEG-PRES’.

As Ito & Mester (2001) argue, there is good reason to avoid this strict distributionalist interpretation of the data. First, it is unclear that the claim that palatalization of alveolar stops is no longer a productive generalization buys any useful predictions. Other than the appearance of foreign words like [paːtiː] ‘party’, [tiː] ‘tea’, and [diŋgo] ‘dingo’, there is little evidence that productive derivation ceases. The alternation remains robust and obligatory in the verbal morphological system, and as Japanese verbs are a closed class it is difficult to draw conclusions about productivity from a wug test. Additionally, the strict distributionalist interpretation risks defining the concept of a “productive generalization” so restrictively as to severely reduce its usefulness (because only those processes that are absolutely exceptionless are seen as psychologically real). I find Ito & Mester’s (2001) argument compelling, and I consider the implications of that study in §2.1.

Others might argue that this specific conflict represents a restriction of the assibilation
process to interactions across a morphological boundary. This might ultimately be the most appropriate analysis of the Japanese data, but it is certain that plenty of ill-formed structures represent true conflict between constraint rankings. The appearance of a totally new sound, for example, cannot be explained away by the morphophonological domain of the process. The case of White Hmong polysyllabic loans is an unavoidable example of overt conflict. In White Hmong, native morphemes are always monosyllables (a fact which must be enforced by a high-ranking markedness constraint), and yet polysyllabic English words like *Pepsi* are not reduced to monosyllables (Golston & Yang, 2001).

This is the problem posed by ill-formed loanwords; regardless of how elegantly our linguistic theory can explain the adaptations that make borrowings well-formed, that theory must also grapple with the fact that languages can tolerate ill-formed loans. In this paper I address the puzzle of ill-formed loans and seek to build an integrated model of loanword adaptation that makes useful predictions about the conditions for the appearance of ill-formed loans and elaborates the theoretical and typological consequences of that model.

## 2 OT formalizations

Among the most important consequences of considering ill-formed loanwords must be the rejection of a straightforward and universal phonology-only model of adaptation like that elaborated in Jacobs & Gussenhoven (2000). If loan adaptations are best explained as
the consequence of processing a non-native word within the L1 phonological grammar, we should never predict the kind of incomplete adaptations characteristic of ill-formed loans. As we saw in (5), ill-formed loans are definitionally non-optimal with respect to the L1 constraint ranking. Even if one adopts the strict distributionalist approach to keep native and loan forms under the domain of a single constraint ranking, the phonology-based model still fails to consistently explain loanword adaptations. This is because when a foreign form is allowed to freely restructure the native grammar, yet still exhibits certain adaptations conforming to L1 constraint rankings, the phonology-only model cannot predict or explain the coexistence of adapted and unadapted structures.

On the other hand, one might argue that ill-formed loans are best treated as a class of unexplainable exceptions and maintain that adaptation of well-formed loans is a phonological effect. This would mean artificially constraining the definition of loanword adaptation such that only the convenient data is theoretically real and worthy of analysis, which I do not believe is a useful method. When we take seriously the challenge of explaining ill-formed loanwords alongside those that are well-formed, we must admit that L1 UR → SR mapping cannot adequately explain the observed patterns of adaptation in lexical borrowing.

As we will see, many theorists working in OT have argued for various phonological mechanisms that might account for the lexical split between native words and well-formed loans on the one hand and ill-formed loans on the other. However, upon consideration
it is clear that none of these approaches truly explain partial nativization (resulting in ill-formed loan forms) as a function of the L1 grammar. In effect they divide the phonological grammar into multiple lexically-specific sub-grammars to produce the observed results, but none can explain the diachronic appearance of a loan-specific sub-grammar as an effect of phonological processing.

In this section I consider some previous proposals for handling variation within the lexicon and explore their consequences for ill-formed loanwords.

2.1 Lexical stratification

One of the simplest possible workarounds for Optimality Theory to avoid the formal inconsistency posed by ill-formed loanwords is to propose that the grammar treats loanwords differently than native words. Ito & Mester (2001) make such a proposal in the form of what they call stratal faithfulness constraints. In this version of parallel OT, faithfulness constraints can have multiple rankings, each corresponding to a different subset of the lexicon, which could differentiate loans from native vocabulary. They further associate the stratification of the lexicon to differentiation between an abstract “core”, which is defined by adherence to all markedness constraints that are active in the language, and a lexical “periphery”, which is defined by deviance from certain markedness constraints active in the core. They predict that most, but not necessarily all, loanwords are likely to be peripheral, or to have peripheral variants.
To return to the example of alveolar stop assimilation in Japanese, this native-loan split could be modeled with contrasting rankings for IDENT[\text{strident}]-A and IDENT[\text{strident}]-B, given in (6), where the former assigns violations only to native Japanese words and the latter only to foreign loans.

(6) a. \text{IDENT[\text{strident}]-B} \gg *T[+\text{high}] \gg \text{IDENT[\text{strident}]-A}
   b. \text{IDENT[\text{strident}]-X}: Assign one violation for each alteration to the value of [±\text{strident}], if the input is of lexical stratum X.

This ranking would select the correct optimal candidates for loans like [paːti:] ‘party’ and verbs with stem-final /t/:

(7) a. \begin{tabular}{|c|c|c|}
  \hline
  patti: & \text{IDENT[\text{strident}]-B} & *T[+\text{high}] & \text{IDENT[\text{strident}]-A} \\
  \hline
  a. [p̥ɔ̞] patti: & & * & \\
  b. [pɑ̃tiː] & & ! & \\
  \hline
\end{tabular}

b. \begin{tabular}{|c|c|c|c|}
  \hline
  mat+i+masu & \text{IDENT[\text{strident}]-B} & *T[+\text{high}] & \text{IDENT[\text{strident}]-A} \\
  \hline
  a. matimasu & & * & \\
  b. [m̥a̞t̥i̞masu] & & & * \\
  \hline
\end{tabular}

This approach is promising for offering a phonological solution to modeling the coexistence of ill-formed loanwords and the native phonology. It is also promising that Ito & Mester (2001) use stratal faithfulness constraints to accurately describe German loanwords with variants that differ in degree of nativization, among other phenomena. Additionally, an internally-complex lexicon that projects speakers’ knowledge of variation onto the phonological grammar is supported by Becker’s (2009) work on lexical trends and
exceptions (discussed in §3.1).

Ultimately, I argue that Ito & Mester (2001) are correct in their basic proposal that the phonological grammar must tolerate co-existing conflicting constraint rankings in order to account for ill-formed loanwords. However, our understanding is greatly enhanced by interrogating the consequences of this model with a focus on how such conflicting constraint rankings are initially learned as a part of the borrowing process. In §3, this investigation also leads us to adopt a model in which adaptation occurs during perception.

2.2 Output-Output Correspondence

Of those linguists who have taken an explicitly hybrid perception-phonology theory of loanword adaptation, Smith (2006) stands out as one of those who has taken care to explore and explain the differences between loanword adaptation and native grammatical processes. Smith gives a study of Japanese loanword doublets (foreign words that have produced two distinct loan forms) that supports phonological and perceptual effects. For example, she cites the loan doublet in (8) to argue for adaptation processes occurring by both perception and phonological processing.

(8) Japanese loan forms from English [dᵻ.rᵻ.bɑɡ] jitterbug: (Smith, 2006)
   a. [dᵻrᵻ.bɑɡ] (deletion by perception)
   b. [dᵻtᵻ:bɑɡɡu] (insertion by production)

Key to Smith’s argument is the role that extra-linguistic (or rather para-linguistic)
factors such as orthography can play in the perception process. She claims that deletion forms like (8a) most likely represent borrowing under conditions where the primary medium of contact was auditory (i.e. spoken English). She also argues that “standard” epenthesis forms like (8b), which retains and geminates coda [ɡ], represent a class of loans that were primarily borrowed from written English. If this is the case, then the epenthetic vowel in the final syllable [ɡɯ] must have been inserted by the phonological grammar, as knowledge of the written English form *jitterbug* should block the misperception of any final vowel.

From this observation, Smith elaborates a version of OT meant to account for faithfulness to perceived source language forms. This proposal makes use of output-output correspondence (OOC) theory of (Benua, 1997). OOC (or OO-Faith) constraints are non-classical additions to Optimality Theory that evaluate output candidates based on their faithfulness to another phonetic form rather than to an input form. These constraints are motivated by apparent faithfulness between morphologically-related forms to explain phenomena of morphological paradigms, opacity, reduplication, etc. Smith takes this framework and proposes a correspondence relationship between loanword output candidates and the perceived source language form (or percept). This percept is the source language output form as perceived by a borrowing language speaker, and in Smith’s formulation it is only relevant to the processing of loanwords. This framework can therefore include effects of perceptual filtering into the functioning of OT phonological process-
ing. The difference between classical input-output faithfulness constraints and Smith’s proposed OOC constraints is summarized in (9).

(9) a. $S_1S_2$-FAITH: Enforce Faith for elements in correspondence between $S_1$ and $S_2$
   b. INPUT-OUTPUT correspondence (IO-FAITH): $S_1$ is the input (UR), and $S_2$ is the output (SR).
   c. SOURCE-BORROWING correspondence (SB-FAITH): $S_1$ is a perceived source language form (percept), and $S_2$ is the borrowed output (SR).

See (10) below for an example of how Smith uses this proposal to derive different illicit consonant cluster repairs for native and borrowed words. The percept form is given in brackets after the UR, if it exists.

(10) (Smith, 2006)

a. Deletion in native Japanese /jom + sase/ ‘read-caus’

<table>
<thead>
<tr>
<th>jom + sase &lt; ∅</th>
<th>CODACond</th>
<th>SB-Max</th>
<th>SB-Dep</th>
<th>IO-Dep</th>
<th>IO-Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. jom.sa.se</td>
<td>!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. jo.mV.sa.se</td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td></td>
</tr>
<tr>
<td>c. be.su.to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>!</td>
</tr>
</tbody>
</table>

b. Epenthesis in loan [be.sɯ.to] ‘best’:

<table>
<thead>
<tr>
<th>best &lt; [best]</th>
<th>CODACond</th>
<th>SB-Max</th>
<th>SB-Dep</th>
<th>IO-Dep</th>
<th>IO-Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. best</td>
<td>!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. be.sɯ.to</td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>c. be</td>
<td></td>
<td>!</td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

c. CODACONDITION: Assign a violation to each syllable-final consonant specified for PLACE.

Here we see that Smith’s proposal accommodates conflicting rankings of the same constraints by invoking different correspondence relationships. Dep must be ranked above
Max to reliably delete illicit codas in native words, but the opposite ranking must hold for loans, because epenthesis is the preferred repair strategy. By adding the percept source form as a lexicalized element of the input for loanwords and adding SB-Faith constraints that enforce faithfulness to that percept, Smith creates the necessary dual rankings of Max and Dep to account for the data.

Example (11) attempts to implement Smith’s model for the problem of ill-formed Japanese loans of the same type as [parti:] ‘party’.

\[(11)\]
\[
\begin{array}{|l|l|l|l|}
\hline
& p\text{art}i: < \text{[parti]} & \text{SB-IDENT[\text{strident}]} & \text{^T[+high]} & \text{IO-IDENT[\text{strident}]} \\
\hline
\text{a.} & \text{[parti]} & & * & \\
\text{b.} & \text{part}'i: & *! & & * \\
\hline
\end{array}
\]

\[
\begin{array}{|l|l|l|l|}
\hline
& \text{mat+i+masu} < \emptyset & \text{SB-IDENT[\text{strident}]} & \text{^T[+high]} & \text{IO-IDENT[\text{strident}]} \\
\hline
\text{a.} & \text{matimasu} & & *! & \\
\text{b.} & \text{mat\text{`imasu}} & & * & \\
\hline
\end{array}
\]

Based on Smith’s assertion that phonetic assumptions made on the basis of English orthography influence most modern Japanese loans, I assume a source language percept form of [parti]; though [ti] is the only relevant sequence. Just as with Max and Dep, we can use this proposal to derive the observed difference between native and loan vocabulary. Because Smith leaves open the questions of perception and UR-formation, it is unclear whether we would expect to find any borrowings whose percept form is different enough from the lexical UR to create conflict between SB- and IO-Faith constraints.
Functionally, for any given ill-formed loanword with a known source language percept, it remains unclear how exactly the explanation given by Smith’s (2006) model would differ from that given by Ito & Mester’s (2001) stratal faithfulness model. When we compare (11) with (7), it seems that one proposal could be substituted for the other, with the only differences being the formal notation. In each proposal there is a loan-specific faithfulness constraint that must dominate the relevant markedness constraint, which in turn dominates a non-loan version of the same faithfulness constraint. The two proposals might appear to differ in their orientation towards perception, but both actually allow for perceptual effects prior to phonological processing. In the lexical stratification model (Ito & Mester, 2001), effects from perception might still be included as a process occurring before the formation of the loan UR. For Smith (2006), perceptual effects are expected, but because they occur during formation of the percept form, they are not formalized as a product of the OT grammar itself. Both proposals seek to formalize adaptation within phonological processing, but also allow for perceptual effects.

However, OO-Faith constraints as presented by Smith lead to some problematic predictions. The OO-Faith model would lead us to assume that any loan for which learners fail to identify a source language form should assimilate to the patterns of the native vocabulary. This is because the presence of a source language percept is the only formal predictor of a word’s behavior. Stated another way, this proposal predicts that conflicting constraint rankings can only be maintained as long as users of the borrowing language are aware of
the foreign origin of the word. This prediction is undesirable because it expects that every English word with [ʒ] should instead be assimilated to the sound system of English as it was before the influence of Norman French. This sound only appears in loanwords, yet no English speaker today needs to perceive some non-native token for *treasure* in order to reliably produce [ʒ]. It is clear that our theory of ill-formed loanwords should not demand conscious knowledge of foreign linguistic forms to prevent full nativization.³ Rather, they are clearly learnable by monolingual speakers.

Smith’s investigation gives us reason to consider the possibility of perceptual and grammatical processes within a single model of loanword adaptation, and I believe she is right to identify that ill-formedness in loans arises from faithfulness to non-native structures. However, I am not convinced that her proposed OO-Faith constraints represent a useful OT formalization, considering their undesirable predictions.

### 2.3 OT and diachrony

Both of the two proposals discussed in §2.1 and §2.2 succeed in providing mechanisms for accommodating conflicting constraint rankings within the same grammar. I have established in §1.2 that this is a necessary addition to classical OT if we are to correctly derive the partial nativization patterns of ill-formed loans. However, simply because stratal faith-

³It is worth noting the differences between the English and the Japanese cases. Appearance of English [ʒ] in loans but not in native words does not necessarily imply the same kind of grammatical conflict between the native and borrowed sublexicon that complementary vs. contrastive distribution implies. Perhaps we need to further analyze the category of ill-formed loanwords to account for these differences. See §4 for further discussion.
fulness constraints or output-output faithfulness can derive the desired outcome does not mean either proposal provides a full picture of ill-formed loanwords as a historical process. In fact, one may be led to incorrectly assume that ill-formed loanwords can be subsumed under a phonology-only approach to loanword adaptation, when in fact this is an illusion. In order for an OT analysis to be plausible, we must understand how the crucial constraint rankings are learned. In this case, the constraint rankings that are particular to ill-formed loans cannot have existed before the appearance of the words they govern, because the native lexicon does not motivate language users to learn them. In the Japanese example, this means that the ranking IDENT[\text{strident}] \succ \text{\text{‘T}}[+\text{high}] cannot be learned from exposure to the native Japanese and Sino-Japanese vocabulary alone; the only ranking learnable before the appearance of loans like [\text{patic}] is the reverse.

This leads us to understand that when we investigate the incomplete nativization of loanwords in OT, we are investigating a process of phonological learning: the accommodation of new constraint rankings. So, we must ask how competing constraint rankings are learned by adult language users in a situation of language contact. In the next section, I introduce and summarize Becker’s (2009) constraint cloning extension of Tesar & Smolensky’s (1998) Recursive Constraint Demotion algorithm (§3.1), and explain how that proposal is well-equipped to model ill-formed loans.
3 Language learning and ill-formed loans

I argue that the creation of ill-formed loanwords represents a process of language learning, and I look to previous research on language acquisition in OT to formalize this idea: that partially assimilated or un-assimilated loans only come about through the acquisition of foreign constraint rankings.

3.1 Constraint cloning

Becker (2009) problematizes lexical trends and exceptions such as the morphological difference in (12) within OT.

(12) English regular and zero-derived past tense verbs:
   a. /ɡaɪd+d/ → [ɡaɪdɪd] (‘guide-pst’)
   b. /sprɛd+d/ → [sprɛd] (‘spread-pst’)

So-called “regular” verbs like that in (12a) express an overt suffix that includes an epenthetic vowel in the case of a /d/-final root. Other verbs ending in /d/ or /t/ like spread in (12) have no suffix in the past tense output. Rather than dismiss that last category as “irregular” with respect to the phonology of the past tense suffix /d/, Becker (2009) argues on the basis of experimental evidence from Turkish and Hebrew that these differences should be treated as a learned constraint ranking.

To accomplish this, Becker describes a constraint cloning algorithm that fits within a theory of OT constraint ranking acquisition originally formalized by Tesar & Smolensky
(1998) called Recursive Constraint Demotion. Becker first explains how the data in (12) does not represent a learnable language under Tesar & Smolensky’s (1998) algorithm because \textit{guided} requires that the constraint ranking $\text{MAX} \gg \text{Dep}$ be installed in the grammar at the same time that \textit{spread} requires the addition of $\text{Dep} \gg \text{MAX}$. Then, he argues that the way learners deal with this data is not to pick one “regular” ranking to install in the grammar and lexicalize the other, but rather to clone one of the two relevant constraints, give it a new ranking, and associate each clone with a list of words in its domain.

In this case, the result is a grammar with the ranking $\text{MAX-guid} \gg \text{Dep} \gg \text{MAX-sprɛd}$, which produces the OT tableaux in (13):

<table>
<thead>
<tr>
<th></th>
<th>\text{gaɪd+d}</th>
<th>\text{MAX-gaɪd}</th>
<th>\text{Dep}</th>
<th>\text{MAX-sprɛd}</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>\text{gaidid}</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>\text{gaɪd}</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>\text{spɛrd}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>\text{spɛrid}</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>\text{spɛrd}</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Becker’s proposal has the advantage of being independently motivated by phenomena of lexical statistics like the tendency of speakers to generalize to novel forms based on the frequency of sound shapes in their lexicon. For example, in the case of English past tense verbs, speakers will prefer to generalize based on more frequent patterns like that of \textit{guided}, but the result is not winner-takes-all. Rather, speakers generalize based on
the frequencies of both “regular” and “irregular” lexical trends. Becker’s approach allows us to formalize this frequency information by including in our phonological grammar the lexical items that are listed by each cloned constraint. Every time a new word is learned for which the cloned constraint is decisive, it is learned as a member of the appropriate list, so blinded, sounded etc. are listed under Max-gaidd but cut, shed etc. are listed under Max-spreッド. When a speaker generalizes to a novel word, Becker (2009) argues that they access a word at random from like words in the lexicon and treat the novel form as if it should pattern with the selected word. This is how speakers make stochastic generalizations to new forms: by indirectly reproducing the relative size of each list associated with a relevant constraint’s clones.

I claim that this framework is well suited to the problem of ill-formed loanwords because these borrowings also represent conflicting lexical trends. If we assume that constraints can still be cloned in the adult language (after the crucial period of L1 acquisition), then initial loanword formation may involve the learning of new constraint rankings through this cloning process. This approach has the benefit of providing not only a mechanism for producing ill-formed loanwords in synchronic OT but also providing a mechanism that can explain their diachronic emergence in the language. In fact it could be the missing link between an OT workaround for ill-formed loans like Ito & Mester’s (2001) stratal Faithfulness constraints and a theory of how these borrowings avoid full nativization during learning.
In my analysis, ill-formed loanwords are the product of language learning, where data that conflicts with the L1 constraint ranking is accommodated rather than adapted. Accommodation occurs through acquisition mechanisms capable of producing lexically-specific constraint rankings such that the resulting loanword represents a new lexical trend. Further, a learner newly acquiring their L1 does not need to know the diachronic origins of an ill-formed loanword in order to preserve foreign structures. Instead they are able to accommodate conflicts between native and non-native lexical trends just as they do for grammatical conflicts appearing between native words. However, I do not mean that native and non-native lexical trends are always on equal footing. In fact, I suspect that lexical trends based on ill-formed loanwords might be given lower weight in frequency-based generalization when those trends are consciously known to be of foreign origin.

The question now is how we build a theory of language processing that makes useful predictions about the conditions allowing for the appearance of ill-formed loans and the patterns of ill-formedness and well-formedness that we observe in loanwords. It is clear that one of the challenges that a successful theory must overcome is the fact that the kind of second language learning that allows for the appearance of many ill-formed loanwords is a partial or imperfect kind of learning. This is because ill-formed loanwords demonstrate a robust tendency to adapt to the host language grammar in various ways even while maintaining certain marked, non-native structures. For example, the Japanese
[ti:ca.tʰɯ] < Eng. *T-shirts might be ill-formed with respect to *T[+high], but it still shows adaptation to the native Japanese grammar as seen in (14) below.


<table>
<thead>
<tr>
<th>English</th>
<th>Japanese</th>
<th>Adaptation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [ti]</td>
<td>[ti]</td>
<td>none</td>
</tr>
<tr>
<td>b. [i]</td>
<td>[iː]</td>
<td>[V,+tense] → [V,+long]</td>
</tr>
<tr>
<td>c. [ʃ]</td>
<td>[ɕ]</td>
<td>segment adjustment</td>
</tr>
<tr>
<td>d. [ɾ]</td>
<td>[a]</td>
<td>segment adjustment</td>
</tr>
<tr>
<td>e. [ts]#</td>
<td>[tʰɯ]</td>
<td>segment reanalysis, resyllabification, epenthesis</td>
</tr>
</tbody>
</table>

As such, the theory I elaborate here is one that includes concepts of universal phonetic salience as well as language-specific perceptual biases, both of which require independent motivation and rigorous definition.

3.2 Towards a perception-learning model of loanword adaptation

Several theoretical implications follow from a model in which ill-formedness in loans represents the learning of lexically-stratified constraint rankings. As will be shown, this approach leads us to consider the possibility that observed adaptations in loanwords are produced by perceptual biases rather than the direct grammatical demands of phonology. This is because the model does not naturally allow a pathway for ill-formed loanwords to be adapted during phonological processing, and therefore demands that adaptations in this class of loanwords be motivated by perceptual effects (or by faulty speech production, which cannot be fully ruled out; see §3.3). If the category of ill-formed loanwords can
independently motivate a perceptual model of adaptation robust enough to explain the full
typological range of adaptations across loanwords in general, the addition of a phonology-
adaptation process for well-formed loanwords would be redundant and undesirable.

The premise of this model is that the OT grammar can support phonological trends that
are lexically partial through the acquisition of alternate constraint rankings. Following
Becker (2009), I claim that constraints are cloned (i.e. alternate rankings are established)
when the learning mechanism is presented with data that cannot be optimal under the
existing grammar. Our point of departure here is the novel application of this learning
mechanism to the study of loanword adaptation. Ito & Mester (2001) have already argued
for the usefulness in analyzing ill-formed loanword phenomena as evidence for phono-
logical generalizations applying over subsets of the lexicon rather than being necessarily
universal. This approach is one way to explain how those differentiated phonologies ap-
pear in a language.

The learning model elaborated here assumes that adult language users, who must be
able to borrow and adapt loanwords, can engage in phonological learning using the same
constraint cloning mechanism that is theoretically motivated for L1 acquisition. How-
ever, we do not expect adults to continue phonological learning exactly as children do.
Rather, we understand that an adult speaker differs from a child speaker in at least one
key respect: the development of a phonetic decoding module. When children and infants
begin to acquire language they can perceive the full range of phonetic category distinc-
tions available to human language. Additionally, they are capable of learning any attested phonological grammar—in OT, this means any constraint ranking is possible. In contrast, by 6 months to a year of age, language learners have established a perceptual bias in favor of those category distinctions relevant to the L1. Further, mature language users have difficulty perceiving unattested or non-distinctive suprasegmental or phonotactic patterns under the conditions of real time speech processing (Peperkamp & Dupoux, 2003). This means we predict that adult phonological learning will differ from child L1 acquisition by the limiting influence of language-specific perceptual bias. I argue that the appearance of ill-formed loanwords is evidence of adult learning in spite of L1 perceptual bias. In this model, children learn the new “non-native” constraint rankings with the same learning algorithm, but without the influence of any language-specific perceptual bias on the input.

It also follows from this framework that, because speakers can form lexically-specific constraint rankings even after L1 acquisition, loanword adaptation occurs before phonological learning. That is, it occurs during perception as a function of language-specific processing biases, what Peperkamp & Dupoux (2003) and others have called a phonetic decoding module. This is the speech processing module that maps a continuous acoustic signal onto a phonetic surface representation made up of discrete segments. Peperkamp & Dupoux (2003) argue for a phonetic decoder that maps input acoustic cues onto the closest native phonetic category, and argue that the mapping produces not only native segments but native suprasegments and syllables. Here, which category is “closest” to a
given input signal is defined as an empirical question of articulatory gestures and/or perceptual similarity. This is the basis of their model of perception as the sole mechanism for loanword adaptation, even including epenthesis and suprasegmental adjustment. Below is a summary of this perceptual model:

(15) Perception of a non-native word (Peperkamp & Dupoux, 2003)
   a. **Source language input**: acoustic signal
      Ex. Continuous acoustic signal corresponding to English [ˈsɪlvɹ̩] silver
   b. **Phonetic decoding module**: acoustic signal → SR
      Ex. English [ˈsɪlvɹ̩] → [ɕiɾɯ.baː]
   c. **Phonological decoding module**: SR → UR
      Ex. [ɕiɾɯ.baː] → /ɕɪɾɯbaː/

It should be noted that, under Peperkamp & Dupoux’s (2003) theory, the phonological decoder (15c) does not play a role in adaptation because the phonetic decoder (15b) is hypothesized to output a fully assimilated SR that will not be changed in the following SR → UR → SR mapping. The inclusion of ill-formed loanwords obviously represents a departure from this strict model, as they may variably preserve non-native segments, suprasegments, and syllables. I argue that ill-formed loans are the product of language-external interference in the regular functioning of the borrower’s phonetic decoder. This interference represents the condition for collective phonological learning, and could arise from some mix of the following:

(16) Potential factors of perceptual interference
   a. bilingualism
   b. long-term exposure to the sounds of source language
c. awareness of orthographic-phonetic patterns
d. formal education
e. high-prestige status of the source language

These social and linguistic factors are hypothesized to all (partially) counteract the regular functioning of a phonetic decoding module that in the absence of any factors of perceptual interference will output only SRs that are optimal under the native grammar. Take for example the appearance of voiced geminate consonants in Japanese loanwords from English. English word-final singleton obstruents often become geminates in Japanese when preceded by a lax vowel in the source form (tense vowels tend to produce loan singletons; Kaneko & Iverson (2009)). The perception model of adaptation explains this as a process of mapping the English acoustic signal onto the closest native Japanese phonetic categories.

(17) Phonetic and phonological decoding of English hit $\rightarrow$ hitto⁴ in Japanese:

<table>
<thead>
<tr>
<th>Signal</th>
<th>SR</th>
<th>UR</th>
</tr>
</thead>
<tbody>
<tr>
<td>[hit]</td>
<td>[hi+t.to]</td>
<td>/hi+t.to/</td>
</tr>
</tbody>
</table>

(Phonetic Map) (Phonological Map)

The Japanese hitto is well-formed because it is optimal according to constraints on native Japanese words such that codas only consist of nasals or the first half of a geminate

⁴The default epenthetic vowel in Japanese loans is [ɯ], and experimental evidence supports the claim that the Japanese phonetic decoder reliably mis-perceives this “illusory” vowel when presented with illicit codas (Dupoux et al., 1999). The quality of the epenthetic vowel [o] after alveolar stops can be explained with the same mechanism, where the phonetic decoder produces native syllables. [tui] and [dui], though they appear in some newer ill-formed loans, are not native syllables, and therefore will not be inserted by the phonetic decoder.
voiceless stops. In contrast, a new class of ill-formed loans has entered Japanese in recent decades that includes voiced geminate obstruents. An example of such a word is \textit{beddo} from English \textit{bed}. In this case, my analysis is that some combination of formal English education and awareness of English orthographic sound correspondences interfered in the phonetic decoding of English [\textit{bed}]. The result of decoding under interference was that the closest phonetic approximation discernible to the Japanese borrower was [\textit{be}^	ext{d.do}]—which contains a non-native syllable—instead of the well-formed variant [\textit{be}^	ext{t.to}] or untested but well-formed possibilities like *[\textit{be}^	ext{d.do}] or *[\textit{be}].

The attestation of a competing well-formed variant of any given ill-formed loanword is not only common, but a prediction that follows from our model. Since the appearance of ill-formed loans is contingent on a borrowing population having access to the kind of experience that interferes with the nativizing effect of language-specific processing bias, it is to be expected that that experience is not equally distributed across the entire speech community. When a speaker without such experience encounters either the source word or the ill-formed loan, they are expected to perceive an SR that could be an optimal candidate under their pre-existing phonological grammar, thus learning a well-formed variant. Once distinct variants are formed, future generations can learn any one or more of these variants without issue, and over time many socio-linguistic outcomes are possible.

\footnote{The downstep symbol (\textsuperscript{1}) marks Japanese pitch accent where it is relevant. Japanese words can have one accented mora, after which all morae are low tone. The downstep symbol immediately follows this accented mora.}
Variants may fall out of use, persist in competition with others, enter free variation, be affected by prescriptive norms, become associated with specific social groups, etc.

When the phonetic decoder produces an SR that cannot be optimal under the speaker’s native grammar, as was the case for words like *beddo* when they first appeared in Japanese, the phonological decoder does not simply record a faithful UR like /beˈddo/. Since OT allows no constraints on the input, learning /beˈddo/ without changing the phonological grammar will not allow for the selection of [beˈd.do]. This is because of the high-ranking markedness constraint *DD prohibiting voiced geminates for the native vocabulary. This means that phonological learning via Becker’s (2009) constraint cloning algorithm must occur as a constituent function of the phonological decoding module, crucially before UR → SR phonological processing.

### 3.3 Speech error adaptations

A reasonable counterargument to the perception-learning model I have proposed here might be that it is possible for loanword adaptations to arise during error-prone speech production. Under this approach, even if a UR → SR mapping under the new phonological grammar preserves certain ill-formed sounds or patterns, a speaker may still fail to produce the optimal SR during speech production due to lack of familiarity with the foreign sounds, contrasts, syllables, etc. So, one might propose a theory of loanword adaptation in which faulty speech production is the only locus of adaptation, or one in which perception
and speech errors constitute co-existing sources of adaptation.

The approach in which all adaptations come from speech errors makes certain predictions about which new constraint rankings are formed by initial borrowers of ill-formed loans. For example, in her explanation of Japanese loan doublets, Smith (2006) claims that influence from English orthography prohibits the perceptual insertion of segments beyond those directly suggested by the written English form. Under her analysis, the final vowel of *jittaabaggu* ‘jitterbug’ must be inserted after orthographic decoding (which takes the place of phonetic decoding), because there is no final vowel in English *jitterbug*. By this logic, I would argue then that the gemination of *[g]* must also occur after phonetic/orthographic decoding, because the written English form gives no indication of a doubled or long consonant. Thus the decoded SR would be *[dit.taːbaɡ]*, and under our learning model this is the form that an initial borrower submits to the phonological learning mechanism. The UR then would be */dᶽittaːbaɡ/*, and constraint cloning is employed to reconcile the existing constraint ranking with the new data. In this case the active markedness constraint violated by the mapping of */dᶽittaːbaɡ* → *[dᶽit.taː.baɡ]* is not *DD but CodaCondition.*

If this is the case, why is *DD the constraint that is violated in observable ill-formed loan forms rather than CodaCondition? There is no evidence that either one of these markedness constraints is ranked lower than the other in the absence of loans like *beddo*. For speech errors to be the cause of this adaptation there must be some hierarchy of rela-
tive articulatory difficulty that can explain why one unfamiliar phonetic form is regularly producible in preference to another that is not. Therefore this approach demands a supporting theory of the limitations of speakers to accurately produce grammatically-selected SRs. For this example, such a theory must explain why D.DV sequences would be more easily produced than coda D for a Japanese speaker who has underlying UR /D/ but no experience producing either coda D or D.DV.

The speech error approach leads to the expectation that non-initial borrowers adopt URs and constraint rankings reflecting the words as they are actually produced by initial borrowers. So even though an initial borrower may have adapted jitterbug as /dᶽitaːbag/ → [dᶽit.taː.baɡ], if they reliably produce [dᶽit.taː.baɡ.ɡɯ], secondary borrowers without access to the English form have no reason to “correct” this error. So through transmission from initial borrowers to secondary borrowers (including L1-acquiring children), the adapted forms /dᶽitaːbagɡɯ/ → [dᶽit.taː.baɡ.ɡɯ] (and thus the lexical trend of *DD deactivating in loans) might spread in use.

4 Typology and future research

The model of loanword adaptation hypothesized in this paper leads us to consider the possibility of a new kind of typology at the intersection of phonology, phonetics, historical linguistics, and socio-linguistics. This typology is that of cross-linguistic phonological contact through ill-formed loanwords. Our hypothesis is that ill-formed loanwords arise
only under the social conditions necessary for linguistic knowledge (be it accurate or distorted) to cross language boundaries otherwise maintained by perceptual bias, isolation, or monolingualism. The next step is to explore the typology of ill-formed loans and the social conditions of their passage from source to borrowing language that allowed for phonological learning.

The extent of bilingualism is one obvious starting point for this investigation. Perhaps in fully bilingual communities the perception-only model of loanword adaptation might be challenged, but these cases do offer the chance to test our prediction that bilingualism should be a highly effective factor of interference in the normal processes of loan assimilation. Wamesa (Gasser, 2014) is one such example of a fully bilingual speech community where many loans from Papuan Malay (the universal L2) have ill-formed and well-formed variants. On the other end of a theoretical continuum we should look at highly monolingual speech communities and investigate what kinds of ill-formed loans appear, if any, and identify the alternative factors allowing for cross-linguistic learning.

Future research will also need to interrogate the empirical function and limitations of perceptual ‘deafness’ as a constraint on real-time speech processing. Special attention should be paid to problematizing and testing the language-specific nature of a “closest phonetic category” and the ability of perceptual deafness to insert syllables and force conformity to the expectations of the grammar. As we have established a model that makes key reference to phonetic similarity, it will be important to connect this approach with evi-
dence for phonetically-minimal transformation as a relevant constraint in human speech. Steriade’s (2001) Perceptual map (P-map) is one proposal that attempts to explain why certain phonological repairs are very common while other equally valid repair strategies possible under OT are not attested. The P-map is a language user’s awareness of relative differences in perceptibility of sounds and sound sequences, and it affects the grammar by projecting a ranking onto the relative faithfulness constraints. A next logical question would be how such a P-map and its corresponding phonological biases might determine cross-linguistic patterns in the perceptual biases that we argue are responsible for loan-word adaptation. The P-map could shed light on the asymmetrical nature of ill-formedness in loans, where certain highly perceptually salient structures appear to be easier to import into the borrowing language, while many less salient differences continue to be adapted.

When it comes to the application of Becker’s (2009) constraint cloning to the problem of ill-formed loans, one distinction which may prove important is that between constraint rankings with positive evidence and constraint rankings without positive evidence. By this I mean the difference between an active constraint evidenced by some alternation (e.g. Japanese *T[+high]) and an active constraint whose ranking is inferred from a lack of evidence to the contrary (e.g. Japanese *[θ]). Under my analysis, it is clear that ill-formed loans that conflict with the first kind of constraint ranking must trigger constraint cloning. However, in the case of, say, a foreign segment appearing in a language whose native lexicon never includes that segment, it could be that the constraints are simply
re-ranked without cloning. This would mean that there is no preservation of the earlier lexical trend within the grammar through constraint cloning. Rather, the appearance of the new phone triggers a language-wide shift in the OT grammar. Further research could untangle these possibilities and lend insight into possible differences between loanwords that are ill-formed for exhibiting foreign segments compared to those that are ill-formed for violating active phonotactic or co-occurrence restrictions.

5 Conclusion

This study introduces ill-formed loanwords as a problem for loanword phonology by analyzing the previously prohibited marked structures that they bring into the borrowing language. I have shown that in OT, the expression of these new structures entails the appearance of constraint rankings that conflict with the native phonology. Drawing on arguments from Ito & Mester (2001) and Becker (2009), I argue that a holistic phonological theory should accommodate lexical trends that are valid for subsets of the lexicon rather than adopting the strict distributionalist approach consistent with classical OT.

Building on previous related work (Becker, 2009; Ito & Mester, 2001; Peperkamp & Dupoux, 2003; Smith, 2006), I have hypothesized a perception-learning model of loanword adaptation in which an adult borrower’s L1 phonetic decoding module is responsible for observed adaptations. This decoding process is predicted to mis-perceive foreign segments, suprasegments, and syllables as native ones except in those historical situations of
intense language contact or exceptional knowledge of the source language that can lead to collective phonological learning. The precise set of such historical factors is the domain of future research, but it will certainly include widespread bilingualism, formal language education and knowledge of written forms in the source language.

In this proposal, ill-formed loanwords represent the products of historical collective phonological learning, and it is predicted that situations of weaker language contact (that lack the crucial factors for learning) will not introduce stable ill-formed loans. The proposed mechanism for learning is able to accommodate and explain the differences in loan and native phonologies observed across many of the world’s languages. What remains to be tested and elaborated upon is the precise nature and power of the L1 phonetic decoder and the question of whether the phonological grammar is ever directly responsible for adaptation.

References


