Loanword Adaptation in Québec French: Evidence for Weighted Scalar Constraints

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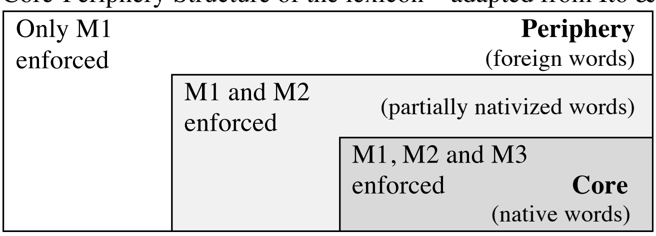
1. Introduction

A considerable body of research has demonstrated that loanwords often pattern differently than native vocabulary with respect to markedness restrictions. Most commonly, clearly "foreign" words observe a subset of the markedness restrictions obeyed by more nativized words (Saciuk 1969, Holden 1976, Paradis & Lebel 1994, Itô & Mester 1995, 1999, 2008, Paradis & LaCharité 1997, Davidson & Noyer 1997, Pinta 2013; *cf*. Jurgec 2010). This gives rise to a nested core-periphery structure like that in (1). Here, three markedness constraints – M1, M2 and M3 – are enforced within the core phonology, but only two of these are enforced among words in the intermediate stratum, and only one is enforced in the periphery. Words in the core lexicon contain a subset of the marked structures found within more peripheral strata.

(1) Core-Periphery Structure of the lexicon – adapted from Itô & Mester 2008



Japanese provides an example of this type of stratification (Itô & Mester 1995, 1999, 2008). In the Yamato (core) stratum, both the occurrence of multiple voiced obstruents within a stem and sequences of a nasal followed by a voiceless obstruent are disallowed – i.e., both OCP-VOICE and *NC̥ are enforced. In the less-nativized Sino-Japanese stratum, OCP-VOICE is still enforced, but sequences of a nasal followed by voiceless obstruent are admitted. Finally, among recent loanwords in the Foreign stratum, violations of both OCP-Voice and *NC̥ are allowed. This gives rise to two asymmetric implicational patterns. If a nasal + voiceless obstruent sequence is repaired in a stem, multiple voiced obstruents within the same stem will also be repaired. Likewise, if multiple voiced obstruents are permitted within a stem, nasal + voiceless obstruent sequences will also be permitted.

While the Japanese lexical strata have a clear etymological origin, implicational patterns are evident in the adaptation of loanwords in other cases as well. This paper considers one such case from Québec French, arguing that the most parsimonious account of the data relies on weighted constraints, as in Harmonic Grammar (HG; Legendre, Miyata & Smolensky 1990, Smolensky & Legendre 2006), which can be subject to scaling factors. This approach allows implicational patterns to be captured without multiplying the set of Faithfulness and/or Markedness constraints, and without the need to impose metaconditions on the set of possible rankings. Furthermore, this approach allows the analysis of implicational patterns seen in loanword adaptation to be united with the analysis of implicational patterns elsewhere in phonology.

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The rest of this paper is structured as follows. Section 2 reviews Itô & Mester's treatment of loanword adaptation in Optimality Theory, and highlights the main challenges it encounters. Section 3 discusses the Québec French data in greater detail, arguing that the overall pattern is genuinely implicational. Section 4 presents the analysis of these data using weighted scalar constraints, and section 5 concludes.

2. Modeling lexical stratification in Optimality Theory

In Optimality Theory with ranked constraints, the effect of loanword classes on the repair of marked structures is typically accounted for by relativizing constraints to lexical strata. In their discussion of the core-periphery structure, Itô & Mester (1995, 1999, 2001) propose that faithfulness constraints have multiple instantiations, with each constraint indexed to apply only to morphemes of a specific lexical stratum. Individual faithfulness constraints can have as many instantiations as the number of lexical strata, and these indexed constraints can be ranked differently relative to conflicting markedness constraints.

To illustrate with a Québec French (QF) example, we can consider the variable adaptation of affricate [ʧ], which is adapted as [ʃ] in some loans, as in *lunch* [lɔnʃ], but realized faithfully in others, as in *batch* [baʧ] (Paradis & Lebel 1994, Paradis & LaCharité 1997). An indexed constraint analysis of this pattern posits that *lunch* and *batch* are associated with different strata, and are therefore subject to separate instantiations of the relevant faithfulness constraint.

(2) a.

/lʌnʧ/$_A$	FAITH$_B$	*ʧ	FAITH$_A$
lɔnʧ		*!	
☞ lɔnʃ			*

b.

/bæʧ/$_B$	FAITH$_B$	*ʧ	FAITH$_A$
☞ baʧ		*	
baʃ	*!		

On this account, the implicational nature of the core-periphery structure follows from the interleaving of the indexed faithfulness constraints with a single, language-specific ranking of markedness constraints. In QF, this can be seen in the relationship between the voiceless palato-alveolar affricate [ʧ] and the rhotic [ɹ]: if [ʧ] is repaired in a loanword, the rhotic [ɹ] must also be repaired, but not vice versa (Roy 1992, Paradis & Lebel 1994). Attested nativizations of English words that contain both segments, such as *scratch* [skɹaʧ], illustrate this pattern. QF speakers permit nativizations that repair both segments [skʀaʃ], only the rhotic [skʀaʧ], or neither segment [skɹaʧ], but not nativizations that repair only the affricate while realizing [ɹ] faithfully *[skɹaʃ]. Given a *ɹ >> *ʧ markedness ranking, the three attested adaptations can be analyzed as belonging to separate lexical strata, whose corresponding indexed faithfulness constraints are ranked differently relative to markedness constraints in a single ranking. No ranking produces the impossible nativization *[skɹaʃ].

(3) Rankings for attested adaptations of *scratch* in QF

a. Ranking for [skʀaʃ]

*ɹ
|
*ʧ
|
FAITH$_A$

b. Ranking for [skʀaʧ]

*ɹ
|
FAITH$_B$
|
*ʧ

c. Ranking for [skɹaʧ]

FAITH$_C$
|
*ɹ
|
*ʧ

Once a broader range of faithfulness constraints are considered, however, it becomes possible to subvert the implicational nature of the core-periphery structure. For instance, non-implicational repair patterns are readily generated if individual faithfulness constraints – like FAITH-ʧ and FAITH-ɹ – are freely rerankable across lexical strata (Itô & Mester 1995, 1999, 2001). With these constraints, it is possible to generate disjunctive patterns where one structure is repaired only in a more nativized stratum, while another is repaired only in a less nativized stratum. The ranking in (4), for instance, will yield attested [skʁaʧ] in Stratum A and unattested *[skɹaʃ] in Stratum B.

(4)

/skɹatʃ/$_A$	Faith-tʃ$_A$	Faith-ɹ$_B$	*ɹ	*tʃ	Faith-ɹ$_A$	Faith-tʃ$_B$
skɹatʃ			*!	*		
☞ skʀatʃ				*	*	
skʀaʃ	*!				*	
skɹaʃ	*!		*			
/skɹatʃ/$_B$	Faith-tʃ$_A$	Faith-ɹ$_B$	*ɹ	*tʃ	Faith-ɹ$_A$	Faith-tʃ$_B$
skɹatʃ			*	*!		
skʀatʃ		*!		*		
skʀaʃ		*!				*
☹ ☞ skɹaʃ			*			*

To prevent the generation of such patterns, Itô & Mester propose that possible rankings among indexed faithfulness constraints are subject to a metacondition, Ranking Consistency, which requires indexed faithfulness to have the same rankings relative to each other in all lexical strata.

(5) **Ranking Consistency:** Let F and G be two types of IO-faithfulness constraints. There are no strata A, B such that the relative rankings of indexed versions of F and G are inconsistent with each other. If F_A >> G_A for some stratum A, there is no stratum B such that G_B >> F_B. (Itô & Mester 1999)

Ranking Consistency ensures that across strata, all repairs either become more likely or less likely to apply, ruling out disjunctive repair patterns (*cf.* Jurgec 2010). Nonetheless, this metacondition alone is not sufficient to derive the main implicational repair patterns of the core-periphery structure. Consider a hypothetical language with the following constraint rankings, where Stratum A is closest to the core and Stratum C is the most peripheral stratum.

(6) Ranking for Stratum A: *ɹ >> *tʃ >> Faith-tʃ$_A$ >> Faith-ɹ$_A$
Ranking for Stratum B: Faith-tʃ$_B$ >> Faith-ɹ$_B$ >> *ɹ >> *tʃ
Ranking for Stratum C: *ɹ >> Faith-tʃ$_C$ >> *tʃ >> Faith-ɹ$_C$

Ranking Consistency is satisfied in (6), because Faith-tʃ$_S$ >> Faith-ɹ$_S$ for each stratum S. However, both [tʃ] and [ɹ] are repaired in Stratum A, neither structure is repaired in Stratum B, and only [ɹ] is repaired in Stratum C. The repair of [ɹ] applies within non-contiguous strata.

Maintaining the implicational patterns of the core-periphery structure requires an additional ranking metacondition, such that constraints indexed to more peripheral strata consistently outrank constraints indexed to strata closer to the core.

(7)

Faith$_C$ — *Most peripheral*
|
Faith$_B$ ↕
|
Faith$_A$ — *Least peripheral*

e.g., Faith-tʃ$_C$ >> Faith-tʃ$_B$ >> Faith-tʃ$_A$
Faith-ɹ$_C$ >> Faith-ɹ$_B$ >> Faith-ɹ$_A$

This restriction ensures that if a marked structure is realized faithfully at some stratum, it will also be realized faithfully in all more peripheral strata. Likewise, if a marked structure is repaired at some stratum, it will be repaired in all less peripheral strata.[1]

[1] A co-phonology approach (see Inkelas & Zoll 2007 for an overview) where each lexical stratum has a corresponding co-grammar, and constraints are reranked across the co-grammars, encounters similar problems. Maintaining the predictions of the core-periphery structure requires positing restrictions on possible rerankings of constraints across co-grammars that are analogous to those necessary in the indexed constraint approach.

Beyond its potential to overgenerate, the indexed constraint approach also faces learnability challenges. Each case where the repair of a Structure A asymmetrically implies the repair of a Structure B requires positing two constraint strata, with no principled upper bound on the number of strata in a given language. This raises the question of how learners come to acquire the appropriate number of constraint strata for their language, since the strata necessary to generate the full range of implicational patterns among repaired structures do not always correspond to clearly-defined etymological classes – a situation observed in QF (Paradis & Lebel 1994, Paradis & LaCharité 1997) and Guaraní (Pinta 2013). In the absence of any independent grounding, determining the number of constraint strata requires learners to attend directly to implicational repair patterns, even though relevant evidence is often limited. A more plausible learning approach would be one in which implicational patterns are inferred from the rankings of constraints independently required within the target grammar, but it is unclear how this is possible within the indexed-constraints approach.

3. Evidence for implicational patterns in Québec French

Québec French has borrowed numerous words from English over the course of its history, including many that contain structures which are historically absent from QF (Picard & Nicol 1982, Picard 1983, Walker 1984, Roy 1992, Paradis & Lebel 1994, Paradis & LaCharité 1997). Examples of the structures considered here are given in (8); all data are from Roy's (1992) corpus of English loanwords in QF.

(8)

a. Palato-alveolar affricates [ʧ, ʤ]
   [fʀɛnʃkɪs] *frenchkiss*
   [lɔnʃ] *lunch*

b. English [ɹ]
   [ʀoːsbiːf] *roastbeef*
   [pʀajməʀ] *primer*

c. Interdental fricatives [θ, ð]
   [daːtsɪt] *that's it*
   [tʀɪl] *thrill*

d. Velar nasal [ŋ]
   [fɪlɪɲ] *feeling*
   [gaɲ] *gang*

e. Glottal fricative [h]
   [ambəʀgəʀ] *hamburger*
   [aʃbak] *hatchback*

f. Vowel followed by nasal + consonant
   [dɔ̃ːp] *dump*
   [ʤɔ̃pe] *to jump*

g. Coronal stop + high front vowel or glide
   [ʦɪp] *tip*
   [ʣiʀɛktɔʀe] *directory*

The preferred repairs for these structures vary. The palato-alveolar affricates are typically nativized as fricatives with the same place of articulation (8a). English [ɹ] is realized as the QF rhotic [ʀ] (8b). The interdental fricatives are realized as coronal stops (8c; *cf.* European French dialects where these segments are instead often nativized as [s, z] – Ritchie 1968). The velar nasal is realized as palatal [ɲ] (8d), while the glottal fricative is simply deleted (8e). Oral vowels followed by a nasal + consonant sequence – i.e., VNC – are seriously underrepresented in French (Schane 1968, Dell 1973) and are generally repaired by fusing the vowel and nasal consonant into a nasalized vowel (8f). Finally, sequences of a coronal stop followed by a high front vowel or glide – i.e., TI – are subject to assibiliation in QF, transforming the stops into the affricates [ʦ] and [ʣ] (8g).

As the data above suggests, while there are systematic repair processes for these non-native structures, there is considerable variation in the extent to which these repair processes apply. To quantify this, we extracted all of the words in Roy's (1992) corpus that included one of the target structures in (8). Two native speakers of QF from the Québec City area provided Roy's data; both were reported to have limited proficiency in English (Roy 1992: 27). The corpus includes directly elicited productions of 591 loanword tokens (313 word types), containing a total of 787 instances of the target structures. Overall, 51.3% of these structures are realized faithfully. Figure 1A plots the rate of faithful (English-like) realization for each of the target structures in the full corpus, while Figure 1B plots the rate of faithful realization for these same structures among the subset of the corpus that includes only word types containing multiple marked structure (165 tokens, 93 word types, 354 instances of the target structures).

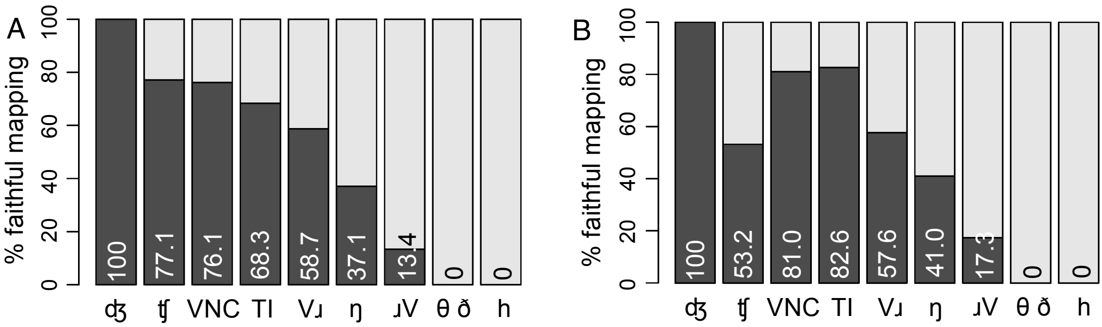

Figure 1: Percent faithful (English-like) realization of target structures in the full corpus (A) and those words containing more than one marked structure (B).

The general frequency patterns here largely conform to the implicational patterns induced by Roy (1992) and Paradis & Lebel (1994). [ʤ] is realized accurately at a rate of 100%, suggesting that it is essentially a "core" segment in contemporary QF. [ʧ] is realized accurately at relatively lower rate. The interdental and glottal fricatives are never realized faithfully. Following Roy (1992), the English rhotic is plotted separately for onset vs. coda position; coda [ɹ], particularly in [əɹ] contexts, is realized faithfully more frequently than onset [ɹ]. The other target structures have intermediate rates of accurate realization, with relatively minor differences observed between the full corpus in Figure 1A and the subset corpus in Figure 1B.

Assuming that the elements that are realized faithfully more frequently are those that are associated with more core strata, Figure 1 gives rise to the structure in (9) – a more articulated version of the core-periphery structure proposed by Paradis & Lebel (1994).[2]

(9) Postulated QF core-periphery structure

Periphery
✔ ʤ VNC TI ʧ Vɹ ŋ ɹV
* θ ð h

✔ ʤ VNC TI ʧ Vɹ ŋ
* ɹV θ ð h

✔ ʤ VNC TI ʧ Vɹ
* ŋ ɹV θ ð h

✔ ʤ VNC TI ʧ
* Vɹ ŋ ɹV θ ð h

✔ ʤ VNC TI
* ʧ Vɹ ŋ ɹV θ ð h

✔ ʤ
* VNC TI ʧ Vɹ ŋ ɹV θ ð h
Core

The strength of the evidence for this core-periphery structure can then be assessed based on the predictions in (10).

[2] The relative frequency of repair for target [ʧ] differs between Figures 1A and 1B. We have chosen in (9) to treat target [ʧ] as a more peripheral structure than target VNC or TI. Sixteen word tokens in the corpus contain target [ʧ] and either VNC or TI. In fourteen of these words [ʧ] is repaired even as the other structures are realized accurately. In the two other cases both structures are realized accurately.

(10) a. If the core-periphery structure is strictly respected, repairing a more tolerated structure (i.e., a more core structure) will imply that any less tolerated structure is also repaired.

b. If there is no core-periphery structure, elements in each stratum will be repaired at the same rate as if they were the only marked structure in word.

To test these claims, we examined the words containing more than one target marked structure (i.e., the subset corpus – Figure 1B). The analysis, summarized in (11), shows that the core-periphery structure is largely, but not absolutely respected. VNC (oral vowel followed by a nasal + consonant sequence) and TI (coronal stop followed by a high front vowel or glide) are the most tolerated non-core structures. If a word contains one of these structures and that structure is repaired, the core-periphery model (10a) predicts that all less tolerated structures – [ʧ], coda [ɹ], [ŋ], and onset [ɹ] – should be repaired with a probability of 1.00.[3] If there is no implicational relationship (10b), these less tolerated structures should be repaired with a probability of .546. The actual probability of the less tolerated structures' repair is .92. In fact, the actual probability of less-tolerated structures being repaired is consistently higher than would be expected in the absence of a core-periphery structure. There are only two instances where the predictions of the core-periphery model in (9) are violated in this dataset: *autoreverse* [otoɹ̠ɪvəʀ̠s] and *background* [bakgɹ̠awn̠].

(11)

	Expected probability of less tolerated structures' repair			**Actual probability of less tolerated structures' repair**	
	Core-periphery respected		No core-periphery		
given ŋ repaired	1.00	[ɹV repaired]	.866	1.00	(14 of 14)
given Vɹ repaired	1.00	[ŋ, ɹV]	.803	.95	(21 of 22)
given ʧ repaired	1.00	[Vɹ, ŋ, ɹV]	.612	1.00	(7 of 7)
given VNC, TI repaired	1.00	[ʧ, Vɹ, ŋ, ɹV]	.546	.92	(12 of 13)

The ideal treatment of these data should be able to capture the generally implicational nature of the patterns seen among loanwords, while avoiding the need for ranking metaconditions or the postulation of multiple strata lacking an etymological basis. Furthermore, the formalism should be able to account for the occasional instances of counter-implication without compromising the system.

4. Modeling patterns of adaptation with weighted scalar constraints

This section argues that there is no need for distinct constraints indexed to lexical strata in Harmonic Grammar. Instead, constraint violations can be scaled based on distance from the lexical core. This proposal builds on a growing body of work showing that scalar constraints within HG can be used to effectively model a wide range of influences on phonological patterning, including continuous phonetic properties (Flemming 2001, Cho 2011, McAllister Byun 2011, Ryan 2011), the abstract sonority scale (Pater 2012, to appear, Jesney 2015), trigger/target strength in vowel harmony (Kimper 2011), prosodic boundary strength (Hsu & Jesney 2016), lexical category membership and frequency (Coetzee & Kawahara 2013, Linzen, Kasanyenko & Gouskova 2013), and locality in vowel harmony (Kimper 2011, McPherson & Hayes 2015).

In the current analysis, Faithfulness violations are scaled according to the basic definition in (12).

(12) *Scaled Faithfulness*
Given a basic constraint weight w,
and a scaling factor s corresponding to distance from the core,
for any input that is not realized faithfully in the output,
assign a weighted violation score of $w \times s$.

[3] Target [h, θ, ð] were excluded from the analysis in (11) because they are never realized faithfully in this data set. Including these does not alter the overall pattern.

To illustrate the basic operation of these constraints, we will again consider the realization of the QF borrowing *scratch*. The two marked target structures here are militated against by the constraints *ɹV and *ʧ; in the tableaux in (13), these constraints are assigned weights of 5.5 and 2.5, respectively. The basic faithfulness constraint FAITH is assigned a weight of 1.0. As (13a) shows, when the target word is treated as a member of the core stratum, and the scaling factor is thus s = 1, the Harmony cost of violating either markedness constraint is greater than the cost of violating faithfulness, and the fully-repaired candidate [skʀaʃ] is selected as optimal. As the distance from the core increases, as in (13b), the penalty associated with violating faithfulness supersedes the penalty for violating *ʧ, and [skʀaʧ] is selected. Finally, once the distance from the core is sufficiently large, violations of both *ʧ and *ɹV are tolerated (13c). Given these basic constraint weights, no scaling factor will yield the counter-implicational output *[skʀaʃ].[4]

(13)

	/skɹaʧ/	*ɹV w = 5.5	*ʧ w = 2.5	FAITH w = 1	H	
a.	skɹaʧ	–1	–1		–8	**Core stratum:** scaling factor s = 1
	skʀaʧ		–1	–1 (×1)	–3.5	
	skɹaʃ	–1		–1 (×1)	–6.5	
	☞ skʀaʃ			–2 (×1)	–2	
b.	/skɹaʧ/	*ɹV	*ʧ	FAITH	H	
	skɹaʧ	–1	–1		–8	**Intermediate stratum:** scaling factor s = 3
	☞ skʀaʧ		–1	–1 (×3)	–5.5	
	skɹaʃ	–1		–1 (×3)	–8.5	
	skʀaʃ			–2 (×3)	–6	
c.	/skɹaʧ/	*ɹV	*ʧ	FAITH	H	
	☞ skɹaʧ	–1	–1		–8	**Peripheral stratum:** scaling factor s = 6
	skʀaʧ		–1	–1 (×6)	–8.5	
	skɹaʃ	–1		–1 (×6)	–11.5	
	skʀaʃ			–2 (×6)	–12	

The necessity of implicational patterns within this system can be visualized as in Figure 2 below. The two dashed lines represent the penalty associated with the two markedness constraints, and the solid line represents the penalty associated with the scaled Faithfulness constraint – increasing from left to right as the distance from the core increases. When the scaled faithfulness penalty is greater than the penalty associated with a conflicting markedness constraint, that marked structure is admitted. In Figure 2, this means that [ʧ] is realized faithfully whenever the scaled faithfulness penalty is greater than 2.5, and onset [ɹ] is realized faithfully whenever the scaled faithfulness penalty is greater than 5.5. There is no scaling value such that [ʧ] is repaired while onset [ɹ] is realized faithfully.

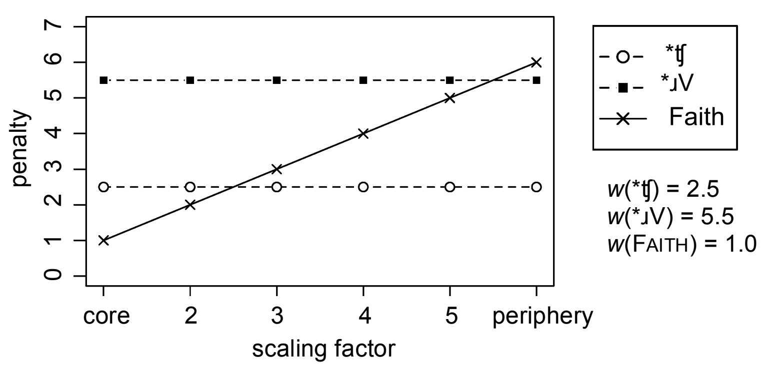

Figure 2: Pattern generated with a single scaled faithfulness constraint.

[4] Alternatively, the scaling factor s could be added to the weight w, yielding a weighted violation score of $w + s$. These approaches are largely equivalent here. For discussion of additive scaling, see Hsu & Jesney (2015, 2016).

These patterns extend straightforwardly to cases where separate faithfulness constraints are associated with the individual marked structures. As long as a consistent scaling factor is used for all Faithfulness constraints, the implicational relationships are retained. The proportional differences in weights between the pairs of conflicting markedness and faithfulness constraints determine which structures are more vs. less tolerated in this model – not the raw weights of the constraints. More tolerated structures – those that are closer to the lexical core, like [ʧ] in QF – are characterized by relatively smaller differences in the weights of the conflicting constraints, while less tolerated structures – those that are closer to the periphery, like onset [ɹ] in QF – are characterized by relatively greater differences in the weights of the conflicting constraints.

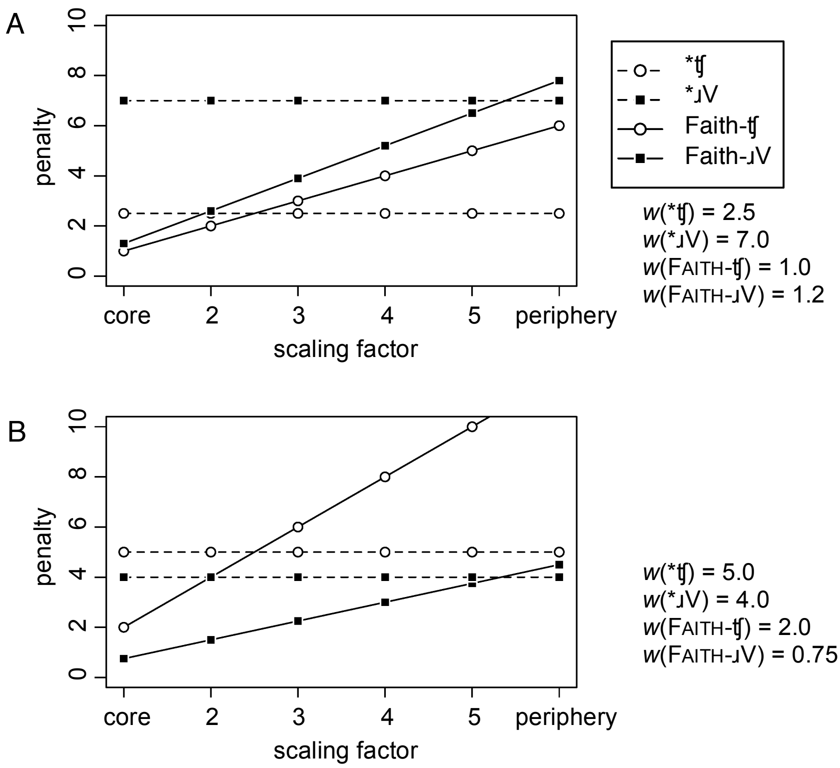

Figure 3: Patterns generated with separate scaled faithfulness constraints.

Figure 3 illustrates this with two sets of weights that yield the QF pattern. In Figure 3A, the weight of *ʧ is again set at 2.5, while the weight of *ɹV is set at 7.0. The two conflicting faithfulness constraints FAITH-ʧ and FAITH-ɹV are weighted at 1.0 and 1.2, respectively. The weight of *ʧ is 2.5 times greater than the weight of FAITH-ʧ, and so once a scaling factor greater than 2.5 is employed, [ʧ] can be realized faithfully. The weight of *ɹV is 5.83 times greater than the weight of FAITH-ɹV, and so a scaling factor greater than 5.83 is necessary for onset [ɹ] to be realized faithfully. With these weights there is no scaling factor where onset [ɹ] is realized faithfully even as [ʧ] is repaired. Figure 3B shows that this pattern holds even when the raw weights of the markedness constraints have the opposite relationship. Here, the weight of *ʧ is 5.0, while the weight of *ɹV is 4.0. With FAITH-ʧ weighted at 2.0 and FAITH-ɹV weighted at 0.75, [ʧ] is again admitted once the scaling factor is greater than 2.5, while the onset [ɹ] is only admitted once the scaling factor is greater than 5.33. The implicational relationship is strictly maintained.

In this system accounting for implicational relationships among repairs does not rely upon learners positing multiple constraints indexed to distinct lexical strata, nor on the maintenance of specific ranking conditions. Indeed, the learner need not acquire a set of distinct lexical strata at all. All that is required is that the learner be able to apply a single scaling factor to all faithfulness constraints on each iteration of EVAL. When a word is treated as more "native", that scaling factor will be relatively small.

When a word is treated as more "foreign", that scaling factor will be relatively large. The learner need only acquire basic weights for conflicting pairs of markedness and faithfulness constraints.

Given a different native phonological system, different degrees of tolerance for various marked structures are expected, allowing a different core-periphery structure to emerge. Within this model, however, implicational patterns are expected to hold across the lexicon. A language like Québec French, which reflects the core-periphery structure in (9), does so because of the specific weights that its grammar assigns to the conflicting markedness and faithfulness constraints. In the current case, it seems likely that the relatively greater tolerance of the language for certain structures is rooted in native phonological patterns. While absent from the native QF lexicon, the affricates [ʧ] and [ʤ] are comprised of gestures that are readily sequenced across morpheme boundaries – *sept chiens* [sɛt ʃjɛ̃] 'five dogs', *monde jeune* [mɔ̃d ʒœn] 'young people'. Oral vowels followed by a nasal + consonant sequence are underattested, but there are occasional examples even in monomorphemic words – *gymnase* [ʒimnaz] 'gymnasium', *binse* [bins] 'mess' (Tranel 1981). For its part, [ŋ] appears as an allophone of [g] when it is adjacent to a nasal consonant – e.g., *diagnostique* [djagnɔstik]~[djaŋnɔstik] 'diagnostic' (Walker 1984: 38). There is at least some non-loanword evidence, then, for the implicated markedness and faithfulness constraints being assigned relatively close weights. No such evidence is available for structures that are less tolerated – i.e., onset [ɹ], [θ], [ð], [h] – supporting a relatively wide separation in the weights of the markedness and faithfulness constraints in these cases.

The fact that ranking metaconditions are not required here also has benefits when it comes to accounting for the rare tokens that invert the general implicational patterns. In the current framework, adding noise to the system, as in Noisy HG (Boersma & Pater 2008), will allow for a small amount of variation in the basic constraint weights across iterations of EVAL, occasionally subverting the expected patterns. Because there are no ranking metaconditions within the weighted scalar constraints model, it is not necessary to distinguish these rare counter-implicational patterns as somehow "exceptional" violations of the metaconditions. Instead, they are a simple consequence of integrating of a weighted scalar constraints system with a model of variation.

5. Conclusion

This paper has argued that weighted scalar constraints can be used to straightforwardly account for implicational patterns of repair vs. non-repair in loanwords, uniting the analysis of lexical strata with the analysis of implicational patterns elsewhere in the grammar. Weighted scalar constraints avoid the need for multiple indexed faithfulness constraints and for the imposition of ranking metaconditions, as required in OT with ranked constraints. This is of particular benefit in languages like Québec French, where there is no etymological basis for the definition of multiple loanword classes. In addition, the weighted scalar constraints model makes clear predictions about the treatment of loanwords, suggesting that the behaviour of novel structures is determined based on the basic difference in weight between the relevant markedness and faithfulness constraints. Patterns of loanword adaptation are a consequence of the fundamental grammatical structure.

References

Boersma, Paul & Joe Pater. 2008. Convergence properties of a Gradual Learning Algorithm for Harmonic Grammar. Ms., University of Amsterdam and University of Massachusetts, Amherst.

Cho, Hyesun. 2011. The timing of phrase-initial tones in Seoul Korean: a weighted-constraint model. *Phonology* 28: 293-330.

Coetzee, Andries W. & Shigeto Kawahara. Frequency biases in phonological variation. *Natural Language and Linguistic Theory* 31: 47-89.

Davidson, Lisa & Rolf Noyer. 1997. Loan phonology in Huave: Nativization and the ranking of faithfulness constraints. In *Proceedings of the 15th West Coast Conference on Formal Linguistics*, 65-79.

Dell, François. 1973. *Les règles et les sons*. Paris: Hermann.

Flemming, Edward. 2001. Scalar and categorical phenomena in a unified model of phonetics and phonology. *Phonology* 18: 7-44.

Holden, Kyril. 1976. Assimilation rates of borrowings and phonological productivity. *Language* 52: 131-147.

Hsu, Brian & Karen Jesney. 2015. Weighted scalar constraints and implicational process application. Paper presented at the *23rd Manchester Phonology Meeting* (MFM 23). Manchester, UK.

Hsu, Brian & Karen Jesney. 2016. Scalar positional markedness and faithfulness constraints in Harmonic Grammar. In *Proceedings of the 51st Meeting of the Chicago Linguistic Society* (2015), 241-255. Chicago, IL: Chicago Linguistic Society.

Inkelas, Sharon & Cheryl Zoll. 2007. Is grammar dependence real? A comparison between cophonological and indexed constraint approaches to morphologically conditioned phonology. *Linguistics* 45: 133-171.

Itô, Junko & Armin Mester. 1995. The core-periphery structure of the lexicon and constraints on reranking. In Jill Beckman, Sue Urbanczyk & Laura Walsh Dickey (eds.), *Papers in Optimality Theory*, 181-209. Amherst, MA: GLSA.

Itô, Junko & Armin Mester. 1999. The structure of the phonological lexicon. In Natsuko Tsujimura (ed.), *The Handbook of Japanese Linguistics*, 62-100. Malden, MA: Blackwell.

Itô, Junko & Armin Mester. 2001. Covert generalizations in Optimality Theory : the role of stratal faithfulness constraints. *Studies in Phonetics, Phonology, and Morphology* 7: 273-299.

Itô, Junko & Armin Mester. 2008. Lexical classes in phonology. In Shigeru Miyagawa & Mamoru Saito (eds.), *The Oxford Handbook of Japanese Linguistics*, 84-106. Oxford: Oxford University Press

Jesney, Karen. 2015. Counterbled-counterfeeding in Harmonic Grammar. In Thuy Bui & Deniz Özyıldız (eds.), *Proceedings of the 45th Meeting of the North East Linguistic Society (NELS 45), Volume 2*, 59-72. Amherst, MA: GLSA.

Jurgec, Peter. 2010. Disjunctive lexical stratification. *Linguistic Inquiry* 41: 149–161.

Kimper, Wendell. 2011. *Competing Triggers: Transparency and Opacity in Vowel Harmony*. PhD dissertation, University of Massachusetts Amherst.

Legendre, Géraldine, Yoshiro Miyata & Paul Smolensky. 1990. Harmonic Grammar – a formal multi-level connectionist theory of linguistic wellformedness: an application. In *Proceedings of the Twelfth Annual Conference of the Cognitive Science Society*, 884-891. Cambridge, MA: Lawrence Erlbaum.

Linzen, Tal, Sofya Kasyanenko & Maria Gouskova. 2013. Lexical and phonological variation in Russian prepositions. *Phonology* 30: 453-515.

McAllister Byun, Tara. 2011. A gestural account of a child-specific neutralisation in strong position. *Phonology* 28: 371-412.

McPherson, Laura & Bruce Hayes. 2015. Relating application frequency to morphological structure: the case of Tommo So vowel harmony. Ms., Dartmouth College and UCLA.

Paradis, Carole & Darlene LaCharité. 1997. Preservation and minimality in loanword adaptation. *Journal of Linguistics* 33: 379-430.

Paradis, Carole & Caroline Lebel. 1994. Contrasts from segmental parameter settings in loanwords: core and periphery in Québec French. In *Proceedings of the MOT Conference on Contrast in Phonology*, 75-95. Toronto, ON: University of Toronto.

Pater, Joe. 2012. Serial Harmonic Grammar and Berber syllabification. In Toni Borowsky, Shigeto Kawahara, Takahito Shinya & Mariko Sugahara (eds.), *Prosody Matters: Essays in Honor of Elisabeth O. Selkirk*, 43-72. London: Equinox Press.

Pater, Joe. to appear. Universal Grammar with weighted constraints. In John McCarthy & Joe Pater (eds.), *Harmonic Grammar and Harmonic Serialism*. London: Equinox Press.

Picard, Marc. 1983. La productivité des règles phonologiques et les emprunts de l'anglais en québécois. *Revue de l'association québécoise de linguistique* 3(2): 97-108.

Picard, Marc & Janet Nicol. 1982. Vers un modèle concret de la phonologie des emprunts. *Canadian Journal of Linguistics* 27(2): 156-167.

Pinta, Justin. 2013. *Lexical Strata in Loanword Phonology : Spanish Loans in Guaraní*. MA thesis. University of North Carolina at Chapel Hill.

Ritchie, William C. 1968. On the explanation of phonic interference. *Language Learning* 18: 183-197.

Roy, Marie-Josée. 1992. *Le rôle des contraintes phonologiques dans l'adaptation d'emprunts anglais en français québécois*. MA thesis. Université Laval.

Ryan, Kevin. 2011. Gradient syllable weight and weight universals in quantitative metrics. *Phonology* 28: 413-454.

Saciuk, Bohdan. 1969. The stratal division of the lexicon. *Linguistics* 1: 464–532.

Schane, Sanford. 1968. *French Phonology and Morphology*. Cambridge, MA: MIT Press.

Smolensky, Paul & Géraldine Legendre. 2006. *The Harmonic Mind: From Neural Computation to Optimality-Theoretic Grammar*. Cambridge, MA: MIT Press.

Tranel, Bernard. 1981. *Concreteness in Generative Phonology*. Berkeley, CA: University of California Press.

Walker, Douglas. 1984. *The Pronunciation of Canadian French*. Ottawa, ON: University of Ottawa Press.

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