

## Output-Output Correspondence vs. Cyclic OT: Beyond Morphological Derivation

A morphologically complex form sometimes violates phonotactic constraints in order to remain faithful to its morphological base. Two competing OT approaches to this phenomenon are *output-output correspondence* (OOcorr) (Benua 1997; Burzio 2005) and *cyclic OT* (Kiparsky 2000). While their theory-internal justifications are very different, the two approaches have been difficult to distinguish empirically. I show that empirical differences do in fact emerge when these models are extended to cases beyond morphologically derived words. Special faithfulness effects seen in loanword adaptation and language games can be successfully analyzed with OOcorr, but not with cyclic OT.

**Why consider language games and loanwords?** Language-game forms may be faithful to certain surface characteristics of the non-game forms they are built from (Itô, Mester, & Kitagawa 1996). Similarly, loanwords may violate phonological defaults in order to “mimic” aspects of their foreign source forms (e.g., Yip 2002). Thus, these two phenomena resemble morphologically derived forms in that the output form can be faithful, not only to its UR, but also to another surface form that it is related to.

**The crucial empirical context.** The empirical difference between OOcorr and cyclic OT emerges in cases of *special contrast*—when two phones are non-contrastive in the core phonology, but contrastive in loanwords or language games. Consider [h] and [f] in Japanese. In non-loan phonology, these sounds are alternants; [f] appears only before [u], and [h (~ç)], the default, appears elsewhere (Vance 1987). This distribution motivates the constraint ranking  $*[HU] \gg *[F] \gg \{IDENT[PLACE], *[H]\}$ , where faithfulness to place is always overridden, and [f] is avoided except when a following [u] makes [h] unavailable. But in loanword adaptation, a different pattern appears. Source-language [f] is faithfully realized in Japanese loans before all vowels (although \*[hu] is still avoided); see example (1). Thus, [f] and [h] contrast (in non-[\_u] contexts). This pattern motivates the constraint ranking  $*[HU] \gg IDENT[PLACE] \gg \{*[F], *[H]\}$ , where the low rank of \*[F] allows [f] to appear freely. In summary, the loan and non-loan phonologies differ in the relative ranking of IDENT[PLACE] and \*[F]. This special-contrast pattern can be handled with OOcorr, but not with cyclic OT.

**OOcorr models special contrast.** The OOcorr model (Benua 1997) establishes a correspondence relation—and therefore a set of faithfulness constraints—between two output forms related by morphological derivation. Itô, Mester, & Kitagawa (1996) have successfully applied OOcorr to language-game phonology. Likewise, this approach can be straightforwardly extended to loan adaptation, serving as an explicit formalization of the loan/source similarity effects that are frequently discussed in the literature. In the case of Japanese, the OOcorr constraint protecting [f] in loanwords, IDENT[PLACE]-OO, would dominate \*[F], while the input-output version of this constraint, IDENT[PLACE]-IO, would be ranked below \*[F]. This ranking allows a loan to preserve the [f] of its source-form base, while a non-loan, which has no base, will neutralize [f] to [h] (see example (2)).

**Cyclic OT fails for special contrast.** The cyclic OT approach (Kiparsky 2000) models faithfulness effects between morphologically related forms in a different way: there are two OT grammars, corresponding to stem- and word-level phonology, and the stem-level output is the word-level input. Derived forms are faithful to their bases because those bases *are* their inputs. As demonstrated in (3), this model cannot be extended to cases of special contrast such as [f] in Japanese loans. Suppose, as in (3a), that loan adaptation is the first cycle of the grammar, which applies only to non-native forms, and the core grammar is the second cycle. The source-form [f] survives cycle 1, but is incorrectly neutralized to [h] when it enters the native phonology on cycle 2. Alternatively (3b), suppose that cycle 1 is the core grammar, and loanwords are subject to an additional second cycle. Here, the source-form [f] is lost already in cycle 1 and cannot be recovered in cycle 2. The only way to salvage a cyclic OT approach is to propose that loanwords and non-loans are each sent to a separate OT cycle. But this move has serious drawbacks: it fails to explain why many aspects of non-loan phonology do apply to loanwords as well (i.e., consonant clusters and certain coda types are always repaired in Japanese, in loans and non-loans alike), and it abandons a core principle of the original cyclic OT model, which is that one cycle provides the input to another. In conclusion, the OOcorr model is the more successful approach, because it can be extended to account for output-form faithfulness relationships beyond morphological derivation.

**Examples**

- (1) firumu ‘film’      hiru      ‘hill’      (data from Shinmura 1969, Vance 1987)  
 feruto ‘felt’      herususeNta: ‘health center’  
 faN ‘fan’      haNdo ‘hand’  
 fo:ku ‘fork’      ho:mu ‘home’  
 futto ‘foot’      —      (cf. furafu:pu ‘hula hoop’, \*hurahu:pu)

(2) OOcorr: Succeeds — loan/source OO constraints always satisfied for non-loans

(a) Loanword adaptation: Source-language base exists; [f] is preserved

/fæN/	base: [fæN]	*[HU]	ID[PLC]-OO	*[F]	ID[PLC]-IO
	> faN			*	
	haN		*!		*

(b) Non-loan phonology: No base; [f] neutralized with [h]

/faru/ ‘spring’	(no base)	*[HU]	ID[PLC]-OO	*[F]	ID[PLC]-IO
	faru		satisfied	*!	
	> haru		satisfied		*

(3) Cyclic OT: Fails — any pass through non-loan stratum neutralizes contrast (desired output: [faN])

(a) Attempt #1: Loanword adaptation triggers Cycle 1; all words enter Cycle 2

c1:	/fæN/	*[HU]	ID[PL]	*[F]	c2:	[faN]	*[HU]	*[F]	ID[PL]
	> faN			*		faN		*!	
	haN		*!			X haN			*

(b) Attempt #2: All words enter Cycle 1; loanword adaptation triggers Cycle 2

c1:	/fæN/	*[HU]	*[F]	ID[PL]	c2:	[haN]	*[HU]	ID[PL]	*[F]
	faN		*!			faN		*!	*
	> haN			*		X haN			

**References**

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