

## Non-phonological cues of stratal affiliation

Peter Jurgec (peter.jurgec@uit.no)

Research has shown that speakers perceive different groups of words (*lexical strata*) on the basis of their phonological properties. A speaker of Turkish, for example, knows that if a Turkish word contains a voiced obstruent coda, it must be a loanword; native words lack voiced codas (Inkelas et al. 1997). However, not all loanwords are phonologically distinct from native words. In Turkish, a word that contains only voiceless obstruent codas can be either native or a loanword. This paper presents evidence that speakers can distinguish lexical strata even if they are phonologically indistinguishable from each other.

Moreton & Amano (1999) show that phonotactic constraints specific to a lexical class affect speech perception. In Japanese, only foreign words contrast [a] and [a:] word-finally. Moreton & Amano (1999) used constructed words of the type  $C_1oC_2a$ , and modified the duration of the final [a], while  $C_1$ ,  $C_2$  cued stratal affiliations: [p] and [ɸ] are found in foreign words, while [rʲ] and [hʲ] are typical of Sino-Japanese words. The results reveal that listeners are most likely to perceive [a] as long [a:] if the word also contains cues of the foreign stratum, in which word-final long [a:] is permitted. Gelbart (2005) has extended these findings to English, French and Latvian. He also reports that some structures are better cues of stratal affiliation than others. Gelbart & Kawahara (2007) examined perceptual bias in Japanese voiced geminates. They used actual words as stimuli and varied the duration of a voiced stop and the final [a]; no other cues were present. They manipulated the duration of voiced stops and [a]; the attested words contained singleton segments, while forms with geminates were non-words. Loanwords crossed over from a word to a non-word at a shorter duration compared to native words, and this is because voiced geminates are possible in loanwords, but not in native words. Speakers must have known which words were native and which loanwords, independent of phonology. The problem with the results, however, is that native words have a variant emphatic pronunciation with voiced geminates, which increases the cross-over duration in native words. Thus, the perceptual bias may be due to phonological variability rather than non-phonological cues.

This paper extends the findings of Gelbart & Kawahara (2007) to Slovenian, and provides more robust results. Jurgec (to appear) demonstrates that phonotactic patterns found in Slovenian lexical strata are not in a subset relation. For example, in stressed positions before a tautosyllabic [r], only one front vowel, [i], is allowed in native words (cf. [mɪr] 'peace' ~ [mi'ru] 'GEN', [sɪrji] 'shit!' ~ [sɛrem] '(I) shit'), while different two vowels {i, ε} are allowed in loanwords (cf. [pɛrla] 'pearl' ~ [pɛr'lit], [suve'nɪr] 'souvenir'). This allows a unique four way comparison between the following groups of words: native words with and without native cues, loanwords with and without foreign cues.

The four types of words were collected from Snoj (2003), for a total of 374 (frequent) words. To exclude any phonological effects, the words were controlled for Lexical Neighborhood Density; the phonotactic structures found in native words were no more frequent than those of loanwords. The words were randomized and presented in a forced choice questionnaire to 127 subjects. Note that the difference between native words and loanwords is not marked in the orthography. (A follow-up experiment with 12 speakers and auditory stimuli revealed no significant differences from the main group.) For each word, speakers had to choose whether a word was a loanword or a native word; three sample loanwords and native words were provided as a part of the instructions.

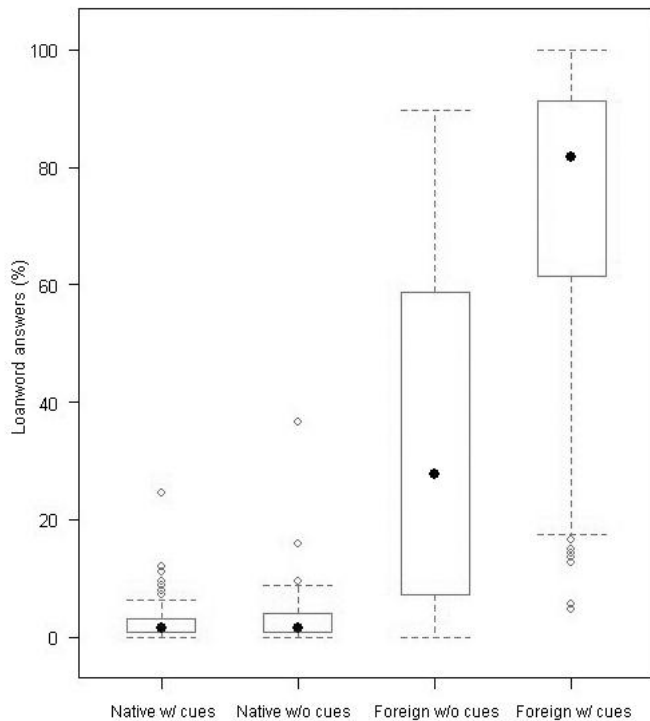


Figure to the left shows the results; each data point presents one word in a 0 (all speakers perceived the word as a native word) to 100 (all speakers perceived the word as a loanword) continuum. On average, loanwords had significantly higher scores, regardless of whether they had cues of foreignness or not (Kruskal-Wallis,  $p < .001$ ). Native words with overt cues of nativeness (median = 1.59), do not differ significantly (Mann-Whitney,  $p = .985$ ) from native words without the cues (median = 1.58). The median value for loanwords without phonological cues of foreignness was significantly ( $p < .001$ ) higher at 34.00. Loanwords with cues of foreignness had the highest median (73.00), significantly different from all other groups ( $p < .001$ ). The results suggest that while phonology affects loanwords perceptibility considerably, speakers also use non-phonological cues of foreignness. Speakers can differentiate loanwords from native words even if they are homophonous (e.g. [tip] 'touch' vs. 'type'). No differences were found between the two types of native words. In other words, the phonological cues have greater effect on loanwords than on native words.

The findings are consistent with the theory of lexical indexation within Optimality Theory (Itô & Mester 1995, 1999, 2001, Pater 2000, 2007, to appear). Loanwords are lexically marked (indexed) and indexed constraints apply to them only. In the absence of any phonological cues, lexical cues remain. On the other hand, since native words lack any index, indexed constraints do not apply to them.

All native words must thus be regarded as a uniform class even if the subset of them has phonological structures that are not found in loanwords.

## References

- Gelbart, Ben (2005). *Perception of Foreignness*. Amherst: GLSA, University of Massachusetts.
- Gelbart, Ben & Shigeto Kawahara (2007). Lexical cues to foreignness in Japanese. In *Proceedings of Formal Approaches to Japanese Linguistics 4*, MIT Working Papers in Linguistics, Cambridge: MITWPL. 49–60.
- Inkelas, Sharon, Orhan C. Orgun & Cheryl Zoll (1997). The implications of lexical exceptions for the nature of grammar. In Iggy Roca (ed.) *Derivations and constraints in phonology*, Oxford: Clarendon Press. 393–418.
- Itô, Junko & Armin Mester (1995). Japanese phonology. In John A. Goldsmith (ed.) *The Handbook of Phonological Theory*, Cambridge, MA and Oxford: Blackwell. 817–838.
- Itô, Junko & Armin Mester (1999). The phonological lexicon. In Natsuko Tsujimura (ed.) *The Handbook of Japanese Linguistics*, Oxford: Blackwell. 62–100.
- 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.
- Jurgec, Peter (to appear). Disjunctive lexical stratification. *Linguistic Inquiry* 41. Available on Rutgers Optimality Archive, ROA 1024, <http://roa.rutgers.edu>.
- Moreton, Elliott & Shigeaki Amano (1999). Phonotactics in the perception of Japanese vowel length: Evidence for long-distance dependencies. In *Proceedings of the 6th European Conference on Speech Communication and Technology*, Budapest.
- Pater, Joe (2000). Non-uniformity in English secondary stress: the role of ranked and lexically specific constraints. *Phonology* 17. 237–274.
- Pater, Joe (2007). The locus of exceptionality: Morpheme-specific phonology as constraint indexation. In Leah Bateman, Michael O’Keefe, Ehren Reilly & Adam Werle (eds.) *University of Massachusetts Occasional Papers in Linguistics 32: Papers in Optimality Theory III*, Amherst: GLSA, University of Massachusetts. 259–296. Available on Rutgers Optimality Archive, ROA 866, <http://roa.rutgers.edu>.
- Pater, Joe (to appear). Morpheme-specific phonology: Constraint indexation and inconsistency resolution. In Steve Parker (ed.) *Phonological Argumentation: Essays on Evidence and Motivation*, London: Equinox. Available on Rutgers Optimality Archive, ROA 906, <http://roa.rutgers.edu>.
- Snoj, Marko (2003). *Etimološki slovar slovenskega jezika*. Ljubljana: Modrijan.