Phonological perception in loanword adaptation

Paul Boersma & Silke Hamann
Amsterdam University & Utrecht University

The discussion on loanword adaptation generally revolves around the question whether their integration takes place in perception, in the grammar, or in both. The perception-only approach (Peperkamp & Dupoux 2003) proposes that the perceptual similarity between loan and native segments alone determines the integration of words. The grammar-only approach (Paradis 1996; LaCharité & Paradis 2005) proposes that loanwords are introduced by bilinguals, who perceive the donor language perfectly so that the underlying forms of loanwords are identical to the surface forms of the donor language. And lastly the combined approach, as represented by e.g. Kenstowicz (2001) and Yip (2006), proposes that the adaptation involves both the native grammar and the phonetic similarity between loan and native segments. In all three approaches, however, perception is assumed to be extra-grammatical, so that loanword adaptation has to be handled by constraints specific to it, such as MATCH (Davidson & Noyer 1996), comprehension-specific MAX and DEP (Kenstowicz 2001), or MIMIC (Yip 2006).

The present paper proposes instead that speech perception itself is controlled by the language-specific grammar. Thus, the fact that the Japanese listeners investigated by Dupoux et al. (1999) perceive an auditory [ebzo] as the phonological structure /.e.bu.zo./ can be directly attributed to the workings of the structural constraint NOCODA in perception. This very same constraint has been traditionally associated with production (Prince & Smolensky 1993). We propose, therefore, that these structural constraints are used both in production and in perception. This is possible if we assume a grammar model with three kinds of representations: an underlying form, a phonological surface structure, and a phonetic form. In such a grammar model, the "middle" representation, i.e. the surface structure, fulfills two roles, depending on whether we consider the listener or the speaker: in listening, the surface structure is the output of (prelexical) perception (the mapping from auditory cues onto phonological elements), while in speaking, the surface structure is (as traditional) the output of phonological production. If we further assume, as is traditional, that a structural constraint like NOCODA evaluates the phonological surface structure, we see that NOCODA works bidirectionally: it must play a role in comprehension as well as in production. Briefly stated, perception is as phonological as production.

Apart from the structural constraints that evaluate the surface structure, two more constraint families are required: the relation between underlying form and surface structure in production is evaluated by faithfulness constraints (McCarthy & Prince 1995), and the relation between phonetic form and surface structure in perception is evaluated by cue constraints (Boersma 2005). With these three constraint families, which are independently required to describe native perception and production, a formal description of loanword adaptation becomes straightforward: the description requires no constraints specific to borrowing (such as MATCH or MIMIC), no duplication of perceptual information in production (such as Steriade's 2001 P-map), and no universal ranking of MAX over DEP in loanword adaptation (the phenomena traditionally ascribed to this ranking are in fact caused by a bias that automatically occurs in the acquisition of the ranking of cue constraints).

These points will be illustrated with examples from Desano, Japanese, Mandarin, Cantonese, and Thai.

References

Boersma, Paul (2005). Some listener-oriented accounts of hache aspiré in French. Rutgers Optimality Archive **730**. Revised version to appear in *Lingua*.

Davidson, Lisa and Rolf Noyer (1996). Loan phonology in Huave: nativization and the ranking of faithfulness constraints. *WCCFL* **15**: 65-80.

Dupoux, Emmanuel, Kazuhiko Kakehi, Yuki Hirose, Christophe Pallier, Stanka Fitneva and Jacques Mehler (1999). Epenthetic vowels in Japanese: a perceptual illusion. *Journal of Experimental Psychology: Human Perception and Performance* **25**: 1568-1578.

Kenstowicz, Michael (2001). The Role of Perception in Loanword Phonology. *Linguistique Africaine* **20**.

Kenstowicz, Michael and Atiwong Suchato (2006). Issues in loanword adaptation: A case study from Thai. *Lingua* **116**(7): 921-949.

LaCharité, Darlene and Carole Paradis (2005). Category Preservation and Proximity versus Phonetic Approximation in Loanword Adaptation. *Linguistic Inquiry* **36**(2): 223-258.

McCarthy, John and Alan Prince (1995). Faithfulness and reduplicative identity. In Jill Beckman, Laura Walsh Dickey & Suzanne Urbanczyk (eds.) *Papers in Optimality Theory*. University of Massachusetts Occasional Papers **18**. Amherst, Mass.: Graduate Linguistic Student Association. pp. 249–384.

Paradis, Carole (1996). The inadequacy of filters and faithfulness in loanword adaptation. In: J. Durand and B. Laks (eds.) *Current Trends in Phonology: Models and Methods*. Salford, University of Salford**:** 509-534.

Peperkamp, Sharon and Emmanuel Dupoux (2003). Reinterpreting loanword adaptations: the role of perception. *ICPhS* **15**: 367-370.

Steriade, Donca (2001). Directional asymmetries in place assimilation. In Elizabeth Hume & Keith Johnson (eds.) *The role of speech perception in phonology*. San Diego: Academic Press. 219-250.

Yip, Moira (2006). The symbiosis between perception and grammar in loanword phonology. *Lingua* **116**(7): 950-975.