

## L2 categories in perceptual adaptation and implications for loanword phonology

Yoonjung Kang<sup>1,3</sup> & Jessamyn Schertz<sup>2,3</sup>

<sup>1</sup>University of Toronto Scarborough, <sup>2</sup>University of Toronto Mississauga, <sup>3</sup>University of Toronto

**Background:** Some propose that loanword adaptation is at its core a function of native language (L1) perception applied to foreign input (L2) devoid of L2 phonological information (Silverman 1992; Boersma & Hamann 2001; Peperkamp, et al. 2008). It has also been noted, however, that L2-L1 correspondences in actual loanwords are far more consistent than expected based on on-line perception by naïve monolinguals and there is also evidence that cross-language perception itself differs as a function of adapters' L2 proficiency (e.g., Kwon in press). These findings suggest that cross-language perception is mediated by adapters' knowledge of L2 sound structure, rather than a simple function of L1 perception applied to L2 acoustic signals. The current study directly tests the assumption of congruence between L1 perception and L2L1 perception and the role of perceived L2 category in mediating L2L1 perception by conducting a series of perception experiments where L1 and L2 stimuli are controlled for their acoustic properties, a departure from previous studies on cross-language perception that did not control for acoustic differences between L1 and L2.

**Experiments:** 87 Seoul-Gyeonggi Korean listeners (65 recruited in Korea and 22 in Toronto) participated in three perception experiments (Table 1) in which they heard stop-initial Korean or English nonce-word stimuli ('paru') and responded with the best-fit Korean (p/p'/p<sup>h</sup>) or English (p/b) category. Stimuli were produced by native speakers of each language, then manipulated to vary systematically in VOT (0-120ms) and f<sub>0</sub> at vowel onset (83-120 Hz) to create a controlled "acoustic space" that was identical in the two languages. Each stimulus was presented twice per task. Korean listeners' L2 proficiency was quantified as the degree of similarity to responses from a control group of eight additional L1 English participants.

**Analyses and Results:** The response is coded into a binary choice of voiceless/aspirated vs. voiced/non-aspirated. Fortis and lenis responses are collapsed to non-aspirated in Korean as they are both exponents of English voiced stops in loanword adaptation. To calculate the congruence of perception patterns across the tasks, we first calculated the rate of voiceless/aspirated choice (ASP.RATE) for each cell of the f<sub>0</sub>-by-VOT acoustic space for each task for each listener. Figure 2 shows the average ASP.RATE values collapsing over all listeners with darker shading indicating more non-aspirated responses. We then calculated how L2L1 responses are different from L1 and L2 responses respectively. In Figure 3, each point represents a single listener plotted by how their L2L1 responses are different from their L1 (x-axis) vs. L2 (y-axis) responses. Most listeners are clustered in the bottom left corner, with very little difference between the two tasks (e.g., Listener A in Figure 4). However, for those listeners with asymmetries, performance on the cross-language mapping task was more similar to the L2 than the L1 task (e.g. those listeners below the diagonal line). (e.g., Listener B in Figure 4). A paired t-test confirms that  $|L2L1 - L1|$  is larger than  $|L2L1 - L2|$  ( $t = 2.1509$ ,  $df = 86$ ,  $p = 0.03429$ ). For each listener, we also calculated the difference between ASP.RATE in the L2 task and the average ASP.RATE of the English control listeners, as a measure of their L2 perceptual proficiency ( $|Control - L2|$ ). We then examined how well listeners' L2 perception proficiency predicts the degree of relative influence of L2 perception vs. L1 perception on L2L1 mapping ( $|L2L1 - L1| - |L2L1 - L2|$ ) and found a significant effect ( $p=0.0295$ ), indicating listeners with higher proficiency rely more on their L2 than L1 in their cross-language mapping than listeners with lower proficiency (See Figure 5).

**Conclusion:** Our data suggest that L2 knowledge mediates cross-language perception, especially for higher proficiency listeners. The results are significant in showing how cross-language mapping is constrained by the (perceived) phonological categories of the L2 input

and that the phonological structure of L2 can play a role (cf. Paradis & LaCharite 1994) even in a perceptual adaptation task, thereby reconciling the conflicting predictions of the so-called “phonological” vs. “perceptual” views of loanword adaptation.

Table 1

Experiment	Stimuli	Response
L1	Korean	Korean
L2	English	English
L2L1	English	Korean

Figure 2

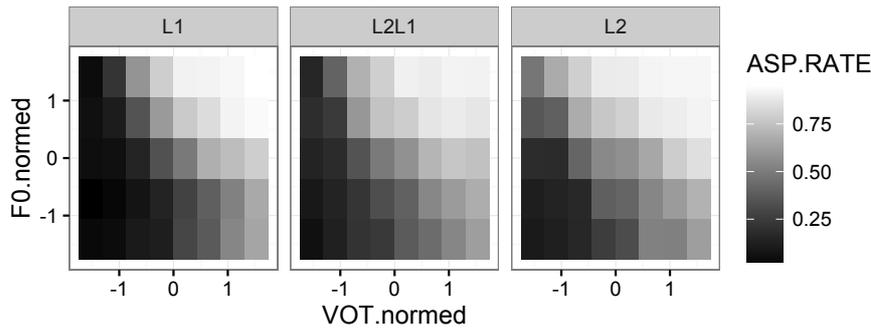


Figure 3

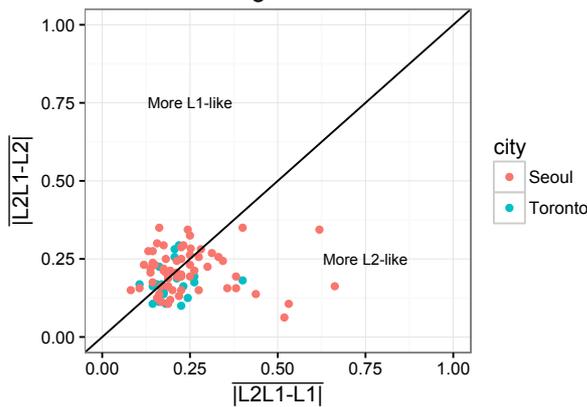


Figure 5

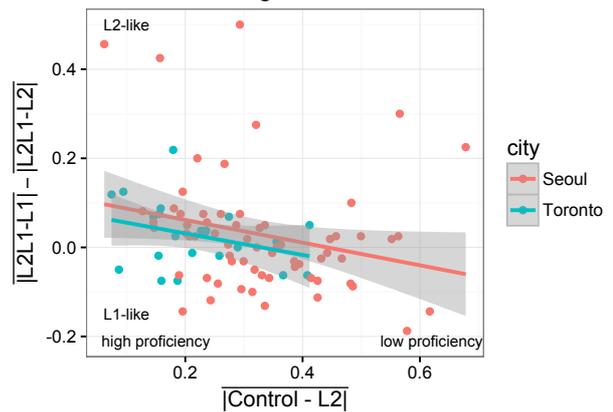


Figure 4

