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► **To cite this version:**

Julia Monnin, H el ene Loevenbruck, Mary E. Beckman, Jan Edwards. Dorsal and coronal acquisition in Drehu and French is unexpected by markedness constraints alone. ICPC 2012 - International Child Phonology Conference, Jun 2012, Minneapolis, MN, United States. hal-00781641

**HAL Id: hal-00781641**

**<https://hal.science/hal-00781641>**

Submitted on 28 Jan 2013

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## **Dorsal and coronal acquisition in Drehu and French is unexpected by markedness constraints alone**

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### **Aim**

Phonological development is often described as reflecting “markedness” constraints. For instance, Jakobson (1939) suggests that mastery of the contrast between [grave] labials and [acute] coronals necessarily precedes the more “marked” contrast between [diffuse] dentals and [compact] dorsals. Jakobson’s claim is corroborated in Locke’s (1983) review of studies of children acquiring English and several other languages, showing more accurate production of [t] relative to [k]. The general idea that speech production and processing universals determine the course of phonological development is developed also by Lindblom (1980), Davis et al. (2002), Wauquier and Yamaguchi (2011), among others.

Cross-sectional studies of children acquiring Greek (Nicolaidis et al. 2003), Japanese (Beckman, Yoneyama & Edwards 2003), and Drehu or French (Monnin & L oevenbruck 2010), by contrast, suggest that any tendency to produce coronals more accurately than dorsals is modulated by language-specific frequencies. In Drehu and French, the highly frequent [k] is slightly more accurate than [t]; in Drehu, the frequent [g], is much more accurate than the rare [d]. It might be argued that this modulation is not due to consonant frequency per se but is related to universal “fronted frames” versus “backed frames” (Davis et al. 2002). To disentangle markedness from language-specific constraints, the present study examines Drehu and French data on [k] and [t] in different vowel contexts.

### **Vowel context effect**

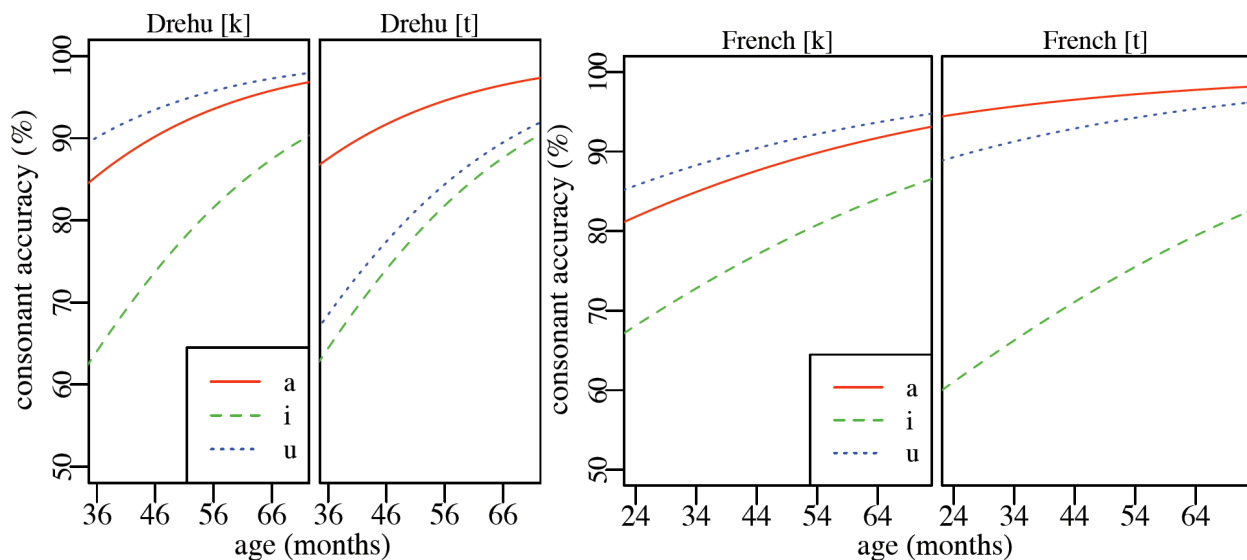
Word-initial consonant-vowel sequences were elicited from 4 groups of about 40 French-acquiring children aged 2 through 5 years, and from 3 groups of about 16 Drehu-acquiring children, aged 3 through 5, in a picture-prompted word-repetition task. Target sounds were transcribed by a native speaker. Figure 1 shows growth in accuracy by age for word-initial [k] and [t] in [a, i, u] contexts. Both stops are mastered early, but [k] is somewhat more accurate for the youngest children, as reported earlier. The difference in accuracy is modulated by vowel context. For Drehu, [t] is less accurate before [u] than [k], in keeping with the “backed frames” hypothesis (intrinsic difficulty of producing coronals before back vowels). For French, however, [t] is less accurate before [i] than [k], a result unexpected in a markedness account.

### **Frequency effect**

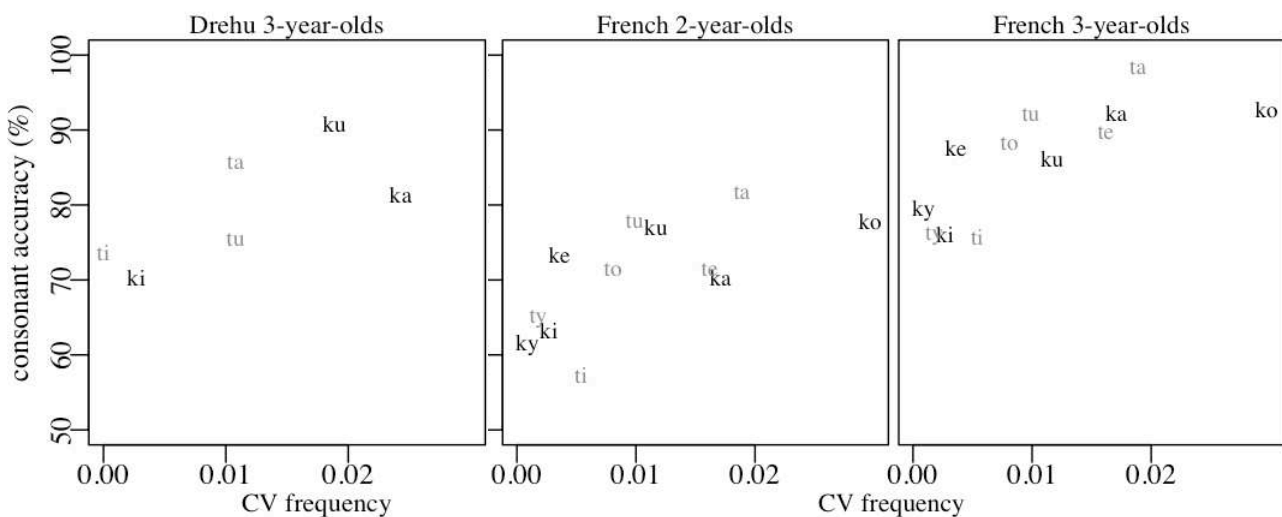
We also recorded two small corpora of child-directed speech. We use these to estimate the type frequencies of the word-initial consonant-vowel sequences elicited. Figure 2 shows the relationship between mean accuracy of [k] or [t] and these CV frequencies for the youngest group of Drehu-speaking children and the two youngest groups of French-speaking children. The lower frequency of [ti] relative to [tu] might explain the lower accuracy of [t] in the front-vowel context.

### **Current work**

The relationships plotted in Figures 1 and 2 support the idea that the relative accuracy of [t] and [k] in development reflects a modulation of the markedness of particular combinations of lingual stop and coarticulated vowel by language-specific phonotactics. Ongoing analyses examine stop burst spectra and vowel formants to evaluate whether there are cross-language phonetic differences in the consonant and vowel targets which might also contribute to the accuracy differences.



**Figure 1.** Growth in accuracy of [k] and [t] productions in the context of [a, i, u]. Curves are summed coefficients of fixed effects in a mixed-effects logistic regression model with age, consonant, vowel, and the consonant-by-vowel interaction as fixed effects and individual-level intercepts to capture differences in overall accuracy across the children.



**Figure 2.** Accuracy of [k] and [t] by CV frequency, in the context of [a, i, u] for Drehu-speaking 3-year-olds (left), and in the 6 contexts in which both consonants were elicited for French-speaking 2- and 3-year-olds (middle and right).

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