

# The NTU Linguist Chatroom



**Join us! Friday, 25 August 2017, 3.30pm  
@ HSS Conference Room (HSS-05-57)**

## Evidence of anatomical biasing on click production: Examining data from the ArtiVarK Study

In this talk I will discuss the ArtiVarK study, which was conducted as part of the Genetic Biases in Language and Speech (G[3]bils) project lead by Dr. Dan Dediu at the MPI for Psycholinguistics in Nijmegen (NL). The aim of ArtiVarK was to collect a large ( $n = 80$ ), ethnically diverse sample featuring speech production and vocal tract morphology data with the intent of examining the relation between vocal tract variation and variation in speech production patterns. The data comprise participant background information, audio recordings of a “phonetic training” session, 3D intraoral scans, and anatomical and static & real-time articulatory MRI scans.

While ArtiVarK has numerous different points of interest, I will focus on clicks, which, as phonemes, are speech sounds with a highly restricted distribution among the world’s languages. Our interest in examining clicks stems from the observation in Traill’s (1985) dissertation on the language !Xóõ that most of his participants appear to lack an alveolar ridge (prominence). Evidence from biomechanical modeling (Moisik & Dediu 2017) substantiates speculations (e.g., Traunmüller 2003) that this phenotypic variation of the wider “Khoisan” peoples might help account for the presence of clicks by serving to facilitate click production and hence lowering the threshold to their adoption as phonemes. While an intriguing possibility, the ArtiVarK data gives us a means to test this facilitation hypothesis by examining our participants’ performance at learning to produce clicks through phonetic training.

Our results do indicate a weak signal that alveolar ridge shape does matter in the production of clicks and in the expected direction (a less bulgy ridge being a predictor of success at clicking). Moreover, regardless of sex or physical size, smaller mouths are better for producing clicks, which corresponds well with the diminutive Khoisan mouth. But inconsistent with the Khoisan oro-facial phenotypic profile is the fact that U-shaped not V-shaped dental arches are more favourable for clicks. Thus we claim that vocal tract morphology matters in producing speech sounds such as clicks, but not *entirely* in the way we expected. The talk is then concluded with comments on how more detailed analysis of the ArtiVarK data will be done using Active Shape Modeling to extract articulatory information from the MRI data.

Moisik, S. R., & Dediu, D. (2017). Anatomical biasing and clicks: Evidence from biomechanical modeling. *Journal of Language Evolution*, 2(1), 37–51.  
Traill, A. (1985). Phonetic and phonological Studies of !Xóõ Bushman. In *Quellen zur Khoisan-Forschung* (Vol. 1). Hamburg: Helmut Buske Verlag.  
Traunmüller, H. (2003). Clicks and the idea of a human protolanguage. *Reports from the Department of Phonetics*, Umeå University (PHONUM), 9, 1–4.

## Speaker



**Scott MOISIK** is currently an Assistant Professor in the Division of Linguistics and Multilingual Studies at Nanyang Technological University, Singapore. His focus is on the ‘meat’ of speech: he does research on speech production with an emphasis on anatomy, physiology, and biomechanics of speech, and the genetic, developmental, and evolutionary underpinnings of the vocal tract. He is interested in how these factors, along with the aerodynamic, acoustic, perceptual, and social facets of speech, conspire to shape speech sound systems, both giving rise to striking similarities yet also diversity from one language to the next.

The TGIF seminar series is organised by the Division of Linguistics and Multilingual Studies, HSS

