Can unnatural stress patterns be learned: New evidence from Klingon

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As "the world's largest fictional language" (Okrand *et al* 2011:111), Klingon has more than 7,500 self-declared learners, between 20-100 fluent speakers, and at least one L1 learner (Okrent 2009). This study investigates how L2 speakers of a constructed language realize stress in casual conversation: Do they successfully acquire the unnatural stress pattern of Klingon?

Background: Linguist Marc Okrand, inventor of Klingon, informs us (pc. 2016) that the language has an unnatural stress system by design: The language is iambic with stress normally falling on the root. However, suffixed syllables ending in glottal stop attract stress (1) despite the fact that glottal stop does not add any moraic weight to the syllable (2), additional constraints are placed on verbs, not discussed here for reasons of space:

(1) a. [d͡ʒɪn.ˈ**mol**] 'a project'   b. [d͡ʒɪn.ˈ**mol**.xom] 'a minor project'
     c. [d͡ʒɪn.ˈ**mol**.xom.mej] 'minor projects'   d. [d͡ʒɪn.mol.ˈ**voʔ**] 'from a project'

(2) a. [pʰaʔ] 'a room'   b. [pʰatʰ] 'system'   c. [pʰaw] 'to arrive'
     d. [pʰawʔ] 'to collide' e. *[pʰawtʰ]

In (1d), despite other preceding syllables with sonorant codas, stress shifts to the syllable ending in [ʔ], a shift not found with the suffixes in (1b, c). In (2), we see that [ʔ] is the only segment permitted to follow an off-glide, suggesting that syllables in Klingon are maximally bimoraic, and that [ʔ] is the only segment that does not associate with a mora (*cf.* Zec 1988, 1995; Shaw *et al* 1999; Oostendorp 2000; Kavitskaya 2002; Windsor 2012).

Predictions: Buckley (2003) and Moreton & Pater (2012) argue that the acquisition of artificial phonological patterns provides a significant window to uncovering the learning biases for natural language and show that artificial phonologies can easily be acquired. However, the ease of phonological acquisition is argued to be inversely proportional to the complexity of the representation. Similarly, Carroll & Windsor (2015), testing first exposure L2 learners of German, argued that the lack of representational complexity facilitates target-like pronunciation in the L2. In this talk, the Klingon stress system is argued to be representationally simple in that it relies on segmental rules rather than prosodic structure. Therefore, it is predicted that that the Klingon stress system can successfully be acquired by speakers and that any errors in stress production can be attributed to discourse functions (eg. contrastive focus or emphasis).

Methodology: Recordings of spontaneous casual conversation between fluent L2 Klingon speakers were transcribed orthographically. Using the rules of stress application from the Klingon grammar (Okrand 1992), the transcription was annotated for predicted stress placement. The recordings of spontaneous conversation were then assessed for the realization of stress in production, and the predictions versus productions were contrasted. Where mismatches were found, the type of error was noted. The sentence was then played for a fluent speaker who provided pragmatic judgements on the potential error to see if it could be explained by discourse functions, or if it truly represented an error. The data were analyzed in R (2013) using Fisher's Exact Test.

Preliminary results and discussion: Our preliminary results suggest that high-proficiency L2 speakers of Klingon have successfully acquired the unnatural stress patterns of that language, and that deviation from the predicted stress patterns can almost entirely be explained by pragmatic confounds such as contrastive focus, negation, or emphasis. These findings support prior results, suggesting that artificial phonologies can be successfully be acquired (Buckley 2003; Moreton & Pater 2012). These findings open the door for future studies on the developmental path of second language learners acquiring an unnatural stress system and how quickly they do so.

Bibliography

Buckley, Eugene. 2003. Children's unnatural phonology. In P. Nowak & C. Yoquelet (eds.), *Proceedings of the Berkeley Linguistics Society* 29. 523-534.

Carroll, Susanne E. & Joseph W. Windsor. 2015. Segmental targets versus lexical interference: Production of second-language targets on first exposure with minimal training. In H. Peukert (ed.), *Transfer effects in multilingual language development*. Amsterdam: John Benjamins. 53-86.

Curtin, Suzanne. 2009. Twelve-month-olds learn word-object associations differing only in stress patterns. *Journal of Child Language* 36: 1157-1165.

de Lacy, Paul. 2006. Transmissibility and the role of the phonological component. *Theoretical Linguistics* 32. 185-196.

Kavitskaya, Darya. 2002. *Compensatory lengthening: Phonetics, phonology, diachrony.* New York: Routledge.

Moreton, Elliott & Joe Pater. 2012. Structure and substance in artificial-phonology learning. *Language and Linguistics Compass* 6: 686-718.

Okrand, Marc. 1992. *The Klingon dictionary*. Toronto: Pocket Books.

Okrand, Marc, Michael Adams, Judith Hendriks-Hermans, & Sjaak Kroon. 2011. 'Wild and whirling words': The invention and use of Klingon. In M. Adams (ed.), *From Elvish to Klingon: Exploring invented languages*. New York: Oxford University Press. 111-134.

Okrent, Arika. 2009. *In the land of invented languages*. New York: Spiegel & Grau.

Oostendorp, Marc van. 2000. *Phonological projection: A theory of feature content and prosodic structure.* New York: Mouton de Gruyter.

Oostendorp, Marc van. 2001. Constructed language and linguistic theory: On the notions possible, impossible and actual language. *Interface: Journal of Applied Linguistics* 15: 203-222.

Prince, Alan. 1990. Quantitative consequences of rhythmic organization. Parasession on the syllable in phonetics and phonology. *Chicago Linguistic Society* 26: 355-398.

R Core Team. 2013. R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. http://www.R-project.ort/.

Schreyer, Christine. 2011. Media, information technology, and language planning: What can endangered language communities learn from created language communities? *Current Issues in Language Planning* 12: 463-465.

Shaw, Patricia A., Susan J. Blake, Jill Campbell, & Cody Shepherd. 1999. Stress in hən'q'əmin'əm' (Musqeam) Salish. *Proceedings of the Workshop on Structure and Constituency in Languages of the Americas* 6. University of British Columbia: UBC Press.

Windsor, Joseph W. 2012. *When nothing exists: The role of zero in the prosodic hierarchy*. Saarbrücken, Germany: Lambert Academic Publishing.

Zec, Draga. 1988. Coda constraints and conditions on moraic projection. *Working Papers of the Cornell Phonetics Laboratory* 12. 255-303.

Zec, Draga. 1995. Sonority constraints on syllable structure. *Phonology* 12. 85-129.