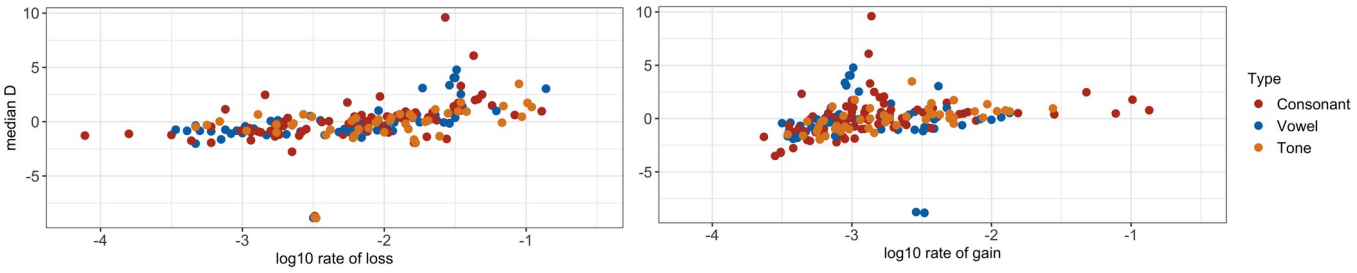
Is tone change more rapid and irregular than segmental change? -
A Mixtec case study

Despite the abundance of tonal languages around the world (Yip 2002), the diachrony of tone is still poorly understood, especially when compared to segmental sound change (Campbell 2021). This is even more so regarding tone change *per se* as opposed to tonogenesis (Ferlus 2004, Dockum 2019, among others). This *lacuna* has contributed to the assumption that tones are inherently unstable and can change unpredictably (Ratliff 2015). In this talk, I address the questions of whether tones change faster than segments and whether they can be used to inform subgrouping in the Mixtec languages of southern Mexico (Otomanguean). All Mixtec languages exhibit complex systems of lexical and grammatical tone that have to be reconstructed to the proto-language (Dürr 1987, Swanton & Mendoza Ruíz 2021) and most probably all the way back to proto-Otomanguean (Rensch 1976, Campbell 2021). As such, these languages provide an ideal case study for testing assumptions about tone change.

I created a database of tonal and segmental sound changes across a sample of 42 Mixtec languages. The changes were identified based on cognate sets derived from a 209-item basic vocabulary list. All entries were converted to IPA and standardized with regard to the tone notation for consistent identification of sound changes. For each cognate set, I reconstructed a proto-form (both tones and segments) applying the comparative method and incorporating previous reconstructions where available (Josserand 1983, Dürr 1987, Swanton & Mendoza Ruíz 2021). I established tone correspondences and tone changes across the 42 languages of the sample applying the comparative methods as with segments. The results of this work are stored in multiple, interlinked databases that can be expanded and re-used for other research questions in the future. Based on a posterior distribution of phylogenetic trees from a previous study (AUTHOR et al. submitted), I calculated phylogenetic signal with the metric *D* (Fritz & Purvis 2010) and estimated rates of gain and loss with a Hidden Markov Model (Beaulieu et al. 2013) for each segmental and tonal change identified.

The results, summarized in Fig. 1, show that tone change in Mixtec does not behave differently from segmental change in any significant way. Many tone changes carry phylogenetic signal and can thus contribute to our understanding of the internal structure of this language family just like segmental changes. Tones also do not change faster or slower than segments overall, exhibiting similar transition rates as segments. These two measures suggest that tone change operates much the same way as segmental change and should be investigated on a par with segmental change.

Fig. 1: Median *D* (phylogenetic signal, y-axis) and rates of gain and loss (change rate, x-axis) per sound change colored by type of change.



References

AUTHOR et al. submitted. [Title withheld to ensure blind review]

Beaulieu, Jeremy, O'Meara, Brian & Donoghue, Michael. 2013. Identifying hidden rate changes in the evolution of a binary morphological character: the evolution of plant habit in campanulid angiosperms. *Systematic biology, 62*(5), p.725–737.

Campbell, Eric W. 2021. Why Is Tone Change Still Poorly Understood, and How Might Documentation of Less-studied Tone Languages Help? In: Epps, Law, Pat-El (eds.). Historical Linguistics and Endangered Languages. Routledge

Dockum, Ricker. 2019. *The tonal comparative method: Tai tone in historical perspective*. Doctoral dissertation: Yale University

Dürr, Michael. 1987. A preliminary reconstruction of the Proto-Mixtec tonal system. Indiana 11. 19–61.

Ferlus, Michel. 2004. The origin of tones in Viet-Muong. In *Papers from the Eleventh Annual Meeting of the Southeast Asian Linguistics Society 2001* (pp. 297–313). Arizona State University Programme for Southeast Asian Studies Monograph Series Press.

Fritz, Susanne & Andy Purvis. 2010. Selectivity in mammalian extinction risk and threat types: a new measure of phylogenetic signal strength in binary traits. *Conservation Biology, 24*(4), p.1042–1051.

Josserand, J. Kathryn. 1983. Mixtec dialect history. Tulane University PhD dissertation.

Ratliff, Martha. 2015. Tonoexodus, tonogenesis, and tone change. In: Honeybone, Patrick & Joseph Salmons (eds.). *The Oxford Handbook of Historical Phonology*. Oxford University Press. pp. 245-261.

Rensch, Calvin R. 1976. Comparative Otomanguean Phonology. Bloomington: Indiana University Press

Swanton, Michael & Juana Mendoza Ruíz. Observaciones sobre la diacronía del tono en el Tu'un Savi (mixteco) de Alcozauca de Guerrero. In Arellanes & Guerrero (eds.), *Estudios lingüísticos y filológicos en lenguas indígenas mexicanas: Celebración de los 30 años del Seminario de Lenguas Indígenas*. México, D.F: Universidad Nacional Autónoma de México

Yip, Moira. 2002. *Tone*. Cambridge University Press.