Expanding StressTyp2: Integrating Pitch Accent and Tone

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StressTyp2 (ST2; [1]) is a forthcoming database of stress patterns of almost 700 of the world's languages, building on a combination of the original StressTyp database [2] and the Stress Pattern Database [3]. These databases catalogue patterns of secondary and primary word-level prominence traditionally referred to as 'stress', but include little information on pitch accent or tonal systems. As the difference between 'stress', 'pitch accent', and 'tone' is an issue of theoretical interest [4], this paper motivates and presents the modifications necessary for the structure of ST2 to accommodate pitch accent and tonal systems.

For simple pitch accent and tone systems which refer to metrical positions in a word, integrating them into the database's current structure would be simple. ST2 uses two codes to classify primary stress patterns—StressTyp Codes (STCs, [2]) and Syllable Priority Codes (SPCs, [3],[5])—in addition to a finite-state acceptor (FSA) formalism to indicate which syllable receives stress. For example, the STC 'P' and SPC '2R' indicate a pattern with penultimate stress. In languages where pitch accent or tone falls consistently on one syllable, this type of coding is sufficient. For example, the pitch accent pattern of Kagoshima Japanese, in which the accent falls on either the penultimate or ultimate syllable [6], is representable by the STCs 'P' and 'U' and the SPCs '2R' and '1R'. Also, lexical stress patterns are currently included in ST2, and lexical tone patterns like Mandarin Chinese could be treated similarly.

However, the nature of pitch accent and tonal patterns will require expansion of ST2's framework. ST2 is primarily concerned with the surface realization of stress patterns, but generalizations regarding pitch accent and tone systems often rely on abstract underlying representations. For example, words in Tokyo Japanese are thought of as having one abstract accent, even though this accent is manifested as a sequence of H tone morae followed by a drop to L. The Bantu language Digo shows surface tonal alternations that are best analyzed as the interaction between two underlying H tones [7]. This can be addressed by expanding the FSA formalism in ST2, which can only describe sets of strings, to finite state transducers, which describe string-to-string mappings.

Additionally, while primary stress patterns are predominantly culminative and obligatory, tone and pitch accent patterns do not always have these properties. Neither the accent pattern of Tokyo Japanese nor the pitch accent of Digo is obligatory, and while Tokyo Japanese is culminative, Digo is not [4,7].

This paper will address the above issues, among others, that will arise in modifying ST2 to include pitch accent and tone. If ST2 is modified according to these recommendations, the resulting database will become especially useful in comparing the nature of suprasegmental patterns, as it will include exactly the kind of stress-like pitch accent and tone systems that are relevant to disputing rigid definitions of terms like 'pitch accent', 'tone', and 'stress' [4].

[1] Goedemans, R., J. Heinz, and H. van der Hulst. 2013. StressTyp2. Forthcoming. **[2]** van der Hulst, H., R. Goedemans and E. Van Zanten. 2010. A survey of word accentual patterns in the languages of the world. Mouton de Gruyter: Berlin. **[3]** Heinz, J. On the role of locality in learning stress patterns. *Phonology*, 26(2):303-351, 2009. **[4]** Hyman, L. 2009. How (not) to do phonological typology: the case of pitch-accent. *Language Sciences* 31: 213-238. **[5]** Bailey, T. 1995. *Nonmetrical Constraints on Stress*. Ph.D. thesis, University of Minnesota. Ann Arbor, Michigan. **[6]** Ishihara, S. 2012. Osaka and Kagoshima Japanese citation tone acoustics. *Journal of the International Phonetic Association*. 42(1): 1-21. **[7]** Kisseberth, C. 1984. Digo tonology. Clements & Goldsmith, *Autosegmental Studies in Bantu Tone*: 105–182. Foris Publications.