Determining L3 Phonological Proximity

Dr. John Archibald
University of Victoria

One recurring question in the field of third language acquisition (L3A) is how the learner determines either the linguistic proximity of two structures, or the typological proximity of two grammars. Rothman (2013) argues that the typologically closer grammar will form the L3 initial state. Westergaard et al. (2016) argue that transfer takes place structure by structure depending on which pairing of structures (L1/L3 or L2/L3) is more similar.

The machinery for assessing linguistic proximity, however, has been under-examined. Rothman (2013) argues that the parser determines typology. He suggests that lexical and phonological comparisons are more 'straightforward' than morphological or syntactic comparisons, but is unclear *how*. Slabakova (2016) is also unclear on the evaluation metric which allows her 'scalpel' to work. Both these models *lack* a concrete comparison algorithm. I will sketch out such an algorithm at the word level within models of spoken word recognition (Archibald, in press; Gwilliams et al. 2018). This is necessary as we need is a theory of how the multilingual processes/parses new L3 input addressing the Credit Problem (Dresher, 1999).

Even in the lexical and phonological domains, we need a learning theory which will tell the learner when to set up a new grammar. Roeper (2018) hints at this by drawing the distinction between grammar *acquisition* and *choice*. In assessing what I will call *I-proximity* (i.e., not psychotypology) we must deal with choice on a micro-level.

Building on multiple grammar theory (Amaral & Roeper, 2014), and cue-based learning (Dresher, 19999; Westergaard, 2009) we can look at measures for assessing linguistic I-proximity phonologically. When new input is detected, it is analyzed to see if the cue is best analyzed as either L1 or L2. By cue matching, the L3 initial state of the particular structure (representational *treelet* in the sense of Fodor, 1999) is determined. In this poster, I will explore an algorithm via case studies of segmental (assigning phones to phonemes), syllabic, and metrical (assigning syllables to feet) parsing. This can also be done by comparing computational outputs (MacKenzie, 2013).

A confounding factor to be considered, however, is the fact that bilinguals (having more experience listening to diverse language input than monolinguals) relax their category-assignment mappings when it comes to parsing. We see this for segments (Kennedy & Trofimovich, 2008) and for stress (Reinisch & Weber, 2012). Yet, while a Bayesian metric (Poeppel et al, 2008) works for spoken word recognition, for the *acquisition* of an L3 phonological grammar, I propose the Tolerance Principle (Yang, 2017; 2018a) be applied to phonological treelets which would guide the choice of an L3 phonological representation.

Tolerance Principle
If R is a productive rule applicable to N candidates in the learning sample, then the following relation holds between N and e, the number of exceptions that could but do not follow R:

$$e \leq \theta_N \text{ where } \theta_N = \frac{N}{lnN}$$

So, if the L3 learner has acquired 1000 words then the threshold would be 145 (Yang, 2018b). If analyzing the L3 forms with the L1 rule has more than 145 exceptions, the rule would not be adopted. If the L3 forms had fewer than 145 exceptions when analyzed with the L2 rule, then it would be adopted. The explanatory power of this principle to determine when an L3 productive rule should be set up will be explored.

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