

Close but not proximate: The significance of phonological segments in speaking depends on their functional engagement

Converging evidence points to a difference between European and Chinese languages in the type of the initial units of phonological encoding for speaking. The phonological access points or “proximate units” (1, 2) are segmental in Indo-European languages but whole syllables in Chinese. Accordingly, Chinese speakers, unlike English speakers, do not register the presence of consistent initial consonants in several word production tasks. Qu et al.’s (3) intriguing report both supports and challenges this interpretation. In their experiment, Mandarin speaking participants produced picture descriptions comprising a color-adjective and noun that shared or did not share initial segments (e.g., green guitar vs. blue guitar in English). Consistent with previous findings, there was no response time benefit of shared initial phonemes. In seeming contrast, there was an early differentiation between shared and different onset conditions in event-related potentials (ERPs).

In combination, these findings can be interpreted as particularly compelling evidence for the subordinate role of phonemes in production of Chinese: Even though the electrophysiology reflected the presence of shared phonemes, there was no behavioral effect. However, how exactly are phonemes subordinated? Qu et al. (3) proposed a complex account involving override of phonological activation by a monitoring process. However, this does not fully comport with the evidence. Because object name retrieval is rapid but adjectives are prenominal, it is plausible that adjectives and nouns are coactivated. What is not clear is how the ERP signature of the resulting phonological concord relates to production. The ERP patterns arose in a 200- to 400-ms window, whereas speech was not initiated until about 900 ms, fully 300 ms later than that typically observed in single word production (4). This suggests that the ERPs may index phonological connectivity but not necessarily

functional engagement of segments in preparation for production. Moreover, if the cancelling process account is correct, one would expect facilitation, rather than a null effect, in faster single-word production tasks for which monitoring is not needed.

We also question Qu et al.’s equation of the proximate unit account (1) with the view that phonemes are vestigial in production of Chinese. We certainly do not endorse the idea that “phonemes are artifacts resulting solely from experience with an alphabetically organized orthographic system” (ref. 3, p. 14266). In the report by O’Seaghdha et al. (figure 1A in ref. 1), we spelled out a model for Mandarin Chinese in which syllables are primary but in which phonemic specification occurs for every selected syllable. Our statement that speakers of Mandarin “intend to produce syllables, perhaps to the exclusion of subsyllabic ingredients” (ref. 1, p. 285) thus refers to an early intentional phase of production rather than to the entire process.

These concerns aside, Qu et al.’s findings (3) bode well for future more complete accounts of word production across languages. Their article promises that comparison of ERP patterns for conditions sharing a variety of phonological units (e.g., syllables and segments among others) in Chinese, European, and other languages will be very informative.

Padraig G. O’Seaghdha^{a,1}, Jenn-Yeu Chen^b, and Train-Min Chen^b
^a*Department of Psychology and Cognitive Science Program, Lehigh University, Bethlehem, PA 18015;* and ^b*Department of Chinese as a Second Language, National Taiwan Normal University, Taipei 106, Taiwan*

1. O’Seaghdha PG, Chen J-Y, Chen T-M (2010) Proximate units in word production: Phonological encoding begins with syllables in Mandarin Chinese but with segments in English. *Cognition* 115(2):282–302.
2. O’Seaghdha PG, Chen J-Y (2009) Toward a language-general account of word production: The proximate units principle. *Proceedings of the 31st Annual Conference of the Cognitive Science Society*, eds Taatgen NA, van Rijn H (Cognitive Science Society, Austin, TX), pp 68–73.
3. Qu Q, Damian MF, Kazanina N (2012) Sound-sized segments are significant for Mandarin speakers. *Proc Natl Acad Sci USA* 109(35):14265–14270.
4. Indefrey P, Levelt WJ (2004) The spatial and temporal signatures of word production components. *Cognition* 92(1-2):101–144.

Author contributions: P.G.O., J.-Y.C., and T.-M.C. wrote the paper.

The authors declare no conflict of interest.

¹To whom correspondence should be addressed. E-mail: pat.oseaghdha@lehigh.edu.