

Gesture alignment in a stressless language

A recent strand of work on the prosody of Indonesian languages has uncovered a region where both tone and stress are entirely lacking (Zanten et al., 2010; Maskikit-Essed and Gussenhoven, 2016; Goedemans and van Zanten, 2014). What had previously been described as word-based stress is recast as phrase- or utterance-final phenomena (cf. Gordon, 2014). Beyond establishing stresslessness as more widespread than previously understood, this also raises a number of interesting theoretical questions. Here, we approach some of these questions with novel evidence from manual gesture. First, if hand gestures are coordinated with stress cross-linguistically (Kendon, 1980), how are such gestures coordinated in stressless languages? Second, are the attested variations in boundary tone placement across Indonesian languages and dialects reflected in the timing of manual gesture.

The basis of the study reported here comes from an hour long sermon by a preacher from Pekanbaru, Sumatra (Abdul Somad), speaking in a recognizably Sumatran variety of Indonesian. The video was tagged by a naive viewer for perceived beat gestures (sharp hand movements with a clear apex, McNeill 1992) without access to the audio or a view of the speaker's head. The location of the beat apexes were then mapped onto a segmental transcription of each utterance to analyze their relation to prosodic structure. The stills in (1) show a beat gesture involving the forceful lowering of the speaker's right hand. The first image corresponds to the the nucleus of the first syllable of *korban* 'sacrifice' while the second image corresponds to the second syllable. The apex of the gesture—in this case, contact between the hand and table surface—is aligned to the end of the word.

Many languages on Indonesia's western rim, including varieties of Malay, show prosodic prominence on the final syllable within the word or phrase despite being essentially stressless. We thus expect beat gestures to be either bound to word/phrase-final prosodic prominence, possibly as in (1), or be completely decoupled from intonational and other prosodic phenomena. The first observation is that the final syllable alignment in (1) is in fact highly regular and appears to take the word as its domain, as shown in (2), where the red highlighting represents the location of each gestural apex. On further examination, we find that beat gestures respect constituent structure and often align to prosodic prominence, more specifically, an H tone. This is seen in (3), where | represents prosodic phrase breaks and the red arrows highlight the alignment of gestures to pitch movements in the annotation below. Here, gestures appear to be aligned with prominent final syllables of prosodic phrases. Data of the type represented in (4) shows, however, that beat gestures can be aligned to constituents smaller than the prosodic phrase. Here, we find gesture alignment to the final syllable of *kalau* and *anak-anak* but in the second clause we find gesture alignment to the final syllable of each of the bracketed constituents, none of which show any prosodic evidence of phrasehood, with the exception of the subject pronoun. Yet there is a clear pattern here: the gestures are aligned with the final syllable in all cases with the exception *kita*. While there are no clear pitch accents cooccurring with the gesture apex, there does seem to be final lengthening in many but not all of the words that host a gesture. Note also that hypothetical structures such as *anak kita* (child 1PL) or *di rumah* (LOC house), where the first word in a small phrase hosts a gesture, are far more rare than the attested configurations in (4).

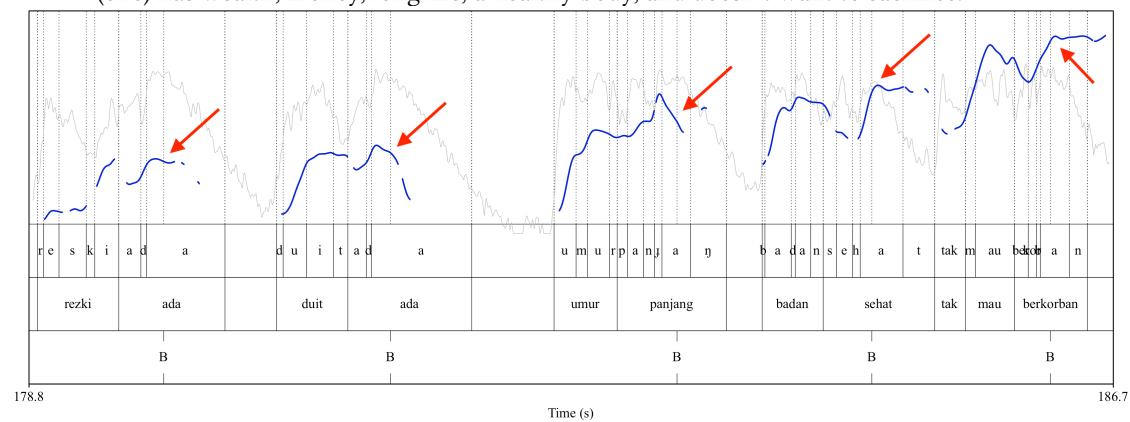
This presentation represents the first thorough study of gesture alignment in a stressless language but we can already draw several preliminary conclusions: (i) With regard to the typology of Austronesian prosodic systems, Sumatran Malay may well fit into the Western Rim prototype (Kaufman and Himmelmann, forthcoming) in showing strong tendencies towards final syllable prominence as evinced not only by pitch movements but also manual gestures. (ii) We find that beat gestures are systematically aligned to prosodic word edges even without outward evidence of stress, pitch or durational prominence. This addresses an overarching research question of whether the absence of stress implies the absence of prosodic structure on the word level. The current study supports a view like that of Maskikit-Essed and Gussenhoven's (2016) analysis of Ambonese Malay as possessing prosodic word *structure* while lacking prosodic word *prominence*.



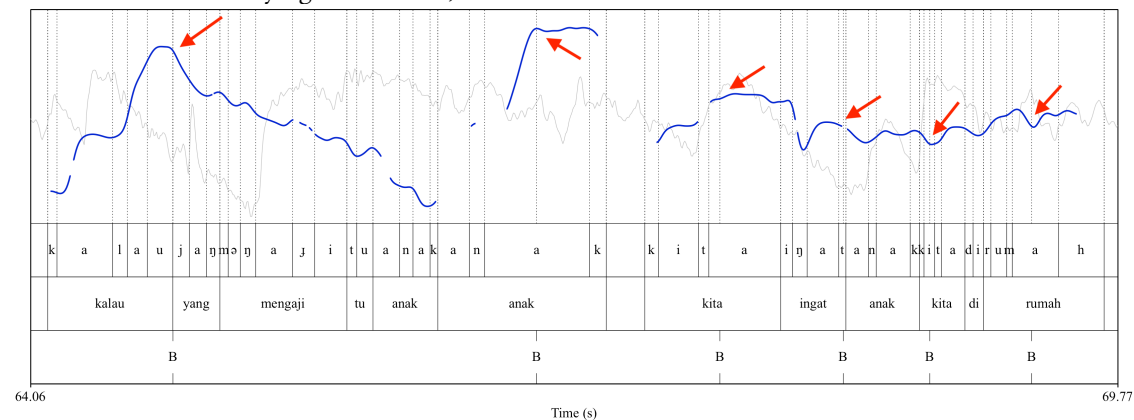
(1)

- (2) apa hukum berkorb^{an} untu? ora^{ng} yar sudah mati
 what law sacrifice for person RELT already dead
 ‘What is the law regarding sacrificing for someone who has already died?’

- (3) rezki ada | duit ada | umur panjang | badan sehat | tak mau berkorban
 wealth EXT money EXT age long body healthy NEG want sacrifice
 ‘(one) has wealth, money, long life, a healthy body, and doesn’t want to sacrifice.’



- (4) C[kalau] TP[yang mengaji tu anak-anak] || NP[kita] V[ingat] NP[anak kita] PP[di rumah]
 if RELT AV:study DEM COLL~child 1PL recall child 1PL LOC house
 ‘If the ones studying are children, we recall our children at home.’



References

- Goedemans, Rob, and Ellen van Zanten. 2014. No stress typology. In *Above and Beyond the Segments: Experimental linguistics and phonetics*, ed. Johanneke Caspers, Yiya Chen, Willemijn Heeren, Jos Pacilly, Niels O. Schiller, and Ellen van Zanten, 83–95. Amsterdam and Philadelphia: John Benjamins.
- Gordon, Matthew. 2014. Disentangling stress and pitch-accent: a typology of prominence at different prosodic levels. In *Word Stress: Theoretical and typological issues*, ed. Harry van der Hulst, 83–118. Cambridge: Cambridge University Press.
- Kaufman, Daniel, and Nikolaus P. Himmelman. forthcoming. Suprasegmental phonology. In *The Oxford Guide to the Western Austronesian Languages*, ed. Alexander Adelaar and Antoinette Schapper. Oxford: Oxford University Press.
- Kendon, A. 1980. Gesture and speech: two aspects of the process of utterance. In *Nonverbal Communication and Language*, ed. Mary R. Key, 207–227. The Hague: Mouton.
- Maskikit-Essed, Rachel, and Carlos Gussenhoven. 2016. No stress, no pitch accent, no prosodic focus: the case of Ambonese Malay. *Phonology* 33:353–389.
- McNeill, D. 1992. *Hand and mind: What gestures reveal about thought*. Chicago: University of Chicago Press.
- Zanten, Ellen van, Ruben Stoel, and Bert Remijsen. 2010. Stress types in Austronesian languages. In *A Survey of Word Accentual Patterns in the Languages of the World*, ed. Harry van der Hulst, Rob Goedemans, and Ellen van Zanten, 87–112. Berlin: De Gruyter.