
Phonetic realization of gestural prominence and beat-likeness: Evidence from a TED Talk in Standard German

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Co-speech gestures can vary in their degree of prominence and 'beat-likeness', two independent properties proposed in the *M3D* labeling scheme (Rohrer et al. 2023). While gestural prominence describes the level of visual saliency of a (manual) stroke relative to neighboring movements, beat-likeness refers to the perception of an underlying rhythmic pulse of a gesture. We are interested in the phonetic and kinematic correlates of these two perceptual concepts.

In our pilot study, we manually annotated 378 gestural strokes in a TED Talk produced by a female native speaker of Standard German. Five annotators independently assessed perceived prominence (1: *weak*, 2: *typical*, 3: *strong*) and beat-likeness (0: *not beat-like*, 1: *somewhat beat-like*, 2: *very beat-like*) of strokes. We used median scores as our consensus ratings. A *MediaPipe*-based script (Trujillo & Pouw, 2021) was adjusted to extract stroke duration, absolute vertical displacement as well as max and mean speed per stroke derived from the movement of the speaker's right wrist (i.e., her dominant hand). We expected prominence to correlate with longer stroke duration, larger absolute displacement, and higher speed. We also tested if stroke duration, displacement as well as mean and max speed could be kinematic correlates of perceived beat-likeness.

We fitted GLMs with prominence, beat-likeness, and their interaction as predictors. Model selection was performed to optimize fit. Our results have revealed that more prominent gestures have longer duration, whereas more beat-like gestures are shorter. These differences are more pronounced on more prominent strokes. Prominence corresponds to increased absolute displacement, even more so for *not beat-like* gestures. Higher mean speed correlates with an increase in both prominence and beat-likeness. However, only prominence, but not beat-likeness, is associated with increases in max speed. Max speed may indicate prominence but not beat-likeness because beat-like gestures are short and uniformly fast, while *not beat-like* gestures show more dynamic speed profiles. Prominent gestures may be both faster on average and more dynamic. In the future, we will also consider acceleration and deceleration as well as gesture referentiality.

References: • Rohrer, P. L., Tütüncübası, U., Vilà-Giménez, I., Florit-Pons, J., Esteve-Gibert, N., Ren-Mitchell, A., Shattuck-Hufnagel, S. & P. Prieto (2023). *The MultiModal MultiDimensional (M3D) labeling system*. • Trujillo, J.P. & W.T.J.L. Pouw (2021). *Kinematic Feature Extraction for Motion Tracking Analysis*.