English compound prominence and compound semantics are mutually predictable

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Previous research identified many factors influencing compound prominence (as in *chíld care* vs. *home phóne*), chiefly related to semantics (e.g. Bell & Plag, 2012, 2013). The nature of this variation, however, is still unclear and raises fundamental concerns about the reality and theoretical treatment of the commonly assumed categorical binary stress patterns (e.g. Kunter, 2010, 2011)

Following ideas in recent research on pitch contours in Mandarin (Chuang et al., 2024), the present study implements a linear discriminative learning model (LDL; Baayen et al., 2019) in which we predict the meaning of compounds from their pitch or intensity contours, and vice versa.

Using 760 English compound tokens from the Boston University Radio Speech Corpus (Ostendorf et al., 1996; Plag et al., 2008), LDL networks were trained on either the pitch or the intensity contours, and on context-dependent semantic vectors computed with GPT2 (Radford et al., 2019). Testing the trained networks on held-out compound tokens, we found that in 88 % of cases the model identified the correct compound semantics based on the pitch contour. For intensity, the accuracy was even higher with 94 %. Predicting pitch and intensity contours from a given compound's semantics appeared to be more difficult with accuracy rates of 39 % and 53 %, respectively.

The present study provides first evidence suggesting that the acoustic signal on the one hand, and context-dependent semantics on the other are closely connected. Using prosodic information from a form's signal alone, one can predict its semantics, and using context-dependent semantics, one can predict a form's pitch and intensity contours.

Regarding the puzzle of prominence in noun-noun compounds, our findings point away from discrete factors used in previous research and instead advocate an approach that leverages the features of the phonetic signal and the corresponding semantics in a discriminative learning process.

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