

Evidence for a prosodic prominence budget in German utterances

Simon Roessig, Janne Lorenzen, Stefan Baumann
IfL Phonetik, University of Cologne, Germany

In this study, we investigate prosodic prominence relations of two succeeding discourse referents. Prosodic prominence of a discourse referent is modulated, among other factors, by its information status. Discourse-*given* referents are often produced less prominently, i.e., with less salient acoustic features, while discourse-*new* referents are more prominent. *Accessible* referents, which have not been explicitly mentioned but are predictable through the context, occupy an intermediate position on the prosodic prominence scale [1], [2]. Beside information status affecting the prominence of single referents, we argue that the syntagmatic relation between two referents in the same utterance (both in terms of meaning and prosodic form) is crucial in determining their prominence level.

To test this claim, we ran an online production task asking 32 native speakers of German to read aloud short stories in such a way that a fellow participant would be able to memorize them and sort corresponding picture cards into the correct order. The eight stories consisted of four sentences, the third of which was the test sentence. Each test sentence contained two target words as indirect and direct objects (see Figure 1 for an example). These were either *new* or *accessible* through the picture cards and the context provided in the second sentence.

The test sentences were annotated prosodically following DIMA [3]. Accent types on the target words were assigned a prominence score based on judgments collected by [4], which can be regarded as a perceptually motivated prominence hierarchy (see table).

| Accent type | Perceived degree of prominence (mean percentages) |
|-------------|---|
| LH* | 78.86 |
| L*H | 71.53 |
| H* | 69.64 |
| H!H* | 62.69 |
| HL* | 57.14 |
| !H* | 53.62 |
| L* | 43.97 |

We discuss preliminary results based on 24 speakers (192 utterances). In Figure 2, mean prominence scores are plotted by pitch accent position (*medial* or *final*) and information status of both referents. Evidently, the first target word is generally produced with more prominent accent types than the second one. This is likely to be a positional effect, since declarative German utterances often show a rising accent followed by a falling one in final position (cf. Figure 3). Overall prominence appears to be lowest in the *accessible-accessible* condition and highest in *new-new*. Syntagmatically, the largest decrease in prominence can be observed in the *new-accessible* condition, the smallest decrease in the *accessible-new* combination. This ranking is mirrored in word duration measures (Figure 4), where the difference between the target words is largest in the *new-accessible* and smallest in the *accessible-new* condition. An *accessible* referent following a *new* one is thus *relatively* least prominent while a *new* referent following an *accessible* one is most prominent, both in terms of duration and accent type. Furthermore, the durational differences between the referents in the ‘homogeneous’ conditions (*accessible-accessible* and *new-new*) are equal.

We regard this result as preliminary evidence for a (prosodic) *prominence budget* of an utterance that is determined by meaning-related cues such as the overall information status of discourse referents and which is distributed across these referents according to their semantic-pragmatic weight.





| | |
|--|--|
|  | <p>Anna hatte einen erfolgreichen Tag. “Anna had a successful day.”</p> |
|  | <p>Am Mittag sind einige Handwerker von der Baustelle nebenan in ihr Geschäft gekommen. “At noon, some craftsmen from the construction site next door came into her store.”</p> |
|  | <p>Unter anderem hat sie dem Maler eine Waage verkauft. “Among other things, she sold the painter a scale.”</p> |
|  | <p>Jetzt ist sie zu Hause und entspannt sich bei schöner Musik. “Now she is at home and relaxes by listening to beautiful music.”</p> |

Figure 1: Example story in *accessible-new* condition

References

- [1] M. Aylett, & A. Turk (2004). “The smooth signal redundancy hypothesis: a functional explanation for relationships between redundancy, prosodic prominence, and duration in spontaneous speech,” *Language and Speech*, 47(1), pp. 31–56.
- [2] W. Chafe (1994). *Discourse, Consciousness, and Time*. Chicago: Univ. of Chicago Press.
- [3] F. Kügler, S. Baumann, & C. T. Röhr (2022). “Deutsche Intonation, Modellierung und Annotation (DIMA) – Richtlinien zur prosodischen Annotation des Deutschen,” in C. Schwarze & S. Grawunder (eds.), *Transkription und Annotation gesprochener Sprache und multimodaler Interaktion*, pp. 23–54, Tübingen: Narr.
- [4] S. Baumann, & C. T. Röhr (2015). “The perceptual prominence of pitch accent types in German,” *Proceedings of the 18th ICPhS*, vol. 298, pp. 1–5, Glasgow: Univ. of Glasgow.

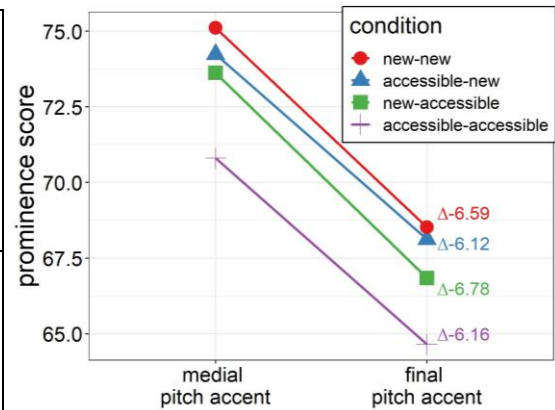


Figure 2: Mean prominence scores as a function of information status

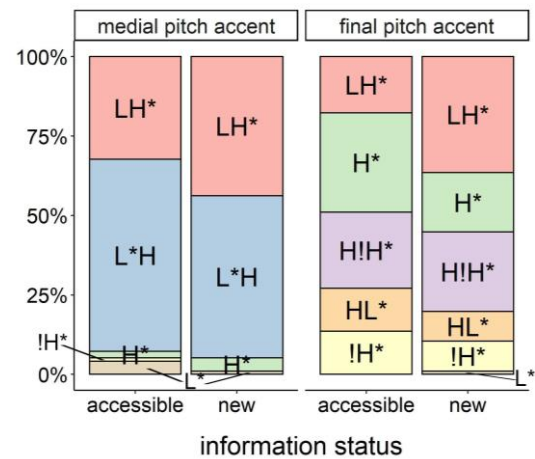


Figure 3: Medial and final pitch accent types as a function of information status

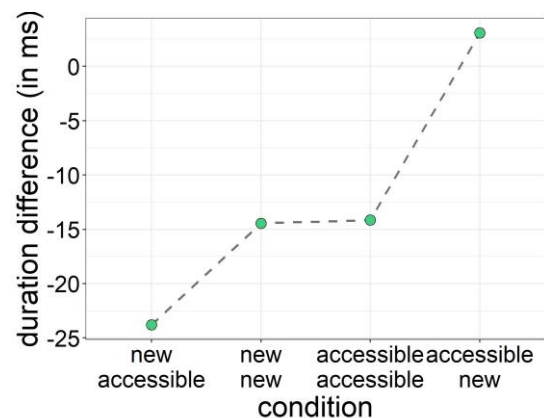


Figure 4: Mean differences in word duration (second target word – first target word)