

## **You don't have to say a word – How duration and F0 trigger or hinder the perception of function words in German.**

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Much of the focus of spoken language research has shifted from isolated read materials to spontaneous speech. Given the variability of spontaneous speech, how do listeners identify reduced words? Recent work (Dilley & Pitt, 2010; Niebuhr & Kohler, 2011) has shown that listeners interpret durations of speech sounds relative to speech rate context, such that relatively long sounds can be interpreted as cues to reduced or deleted lexical material. The present work aimed to replicate this recent work for German and extend it in two ways. First, we investigated whether it is possible for listeners to perceive multiple lexical interpretations for the same reduced speech. Second, we investigated the contribution of different types of prosodic contexts on which and how many words are perceived.

Experiment 1 materials consisted of sentences containing one of four /n/-initial polysyllabic nouns (*'Nachrichtensprecher*, *'Nebendarsteller*, *No'belpreisträger*, *Na'turheilmittel*); each was preceded by highly-reduced *denn einen*, a particle+article sequence, realized as lengthened noun-initial /n/. Six stimuli were derived from each sentence, based on two basic manipulations: target [n:] was time-compressed or the remainder was time-expanded. Three levels of prosodic manipulation were used: a moderate rate change with original pitch range, a large rate change with original pitch range, or a moderate rate change with expanded pitch range on the accented syllable. Experiment 2 used complementary sentences containing one of the four nouns, but *denn einen* was omitted. In Experiment 2 materials, the /n/ at the beginning of each noun was time-expanded, or the remainder was time-compressed. The same three levels of prosodic manipulation were also used as in Experiment 1. Each experiment additionally included the corresponding original sentences.

Forty-two native German speakers participated in the experiments, 21 in each study; the task was to transcribe each utterance. The frequencies of transcribing *denn einen*, *einen*, *denn*, or  $\emptyset$  prior to the nouns were determined. Mean frequencies revealed that the proportion of polysyllabic responses changed as a function of the relative duration of the target and context in both experiments. Time-compression and time-expansion were both effective at changing lexical percepts. Moreover, expanding the pitch-accent F0 range decreased the amount of perceived lexical material and/or triggered more *denn* transcriptions. The results suggest that listeners formed expectancies about lexical content based on speech rate and pitch-accent context. These expectancies then influenced the number of words and syllables perceived. These findings help to explain the robustness of speech recognition for casual speech.

(399 words)

### **References:**

Dilley, L. C. & Pitt, M. A. (2008). Now you hear it, now you don't: Effects of speech rate on function word perception. Paper presented at the 49th Annual Meeting of the Psychonomic Society, Chicago.

Niebuhr, O. & Kohler, K. J. (2011). Perception of phonetic detail in the identification of highly reduced words. *Journal of Phonetics* 39, 319-329.