**Introduction**

Does syntactic predictability facilitate spoken-word recognition? More specifically: does word-order information facilitate recognition of past participles? If so, is the influence of word order information different for casual and careful speech?  

**Hypothesis 1:** Yes - the influence of word order information is smaller in casual speech because the words carrying the syntactic information (i.e., auxiliary verbs) are often acoustically reduced.  

**Hypothesis 2:** Yes - the influence of word order information is larger in casual speech because listeners use it to compensate for the fact that the past participles are acoustically reduced.  

**Hypothesis 3:** No - the influence of word order information is the same for careful and casual speech.

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**Materials**

**Stimuli**  
64 Dutch sentences with pairs of auxiliary verbs and past participles in two word orders - both legal in Dutch.  

<table>
<thead>
<tr>
<th>Word order</th>
<th>Example</th>
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| Auxiliary-first (more predictive) | Ik weet zeker dat hij heeft geleund op de houten tafel.  
| Participle-first (less predictive) | Ik weet zeker dat hij geleund heeft op de houten tafel. |

Casual and careful versions of sentences recorded by female native Dutch speaker.

**Acoustic measurements**  

- **Past participles**  
  - geleden  
  - geleund  
  - geleund 
  - gekleurd  
  - gekleurd  
  - gekleurd

- **Auxiliary verbs**  
  - heeft  
  - heeft  
  - heeft

- **Schwa in past participles**  
  - gelift  
  - gelift  
  - gelift

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**Method & Results**

**Experimental method**

- **Visual world paradigm**  
  Participants listen to spoken sentences and see 4 words on a computer screen while their eye movements are being recorded.

- **Task**  
  “Click with the mouse on the word that occurred in the sentence.”

**Experiments**

- **Experiment 1:** Complete sentences; no time pressure.
- **Experiment 2:** Sentence up to target word; no time pressure.
- **Experiment 3:** Complete sentences; time pressure to speed up responses.

**Results combined across 3 experiments**

- **Fixations to target word (past participle)**
  - **Participle onset**
  - **Analysis window**

- **Reaction times from participle onset (ms)**
  - **Participle-first**
  - **Auxiliary-first**

**Eye fixations**

- More fixations to the past participle when it occurred in the more predictive word order (i.e., auxiliary-first).
- Fewer fixations to the past participle when it was produced in a casual manner.

**Reaction times**

- Interaction between word order and speaking style:  
  - The benefit of the more predictable word order (i.e., auxiliary-first) is larger for casual than for careful speech.

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**Discussion**

- Past participles easier to recognize when preceded by an auxiliary verb than when followed by an auxiliary verb.  
  ⇒ Word order information used to predict word classes, which facilitates word recognition.  

- Casually produced participles more difficult to recognize than carefully produced participles.  
  ⇒ Acoustically reduced words more difficult to recognize than carefully produced words.

- R1: suggest the additional benefit of word order information for casual speech emerges late during word processing.

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**Conclusions**

- Syntactic predictability, in the form of word order, is used during word recognition.
- It is used in casual speech although the auxiliary verbs are acoustically reduced.
- Support for Hypothesis 2: syntactic information used more in casual than in careful speech, compensating for reduction of past participle.

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**References**

