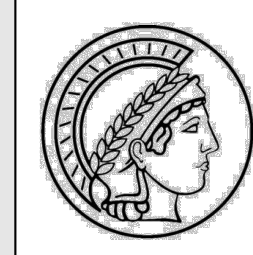


Syntactic predictability can facilitate the recognition of casually produced words in connected speech

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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.^[1]

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.

Materials

Stimuli

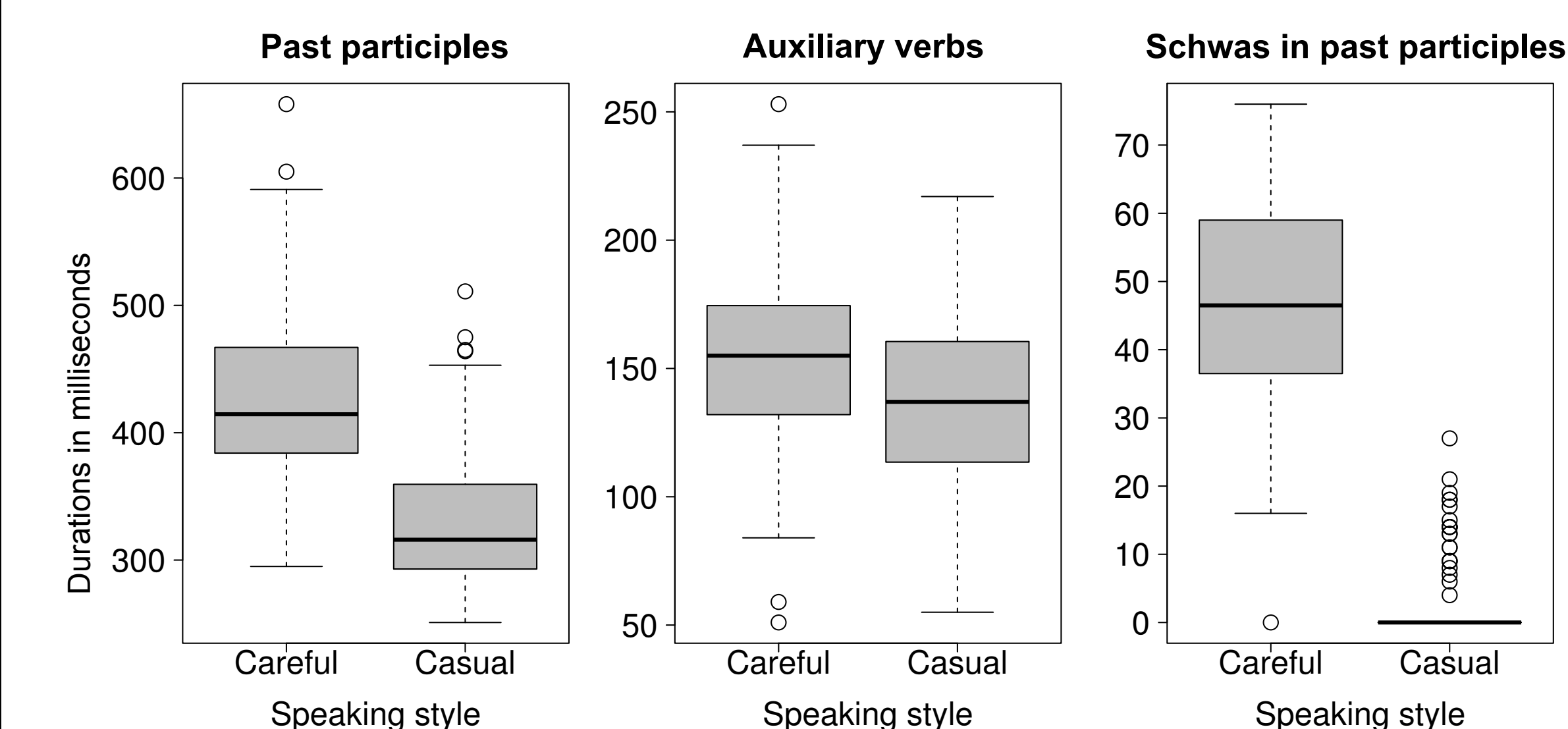
64 Dutch sentences with pairs of auxiliary verbs and past participles in two word orders - both legal in Dutch.

Word order	Example
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.

*I know for sure that he **has leaned** against the wooden table.*

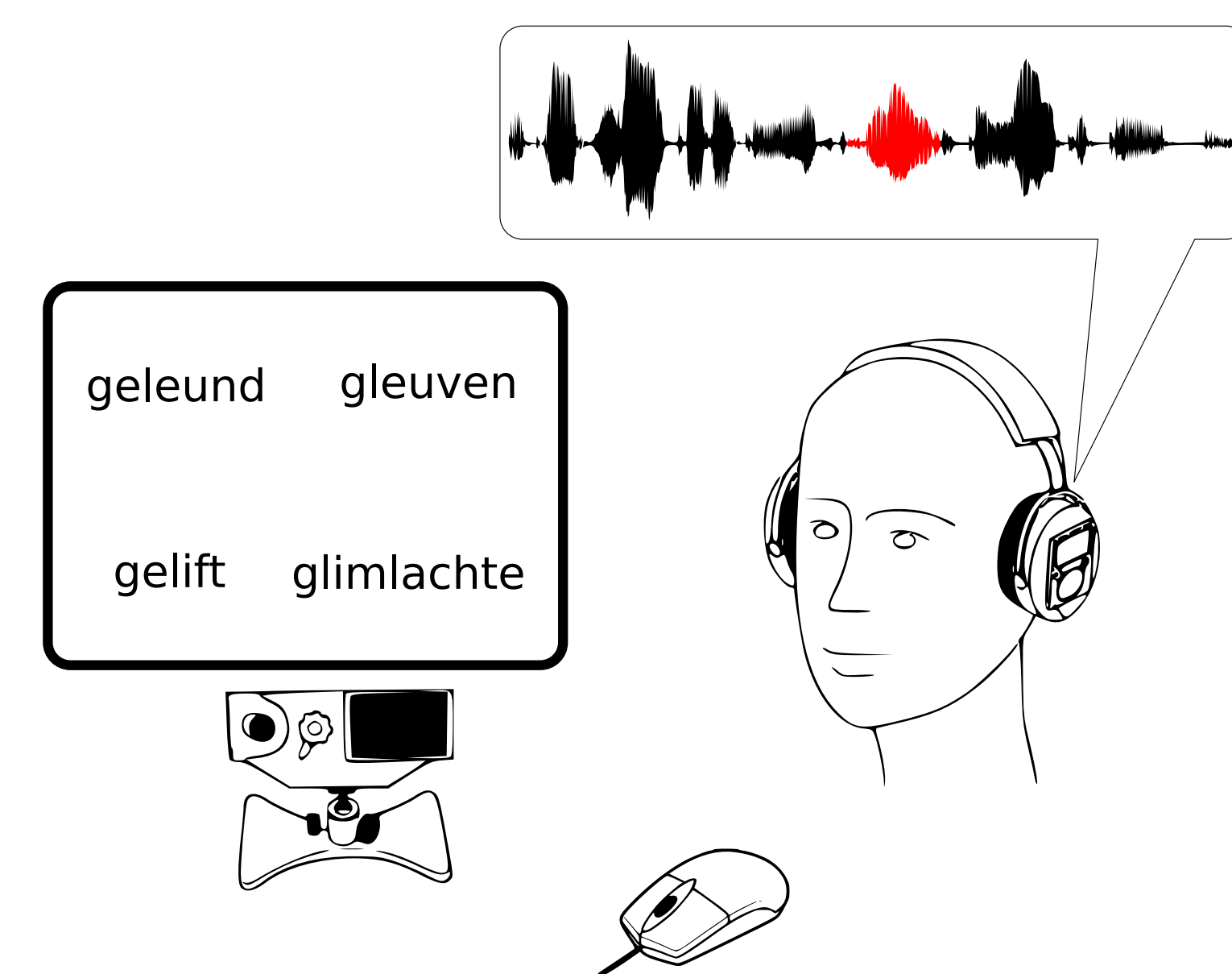
Casual and careful versions of sentences recorded by female native Dutch speaker.

Acoustic measurements



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.

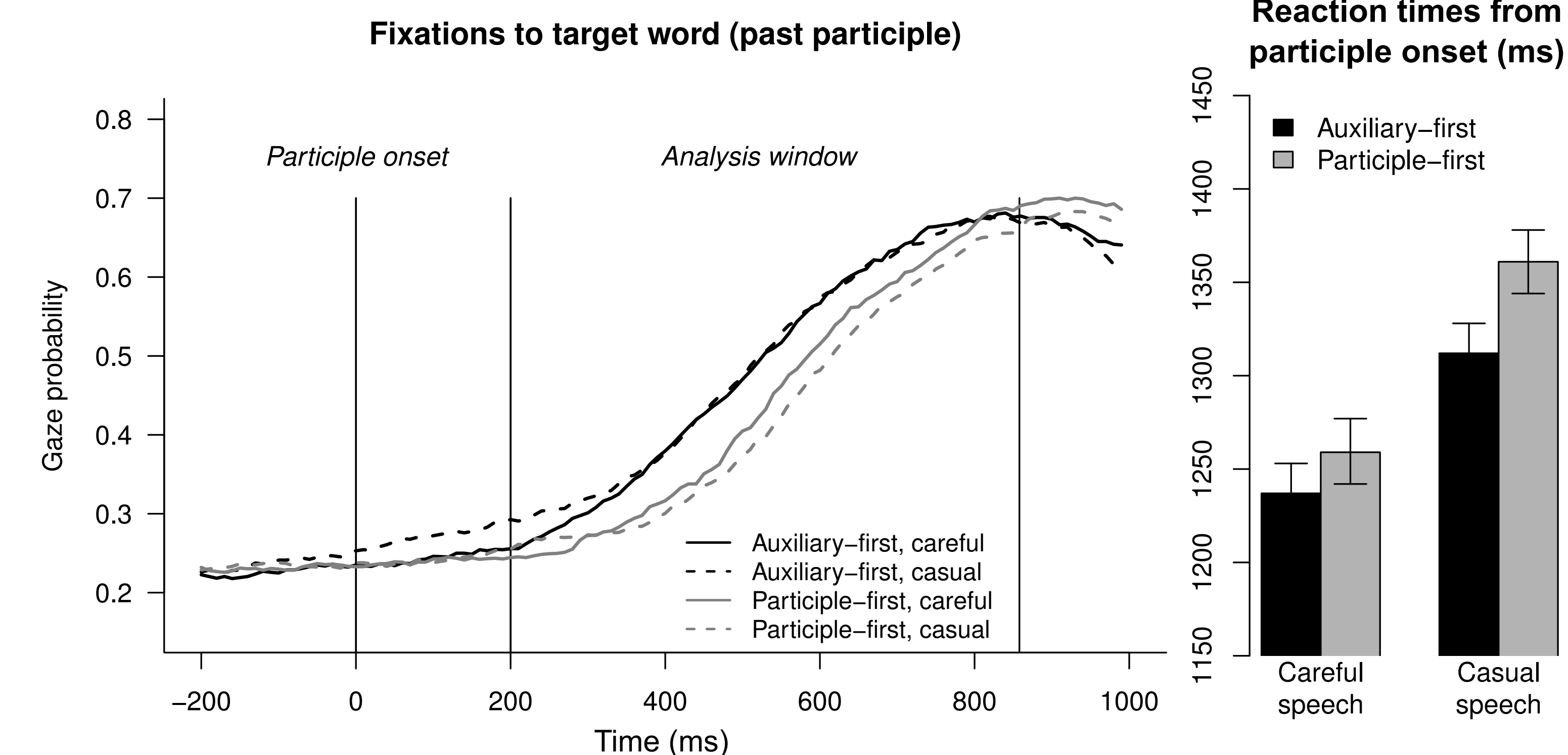
Task

"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



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.

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.^[2]

- Casually produced participles more difficult to recognize than carefully produced participles.

⇒ Acoustically reduced words more difficult to recognize than carefully produced words.^[3]

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

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.

References

- [1] Johnson, K. (2004). Massive reduction in conversational American English. In K. Yoneyman, & K. Maekawa (Eds.), *Spontaneous speech: Data analysis. Proceedings of the 1st Session of the 10th International Symposium* (pp. 29-54). Tokyo, Japan: The National International Institute for Japanese Language
- [2] Arai, M. and Keller, F. (2013). The use of verb-specific information for prediction in sentence processing. *Language and Cognitive Processing*, 28(4), 525-560.
- [3] Ernestus, M., Baayen, H., and Schreuder, R. (2002). The recognition of reduced word forms. *Brain and Language*, 81, 162-173.