THE DYNAMICS OF SENSE-MAKING:
ERP evidence of semantic involvement of words within words

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Introduction

In spoken language many words contain shorter words (e.g, *pain* in *champagne*). We know from word-recognition research that lexical and semantic representations of word-initial embedded words, e.g., the Dutch word *snor* (moustache) in *snorkel* (snorkel) are temporarily activated as the acoustic information unfolds. The evidence regarding the activation of word-final embeddings, e.g., the Dutch word *meel* (flour) in *kameel* (camel) is less conclusive. The aim of the present study is to examine the semantic involvement of embedded words during language comprehension and gain more insight into the dynamics of sense-making and its relation to lexical activation.

QUESTION

Do listeners briefly take into account the meaning of embedded words when making sense of spoken language?

Method

In two ERP experiments, listeners (n=28 per exp.) heard sentences in which the critical multisyllabic words contained either an initial or final embedding. The semantic fit of these carrier words and embedded words in the context was manipulated such that the semantic involvement of the embedded words should result in a modulation of the N400.

EXPERIMENT 1

INITIAL EMBEDDINGS

Contextually supported embedding ——————
De man vroeg de kapster of ze zijn **snor**kel op zolder had zien liggen
Lit. The man asked the hairdresser whether she his [moustache]snorkel in the attic had seen

Contextually unsupported embedding ············
De man vroeg de zangeres of ze zijn **snor**kel op zolder had zien liggen
Lit. The man asked the singer whether she his [moustache]snorkel in the attic had seen
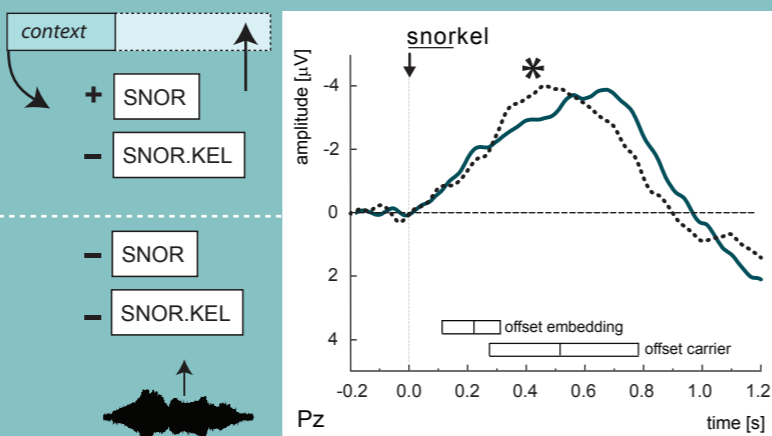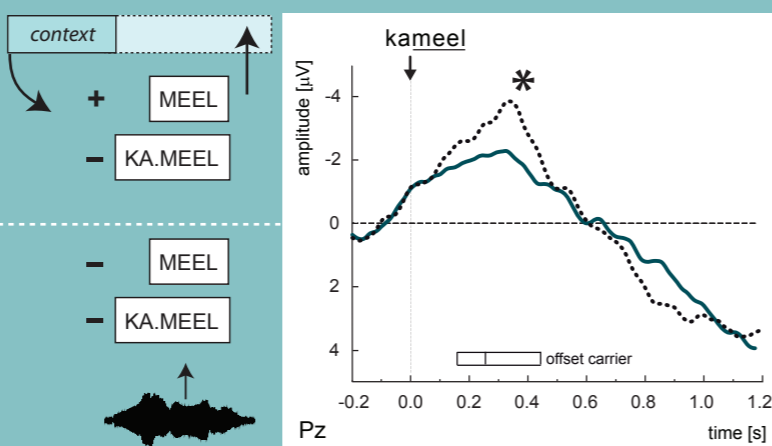

FINAL EMBEDDINGS

Contextually supported embedding ——————
Jane wilde een quiche bakken, maar zag dat er geen **ka**meel in de dierentuin was
Lit. Jane wanted to bake a pie, but saw that there no camel[flour] in the zoo was

Contextually unsupported embedding ············
Jane wilde een jurk kopen, maar zag dat er geen **ka**meel in de dierentuin was
Lit. Jane wanted to buy a dress, but saw that there no camel[flour] in the zoo was

When the context supports the embedding, both initial and final embeddings are taken into account.

EXPERIMENT 2

INITIAL EMBEDDINGS

With (unsupported) embedding ············
Toen Mark op vakantie naar Aruba ging, besloot hij een **snor**kel mee te nemen
Lit. When Mark went on holiday to Aruba, decided he a [moustache]snorkel to take

Without embedding ——————
Toen Kees op het schoolplein gevallen was, kreeg hij een **zwachtel** om zijn enkel
*Lit. When Kees fell on the playground, got he a **bandage** around his enkel*
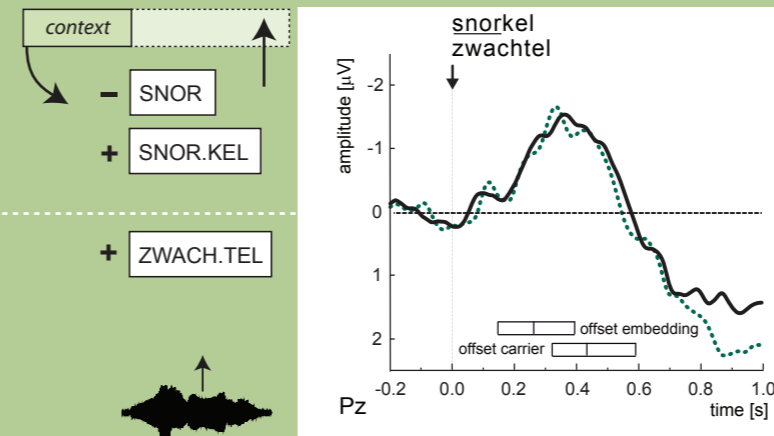
FINAL EMBEDDINGS

With (unsupported) embedding ············
Toen Emma in de dierentuin was, had zij geen **ka**meel of dromedaris gezien
Lit. When Emma was in the zoo, had she no camel[flour] or dromedary seen

Without embedding ——————
Toen Hanna haar tiende verjaardag vierde, wilde ze geen **patat** of pizza eten
*Lit. When Hanna celebrated her tenth birthday, wanted she no **fries** or pizza to eat*
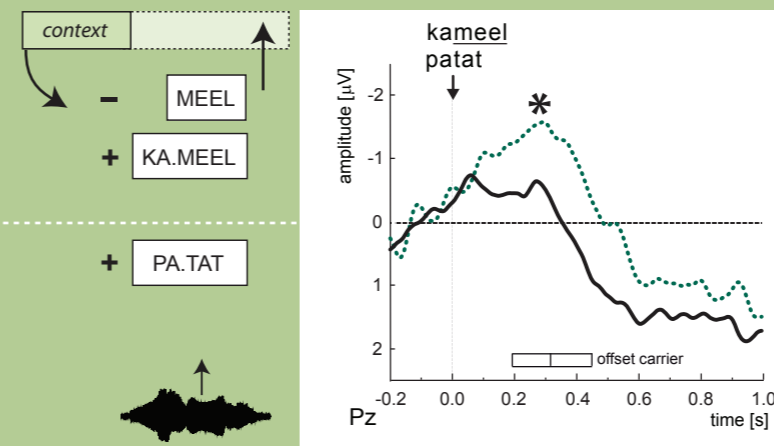
When the context supports the carrier word, only final embeddings are taken into account.

Results

When the context supports the meaning of the embedding and not that of the carrier word, listeners briefly take into account the meaning of both initial and final embedded words (EXP 1).

Surprisingly, listeners also take into account the meaning of final embeddings when the context supports the meaning of the carrier word and not that of the embedding, while initial embeddings are ignored in this situation (EXP 2).

Interpretation

- If σ is a strong syllable it may well be the onset of a word (metrical segmentation strategy).
- σ can be the beginning of only ONE word.
- If there are more possible lexical candidates with σ as beginning (given the speech input), the context strongly biases selection.

The sense-making system can pursue multiple interpretations for the same piece of signal (e.g., both *kameel* and *meel* are taken into account), except when the lexical candidates in question need the same piece of signal for their onset (e.g., initially only *snor* or *snorkel* is taken into account).