I. Introduction

Abstract:

We present results from two word-by-word self-paced reading experiments in German showing that the complexity of wh-fillers vs. non-wh-fillers (topicalized phrases, or ‘TOP-fillers’) in long-distance dependencies has differential processing effects, although from a syntactic point of view the two extraction types should involve the same displacement operations.

**Wh-extraction:** Processing of filler-gap-dependencies with wh-fillers has been shown to be sensitive to the complexity of the wh-filler (bare wh-word / which-NN phrase).

- **Type A findings:**
  In Dutch, complex wh-fillers incur longer reading times at the gap site than bare wh-words (Donkens, Hoeks, and Stowe, 2013).
  In English, complex wh-fillers in object questions cause greater processing difficulties in various tasks for children and aphasics (Avrutin, 2000; Goodluck, 2005, Shapiro, 2000).
- **Type B findings:**
  In English, bare wh-words incur longer reading times at the gap site than complex wh-fillers (Hofmeister and Sag, 2010).

**Topicalization:** Filler complexity has not been explored. Relevant related findings:

- Wh-and TOP-fillers of equal complexity in German: higher integration costs (P600) for wh-filler at the clause-final verb but no differences earlier in the clause (Felser, Chalsen, and Münte, 2003).
- German object fronting: higher processing costs throughout the clause in comparison to subject-initial clauses → suggested to be effect of storage costs in working memory (Weskott, 2003; Matzeke et al., 2002).
- Galician complex sentences with fronted objects: prolonged reading times → suggested to be reflecting active search for integration site (Pablos, 2006).

II. Method and Materials

**Two word-by-word self-paced reading experiments** 60 participants. Dependent variable: reading times. Conditions: SIMPLE/COMPLEX filler.

**Exp 1:** 40 item, 92 fillers. **SIMPLE:** bare wh-word. **COMPLEX:** which-phrase with adjective or with adjective + adverb

**Wh-questions (preceded by a context sentence)**

*Wen?* Welchen schwer kranken Jungen hat Jim gesagt, dass der Fahrer [VP GAP mit einem Wagen abgeholt hat] und...
*Wer?* Which seriously ill boy did Jim say that the driver [gap with a car picked up] has and...

**Topicalization**

_Einen Jungen_ / _Einen schwer kranken Jungen_ hat Jim gesagt, dass der Fahrer [VP GAP mit einem Wagen abgeholt hat] und...
_A einen_ / _A sehr kranken_ Jungen hat Jim gesagt, dass der Fahrer [gap with a car picked up] has and...

In both experiments, a gap site can be postulated well before the subcategorizing verb: before the PP, at the VP boundary (cf. e.g. Felser, Chalsen, and Münte, 2003).

III. Results and Discussion

**Wh-extraction:** longer RTs for the complex wh-filler, spanning from the noun in the PP (Wagen) until the clause-final auxiliary (hat).

- Filler complexity effects arise when a gap can be postulated: from the VP boundary onwards.
- Filler complexity modulates reactivation/retrieval.

**Topicalization:** complex fillers lead to shorter RTs than simple fillers from the beginning of the embedded clause (dass) until the clause-final auxiliary (hat).

- Filler complexity effects arise earlier than in wh-extraction.
- Filler complexity modulates processing dynamics of entire embedded clause → TOP-fillers are held actively in memory until they can be integrated rather than being reactivated at the gap site.

**Finding that higher complexity leads to longer RTs, groups with type A findings above:** during reactivation the conceptual properties of the filler are re-accessed, which is more costly for more complex fillers.

**Advantage of more complex fillers is expected by interference theory for memory representations:** the more (unique) cues are provided to identify an element in memory the more robust that element is for incoming competitors (cf. e.g. Vasishth and Lewis, 2006).

IV. General Discussion

**Two processing mechanisms**

The observation that the modulation of filler complexity leads to different effects in the two structurally identical environments suggest that the semantics of the fillers (question word, indefinite NP) leads to different processing mechanisms.

**Topicalization**

We propose that an indefinite NP denotes a semantic object that corresponds to a discourse referent in memory in the sense of Gibson (1998).

- Discourse referents are actively held in memory until they are fully processed.
- Every incoming phrase interferes with this memory representation.
- A more specific element is more robust against interference.

**Wh-questions**

A wh-question word, in contrast, does not denote a semantic object that corresponds to a discourse referent but to a memory index.

- At the gap site the content of the index is reaccessed/reactivated.
- Reactivation of more complex information is more costly than reactivation of less complex information.
References


