Filler complexity in filler-gap dependencies: *Wh*-extraction vs. topicalization

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We present results from two word-by-word self-paced reading (SPR) 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 viewpoint the two extraction types should involve the same displacement operations. ◆ The 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*-NP phrase). The findings differ with respect to the direction of the complexity effect. Type A findings: In Dutch, complex *wh*-fillers incur longer reading times (RTs) at the gap site than bare *wh*-words (Donkers et al. 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 RTs at the gap site than complex *wh*-fillers (Hofmeister & Sag 2010). ◆ For TOP-fillers, filler complexity has not been explored. In a comparison of *wh*-and TOP-fillers of equal complexity in German, an ERP study by Felser et al. (2003) found higher integration costs for *wh*-filler at the clause-final verb but no differences earlier in the clause. Other research on German object fronting (= topicalization) reports higher processing costs throughout the clause in comparison to subject-initial clauses (Weskott 2003; Matzke et al. 2002), which has been interpreted as an effect of storage costs in working memory. For Galician complex sentences with fronted objects, Pablos (2006) also reports prolonged RTs, and suggests that these reflect an active search for an integration site.

Exp 1: 60 participants read a context sentence followed by a *wh*-question with an extracted object *wh*-phrase (40 items, 92 fillers). Filler complexity of the *wh*-phrase was SIMPLE (bare *wh*-word, see (1)) or COMPLEX (*which*-NP with adjectival modifiers, (2)). A gap site can be postulated well before the subcategorizing verb: before the PP, at the VP boundary (cf. e.g. Bader & Lasser 1994). Statistical analysis revealed longer RTs for the complex *wh*-filler, spanning from the noun in the PP (*Wagen*) until the clause-final auxiliary (*hat*). The results suggest that filler complexity modulates filler reactivation/retrieval. The effects arise when a gap can be postulated: from the VP boundary onwards. The finding that higher complexity leads to longer RTs groups with the type A findings above. In line with this research we assume that during reactivation the conceptual properties of the filler are re-accessed which is more costly for more complex fillers. ◆ **Exp 2:** 60 participants read a declarative sentence with the same structure as the question in Exp 1 but with an indefinite object NP as filler (42 items, 92 fillers). Filler complexity was SIMPLE (NP without modifiers, (3)) or COMPLEX (NP with adjectival modifiers, (4)). Statistical analysis revealed that complex fillers lead to shorter RTs than simple fillers from the beginning of the embedded clause (*dass*) until the clause-final auxiliary (*hat*), i.e. the direction and the timing of the complexity effect was different than in Exp 1. The results suggest that TOP-fillers are held actively in memory until they can be integrated rather than being reactivated at the gap site. The advantage of more complex fillers is expected by an 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.

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 whose specifics need to be explored.

(1) Wen$_{\text{who.ACC}}$	hat Jim gesagt [$_{\text{embedded clause}}$ dass der Fahrer
(2) Welchen$_{\text{who.ACC}}$ schwer$_{\text{seriously}}$ kranken$_{\text{ill.ACC}}$ Jungen$_{\text{boy.ACC}}$	*has Jim said that the driver*
(3) Einen$_{\text{a.ACC}}$ Jungen$_{\text{boy.ACC}}$	[$_{\text{VP}}$ [GAP] [$_{\text{PP}}$ mit einem Wagen] abgeholt] hat] und...
(4) Einen schwer kranken Jungen	*with a car picked.up has and*

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