Missing VP effects and individual differences  
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Sentences involving multiple center-embedding (The rat the cat the dog chased killed ate the malt) are known to be hard to process. Acceptability ratings are typically low. However, dropping one of the verbs increases acceptability (e.g. Gibson & Thomas 1999). The mechanism underlying this so-called missing-vp effect are a matter of debate. Some accounts attribute the effect to memory overload (e.g. Gibson & Thomas) while others assume interference during the integration of clause-final verbs (e.g. Häussler & Bader 2015). Interestingly, investigations of the missing-VP effect in German yield inconsistent results. In Häussler & Bader (2015), participants occasionally failed to notice the ungrammaticality whereas German participants in Vasishth et al. (2010) showed a more pronounced sensitivity the ungrammaticality than English native speakers. The talk will focus on a further source of variation, viz. individual differences.

An eye-tracking study collected reading times for complex verb-final sentences involving multiple center-embeddings (cf. Table 1). Sentences were either grammatical, lacked VP2 or lacked VP1. In addition, highest embedded subject (NP1) was either singular or plural. Number marking was varied to see whether number agreement can help navigating complex sentences. Post-experiment, we collected participants’ thoughts about the experiment and assessed the reading span level for half of the 96 participants.

Feedback from 47 of the 96 participants in a post-experiment questionnaire indicates that they noticed the ungrammaticality (henceforth: thorough readers). Other participants reported only vague difficulties but nothing specific (henceforth: shallow readers). This offline feedback is also reflected in reading times: thorough readers have significantly longer reading times in ungrammatical conditions while shallow readers do not. Only thorough readers show an interaction between Grammaticality and Number: In ungrammatical sentences with a singular NP1, reading times slow down for both missing-VP conditions whereas in sentences with a plural NP1, the slowdown is restricted to the missing-VP1 condition (Figure 1). This interaction suggests that for plural ungrammatical conditions, even thorough readers were likely to at least temporarily miss the ungrammaticality of the missing VP2. Individual reading span scores correlate mildly but significantly with reader type (r = .29, p < .05), cf. Figure 2.

The talk will discuss two conclusions: (i) Thorough readers make use of morpho-syntactic cues such as number to navigate memory demanding structures. As a downside, this makes them vulnerable to interference. (ii) The cognitive abilities reflected in an individual’s reading span score are involved in keeping track structural dependencies in memory demanding sentences.

References
Table 1: Structure and example of the experimental stimuli

Structure
(matrix clause \([CP_1 \ NP_1^{\text{sing/plu}} [CP_2 \ NP_2^{\text{sing}} [CP_3 \ NP_3^{\text{sing}} \ldots \ VP_3^{\text{sing}}] \ (VP_2^{\text{sing}})] \ (VP_1^{\text{sing/plu}})]\) adv clause)

Example
Es wurde öffentlich, dass der/die Kellner, den/die ausgerechnet der Manager, bei dem das Geld gefunden wurde, (beleidigt hat), (geklagt hat/haben), nachdem ein Zeuge aufgetaucht war. ‘It became public that the waiter who only that manager with whom the money was found has insulted has litigated after a witness had appeared.’ (Condition ‘missing-VP2’ lacked the material in red parentheses, condition ‘missing-VP1’ lacked the material in violet parentheses.)

Figure 1. Rereading times in NP1 region (that the waiter/s) for shallow readers (left) and thorough readers (right)

Figure 2. Correlation of reader type and reading span

Correlation
reader type × reading span