SYNTACTIC PLANNING AND LEXICAL ACCESS IN SENTENCE PRODUCTION

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Introduction: The production of a sentence requires the preparation of a minimal linguistic unit, e.g., the first syntactic phrase (Smith and Wheeldon, 1999), and the retrieval of lexical representations. During the preparation of the to-be-produced unit, the retrieval of lexical items may (Wheeldon et al., 2013) or may not be (Lee et al., 2013) restricted by the planned structure. Current discussions in sentence production rely on data from speech. Written production has been widely neglected. However, writing might be crucially different from speech; e.g., speech has stronger constraints on fluency than writing that affect the timing of pauses and corrections. This study aims at (a) replicating the finding that planning is restricted to the initial phrase (Smith and Wheeldon, 1999), (b) testing whether or not lexical access is restricted by the planned structure, and (c) determining whether these results replicate in speech and writing.

Method: English natives (n=32) were shown moving arrays of familiarised images of *Peter* and *Tania*, and Snodgrass images to elicit structures as in (1). Subject complexity was crossed with codability of the image of *NP2*. Subject complexity determines whether the initial phrase embraces NP2 (1-a) or not (1-b) (see Smith and Wheeldon, 1999). Codability indicates the number of names for an image, and is known to correlate with lexical accessibility (Griffin, 2001); e.g., an image of a *bell* has fewer names (high codability) than an image of a *hat* (low codability). Codability estimates were taken from picture naming data. Subjects were tested in a spoken and written session. 96 items and 44 fillers were counterbalanced and presented randomly. Latency and fixations prior to production onset were recorded.

(1)   a.   Peter and the *NP2* moved up and Tania moved down. (complex subject)
        b.   Peter moved up and the *NP2* and Tania moved down. (simple subject)

Predictions: If the initial phrase is the planned unit, complex subjects (1-a) should require more preparation costs than simple subjects (1-b). If this syntactic scope restricts lexical access, only complex subjects are expected to show increased planning costs for low codability compared to high codability. Conversely, if lexical access exceeds the planned structure, codability should affect planning independently of subject complexity.

Results: Fig. 1 shows onset latency and Fig. 2 total fixation duration on image NP2. Onset latency was longer for complex than for simple subjects. This interacted with codability, with longer latency for low codability than high codability in complex subjects only. In total fixation duration, an interaction of subject complexity by codability by modality was found, revealing a large codability effect for complex subjects in writing but not in speech with a weaker subject complexity effect for highly codable images in writing than in speech.
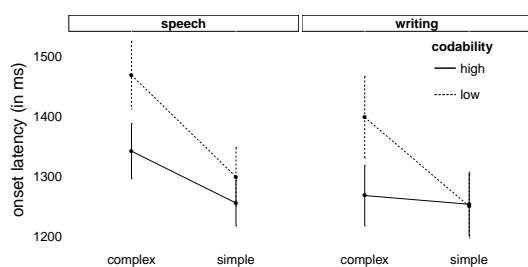
Fig. 1: Onset latency (with 95% CIs)
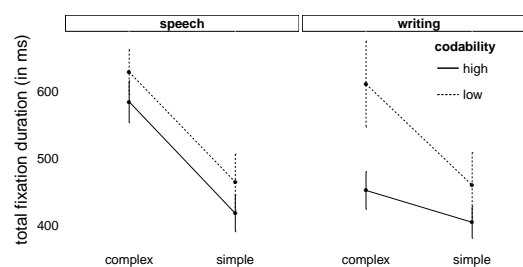
Fig. 2: Total fixation duration (with 95% CIs)

Discussion: The subject complexity effect reveals a phrase planning scope for speech. Codability effects appeared in complex but not in simple subjects. Writing compared to speech showed a weaker subject complexity effect for highly codable images but not for low codable images. These difference suggest that lexical access is clausal, while the structural scope is phrasal and narrower in writing than in speech. Overall, qualitatively similar planning patterns were seen in speech and writing pointing to a mutual linguistic planning system.