

LANGUAGE PLANNING IN WRITING RESEMBLES PLANNING IN SPEECH

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Even for short sentences speakers typically mentally prepare less than the full sentence before starting to speak. The extent of pre-planning, and particularly whether or not it extends beyond a sentence-initial noun is determined by content and structure of some minimal linguistic unit (Bock & Ferreira, 2014). The scope of advance planning, however, is also subject to non-linguistic factors (Wagner et al., 2010). One possible source of variation is output modality. Existing research on sentence planning is solely based on spoken data. It is possible, therefore, that planning beyond the sentence-initial noun might result from the need to satisfy modality-specific constraints. Speech and writing differ in fluency demands – long pauses/frequent corrections are permitted in writing but not speech; written output is typically slower than speech suggesting increased demands for buffering planned items prior to output. These factors suggest a push towards shorter planning scope in written production, and less overlap between subsequent planning units. It is possible, therefore, that existing findings relating to planning in sentence production are influenced by modality-specific factors and do not solely reflect fundamental features of the language system.

We address two questions about advance planning of short sentences in both writing and speech. Specifically (1) can advance grammatical encoding of coordinated NPs (*A and the B*), as frequently reported for speech (see Martin et al., 2014), be explained by modality-specific requirements, and (2) for both spoken and written production is the extent of advance planning determined by syntactic or conceptual processing of the utterance/text that is to be produced.

In two series of experiments we elicited short sentences in keyboard typing and speech in response to arrays of simple line drawings shown on the computer screen. We recorded the time required to initiate the sentence and eye movements to the depicted referents of the utterance.

In the first series of 3 experiments ($N_s=32$), we manipulated structure of elicited sentences: Target sentences started with either a coordinated NP (e.g. *Peter and the cake moved above the hat*) or a simple noun (e.g. *Peter moved above the cake and the hat*). Both in writing and speech we found fixations on the referent of the second noun before onset in coordinated NPs associated with longer onset latencies.

In the second series of 2 experiments ($N=32, 64$), we tested the hypothesis that advance planning scope is determined at a conceptual level, before grammatical encoding. We manipulated the semantic structure of the underlying message of the target phrase but kept syntactic and lexical properties constant. Specifically in target phrases such as *The painting with the man* we manipulated the stimulus array such that either the first or the second noun was contrastive (e.g. *The painting with the man* [not the dog with the man], vs. *The painting with the man* [not the painting with the child]). In both writing and speech we found earlier fixations to the referent image of the second noun if it served a contrasting function.

The most parsimonious interpretation of these results suggest two main conclusions: (1) Previous findings on advance planning of simple sentences generalise to writing and so are likely to result from a general feature of the language system and not modality-specific requirements of spoken production. (2) Conceptual contrasts within the message of a target phrase affect planning scope even when surface features of the phrase are held constant. This suggests that planning scope is (in at least some contexts) dependent on semantic and not grammatical features of the target. Again this holds true for both spoken and written output.