

A neurocomputational mechanism selecting verb-second versus verb-final word order in causative clauses of spoken German and Dutch

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In Dutch and German, the canonical order of subject, object(s) and finite verb is ‘verb-second’ (V2) in main but ‘verb-final’ (VF) in subordinate clauses. This occasionally leads to the production of noncanonical word orders. Familiar examples are causative clauses introduced by a subordinating conjunction (Du. *omdat*, Ger. *weil* ‘because’): the *omdat/weil-V2* phenomenon. Causative clauses may also be introduced by coordinating conjunctions (Du. *want*, Ger. *denn*), which license V2 exclusively. In recent corpus-linguistic studies of spoken German and Dutch (Kempen & Harbusch, 2016; submitted), we found that (1) *omdat-V2* is much less frequent than *weil-V2*; (2) the frequency relations between coordinating and subordinating conjunctions in the two languages are opposite (*want* >> *omdat*, *denn* << *weil*); (3) some less frequent subordinating causative conjunctions (*doordat* in Dutch, *da* in German hardly ever elicit V2); and (4) *want/denn-VF* structures are never produced (Table 1). Interestingly, speakers could have avoided noncanonical utterances by leaving the causative relation implicit — at least under certain conditions (see below).

Table 1. Distribution of explicitly causative clauses in Dutch and German.

Dutch	Clause Type	%	German	Clause Type	%
	<i>want-V2</i>	79.7		<i>denn-V2</i>	16.2
	<i>omdat-V2</i>	1.2		<i>weil-V2</i>	34.1
	<i>omdat-VF</i>	18.3		<i>weil-VF</i>	39.1
	<i>doordat-VF</i>	0.8		<i>da-VF</i>	10.6

The theory we propose to explain these observations is based on the following four key assumptions:

(A) Causative clauses are RESTRICTIVE or APPOSITIVE. Consider this example: *Some drivers were ticketed because they were speeding*. In the restrictive reading, the speaker assumes the dialogue partner already knows that some of the drivers got a ticket but not why, and asserts speeding as the reason (rather than, e.g., illegal parking). We call this a “SINGLE-ASSERTION PROPOSITION”. In the appositive reading, the

speaker has produced a “DOUBLE-ASSERTION PROPOSITION”: not only the ticketing event is asserted but also speeding as reason. (Only in case of an appositive clause can the speaker leave the causative relation implicit, to be inferred by the listener.)

(B) Causative clauses introduced by a coordinating conjunction are always appositive; those introduced by a subordinating conjunction are restrictive or appositive.

(C) Speakers of German produce about the same proportion of appositive causative clauses as speakers of Dutch (around 80%). This number can be inferred from Dutch, where *want* is a coordinating conjunction, hence appositive (cf. (B)).

(D) Selecting the causative conjunction, i.e. choosing between subordination vs. coordination along with the choice of a specific conjunction, depends not only on appositeness/restrictiveness but also on accessibility in the mental lexicon (high-frequent ones are more easily accessible), and proceeds largely independently of the selection of V2 vs. VF order in the ensuing causative clause.

Figure 1 depicts our overall production model, which accurately simulates the observed data pattern of Table 1. It uses inhibition-based competition between the alternative choices within the “Lexicalization” and “Linearization” node layers. The simulation in SIMBRAIN (<http://simbrain.net>) demonstrates that the strongly differing proportions of noncanonical constructions in Dutch and German are entirely due to cross-linguistically differing lexical preferences w.r.t. choice of causative conjunction.

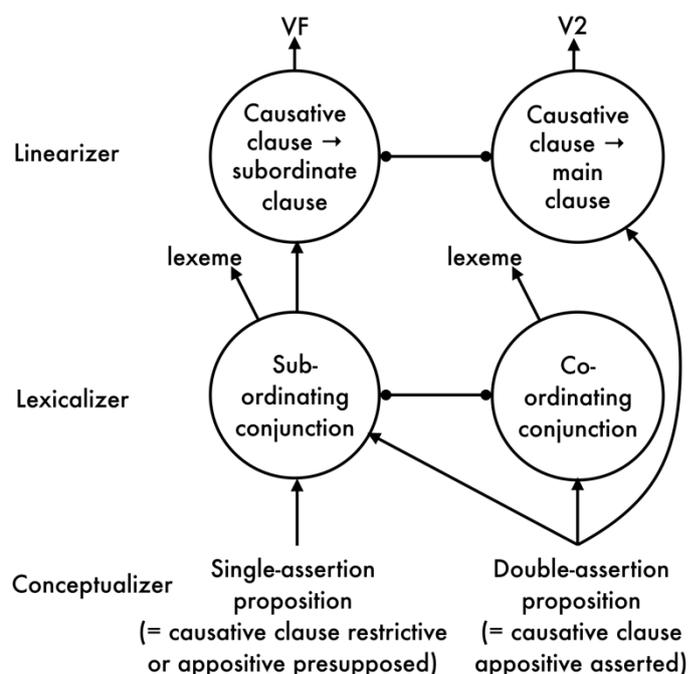


Figure 1. Neural circuit controlling the speaker’s lexical, and word order choices in response to the type of proposition (single- vs. double-assertion) serving as input. Excitation spreads unidirectionally from lower to higher components (→). Within Lexicalization and Linearization components, there is bidirectional spread of inhibition (•—•). The slanted arrows ascending from the Lexicalizer nodes represent activation of the connector’s phonological wordform (“lexeme”).

References

- Kempen, Gerard, and Harbusch Karin (2016). Verb-second word order after German *weil* 'because': Psycholinguistic theory from corpus-linguistic data. *Glossa: a journal of general linguistics* 1(1):3, 1–32.
- Kempen, Gerard, and Harbusch Karin (submitted). A competitive mechanism selecting verb-second versus verb-final word order in causative and argumentative clauses of spoken Dutch: A corpus-linguistic study.