

**Structure selection during sentence production: A role for executive control?**

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Multiple syntactic alternatives are often available to express one message. One of the factors driving the choice for a syntactic frame is verb bias. This study focuses on the role of verb bias in the process of selecting a syntactic frame for dative sentences. While some verbs are typically used with one structure (e.g., *voorleggen* [*submit*] and the prepositional object dative in Dutch), other verbs have a weaker bias towards one syntactic frame (e.g., *voorstellen* [*propose*]): the latter can be used interchangeably in the prepositional object dative (PD) and double-object dative (DO) construction, and thus allows for some degree of syntactic flexibility during production. On one view, syntactic flexibility may facilitate production because it enables speakers to fill the post-verbal sentence slots with either a direct object or an indirect object (the *incremental* view), while on a different view, flexibility can lead to competition between structural alternatives, delaying the production of the sentence until this competition is resolved (the *competition* view)<sup>1</sup>. The two views make opposite predictions regarding the production of sentences featuring verbs with different biases. The *incremental* view predicts shorter verb onsets for sentences featuring weak-bias verbs than strong-bias verbs, while the *competition* view predicts shorter onsets for sentences with strong-bias verbs. In addition, if the competition view holds, sentence production may benefit from a mechanism that helps resolve competition between two syntactic frames by suppressing one frame to enable fast selection of the other frame. We hypothesized that executive control (EC) can mediate this selection process, facilitating structure selection in the weak verb bias condition.

The current study compared the speed of producing Dutch datives featuring verbs with a strong and a weak bias towards the double-object and prepositional dative structure. 28 strong-weak bias verb pairs were selected from a corpus analysis of the Dutch dative alternation<sup>2</sup> (controlling for verb frequency, length and number of syllables). For each verb pair, one sentence was constructed which could accept both verbs (e.g., strong bias: *The student submits the plan to the professor* vs. weak bias: *The student proposes the plan to the professor*) in both a DO and PD sentence frame. Target sentences were intermixed in a list of intransitive filler sentences. All sentences were presented to participants ( $n=36$ ) in an RSVP paradigm (Rapid Serial Visual Presentation): on each trial, speakers read a sentence presented rapidly one word at a time, performed a short distractor task, and then saw a sentence preamble (e.g., *The student...*) which they had to complete with the sentence they had just read. This paradigm allows elicitation of sentences with the target verbs and nouns, while still simulating a production situation: fast presentation of the sentences promotes reconstruction, rather than verbatim repetition of the sentence after the preamble. Participants also completed the Flanker task<sup>3</sup>, an EC task commonly used to assess the ability to selectively inhibit one response (here: the alternative frame) in order to select a competing response (here: the target frame).

Onset analyses were performed on sentences reconstructed with the original wording and structure (66% of all responses, or 665 sentences). In line with the *competition* view, participants were 37 ms faster to initiate sentences featuring strong-bias verbs than weak-bias verbs,  $\beta = -35.28$ ,  $t = -2.03$ . In addition, participants with higher EC were only 10 ms faster on strong-bias than weak-bias sentences, while participants with poorer EC showed a larger verb bias effect and were 63 ms faster to initiate strong-bias sentences in both frames,  $\beta = -229.05$ ,  $t = -1.66$ ,  $p = .10$ . This suggests that EC can facilitate structure selection in sentences with high syntactic flexibility. In contrast to earlier studies of syntactic flexibility with dative verbs<sup>1</sup>, the results provide a first indication that equipotent syntactic alternatives can compete during sentence production and suggest that EC can play a role in resolving this competition.

**References**

- 1 Ferreira (1996). *JML*, 35, 724–755.
- 2 Coleman (2009). *Lang Sci*, 31, 593-611.
- 3 Eriksen, & Eriksen (1974). *Percept Psychophys*, 16, 143–149.