

Auxiliary fronting in German verb clusters: Evidence from delayed sentence repetition

German verb clusters containing a modal verb in the perfect tense are special because they are required to appear with the auxiliary in first position according to prescriptive grammar, thereby deviating from the default verb order in German (“selected verb before selecting verb”). Experimental results and corpus data show, however, that non-dialect speakers of German accept the auxiliary in later positions as long as the auxiliary precedes the modal verb (Bader & Schmid, 2009; Niehaus, 2014). While verb clusters have been the subject of numerous theoretical studies, few studies have looked at their production from a psycholinguistic point of view (for German, see Vogel et al., 2015).

We present two experiments that have investigated the production of 3- and 4-verb clusters. Our experiments used a variant of the production-from-memory procedure that is widely used in research on language production (e.g., McDonald et al., 1993). Participants first heard a sentence which they had to memorize. They then had to add together two numbers. When they had done the addition task, they had to repeat the sentence.

Experiment 1 investigated sentences with 4-verb clusters as in (1), with the finite auxiliary in either first, second, or third position.

- (1) Ich weiß, dass das Dach vor dem Sturm hätte₁ erneuert Δ_2 werden Δ_3 müssen.
I know that the roof before the storm had repaired be must
'I know that the roof should have been repaired before the storm.'

24 students with German as their native language participated in Experiment 1. No participant was a dialect speaker. The results are shown in Table 1. The results show a substantial number of responses with the auxiliary in second position, even when it appeared in the first or the third position in the target sentence that participants had heard and memorized. They produced even more responses with the auxiliary in the first position, but this was expected because only auxiliary-initial clusters are grammatical according to prescriptive grammar and clusters of this type occur with a frequency well above 90% in corpus investigations of German. In Vogel et al.’s (2015) study of 3-verb clusters, participants almost never changed the position of the auxiliary when it appeared in cluster-initial position in the target sentence. The fact that in our experiments participants spontaneously moved the auxiliary from first to second position in 26% of all cases suggests that when producing 4-verb clusters, native speakers are more flexible than when producing 3-verb clusters. Note also that the auxiliary was rarely produced in the third position of the cluster, even when it was located there in the target sentence. Thus, the first and the second position seem to be the most preferred auxiliary positions for the 4-verb clusters under investigation.

The second experiment tested the effect of rhythmic well-formedness on the linearization of 3-verb clusters. Vogel et al. (2015) have shown that the prosodic structure of the lexical verb affects the linearization of 3-verb clusters. In our experiment, the elements of the verb clusters were held

Table 1: Percentages of different verb clusters produced in Experiment 1 (VPR = verb projection raising).

Response	Target sentence		
	Aux=1	Aux=2	Aux=3
Aux=1	64	56	51
Aux=1 (VPR)	5	4	7
Aux=2	26	38	35
Aux=3	5	2	7

Table 2: Percentages of different verb clusters produced in Experiment 3 (VPR = verb projection raising).

Response	Target sentence			
	Aux=1		Aux=2	
	Full NP	Pronoun	Full NP	Pronoun
Aux=1	63	84	57	62
Aux=1 (VPR)	32	9	22	3
Aux=2	5	7	21	35

constant but the preceding sentential context varied, as shown in (2).

- (2) Max hat gesagt, dass Maria einen Kollegen/ihn hat besuchen Δ_2 wollen.
 Mas has said that Maria a colleague/him has visit want
 ‘Max said that Maria wanted to visit a colleague/him’

The object was either a full NP or a pronoun, and the auxiliary appeared in the first or the second position of the verb cluster. With a full NP, there is a stress clash between noun and lexical verb for VAuxMod clusters but not for AuxVMod clusters. With a pronoun, there is a stress lapse for AuxVMod clusters but not for VModAux clusters. The results are shown in Table 2. As in Vogel et al. (2015), target sentences with the auxiliary in first position were almost always recalled with the auxiliary again in first position, with a substantial number of VPR responses when the object was a full NP. For target sentences with the auxiliary in second position, the majority of sentences was also recalled with the auxiliary in first position, showing a strong attracting effect of the Standard German order. However, a substantial number of responses had the auxiliary in second position, with almost twice as much responses when the object was a pronoun. Thus, the rhythmic properties of the preceding sentential context had a strong effect on how participants positioned the auxiliary (related findings from historical linguistics are summarized in Sapp, 2011).

In summary, our production experiments yielded the following major results. First, for target sentences with an auxiliary-initial 4-verb cluster, but not for target sentences with an auxiliary-initial 3-verb cluster, participants changed the position of the auxiliary in a substantial number of cases, producing clusters with the auxiliary in second position. Second, 4-verb clusters were almost never produced with the auxiliary in the third position. Finally, rhythmic considerations affected the placement of the auxiliary in 3-verb clusters. We will discuss our findings with regard to recent syntactic analysis of verb cluster formation (e.g., Abels, 2016) and with regard to the syntax-prosody interface.

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