

Planning of active and passive voice in German – Can we see it in the eyes?

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Eye-tracking during sentence production studies demonstrated that directing speakers' attention to one of the characters in an agentive event scene by means of a perceptual cue can affect speakers' syntactic choice [e.g., 1-3]. In English, cueing of patients led to an increased number of passive voice utterances [1, 2]. In languages with flexible word order and morphological case, however, speakers were considerably less inclined to produce a passive. In a recent study on Russian [4], cueing the patient and presenting it to the left of agents more likely resulted in patient-initial active sentences while only very few passives were produced. This stands in marked contrast to the findings of a German study [3] using a similar experimental design. While German participants made restricted use of voice alternations, they did not produce patient-initial actives. Following up on the assumption that morphology affects speech planning [e.g., 5], in our study on German we aimed to investigate the role of morphological case. German is ideally suited for this investigation as subject (nominative) and object case (accusative) are distinctly marked on masculine nouns but not on feminine nouns (e.g., *der Vampir* vs. *den Vampir* – 'the vampire' compared to *die Nonne* vs. *die Nonne* – 'the nun').

We aimed to elicit non-canonical structures (passives, patient-initial actives) by perceptually priming the patient of an action in a subsequent event scene. As position of the patient has proven to affect syntactic choice [3, 4], we always presented animate patients to the left of animate agents. In Experiment 1, the scene was preceded by a red dot appearing at the patient's position. In Experiment 2, the cue was not only informative regarding the patient's visuo-spatial position but also provided a preview of the patient. In both experiments the cue was shown for 700 ms. We investigated whether case marking affected syntactic choice by varying the gender of agent and patient. We hypothesized that ambiguity in case marking may facilitate the application of a linear incremental planning strategy [see 1] and increase the production of non-canonical structures. Participants could start utterance planning with the first increment, the feminine patient, without (full) generation of a conceptual framework following a hierarchical incremental strategy, provided with the option to continue with a patient-initial active (OVS) or passive sentence.

Figure 1 shows the distribution of utterance types and SOTs for Exp. 1 and 2, including 41 participants each. In none of the experiments did participants produce a patient-initial active sentence. There was no effect of gender on syntactic choice, nor was there an effect of gender on SOTs. SOTs were longer for passives than actives in Exp. 1, while the reversed pattern was seen in Exp. 2. Participants were more likely to produce a passive in Exp. 2 than in Exp. 1 (effect of cue type). While SOTs for actives were similar in Exp. 1 and 2, SOTs for passives were faster in Exp. 2 as compared to Exp. 1 (interaction between voice and cue type), indicating that referential cueing facilitated passive production. Figure 2 shows the fixation proportions. Eye-tracking analyses of the initial 400 ms time window [6] (here shifted 200 ms forwards to account for eye movement latency, i.e. 200–600ms) showed that gender did not modulate fixations on patients (vs. agents). However, there were more patient fixations for passives than actives and fewer patient fixations after a referential cue than after a simple cue.

We conclude from our results that (explicit) marking of morphological case on the sentence-initial NP does not affect syntactic choice in German. A modulating factor we identified was cue type [cf. 2]. We will discuss our findings in light of more language-specific properties and different speech planning strategies as they were revealed by our eye movement data.

[1] Gleitman et al. (2007). On the *give* and *take* between event apprehension and utterance formulation, JML. [2] Myachikov et al. (2012). Referential and visual cues to structural choice in visually situated sentence production, Front Psychol. [3] Esaulova et al. (2019). Describing events: Changes in eye movements and language production due to visual and conceptual properties of scenes, Front. Psychol. [4] Pokhoday et al. (2019). Effects of visual priming and event orientation on word order choice in Russian sentence production, Front Psychol. [5] Norcliffe et al. (2015). Word order affects the time course of sentence formulation in Tzeltal, Lang. Cogn. Neurosci. [6] Griffin & Bock (2000). What the eyes say about speaking, Psychol. Sci.

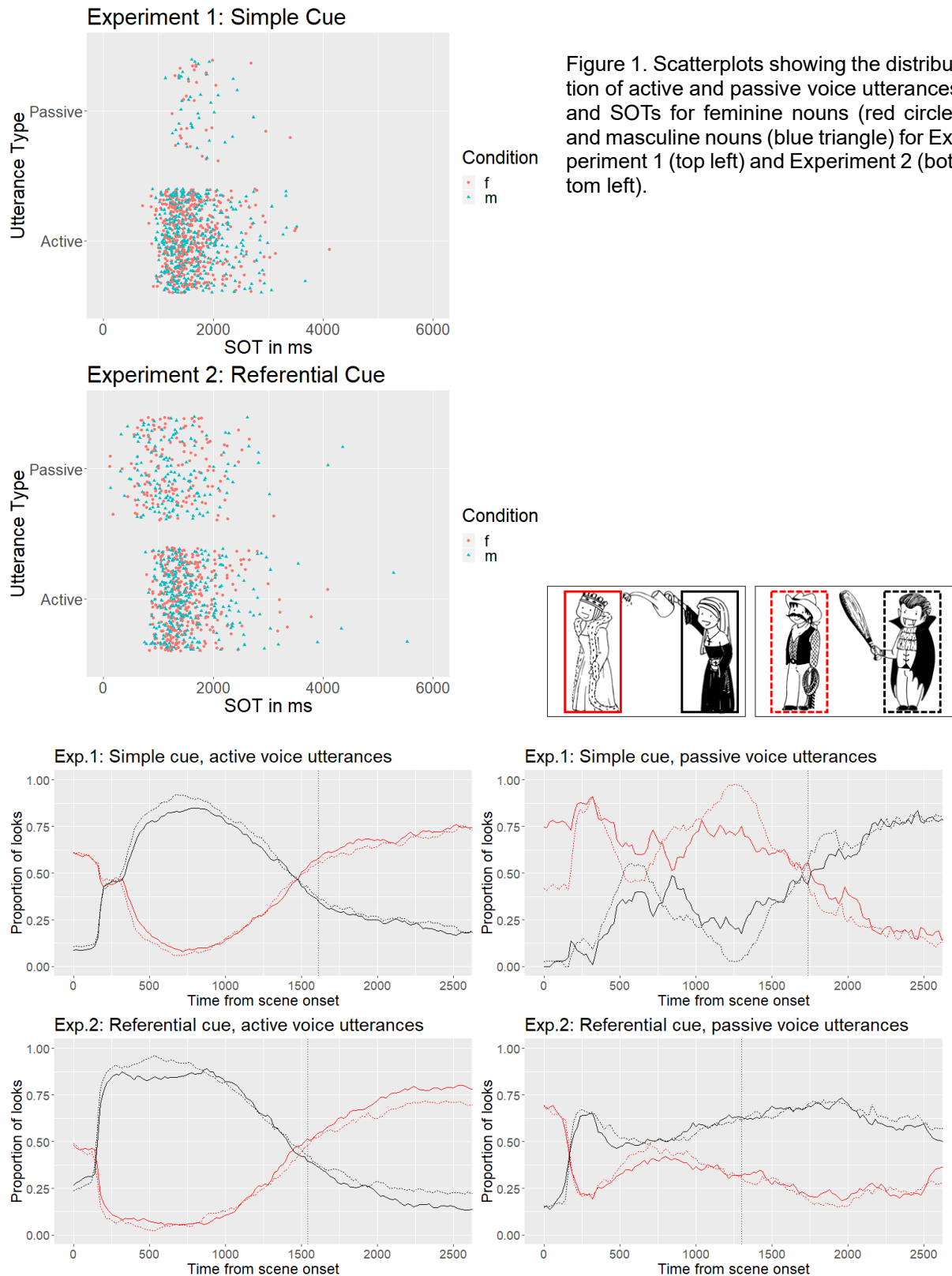


Figure 1. Scatterplots showing the distribution of active and passive voice utterances and SOTs for feminine nouns (red circle) and masculine nouns (blue triangle) for Experiment 1 (top left) and Experiment 2 (bottom left).

Figure 2. Time course from scene onset showing the proportion of looks on agent (black) and patient (red) for feminine (solid line) and masculine (dashed line) nouns; not shown are other on-screen looks. The dotted vertical lines indicate the average speech onset. Note that there were only a few passive voice utterances for Experiment 1 (69 trials).