

Processing flexible argument structure in Dutch, German, and English

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Abstract

Permissive subjects, which are non-agentive subjects combined with action verbs in the active form (e.g., ‘A few years ago a penny would buy you two or three pins’; ‘The tent sleeps four people’), are hardly found in German compared to English. For this contrast, previous research offers an explanation related to processing constraints, proposing that distinct processing strategies account for varying efficiency of processing permissive subjects. The differences in processing strategies are said to correlate with basic typological properties, specifically basic word order. In order to demonstrate cross-linguistic differences in the processing of permissive subjects, we conducted an experiment where native speakers of English, Dutch, and German performed a self-paced reading task. Based on the results, we argue that fundamental differences in processing strategies are present in English and Dutch on the one hand (look ahead parsing) and German on the other (look back parsing). However, our findings challenge the claim that different processing strategies are directly related to contrasts in the basic position of the verb. It is likely that also other contrasts in basic language properties could influence processing permissive subjects, most likely case.

Keywords: permissive subjects, sentence parsing, West Germanic languages, SVO/SOV word order, self-paced reading

Introduction

Present-day English allows a wide range of semantic roles to function as the subject. Permissive subjects, which are non-agentive subjects combined with action verbs in the active form (e.g., ‘A few years ago a penny would buy you two or three pins’; ‘The tent sleeps four people’), are hardly found in German compared to English (Rohdenburg 1974, Hawkins 1986, Müller-Gotama 1994, Dreschler 2020, Levshina 2020). For this contrast, previous research offers an explanation related to processing constraints, proposing that distinct processing strategies account for varying efficiency of processing permissive subjects. The differences in processing strategies are said to be linked to basic typological properties, specifically basic word order. If a language has SVO order (like English), permissive subjects can be better processed due to more routinized look ahead parsing strategies. In contrast, if a language is SOV (like German), parsers are more used to look back parsing strategies, leading to difficulties in processing permissive subjects (Hawkins 2014; Engelhardt et al., 2023). The

present study addresses the question if fundamental differences in the processing of permissive subjects can be revealed indicating look ahead or look back parsing, and if parsing strategies depend on typological features like SVO versus SOV word order. Additionally to English and German, we investigate Dutch, as it is clearly SOV but seems to allow slightly more diverse roles in the grammatical subject than German (Müller-Gotama 1994).

Method and materials

To investigate cross-linguistic processing of permissive, a self-paced reading experiment was conducted with native speakers of English (n=40), Dutch (n=45), and German (n=45). The experimental design manipulated AGENTIVITY of the subject phrase, distinguishing between non-agentive conditions (the permissive subjects) and agentive control conditions. Agentive test items contained the same critical verb as non-agentive stimuli but began with an animate noun phrase, which is a plausible agent for the critical verb. In addition, we also manipulated DOCUMENTEDNESS by including both in English documented permissive subjects (Doc) as well as extended ones (Ext) (e.g., ‘The house lives four families’). The latter are not accepted in English (Rohdenburg 1974) and considered ungrammatical across all three languages. The inclusion of extended constructions provides an opportunity to investigate whether speakers apply similar processing strategies to both existing and non-existent constructions, independent of the frequencies of the constructions, thereby shedding light on how constraints on permissive subjects are shaped not only by linguistic norms but in particular processing routines.

Results

The RTs (Reading Times) of the verbs in non-agentive sentences and agentive sentences were analyzed using linear mixed-effects models to account for both fixed effects and random effects for participants and items. The model reveals a significant interaction between LANGUAGE and AGENTIVITY (Figure 1). All interactions in the model involving the factor DOCUMENTEDNESS are non-significant, which suggests that documentedness does not substantially modulate RTs in our dataset. The results indicate that German speakers experience difficulties in processing permissive subjects. English speakers, in contrast, demonstrate consistently fast processing across all constructions. Dutch speakers were expected to show comparable difficulties in processing permissive subjects as in German due to basic SOV word order in Dutch similar to that of German (based on Hawkins 2014, Engelhardt et al. 2023). However, RTs in Dutch reveal a faster processing of permissive subjects compared to German, and fall between those of English and German speakers.

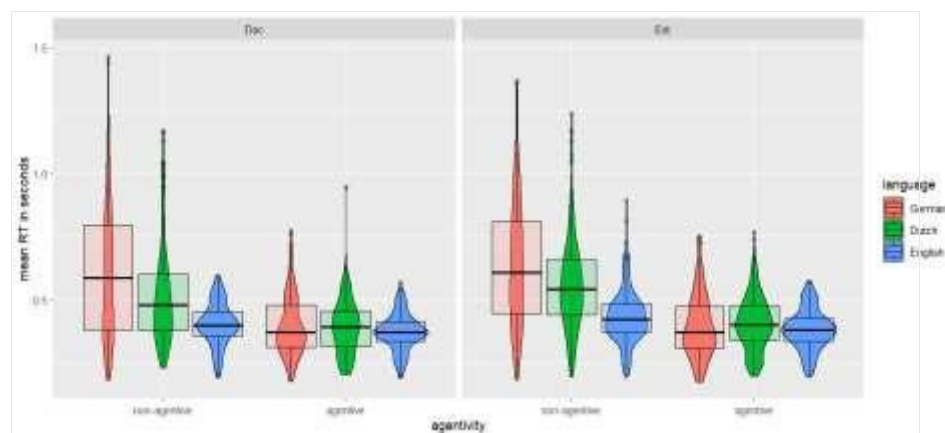


Figure 1. Effects of Language, Agentivity and Documentedness on RTs.

Importantly, this pattern is not limited to permissive subjects documented in English (Doc); our experiment suggests that these contrasts extend even beyond the known constructions. Extended (Ext), non-existent permissive subjects, too, are read faster in English and Dutch than in German. These effects cannot be attributed to usage-based frequency data and the prevalence of these constructions in the three languages. Therefore, our findings go beyond the established understanding that high-frequency constructions are cognitively easier to activate, and therefore easier to produce and process. Since we also observe a tendency among Dutch speakers to process non-documented permissive subjects significantly faster than speakers of German, our results not only indicate fundamental differences between English and German (SVO vs. SOV) in how vague semantics in permissive subjects are processed, but, importantly, also between Dutch and German (both SOV).

Discussion

In this study, we conducted a self-paced reading experiment to investigate differences in the processing of non-agentive subject-verb combinations in permissive subjects in English, Dutch, and German. The aim was to determine whether fundamental differences in processing strategies for this type of loose form-to-meaning mapping can be observed across the three languages, and to what extent these differences are influenced by basic word order properties (SVO vs. SOV). In English, all constructions in our experiment are processed fast, while German speakers show significant difficulty processing loose semantics in subject-verb combinations. In Dutch, too, permissive subjects are processed significantly faster than in German. We argue that speakers of the three languages employ different strategies to process non-agentive subject-verb combinations in permissive subjects. We interpret our findings to suggest

that in particular English speakers, as speakers of SVO languages, routinely employ look ahead strategies, which likely facilitate the processing of permissive subjects (Hawkins 2014; Levshina 2020). In contrast, speakers of SOV languages like German encounter greater challenges in processing permissive subjects, which we interpret as evidence of a reliance on look back strategies to earlier sentence material that must be integrated into the parsing string. According to Hawkins (2014) and Levshina (2020), this process is hindered by the vague semantics inherent to permissive subjects.

The observation that speakers of Dutch as an SOV language like German show faster processing speeds than German indicating look ahead processing mechanisms, too, appears to conflict with the hypothesis that look ahead parsing routines are directly related to SVO word order. In Dutch, other mechanisms than word order appear to facilitate the processing of vague semantics in permissive subjects. We argue that also other contrasts in language systems contribute to facilitating the processing of permissive subjects in Dutch compared to German. Verb-dependent processing triggered by the loss of case (Hawkins 2014:142) may be already activating a certain degree of looking ahead toward later sentence material and the integration of late frame selection, making these strategies more routine in both English and Dutch. Therefore, the absence of case marking in Dutch might explain the differences in processing efficiency of permissive subjects in Dutch and German.

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