# Not only the apples: Focus sensitive particles improve memory for information-structural alternatives

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## ARTICLE INFO

## ABSTRACT

Focus sensitive particles highlight the relevance of contextual alternatives for the interpretation of a sentence. Two experiments tested whether this leads to better encoding and therefore, ultimately, better recall of focus alternatives. Participants were presented with auditory stimuli that introduced a set of elements ("context sentence") and continued in three different versions: the critical sentences either contained the exclusive particle *nur* ("only"), the inclusive particle *sogar* ("even"), or no particle (control condition). After being exposed to blocks of ten trials, participants were asked to recall the elements in the context sentence. The results show that both particles enhanced memory performance for the alternatives to the focused element, relative to the control condition. The results support the assumption that information-structural alternatives are better encoded in memory in the presence of a focus sensitive particle.

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## Introduction

The ultimate aim of language comprehension is the successful construction of a mental model (e.g., Johnson-Laird, 1983; van Dijk & Kintsch, 1983), which represents the meaning of an utterance that has been perceived. Furthermore, this meaning representation should be long-lasting, such that an interlocutor will be able to remember the gist of a conversation at some later point in time. In the present paper we investigate how recall of a dialogue is modulated by the presence of focus sensitive particles like *only* and *even*.

In prevalent linguistic theories on focus, the function of focus is to indicate "the presence of alternatives that are relevant for the interpretation of linguistic expressions" (Krifka, 2007: p. 18; see also Rooth, 1992). The additional

function of a focus sensitive particle is that it establishes a specific relation between a focused element and its set of alternatives (cf. König, 1991; Rooth, 1992). Consider a sentence like the one in (1):

(1) *John **only** saw Sue at the dinner party*

In (1), the particle *only* associates with the element in focus *John* and expresses that, among the set of possible alternatives {Sue, Mary, Paul,...}, John saw no-one else but Sue. Thereby, the focus operator excludes the alternatives to the focused element. From a theoretical perspective, focus operators can be divided into subclasses of inclusive, exclusive, and scalar particles (see e.g., Krifka, 1999; König, 1991). While exclusives like *nur* ("only") express that the focused element and its alternatives do not share the property expressed by the predicate, inclusives like *auch* ("also") and *sogar* ("even") have an additive meaning component, indicating that the assertion also holds for at least one of the alternatives. Standard theories of focus particles further identify a presupposition of likelihood in the scalar particle *sogar*. That is, *sogar* induces a

scale of likelihood on members of the alternative set and assigns the focused element the lowest value.

An alternative set is not only induced by focus sensitive particles but also by a contrastive focus accent (L + H* in the ToBI system, cf. Silverman et al., 1992). Using contrastive prosody, Husband and Ferreira (2012) investigated how a contrast set is generated during language comprehension. Using a cross-modal priming paradigm, they presented participants with auditory sentences like "The museum thrilled the sculptor when they called ...". The word *sculptor* (the prime) was either pronounced with contrastive or with neutral prosody. Only the cases in which *sculptor* was pronounced with contrastive prosody are relevant here. In their first experiment, a visual word was presented right after *sculptor*. The word could be a contrastive semantic associate (*painter*), a non-contrastive semantic associate (*statue*), or unrelated. Reaction times to both contrastive and non-contrastive semantic associates were faster than reaction times to an unrelated control word. However, in a second experiment, a delay of 750 ms was introduced between prime and target. In this experiment, only contrastive associates were replied to faster. Husband and Ferreira assume that, initially, activation spreads to all semantically related words, but that a later suppression process generates the correct alternative set. They reason that later access should be inhibited for elements that do not belong to the alternative set (see also a study by Braun and Tagliapietra (2010), demonstrating a cross-modal priming effect for contrast alternatives after primes produced with contrastive focus accent but not after primes produced with neutral prosody).

The study described above shows evidence for the on-line activation of an alternative set during language comprehension. However, a related question would be whether these alternatives also feature prominently in a representation of the processed discourse, that is, whether they will be remembered better.

Most research on the effect of information structure on memory has investigated memory for the *focused element*. Several studies suggest that *focused elements* are privileged in memory representation compared to non-focused constituents, i.e., they are remembered with a higher accuracy and are represented at a more fine-grained semantic level (e.g., Birch & Garnsey, 1995; Sturt, Sanford, Stewart, & Dawydiak, 2004). Hence, information structure seems to play a role in the mental representation of the meaning of an utterance. If the theoretical assumptions of Rooth's Alternative Semantics (Rooth, 1992) hold, focus indicates the presence of alternatives. Therefore, focus should not only improve memory for the focused element but also for information-structural *alternatives*.

However, this question has been investigated less intensively. In fact, we only know of one study about the memory representation of information-structural *alternatives*. Fraundorf, Watson, and Benjamin (2010) compared three theoretical accounts about the function of contrastive accenting, two of which were concerned with its effect on alternatives to a focused expression. The granularity account (based on a study by Sanford, Sanford, Molle, & Emmott, 2006) predicts that a focused item is represented more specifically, leading to less activation of related items

(i.e., the alternatives). The contrast representation account developed by Fraundorf et al. (2010) assumes that contrastive pitch accenting might also strengthen the representation of the contrast items (the alternatives), leading not only to better encoding for what did happen but also to better encoding for what did not happen.

Fraundorf et al. presented participants with short recorded discourses containing contrast sets consisting of two items. One of these items was specified, using either non-contrastive (H*) or contrastive (L + H*) pitch accent. In a later recognition memory test, the L + H* accent increased both the number of hits to correct statements, and the number of correct rejections of the contrast item. The latter finding suggests that contrastive pitch accent on a focused element also enhances memory for its alternatives, facilitating participants' decision that something did not happen. The findings support the contrast representation account: contrastive pitch accent is used by listeners to encode information about all elements in the contrast set.

To sum up, previous findings suggest that focused information and information-structural alternatives have a privileged memory representation. In the present study, we investigate the impact of focus sensitive particles on the representation of the mental model that listeners construct from an utterance. In contrast to focus accenting, which indicates the presence of alternatives, a focus particle necessarily instantiates a contextually-salient set of alternatives, because this alternative set is part of its meaning (cf. Beaver & Clark, 2008, who distinguish weak focus induced by contrastive pitch accent and strong focus induced by focus particles, and König, 1991). Therefore, alternatives might be even more salient when a focus particle is used, compared to cases where focus is indicated by means of pitch accent alone. In the following two experiments, we investigated if alternatives to a focused element are recalled even better if the focused element is not only accented but also preceded by a focus particle. In addition, we investigated whether exclusive and inclusive particles differentially affected the representation and hence the recall of focus alternatives.

## Experiment 1

We used a delayed recall experiment to measure the effects of the presence or absence of inclusive and exclusive focus sensitive particles on memory for information-structural alternatives. Participants were presented auditorily with short dialogues and were later asked to recall the elements mentioned in the story. The critical manipulation was whether the utterances contained an inclusive (*sogar*), an exclusive (*nur*), or no (control condition) focus sensitive particle. The measure of interest was the number of remembered alternatives.

Based on the lexical meaning of the focus particles, the following hypothesis can be formulated: memory for the alternative set should be worst for exclusives, intermediate in the control condition and best for inclusives. This prediction was based on the assumption that focus sensitive particles alter the representation of elements in the alter-