Cataphoric presupposition verification and symmetric filtering: The case of Occasion verbs

Oliver Bott and Torgrim Solstad

Bielefeld University
{oliver.bott,torgrim.solstad}@uni-bielefeld.de

Abstract

Presenting evidence from four offline rating experiments, we argue that a verb class we characterize as *Occasion verbs* (e.g., *thank*, *criticize*, *congratulate*; partly overlapping with *judgment verbs* [13]) displays the intriguing property of allowing for cataphoric presupposition verification more broadly than other triggers discussed in previous research. Experiment 1 through 3 used methods established by Tonhauser and colleagues ([33, 34]) to show that Occasion verbs do indeed pattern with a selection of thirteen other well-known triggers (e.g., factive and aspectual verbs, demonstrative noun phrases). In addition, Experiments 1 and 2 also provided evidence that Occasion verbs – as opposed to those well-established triggers – allow for the cataphoric verification of presuppositions in a separate clause. Experiment 4 provided more targeted evidence as to the compositional consequences of this cataphoric verifiability. We compared the filtering behaviour of Occasion verbs with factive or aspectual triggers (e.g., *know* and *continue*) for conjunctions in the antecedent of conditionals. The results show that while factive and aspectual verbs show left-to-right filtering asymmetry (cf. [22]), Occasion verbs display symmetric filtering.

1 Introduction

The expressions known as "presupposition triggers" (cf. e.g., [21]) constitute a heterogeneous class, characterized by Karttunen as the "zoo of presupposition triggers" ([18]). Thus, triggers of presuppositions have been shown to display projective variability [18, 1, 15, 12], as, for instance, reflected in the distinction between weak and strong triggers. In the present paper, we argue that triggers may also vary with regard to how easily they allow for discourse-cataphoric verification, that is, in subsequent discourse. More specifically, we will offer experimental evidence that a verb class that we call *Occasion verbs* (e.g., *thank*, *congratulate*, *praise*, *criticize*; partly overlapping with Fillmore's *judgment verbs* [13]) is more flexible than more well-established triggers like factive or aspectual verbs with regard to such cataphoric verification, thereby possibly requiring a cage of its own in the zoo of triggers. This conclusion is based on evidence from four rating studies in German, in which we, on the one hand, showed that Occasion verbs do indeed project like other triggers in the Family-of-Sentence contexts [10]. Furthermore, the results support the conclusion that the presupposed content of Occasion verbs is special in the way it relates to at-issue content, allowing both left-to-right as well as right-to-left filtering.

Presuppositions display a number of anaphoric properties, most famously formulated by van der Sandt [35], according to whom pronominal anaphora are but a special case of presupposition-triggering expressions [14]. In accordance with this idea, presuppositions have mostly been taken to be characterized by *anaphoric asymmetry* or *left-right asymmetry* (see discussion in e.g., [24, 9, 22, 3]): Just as cataphoric pronominal reference is only possible for specific constructions, presupposed material must also generally precede the presupposition trigger (unless it can be accommodated). Possible exceptions to this principle have been discussed under the notion of *postsuppositions* ([8]). For instance, in Romanian *Şi A şi B au fugit* 'A as well as B ran away'

the presupposition triggered by *şi* 'too' ("someone else than A ran away") can be verified by *B*. What is more, [9] also observed that for French *aussi* 'too', the presupposed content may follow the trigger. However, the availability of cataphoric presupposition verification has been taken to be strongly limited. Whereas postsuppositions are limited to sentence-internal verification, *aussi* requires the two sentences to be conjoined via *or*, *if* or *unless* (see also [7]).

Experimental research has provided mixed evidence as to the possibility of symmetrical filtering. Beyond the study by [9], [6] found the cataphoric verification of presuppositions to be marginally better for *if* conditionals as opposed to *and* conjunctions for the trigger *again*. In yet another experimental study, however, Mandelkern et al. [22] investigated filtering for conjunctions in the antecedent of conditionals, arguably a more constrained configuration for investigating presupposition projection (*If Mary used to do Jivamukti yoga and she stopped doing yoga, then Matthew will interview her for his story*). Employing a discourse rating paradigm in their Experiment 3, [22] found that for conjunction, only asymmetric left-to-right filtering is available, as expected on most theoretical approaches. Interestingly, though, applying the same methods as in [22], [17] found filtering to be symmetric for disjunction, that is, they found no significant difference between left-to-right and right-to-left ordering of trigger and presupposed content. In conclusion, thus, the experimental evidence – in particular the conjunction vs. disjunction studies by [22] and [17] – suggests a mixed picture. Although the results cannot be seen as having resolved the (a)symmetry, they seem to confirm what theoretical studies have proposed: If right-to-left filtering is available, it is heavily constrained.

In this paper, we present empirical evidence that *Occasion verbs* not only allow for the cataphoric verification of presuppositions, but also that they do so at a more general discourse level, without the constraints discussed above. Furthermore, we also show that they allow for right-to-left filtering in constructions parallel to those tested by [22]. While they have received little attention in (theoretical) linguistics, Occasion verbs figure prominently in psycholinguistic research on discourse expectations as the so-called Agent-Evocator subclass of Implicit Causality verbs ([2]). Occasion verbs subsume some of the well-known 'verbs of judging' [13, 23] such as *blame*, *criticise*, and *praise*, but also 'non-judgment verbs' like *thank*, or *congratulate*. On our analysis, these verbs presuppose that there is an occasion upon which the agent acts. If one thanks or criticises someone, there must be some (preceding) eventuality the agent considers worthy of gratitude or critique ([28, 29]). The cataphoric verifiability of this presupposition is evidenced by sequences such as *John thanked Lisa. [...] She had helped him on the day before.* Importantly, the cataphoric potential seems related to a discourse expectation that the eventuality denoted by the verb must be specified in subsequent discourse ([19, 4, 20]).

The present study thus provides additional evidence for the complex properties of projective content. The four experiments we report on compared Occasion verbs with other presupposition triggers with respect to their potential for cataphoric verification, their projectivity across varying contexts and their filtering behaviour.

2   Experiments 1 and 2

Experiments 1 and 2 used identical methods to test for the status of sixteen Occasion verbs as presupposition triggers as well as their discourse-cataphoricity in two different blocks. While experiment 1 ($N = 71$) compared Occasion verbs to seven well-established presupposition triggers like personal pronouns, demonstratives, possessives, factive and aspectual verbs, Experiment 2 ($N = 60$) compared Occasion verbs to six other triggers such as clefts, definite descriptions, *too* and *again*. In this proceedings paper, we will greatly gloss over particulars of the experiments. All materials and statistical analyses can be found here: https://osf.io/9y3nu/ (see [29]).
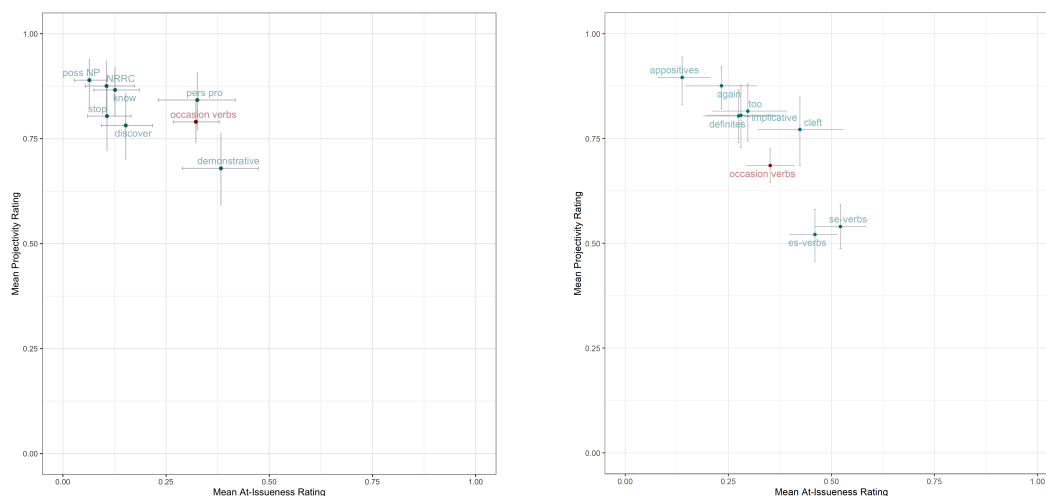
Figure 1: Mean projectivity and at-issueness ratings (and 95% CIs) for Occasion verbs as compared to other presupposition triggers in Experiments 1 (left) and 2 (right)

Projectivity and (non-)at-issueness: We will first turn to the second block of the experiments, which established that Occasion verbs do indeed pattern with other presupposition triggers not only in terms of projectivity, but also non-at-issue content, following the assumptions behind the Gradient Projection Principle [34], which states that content projects to the extent that it is non-at-issue (see [26]). We adopted the methods in [34] for eliciting projectivity and (non-)at-issueness ratings. Participants were asked to imagine overhearing utterances as part of brief dialogue snippets. Those utterances embedded presupposition triggers in questions as in: *Leo asks: "Did Ann congratulate Pete?"*. Projectivity was elicited by asking participants yes-no questions like *Is Leo certain that there was an occasion for Ann to congratulate Pete?*. If the (presumed) presupposition of *congratulate* projects, we would expect a positive answer. (Non-)at-issueness was measured via *whether*-questions such as *Did Leo ask whether there was an occasion for Ann to congratulate Pete?*. If the presupposed "occasion content" is not-at-issue, this question should evoke a negative answer. Answers were collected with a slider on a scale from 0 ("no") to 100 ("yes"). Mean projectivity and at-issueness ratings for the two experiments are presented in Figure 1.

The inference of occasioning events triggered by Occasion verbs clearly projected with an on average projectivity rating of 0.74 and a mean at-issueness rating of 0.33 over the two experiments. A clustering analysis corroborated that Occasion verbs pattern with the other presupposition triggers. As a side remark, this analysis also confirmed that non-presuppositional Implicit Causality verbs (cf. [5, 30]) do not pattern with those other triggers (called "se/es-verbs" in the right panel in Figure 1). The data importantly also replicates the finding by [34] that at-issueness and projectivity are negatively correlated (Pearson's $r = -0.68$, $p < .01$). Thus, we feel confident in concluding that Occasion verbs can be viewed as presupposition triggers, or, more generally, as "expressions associated with projective content" ([33]).
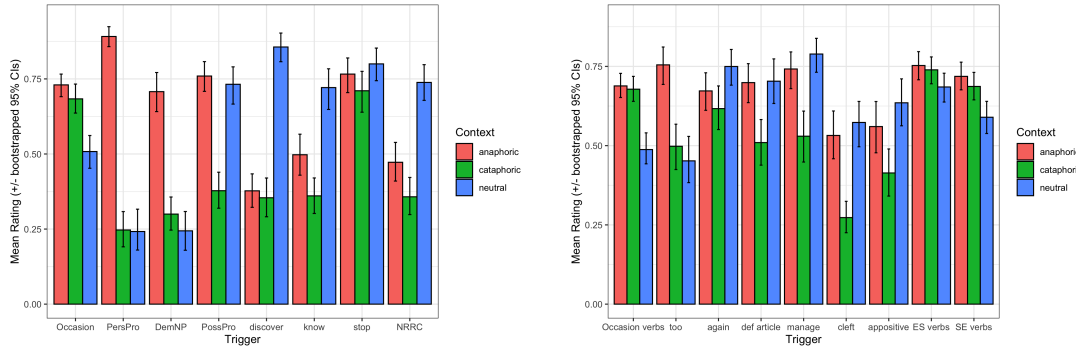
Figure 2: The discourse-anaphoric properties of Occasion verbs vs. other triggers tested in Experiments 1 (left) and 2 (right) comparing anaphoric and cataphoric to neutral conditions

Cataphoricity and anaphoricity: The other block of the two experiments investigated the availability of cataphoric (and anaphoric) verification of the presupposed content of Occasion verbs and the other presupposition triggers. The triggering expressions were embedded in brief discourses realizing three conditions:

(1)   *Preceding context:* Ann and Pete are neighbours ...
   a.   ***m*-neutral condition:** She congratulated him.
   b.   **anaphoric condition:** It was his birthday yesterday. She congratulated him.
   c.   **cataphoric condition:** She congratulated him. It was his birthday yesterday.

The *m(eaning)-neutral condition* in (1a) (cf. [33]) required accommodation of the presupposition and served as a baseline. The *anaphoric condition* additionally included a sentence verifying the presupposition that preceded the target sentence containing the trigger, as in (1b). Crucially, in the *cataphoric condition* (1c) this additional presupposition-verifying sentence followed the target sentence. Participants provided discourse coherence ratings using a slider (0 = "completely incoherent" to 100 = "perfectly coherent"). The results are shown in Figure 2.

For reasons of space, we only compare Occasion verbs with personal pronouns and demonstrative noun phrases: In line with previous research, personal pronouns and demonstrative noun phrases required the explicit introduction of an antecedent (neutral condition; right-most, blue bar in the bar triplets). Moreover, cataphoric reference to a subsequent discourse entity was hardly possible (cataphoric condition; middle, red bar). For these two types of expressions, neutral and cataphoric conditions were rated equally bad with no statistically significant difference (pronouns: $\chi^2(1) = .03$, $p = .87$; demonstrative noun phrases: $\chi^2(1) = 1.92$, $p = .17$). By contrast, Occasion verbs allowed for both anaphoric (left-most, red bar) and – as the only trigger in the study not easily allowing for accommodation in the first place – cataphoric verification of the presupposition. For Occasion verbs, both of these conditions were rated significantly better than the neutral condition (anaphoric condition: $\beta = 22.3$, $se = 2.92$, $\chi^2(1) = 21.76$, $p < .001$; cataphoric condition: $\beta = 17.85$, $se = 2.76$, $\chi^2(1) = 36.72$, $p < .001$).

Summing up the overall results of Experiments 1 and 2, we showed that Occasion verbs are in fact presuppositional in nature. This new trigger class patterned with other, well-understood triggers with respect to projectivity and at-issueness. At the same time, Occasion verbs proved to be special in allowing for cataphoric presupposition justification.
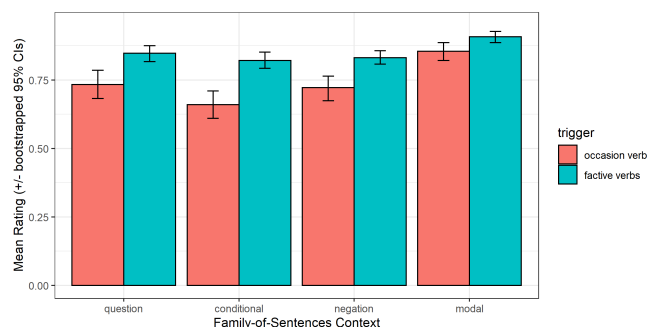
Figure 3: Projectivity of Occasion and factive verbs in Family-of-Sentence contexts (Exp. 3)

3   Experiment 3

Empirical work on factive and other kinds of sentence-embedding predicates have provided evidence for heterogeneity among triggers also with respect to Family-of-Sentence environments [27, 11, 25]. With a design similar to that used in the blocks investigating projectivity and at-issueness in the previous two experiments, Experiment 3 ($N = 105$) investigated whether the effects found in those experiments generalize to other entailment-canceling environments, more precisely to all so-called Family-of-Sentences environments [10], that is, for triggers embedded in questions, under negation, conditionals and modals. The factive verbs (*know*, *reveal*, *regret*) were included as controls.

The aggregated projectivity ratings in the four Family-of-Sentence contexts are summarized in Figure 3. The results can be summarized as follows: Even though there are slight differences between Family-of-Sentence contexts, the projective nature of the inference triggered by Occasion verbs generalizes to all Family-of-Sentence contexts. As in the previous experiments, these findings were confirmed by linear mixed-effect regression analyses.

4   Experiment 4

Experiment 4 put the cataphoric verifiability of occasion presuppositions to a stricter compositional test: Allowing cataphoric verification, occasion presuppositions should also display filtering from right-to-left in addition to the commonly assumed left-to-right filtering. As mentioned above, [22] has suggested that such filtering is strictly asymmetric under conjunction. In this experiment ($N = 58$), we therefore contrasted Occasion verbs – never tested before with respect to filtering – with the aspectual and factive presupposition triggers from [22] in a conceptual replication of their study. We used a 2 (TRIGGER TYPE) × 3 (ANTECEDENT TYPE) within design as follows: The two types of triggers appeared without or *in conjunction with* content verifying the presupposition in the antecedent of a conditional as follows:

(2)   a.   **Conjoined, trigger first:** If Pete congratulated Ann and she won a race, then . . .
       b.   **Conjoined, trigger last:** If Ann won a race and Pete congratulated her, then . . .
       c.   **trigger-only:** If Pete congratulated Ann, then . . .

If filtering is symmetric, conjunct order – trigger-first (2a) vs. trigger-last (2b) – shouldn't make a difference. Under asymmetric filtering, however, trigger-first (2a) should display projection, whereas trigger-last (2b) should not, as the presupposition is filtered in this case. In the trigger-
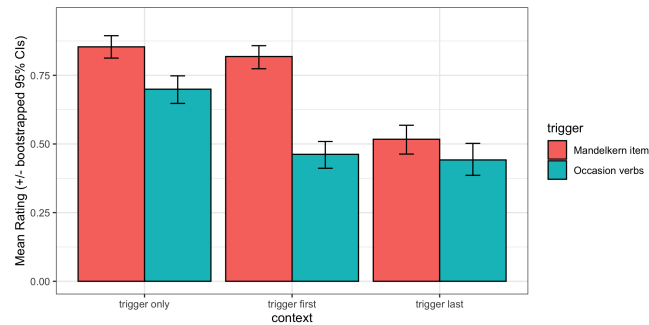
Figure 4: Left-to-right and right-to-left filtering for Occasion verbs and factive verbs in Exp. 4

only condition (2c), the presupposition should always project. The results for the projectivity ratings (again using the methods in [34]) are shown in Figure 4.

We found a clear difference between Occasion verbs and the verbs tested by [22]. More precisely, as confirmed in a linear mixed effects regression analysis, the results displayed a clear interaction with respect to the right-to-left filtering condition: For factive and aspectual verbs, the TRIGGER-FIRST and TRIGGER-ONLY conditions displayed presupposition projection, whereas the TRIGGER-SECOND condition did not, as we would expect under left-to-right filtering.

In contrast, Occasion verbs led to the orthogonal pattern, with TRIGGER-FIRST conditions patterning with TRIGGER-LAST conditions, both showing equally low projection scores (i.e., filtering). Put differently, Occasion verbs displayed perfect symmetry with respect to filtering. Our current take is that this is related to the lack of informative presuppositions (e.g., [31]) for Occasion verbs (unlike factive verbs, they are not clause-embedding).

5 Conclusion

This study shows two things: The "occasioning eventualities" associated with Occasion verbs are in fact presuppositions, sharing defining characteristics with a wide range of other triggers (Experiments 1 through 3). At the same time they prove to be special, as they were the only triggers that allowed for discourse-cataphoric verification (Experiments 1 and 2). Adding more weight to this conclusion, our study shows that these contents easily allow for right-to-left filtering, with no preference for incremental presupposition processing (Experiment 4). Interestingly, the cataphoric verifiability of this trigger type extends well beyond a single sentence boundary.

Our results speak against approaches principally upholding asymmetry, such as [16, 17], who have argued that there is a fundamental difference in the availability of filtering for conjunctions and disjunctions, with only the latter allowing it symmetrically. Rather, our results can be more easily accommodated if one assumes filtering to be symmetric, and apparent counterexamples to be infelicitous due to informational redundancy [32]. Our current take is that Schlenker ([24]) comes closest to representing such a view in characterizing left-to-right filtering as a bias arising from a preference for incremental left-to-right processing.

Summing up, the presuppositional nature of Occasion verbs, in particular, the availability of cataphoric presupposition verification, is a discourse phenomenon with interesting consequences for compositional approaches to projection. One possible upshot for the composition of presupposed content with at-issue content is that we may expect to see variation across trigger types with regard to the availability of symmetric filtering.

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