

UNIVERSALS IN PRAGMATICS: *MAXIMIZE PRESUPPOSITION AND OBLIGATORY IMPLICATURES**

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1 Introduction

Presupposition triggers, such as the additive particle *too*, the iterative *again*, and the definite determiner *the*, are obligatory as soon as their presuppositions are met in the context. For example, in (1a) the presupposition triggered by *too*—that somebody other than Bill came to the party, here, John—is satisfied in the context. Generally, not using a presupposition trigger when one could leads to pragmatic oddness, indicated by # below (see Sauerland 2008, Chemla 2008, Percus 2006 for English; Heim 1991, Bade 2016 for German; and Amsili et al. 2016 for French).

- (1) a. John came to the party. Bill came, #(too).
b. Jenna went ice skating yesterday. She went ice skating today, #(again).
c. #A / ✓The sun is shining.

Two different types of mechanisms have been proposed in the literature in order to account for the obligatory insertion of presupposition triggers. The first one is based on the pragmatic principle *Maximize Presupposition*; the second one is *Obligatory Implicatures*. Importantly, the predictions of both accounts differ in a range of cases. Of particular importance for this paper, *Obligatory Implicatures* but not *Maximize Presupposition* predicts an alignment of the insertion of the additive with the exhaustive context.

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In this paper we offer a cross-linguistic perspective on the phenomenon of obligatory presupposition triggers by comparing two experimental studies on the obligatory occurrence of the additive particle in two unrelated languages: German and Ga (Kwa). We argue that the insertion of the additive particle follows from the same mechanism, *Obligatory Implicatures*, in both languages. The phenomenon of obligatory additives is thus claimed to be a cross-linguistically stable phenomenon in pragmatics. Therefore, the work straightforwardly adds to the debate of universals in pragmatics (von Stechow and Matthewson, 2008, Matthewson, 2006) and the classification of non-at-issue content in the view of cross-linguistic data (Tonhauser et al., 2013).

The outline of the paper is as follows. In Section 2 we present the background motivating the research presented here, which is broken down into two main parts: first, we discuss two approaches accounting for the obligatory insertion of presupposition triggers, that is, *Maximize Presupposition* in Section 2.1 and *Obligatory Implicatures* in Section 2.2, as well as the predictions of both in Section 2.3; second, in Section 2.4, we provide an overview of the results of a previous study on German, which suggests that the insertion of additive particles in German is better modelled by *Obligatory Implicatures* than by *Maximize Presupposition*. Subsequently, Section 3 offers the relevant background on the Ga language, and Section 4 presents a study on the insertion of additives in Ga, the results of which similarly pose challenges for predictions made by *Maximize Presupposition* but are in line with those for *Obligatory Implicatures*. Section 5 concludes.

2 Theoretical Background

2.1 *Maximize Presupposition*

The principle *Maximize Presupposition*, which states: “Make your contribution presuppose as much as possible!”, was originally introduced in Heim (1991) to account for the infelicity of the indefinite determiner as opposed to the definite determiner for cases such as in (2).

- (2) a. #A father of the victim arrived at the crime scene.
 b. ✓The father of the victim arrived at the crime scene.

Both sentences in (2) are argued to be identical on the level of assertion; therefore, they are equally informative and their competition cannot be accounted for by the maxim of quantity (Grice, 1989). Although both sentences do not differ at the assertion level, (2b) unlike (2a) presupposes that there is a unique father. Since it is satisfied in the context that the victim has a unique father—everybody has just one biological father—(2b) is preferred over (2a) according to *Maximize Presupposition*.

Recently, *Maximize Presupposition* has been modified and extended to other presupposition triggers (Sauerland, 2008, Percus, 2006, Chemla, 2008, Singh, 2011). Many of the more recent accounts work with the global or local pragmatic competition of items (alternatives) which are ordered on a scale of presuppositional strength, examples of which are given in (3). A formulation of the principle *Maximize Presupposition* which makes use of these ordered sets of alternatives is given in (4).

- (3) Scales of presuppositional strength: {the, a} , {every, both}, {∅, too}, {∅, again}, {believe, know} , {SG, PL} , {SPEAKER, HEARER} , {PRESENT, PAST}

- (4) *Maximize Presupposition* (Percus, 2006)

- a. Alternatives are only defined for lexical items. For any lexical item, the alternatives consist of all “presuppositionally stronger” items of the same syntactic category.

- b. Do not use ϕ if a member of its Alternative Family is felicitous and contextually equivalent to ψ (ϕ is contextually equivalent to ψ iff for all w in the common ground, $\phi(w) = \psi(w)$).

Following this type of approach, the dispreference of (2a) is explained with pragmatic reasoning: the hearer assumes that by not obeying *Maximize Presupposition* the speaker wants to convey that she believes the presupposition of the stronger alternative is false, i.e., that there is not one unique father of the victim. This, however, goes contrary to common knowledge and leads to oddness.

2.2 Obligatory Implicatures

An alternative proposal to account for the obligatory insertion of presupposition triggers was put forward by Bade (2016), which is based on a grammatical approach to scalar implicatures (Fox, 2007, Chierchia et al., 2012). Crucially, it makes use of the insertion of a (sometimes mandatory) covert exhaustivity operator with the meaning provided in (5) (Fox, 2007).

$$(5) \quad [[\text{EXH}]](A \langle \langle s, t \rangle, t \rangle)(p \langle s, t \rangle)(w) = p(w) \ \& \ \forall q [q \in \text{IE-}A \ \& \ p \Rightarrow q \rightarrow q(w)=0]$$

This operator takes a proposition p and a set of innocently excludable (IE) alternative propositions A and excludes all alternatives in A which are not entailed (non-weaker) by the proposition p .¹ The exhaustivity operator is assumed to be responsible for the arising of scalar implicatures (Chierchia et al., 2012) and particularized conversational implicatures: an exhaustivity inference (Bade, 2016).² In particular, this inference arises because interlocutors sometimes interpret sentences with respect to the implicit Question Under Discussion (QUD), typically marked by focus (Beaver and Clark, 2008), as in (6).

- (6) a. [Bill]_F came to the party.
b. Implicit QUD: Who came to the party?

Bade (2016) follows the grammatical approach to scalar implicatures and argues for the presence of a covert exhaustive operator in (6a). The exhaustivity operator works on the alternatives defined via the question set, the set of propositions that are possible answers to the QUD (Hamblin, 1973, Karttunen, 1977). The insertion of the trigger under this theory follows from the fact that this sometimes mandatory implicature leads to a contradiction with the context and must be blocked or cancelled.

2.3 Predictions of *Maximize Presupposition* vs. *Obligatory Implicatures*

The two theories outlined above make the same prediction for the insertion of the trigger in matrix clauses: both predict sentence (7a), but not (7b), to be degraded in the context of (7).

- (7) Context: John came to the party.
a. #Bill came to the party.

¹Innocently excludable alternatives include the maximal set of alternatives which can be negated while maintaining consistency.

²The proposal is motivated by observations of Krifka (1999) and Sæbø (2004), who explain the insertion of additive particles by making it dependent on the inferences of contrastive focus and contrastive topics. Bade (2016) argues that the mechanism is more general and extends to the obligatory insertion of *again* and *know*.

- b. ✓ Bill came to the party, too.

The explanation for why this is, however, differs. For *Maximize Presupposition*, there is a competitor to (7a) which has more presuppositions, namely (7b). Since the hearer deduces that using (7a) instead of (7b) means the speaker believes its presupposition (that someone other than Bill came to the party) is false, it yields an inference that it is not true that somebody else came to the party. This inference however is contradictory to the context, which states that John came to the party, and therefore (7a) is infelicitous in the context of (7). This is shown formally in (8).

- (8) a. $[[\text{Bill came to the party}]]$ =
 $\lambda w. \text{Bill came to the party in } w$
 b. $[[[[\text{too } C] [\text{Bill}_F \text{ came to the party}]]]]$ =
 $\lambda w: \exists p [p \in C \ \& \ p(w)=1 \ \& \ p \neq \lambda w. \text{Bill came to the party in } w]. \text{Bill came to the party in } w$
 c. $\neg \exists p [p \in C \ \& \ p(w)=1 \ \& \ p \neq \lambda w. \text{Bill came to the party in } w]$
 d. “It is not true that someone other than Bill came to the party” \Rightarrow contradictory to “John came to the party”

Obligatory Implicatures, on the other hand, predicts the sentence in (7a) to be obligatorily exhaustified with regard to the question “Who came?” due to the obligatory focus on *Bill*. The resulting exhaustive implicature that Bill and no one else came to the party is the most informative answer to “Who came?” and yields a contradiction with the context, i.e., that John came (which, crucially, is not entailed by *Bill came*). This is demonstrated formally in (9):

- (9) [S EXH [[$\sim C$] [VP Bill_F came to the party]]]
 a. $g(C) = \text{QUD} = [[\text{Who came to the party}]] = \{ \text{Bill came, John came, Mary came, Susi came...} \}$
 b. $[[\text{EXH}]]([[\text{Who came to the party}]]) ([[\text{Bill came to the party}]]) (w) = 1$ iff $[\text{Bill came to the party}](w) = 1 \ \& \ \forall q [q \in [\lambda p. \exists x. p = \lambda w. \text{person}(x)(w) \ \& \ \text{at-the-party}(x)(w)] \ \& \ [\text{Bill came to the party} \Rightarrow q] \rightarrow q(w) = 0]$
 c. “Bill and no one else came to the party” \Rightarrow contradictory to “John came to the party”

However, in embedded structures, in particular under negation, the two theories make different predictions regarding the insertion of presupposition triggers (Bade and Tiemann, 2016). *Maximize Presupposition* predicts (10b) to be the stronger competitor compared to (10a), since it has more presuppositions that are fulfilled in the context while sharing its assertion, and thus it should be preferred. By contrast, according to *Obligatory Implicatures* the trigger must only be inserted if an exhaustivity implicature is mandatorily yielded. Since implicatures are blocked under negation for independent reasons, the trigger is predicted not to be obligatory, as in (10a) (Bade and Tiemann, 2016).

- (10) Context: John came to the party.
 a. ✓ It’s not the case that Mary came to the party.
 b. ✓ It’s not the case that Mary came to the party, too.

Crucial to this study, *Obligatory Implicatures* further predicts a connection between exhaustivity implicatures and the insertion of triggers, in particular, additive particles. Namely, the

presupposition trigger should be more obligatory if an exhaustive inference is made prominent by the context; however, if no contradiction arises, the trigger is predicted to be superfluous. Opposed to this, *Maximize Presupposition* does not predict any interaction with context and exhaustivity, other than that the presupposition needs to be fulfilled.

It has been shown in previous experimental studies on German that presupposition triggers fall into two classes with respect to their obligatory insertion (Bade and Tiemann, 2016, Bade, 2016): the first set of triggers, including definites, is better captured by *Maximize Presupposition*; the second set of triggers, including additives and iteratives, is better captured by *Obligatory Implicatures*. An experimental study on the obligatory insertion of the additive *auch* ‘too’ in German is reported in the next section.

2.4 Previous Experiment on German

A previous experiment on German shows that the insertion of additives is sensitive to contextual exhaustivity and that additives directly target exhaustivity by cancelling it (Bade, 2016). In this way, the results are in line with *Obligatory Implicatures*, which predicts an alignment of the insertion of the additive with an exhaustive interpretation. By contrast, *Maximize Presupposition* does not predict an effect of context on how degraded a sentence without an additive is, nor how acceptable a sentence with the trigger may be. Thus, the results pose challenges for this approach.

In order to test the predictions of *Maximize Presupposition* and *Obligatory Implicatures*, Bade (2016) created contexts with exhaustively interpreted sentences.³ Two aspects were paid attention to which were supposed to favor an exhaustive interpretation: First, the critical contextual sentence, written in boldface in (11), was embedded in a sequence of events. Second, a wrap-up sentence at the end of the context was added suggesting the finality of all individual events. Thus, the context strongly suggested that the issue of who was greeted by Rita is resolved:⁴

- (11) Rita ist ins Büro gekommen, hat Kaffee gekocht, **Stefan und Sabine begrüsst** und sich
 Rita is in office come, has coffee cooked, **Stefan and Sabine greeted**, and REFL
 an ihren Schreibtisch gesetzt.
 on her desk sat.
*Rita came to work, made coffee, **greeted Stefan and Sabine**, and sat down at her desk.*
- a. Sie hat Lisa begrüsst.
 She has Lisa greeted.
 “*She greeted Lisa.*” (condition A, no additive)
 - b. Sie hat auch Lisa begrüsst.
 She has also Lisa greeted.
 “*She greeted Lisa, too.*” (condition B, with additive)
 - c. Sie hat Lisa nicht begrüsst.
 She has Lisa NEG greeted
 “*She did not greet Lisa.*” (condition C, negation)

³Note that it is still under debate which structural and contextual factors make exhaustivity implicatures mandatory or the default (Magri, 2011, Chierchia et al., 2012).

⁴The following glosses are used: DET = determiner; 3 = third person; PRT = particle; NEG = negation; COMPL = complementizer; IMPF = imperfective, REFL = reflexive

- d. Sie hat Stefan begrüßt.
She has Stefan greeted.
“She greeted Stefan.”

(condition D, entailment)

The context was followed by a target item in one of four conditions: a new sentence without a trigger, as in (11a); a new sentence with a trigger, i.e., the additive particle *auch* ‘too’, as in (11b); a new sentence without a trigger and with negation, as in (11c); and a sentence entailed by the context, as in (11d). The task of participants was to judge the acceptability of the target in context on a scale from 1 (‘not acceptable’) to 7 (‘fully acceptable’). Importantly, participants were advised to read the target as a continuation of the context.

Both *Obligatory Implicatures* and *Maximize Presupposition* predict sentences without the trigger to be degraded due to a contradiction that arises with the context. As a result, condition A (without the additive) is predicted to be significantly worse than condition B (with the additive) by both theories. The theories make different predictions however for the sentence with negation. According to *Obligatory Implicatures* an exhaustivity implicature does not occur under negation, which is why the sentence does not lead to a contradiction and is thus not degraded. It should be at least as acceptable as the sentence with the trigger. According to *Maximize Presupposition*, on the other hand, the inference arising from not using the trigger is predicted to project. Importantly, there is a stronger competitor with negation and the trigger which is presuppositionally stronger (the sentence with negation and *auch*). Therefore, the hearer infers that the presupposition of the stronger competitor is false, i.e., that there is no other person besides Lisa that was greeted. This inference is contradictory to the context and should lead to oddness.

The results of the experiment are presented in Figure 1.⁵ Sentences without the additive (condition A) were judged significantly worse than sentences with the additive (condition B) and sentences entailed by the context (condition D), as predicted by both theories. As for sentences with negation (condition C), they were more acceptable than sentences with no additive (condition

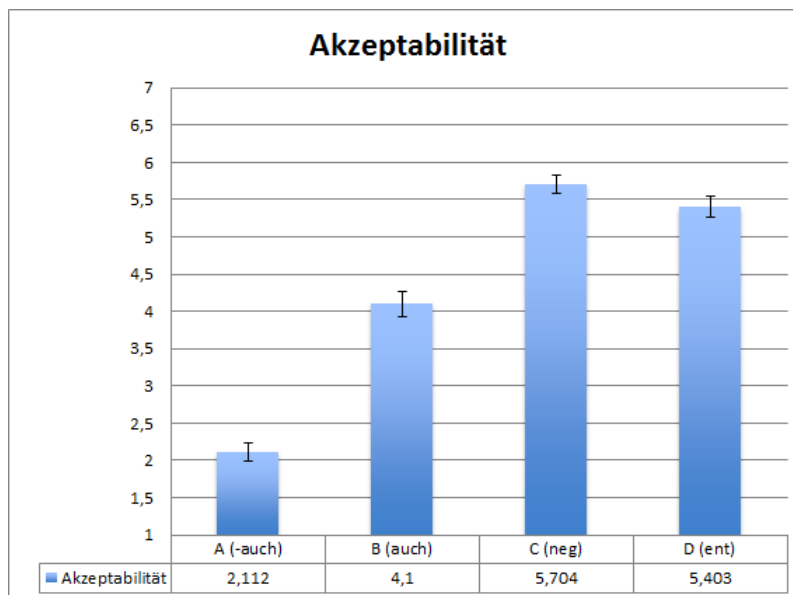


Figure 1: Average Acceptability Conditions A–D

A) and sentences with the additive but without negation (condition B), and as acceptable as the sentences entailed by the context (control condition D). Thus the data suggest that the inference from not using the additive fails to project, which is more in line with it being an implicature and therefore supports the *Obligatory Implicature* approach and causes challenges for *Maximize Presupposition*.

Moreover, it was found that even sentences with the additive (condition B) were degraded compared to sentences entailed by context (control condition D) and sentences with negation but without the additive (condition C). This strongly suggests that the additive *auch* is sensitive to the exhaustivity effects made strong by the context and that this is a case of implicature cancellation. Thus, overall the results of the experiment are more compatible with *Obligatory Implicatures* for the insertion of the additive particles in German: it is not obligatory under negation and does interact with exhaustivity.

However, there is a problem with the design of this experiment: there is no independent evidence that the manipulated contextual factors indeed yield a stronger exhaustivity effect. The aim of the study on additive particles in Ga, reported in the next section, was two-fold. The first goal was to test the predictions of *Maximize Presupposition* vs. *Obligatory Implicatures* in a language in which exhaustivity is marked structurally and there is independent evidence for this structure's exhaustivity effect. The second goal was to test whether *Obligatory Implicatures* is pragmatic in nature and cross-linguistically stable.

3 The Ga Language

Ga is a Kwa language spoken in the Greater Accra Region in Ghana by ca. 745,000 speakers. It is an SVO language with two tones: Low and High. The *ni*-cleft structure in Ga, illustrated in (12), introduces a structural bi-partition in which the exhaustively interpreted focused constituent (pivot) is to its left and the backgrounded part is to its right (Renans, 2016b,a, Grubic et al., 2017).⁶

- (12) [Q:] Who ate banku yesterday?
 a. Kòfí nì yè bà̀nkú nyè.
 Kofi PRT eat banku yesterday
 'It is Kofi who ate banku yesterday.'

Importantly, the pivot in the *ni*-structure is interpreted exhaustively, as evidenced by the contrast in (13). If the *ni*-structure were not interpreted exhaustively, it would be possible to add to the sentence with the *ni*-structure another sentence which differs in the pivot but not in its backgrounded part, contrary to fact, as illustrated in (13a). At the same time, sentences in their canonical SVO form can be conjoined without leading to infelicity, as illustrated in (13b).

- (13) a. #Felix nì kane-ɔ wolo ní Kofi nì kane-ɔ wolo.
 Felix PRT read-IMPf book and Kofi PRT read-IMPf book
 'It is Felix who reads a book and it is Kofi who reads a book.' (ni-Cleft)

⁵See Bade (2016) for details regarding the experimental set-up and statistical analysis.

⁶An example marked with # or ? means that the example was judged by native speaker informants as unacceptable in the given context and we hypothesize that it is for semantic or pragmatic reasons; in the case of ? the judgments were not as clear as in the case of #; examples with no preceding mark were judged as acceptable

- b. Felix kane-ɔ wolo ní Kofi kane-ɔ wolo.
 Felix read-IMPF book and Kofi read-IMPF book
 ‘Felix reads a book and Kofi reads a book.’ (SVO)

Another piece of evidence that the *ni*-structure gives rise to an exhaustivity effect comes from the data in (14): the information in the context that Dora and Lisa bought a dress clashes with the exhaustively interpreted sentence in (14a), which roughly conveys the meaning that Lisa (and nobody else) bought a dress; cf. (14b).

- (14) Context: It was Dora and Lisa who bought a dress yesterday.
- a. ?Lisa **ni** he ataade nyɛ.
 Lisa PRT buy dress yesterday
 ‘It was Lisa who bought a dress yesterday.’ (ni-Cleft)
- b. Lisa he ataade nyɛ.
 Lisa buy dress yesterday
 ‘Lisa bought a dress yesterday.’ (SVO)

Moreover, the exhaustivity effect triggered by the *ni*-structure is not at-issue, as shown by the minimal pair in (15).⁷ The rationale for this test is as follows: It is independently known that the exhaustivity effect triggered by the exclusive particle *pɛ* is at-issue (Renans, 2016a, 2017). For that reason, the negation in (15a) targets the exhaustive meaning component leading to the interpretation that Fred was not the sole invitee. Therefore, one can felicitously continue with *She also invited Gord*, because the additive particle *hu* has an anaphoric referent to pick up (namely, *Fred*). By contrast, the exhaustivity effect triggered by the *ni*-structure is not at-issue and thus the negation in (15b) targets the identity of the person who was invited rather than the fact that Fred was the only invitee. Therefore, the additive particle in the following sentence lacks the anaphoric referent that could be picked up, and thus its use is infelicitous.

- (15) a. **Jééé Fred pɛ** è-fɔ̀ nìnè è-tsé. È-tsé Gord #(*hú*).
 extscneg Fred ONLY 3SG-throw hand 3SG-call 3SG-call Gord also
 ‘She didn’t only invite Fred. She #(*also*) invited Gord.’ (pɛ ‘only’)
- b. **Jééé Fred ni** è-fɔ̀ nìnè è-tsé ɪɛ. È-tsé Gord (#*hú*).
 NEG Fred PRT 3SG-throw hand 3SG-call DET 3SG-call Gord also
 ‘It wasn’t Fred she invited. She (#*also*) invited Gord.’ (ni-Cleft)

Since we want to check the obligatoriness of the additive particles in certain contexts, we identified an additive particle in Ga: *hu*. Crucially, *hu*—as its German counterpart *auch* ‘also’—has a not-at-issue additive meaning component, i.e., the sentence in (16) asserts that Maria bought potatoes and gives rise to the inference that somebody other than Maria bought potatoes.

- (16) Maria hu he atomo.
 Maria ALSO buy potatoes
 ‘Maria also bought potatoes.’

⁷In the previous literature, the exhaustive non-at-issue meaning component of the *ni*-structure is analyzed as a conditional presupposition; see Renans (2016a,b) and Grubic et al. (2017) for a discussion.

- a. ASSERTION (AT-ISSUE): Maria bought potatoes.
- b. ADDITIVE (NOT-AT-ISSUE): Somebody other than Maria bought potatoes.

That the additive meaning component of sentences with *hu* is not-at-issue is demonstrated in (17). The procedure of the test was as follows: language consultants were presented with a short contextual description and a negated sentence with the additive particle *hu* along with two questions about it. Question (a) was about the at-issue meaning component (here, whether Maria bought potatoes) and question (b) was about the additive meaning component (here, whether somebody other than Maria bought potatoes). Consider first question (a). The at-issue meaning components are visible to negation, i.e., they should be targeted by the negative operator. Therefore, language consultants should answer with ‘no’ to question (a). By contrast, the not-at-issue meaning components are not visible to negation and therefore language consultants should answer with ‘yes’ to question (b).

- (17) Maria ke enyemimeɪ le tee jaano. Jee anɔkwale ni ake Maria **hu** he
 Maria and her.friends DET went market NEG truth REL COMPL Maria also bought
 atomo.
 potatoes
 ‘Maria and her friends went to the market. It is not the case that also Maria bought
 potatoes.’
- a. Did Maria buy potatoes?
 - i. yes
 - ii. no
 - iii. it’s not known
 - b. Did anybody else buy potatoes?
 - i. yes
 - ii. no
 - iii. it’s not known

The predictions were borne out. Language consultants indeed answered with ‘no’ to the question whether Maria bought potatoes, suggesting that it is visible to negation and therefore at-issue. On the other hand, they answered with ‘yes’ to question (b), suggesting that the additive meaning component is not visible to negation and hence not-at-issue.

Summing up, in this section we established that the *ni*-structure and the additive particle *hu* have the properties required to conduct a study checking the predictions of *Maximize Presupposition vs. Obligatory Implicatures*. First, the pivot in the *ni*-cleft structure is interpreted exhaustively and this exhaustive effect is not part of the asserted content. And second, *hu* is an additive particle with similar semantics to German *auch*, at least with respect to the issues relevant for this study.

4 Experiment in Ga

4.1 Methods

We conducted an off-line study in the form of a questionnaire in order to check the predictions of *Maximize Presupposition* vs. *Obligatory Implicatures*. Specifically, we wanted to test the obligatoriness of the insertion of the additive particle *hu* in exhaustively interpreted contexts conveyed by the *ni*-structure compared to non-exhaustive contexts.

4.1.1 Participants

A total of 26 undergraduate students (female: 18; male: 8; range: 17–29) from the University of Ghana at Legon, all native speakers of Ga, volunteered to participate in our experiment. All participants were multi-lingual to varying degrees, and many reported that they were native speakers of at least one other language spoken in Ghana (e.g., Twi, Ewe, or English). Participants were compensated 5 Ghanaian Cedi for their time.

4.1.2 Procedure & Materials

The experiment was conducted offline using a pen-and-paper questionnaire. Participants were asked to judge on a scale from 1 ('totally unacceptable') to 7 ('totally acceptable') the target sentence as presented in context. For the context, we manipulated the strength of exhaustivity via the SENTENCE type (2 levels: SVO, *ni*-Cleft); and for the target, we manipulated the presence/absence of the ADDITIVE particle *hu* (2 levels: \pm Additive). All levels in the 2x2 factorial design were fully-crossed. There were 24 lexicalizations per context-target pair, such as in the following. Thus, each participant saw 6 lexicalizations per condition with no repeat lexical items.

(18) SENTENCE

- a. Tɛtɛ ba shia. E-ye banku.
 T. come home 3SG-eat banku(=Ghanaian dish)
 'Tɛtɛ came home. He ate banku.' (SVO)
- b. Tɛtɛ ba shia. Banku ni e-ye.
 T. come home banku PRT 3SG-eat
 'Tɛtɛ came home. It was banku he ate.' (*ni*-CLEFT)

(19) ADDITIVE

- a. E-ye blɔfoŋme hu.
 3SG-eat pineapple also
 'He also ate pineapple.' (+ADDITIVE)
- b. E-ye blɔfoŋme.
 3SG-eat pineapple
 'He ate pineapple.' (–ADDITIVE)

For the sake of example, a participant might see a context-target pair in the [SVO, +ADDITIVE] condition as in the following trial, and their task was to judge the acceptability of the underlined sentence in the context:

- (20) Tɛtɛ ba shia. Eye banku.
 Eye blɔfoŋme hu.
 ‘Tete came home. He ate banku.
 He also ate pineapple.’ [SVO, +ADDITIVE]

In total there were 24 context-target pairs plus 24 filler items, randomized and distributed in a Latin square design across 4 lists. Each list was presented in two versions, with the stimuli from version one reversed in version two in order to balance out any effects of the order of presentation.

4.1.3 Predictions

As discussed above, *Maximize Presupposition* is a general pragmatic principle predicting the trigger to be obligatory if its insertion is contextually licensed. Since both context conditions manipulated by the SENTENCE type, the one with an SVO structure and the one with the *ni*-Cleft, make the presupposition of the additive true, a main effect of \pm ADDITIVE is predicted. Leaving out the trigger should be equally bad in both conditions, inserting it should be equally good; crucially, no interaction of the factors SENTENCE TYPE and ADDITIVE is predicted.

Obligatory Implicatures, on the other hand, predicts the obligatoriness of the trigger to be gradient: the more exhaustive the context, the more obligatory the trigger. If no exhaustivity inference arises that could lead to a contradiction, the trigger is predicted to be superfluous. If the exhaustivity effect is strong, the additive is obligatory in order to cancel exhaustivity. The more prominent exhaustivity is made by the context, the stronger the effect of cancellation should be according to *Obligatory Implicatures*. Since the exhaustivity effect has been shown to be stronger with the *ni*-structure in Ga, leaving the additive out in the sentence following the *ni*-cleft should be worse than leaving the additive out after the SVO sentence. Thus, *Obligatory Implicatures* predicts an additional interaction between the presence or absence of the additive and the type of contextual sentence.

4.2 Results

The results of the experiment are presented in Figure 2. We ran a linear-mixed effects model with parsimonious random effects structure using the *rePCA* function in the *RePsychLing* library (MIT, v.0.0.4)⁸ as recommended in Bates et al. (2015). Sum contrasts were used for the contextual SENTENCE type predictors (*ni*-Cleft: -0.5 , SVO: 0.5) as well as the ADDITIVE predictors ($-$ Additive: -0.5 , $+$ Additive: 0.5). Analyses were implemented using the *lme4* library (GPL-2|GPL-3, v.1.1-14; Bates et al., 2015) in the R environment (GPL-2|GPL-3, v.3.3.3; R Core Team, 2017). We report estimates, standard errors, and t-values from the *lmer* output, with a t-value exceeding 1.96 considered statistically significant with $p < 0.05$.

There was no significant main effect of contextual SENTENCE type ($\hat{\beta} = 0.2289$, SE = 0.2154, $t = 1.063$); however, there was a highly significant main effect for the ADDITIVE predictor ($\hat{\beta} = 1.7407$, SE = 0.3431, $t = 5.073$)—participants overall judged the sentences with the additive particle as more acceptable than those without.⁹ For the interaction, crucially, the absence of the

⁸Available at <https://github.com/dmbates/RePsychLing>.

⁹Although participants judged exhaustivity violations with *hu* as relatively acceptable, which is unexpected if the exhaustive meaning component is a presupposition, we nonetheless believe that the results are in line with a previous analysis of the *ni*-structure as giving rise to a presuppositional exhaustivity effect (Renans, 2016a,b). Importantly,

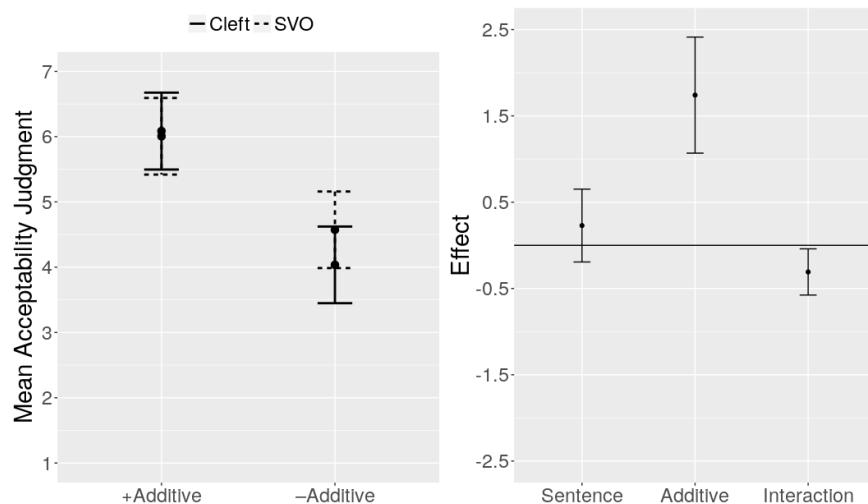


Figure 2: Model-estimated means (left) and coefficient estimates (right) with 95% confidence intervals.

additive particle *hu* had a higher negative effect on the acceptability of sentences in the context of strong exhaustivity (*ni*-Clefts) than in the context of weak exhaustivity (SVO), and this effect was significant ($\hat{\beta} = -0.3087$, $SE = 0.1366$, $t = -2.259$). This is seen in the left graph in Figure 2 in the larger difference in means between *ni*-Clefts and canonicals in the -ADDITIVE condition, with *ni*-Cleft contexts being judged as less acceptable than SVO contexts, when compared to the +ADDITIVE condition. Results suggest that the presence of the additive particle in Ga aligns with the exhaustive interpretation of the context, as predicted by *Obligatory Implicatures*. On the other hand, the results pose challenges to *Maximize Presupposition*, which cannot account straightforwardly for the Ga data.

5 Discussion

We found evidence that the obligatory insertion of additive particles is a cross-linguistic stable phenomenon. In addition, the data suggest that obligatory additives directly interact with exhaustivity inferences. In both Ga and German, sentences without the trigger are more degraded when the previous sentence receives an exhaustive interpretation, i.e., (21a) is less acceptable than the sequence in (21b).

- (21) a. EXH John came. Bill came.
b. John came. Bill came.

This suggests that (21a) necessarily leads to a contradiction due to the presence of exhaustivity, whereas (21b) can be saved by reanalyzing the second sentence as an addition. However, in both cases the preferred interpretation is one in which the two propositions are understood as a contrast, i.e., the second sentence directly negating the fact that John came. This difference in acceptability

the *ni*-cleft gives rise to a conditional presupposition (e.g., the sentence *Kofi ni sele* ‘It is Kofi who swam’ in rough terms presupposes that if Kofi swam, then Kofi is the only person who swam). In some contexts this conditional presupposition, in turn, can be targeted by negation, to be discussed in future work.

of the sentence without the trigger is straightforwardly explained by *Obligatory Implicatures* but not *Maximize Presupposition*. In German, there was an additional effect of cancellation: the sentence with the trigger was more degraded in the case when there was a strong exhaustivity effect in the previous sentence, i.e., (22a) is less acceptable than (22b).

- (22) a. EXH John came. Bill came, too.
 b. John came. Bill came, too.

Sentences with additives are overall more acceptable than sentences without them since by presupposing that all alternatives are true the contradiction is avoided. In addition, the data on German suggest that *auch* cancels the exhaustivity inference, i.e., it negates the not-at-issue content, as in (23).

- (23) EXH John came. (No, not EXH John came,) Bill came, too.

We observe that, cross-linguistically, additives mark that a QUD has been previously answered, and they negate the fact that this previous answer was exhaustive. This negation can be perceived as odd if it was previously suggested that the QUD was exhaustively answered. Our data support a view in which additives are discourse managing triggers. To further develop this view but also to account for differences, i.e., that cancellation was perceived as degraded in German but not Ga, one has to investigate further the exhaustivity effect associated with different structures in different contexts, especially the role of the QUD or alternatives. Another interesting open question is whether the empirical divide between triggers (one set captured by *Maximize Presupposition*, the other by *Obligatory Implicatures*) can be found in other languages. A related issue is whether the empirical scope of *Maximize Presupposition* is restricted to items which are ordered on a scale of presuppositional strength, possibly even restricted to presuppositional features (as suggested by Bade 2016). So far, our data suggest that the pragmatic principle behind *Obligatory Implicatures* is cross-linguistically stable.

6 Summary

In this paper, we presented the results of a pioneering experimental study on Ga checking the predictions of two theories on the insertion of presupposition triggers: *Maximize Presupposition* vs. *Obligatory Implicatures*. We found that the insertion of the additive in Ga is sensitive to the context, in particular to its exhaustive interpretation, as expected under *Obligatory Implicatures*. Therefore, the results are in line with this approach, while posing challenges for *Maximize Presupposition*. Furthermore, the results of the experiments on both German and Ga suggest that this pragmatic mechanism is cross-linguistically stable and point to universal principles in pragmatics.

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