

Obligatory Additives in the Antecedent of Conditionals

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Abstract. The paper investigates the obligatory insertion of additive particles in the antecedent of conditionals. Two theories are compared with regard to their different predictions regarding this insertion. One theory works with the principle *Maximize Presupposition* (Heim, 1991), the other postulates a relation between mandatory exhaustivity inferences and insertion of additive particles (Bade, 2016). The first theory predicts additives to be obligatory under downward entailing (DE) operators which are holes for presuppositions. The second theory predicts the insertion of additives to not be obligatory under DE-operators due to the fact that exhaustivity inferences are usually blocked in these environments for independent reasons (Chierchia et al., 2012). Previous studies already suggest that additives (and iteratives) are not obligatory under negation, contrary to the predictions of *Maximize Presupposition* (Bade and Tiemann, 2016). In the present paper, an experimental study on the insertion of German “auch” in antecedent of conditionals is reported which tests the predictions of both theories and further confirms an account of obligatory additivity working with *Obligatory Implicatures*.

Keywords: presuppositions, conditionals, implicatures.

1. Introduction

The paper investigates the obligatory insertion of additive particles in the antecedent of conditionals. Previous studies on obligatory presupposition triggers suggest that additive particles do not fall in the class of triggers whose obligatory insertion follows from the principle *Maximize Presupposition* (Bade, 2016). Rather, the data suggest that additives are inserted to block or cancel exhaustivity implicatures. One important prediction of *Maximize Presupposition* is that presupposition triggers are obligatory in contexts which are holes for presuppositions, such as under negation and in the antecedent of conditionals. It has been shown that additives are not obligatory under negation (Bade and Tiemann, 2016). This is straightforwardly explained under an account working with *Obligatory Implicatures*. Since exhaustification is blocked under negation for independent reasons, insertion of the trigger is unnecessary. The study presented here tested the predictions of *Maximize Presupposition* and the competing theory *Obligatory Implicatures* for the insertion of additives in antecedents of conditionals. The results show that additives are generally not obligatory in this environment. Moreover, the data suggest that the insertion of additives interacts with the interpretation of the conditional as a whole. The study is thus also revealing with regard to the ongoing question under which circumstances exhaustivity implicatures occur locally.

Section 1 gives the theoretical background, specifically it discusses the two theories *Obligatory Implicatures* and *Maximize Presupposition*. In section 2 an acceptability rating study on German “auch” in antecedent of conditionals is presented which tested the predictions of the two theories.

2. Theoretical Background

Presupposition triggers are obligatory when their presupposition is fulfilled in the context, see examples in (1) (Heim, 1991; Sauerland, 2008; Percus, 2006; Chemla, 2008).

- (1) a. The / # A father of the victim arrived.
 b. Bob came to the store. Bill came, #(too).
 c. Peter went to Norway this year. He went to Norway #(again) last year.
 d. John # believes / knows Paris is in France.

There are two approaches to the phenomenon of obligatory presuppositions, one is working with the principle *Maximize Presupposition*, the other makes use of *Obligatory Implicatures*. Previous experimental findings suggest that presupposition triggers fall into two classes with regard to their obligatory insertion. The insertion of one set of triggers is better captured using *Maximize Presupposition*, the insertion of the other group seems to follow from *Obligatory Implicatures*. Both theories predict the insertion of the triggers in (1) to be obligatory. Theories working with *Maximize Presupposition* assume that there is lexical competition between the trigger and its non-presuppositional counterpart, which are ordered on a scale, see examples in (2).

- (2) Scales: {the, a}, {both, every}, {believe, know}, {again, \emptyset }, {SG, PL}, {too, \emptyset }, {PRES, PAST}

Using the weaker item on this scale of presuppositional strength will lead to an “anti-presupposition” or “implicated presupposition”, i.e. the inference saying that the presupposition of the stronger competitor is false. The inference arising from using (3a) instead of (3b), for example, is that it is not certain that there is a unique 6ft long catfish, see (3c).

- (3) a. Robert caught a 6ft long catfish.
 b. Robert caught the 6ft long catfish.
 c. $\neg\exists x.\forall y.6\text{ft-catfish}(y) \leftrightarrow x = y$

Parallely, (4a) has an inference that it is not certain that the victim has one unique father, which contradicts common knowledge. As a result, the definite determiner is obligatorily inserted. “Antipresuppositions” (Percus, 2006) are argued to have a special status. First, these inferences are said to be projective content, a property they share with presuppositions. Since the negated (4a) has the presuppositional stronger competitor in (4b) the same undesired inference arises that the presupposition of (4b) is false, see (4c). As a result the definite must be inserted under negation.

- (4) a. #A father of the victim did not arrive.
 b. The father of the victim did not arrive.
 c. $\rightsquigarrow \neg\exists x.\forall y.\text{father-of-victim}(y) \leftrightarrow x = y$

Another property is that these inferences usually resist strengthening. That is, the inference in (3a) cannot be strengthened to “It is certain that there is more than one 6ft long catfish”, as would be expected if they were implicatures.

However, it has been observed that not all presupposition triggers behave alike when it comes to their obligatory insertion. Specifically, it has been shown that the inferences from not using presupposition triggers other than the definite determiner do not necessarily come with the features just discussed. First, it has been argued that some of the “antipresuppositions” can be strengthened in the same way as implicatures (Chemla, 2008). The sentence with “believe” in (5), for example, has a strong inference that it is certain that the speaker does not have a brother. This is because speakers are usually opinionated when it comes to them having siblings or not.

(5) Jane believes I have a brother.

Second, the presupposition triggers “too” and “again” (German “auch” and “wieder”) are not obligatory under negation, which shows that their “antipresuppositions” do not project, see examples in (6) below (Bade and Tiemann, 2016).

(6) a. Yesterday Jenna went ice-skating. Today she did not go (again).
b. Bob came to the party. It is not true that John came, (too).

Moreover, the circumstances under which the trigger “too” is inserted seems to align with the circumstances under which exhaustivity implicatures arise. The more pressure to derive an exhaustivity implicature, the more pressure to insert the trigger (Bade, 2014, 2016). These facts are more compatible with a theory that assumes that obligatory insertion of the presupposition trigger follows from *Obligatory Implicatures*.

The theory assumes that the (b) sentences in (7)-(9) have implicatures, given in (c) respectively, which are contradictory to the contexts in (a).

(7) a. Paris is in France.
b. Mary believes_F that Paris is in France.
c. It is not certain that Paris is in France.

(8) a. John has visited Rome.
b. Peter_F has visited Rome.
c. Peter is the only one who has visited Rome.

(9) a. Mary came to John’s party last year.
b. She came to John’s party this year_F.
c. This year is the only time Mary came to John’s party.

These implicatures are derived by a covert exhaustivity operator, see definition in (10) (Fox, 2007), which evaluates the focus, for example on “Peter” in (8b). One further assumption is that, in the absence of other overt alternatives, the Question Under Discussion (QUD, Roberts

(1996)) which matches the focus provides the set of alternatives (Bade, 2016). The derivation of the exhaustivity implicature is given in (11).

- (10) a. $\llbracket \text{EXH} \rrbracket (A_{\langle \langle s,t \rangle, t \rangle})(p_{\langle s,t \rangle})(w) \Leftrightarrow p(w) \ \& \ \forall q \in \text{NW}(p, A): \neg q(w)$
 b. $\text{NW}(p, A) = \{q \in A: p \text{ does not entail } q\}$
- (11) $\llbracket [[\text{EXH } Q] [\text{Peter}_F \text{ has visited Rome }]] \rrbracket = \text{Peter was in Rome in } w \ \& \ \forall q [q \in [\lambda p. \exists x. p = \lambda w. x \text{ was in Rome in } w] \ \& \ p \not\Rightarrow q \rightarrow q(w) = 0]$

This theory does not predict triggers to be obligatory under negation since exhaustivity is blocked here for independent reasons (Bade and Tiemann, 2016). Moreover, the inferences arising from not using the trigger are supposed to be implicatures, which explains that they are dependent on context and can be strengthened (Sauerland, 2004).

The empirical picture arising so far is that presupposition triggers fall into two classes with regard to obligatory insertion (Bade, 2016). One set of triggers, including the definite, is better captured by *Maximize Presupposition* since inserting it is obligatory below DE-operators and its insertion does not depend on the context, especially the QUD. Another set of triggers, including “know”, “again” and “too”, follow from *Obligatory Implicatures*. Leaving them out creates implicatures which can be contradictory to the context and do not arise under DE-operators.

3. Experimental Study

3.1. Idea: presupposition triggers in antecedents of conditionals

Maximize Presupposition predicts presupposition triggers to be obligatory in antecedents of conditionals since they are holes for presuppositions. That is, the presupposition of “again” in (12a) that Peter was in Norway before projects out of the if-clause in (12b).

- (12) a. Peter was in Norway again this year.
 b. If Peter was in Norway again this year, he was fishing.

As a result, if (13a) is used instead of (12b), which is the presuppositionally stronger competitor, the “anti-presupposition” in (13b) arises that the presupposition of the competitor is false.

- (13) C: Peter was in Norway last year.
 a. If Peter was in Norway this year, he was fishing.
 b. $\sim\sim$ It is not true that Peter was in Norway before.

Due to this inference, (13a) is predicted to be degraded in the context given in (13) which establishes that Peter was in Norway before by *Maximize Presupposition*.

According to *Obligatory Implicatures* the insertion of the presupposition trigger should only be forced if an exhaustivity implicature arises which is contradictory to the context. The question thus is: what exactly are the exhaustivity implicatures that arise with if-clauses? There is

evidence from scalar implicatures that exhaustivity implicatures arise below the if-clause. The sentence in (14) is ambiguous between the reading in (14a) and the one in (14b).

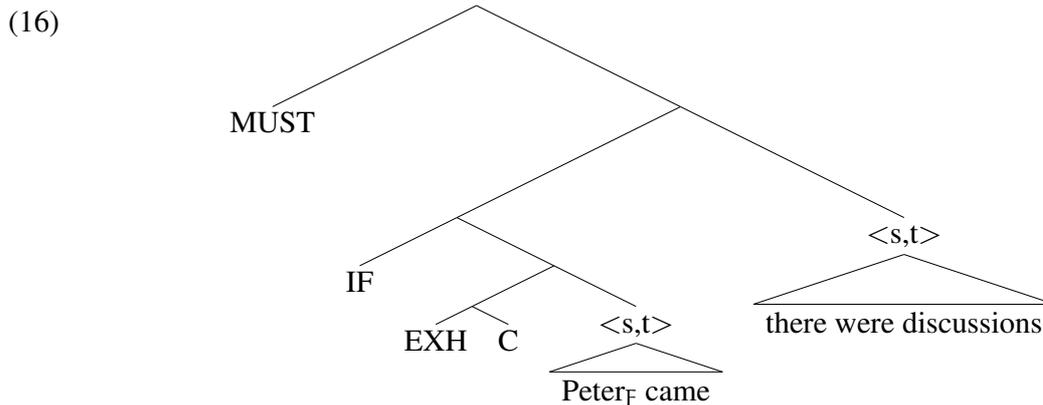
- (14) If you have salad or dessert, you pay \$20.
 a. If EXH you have salad or dessert, you pay \$20.
 ‘If you have salad or dessert but not both you pay \$20.’
 b. If you have salad or dessert, you pay \$20.
 ‘If you have salad or dessert or both, you pay \$20.’

Since the scale ordering the items {or, and} (Horn, 1984) is reversed under downward-entailing operators the sentence in (14b) is already the strongest competitor. Adding an exhaustivity operator below “if” usually would not lead to strengthening and thus is ruled out on the basis of the economy condition (Chierchia et al., 2012). Readings such as the one in (14a) are available, but are argued to require special circumstances and usually pitch accent on the scalar item (Fox and Spector, to appear).

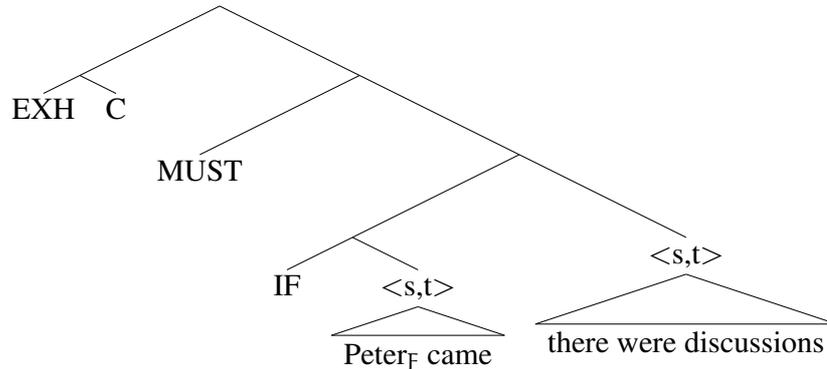
For sentences with particularized conversational implicatures yielded by focus, such as the one in (15), the picture looks very similar. There are two exhaustification strategies, given in (15a) and (15b) and both seem available.

- (15) If Peter_F came, there were discussions.
 a. If EXH Peter came, there were discussions.
 b. EXH If Peter came, there were discussions.

The LF for (15a) is given below in (16), the one for (15b) is given in (17).



(17)



Let us assume that the context in which (16) is uttered is the one in (18).

- (18) Mary came.
 a. If EXH Peter_F came, there were discussions.
 b. EXH If Peter_F came, there were discussions.

The relevant alternatives for (18a) are propositions of the form given in (19).

- (19) Alt = {Peter came, Mary came, Peter and Mary came, ...}

If the exhaustification strategy in (18a) is chosen, both alternatives “Mary came” and “Mary and Peter came” are excluded since they are non-weaker and the reading in (20) is yielded. Assuming that a epistemic (realistic) modal base is chosen for the covert modal which is restricted by the if-clause this reading yields a contradiction (Kratzer, 1991).

- (20) $\forall w \in \{w' : w' \text{ is compatible with the evidence available in the utterance situation in } w_{@}\} \& \text{Peter came in } w \& \text{Mary did not come in } w \rightarrow \text{there were discussions in } w$
 ‘If Peter and not Mary came, there were discussions.’

Since it is already established in the context that Mary came the indicative conditional with a low EXH operator must be perceived as contradictory. There is no possible world in accordance with the facts of $w_{@}$, the actual world, where Mary did not come. With the exhaustification strategy in (18b) the relevant alternatives are the one in (21).

- (21) Alt = {If Peter came, there were discussions; If Mary came, there were discussions; If Peter and Mary came, there were discussions ...}

The sentence in (18b) entails that if Peter and Mary came there were discussions. The only alternative which is non-weaker and thus excluded is that if Mary came there discussions, see the interpretation of (18b) in (22).

- (22) $\forall w \in \{w' : w' \text{ is compatible with evidence available in the utterance situation in } w_{@}\} \& \text{Peter came in } w \rightarrow \text{there were discussions in } w \& \neg \forall w \in \{w' : w' \text{ is compatible}$

with the evidence available in the utterance situation in $w_{@}$ } & Mary came in $w \rightarrow$
 there were discussions in w
 ‘If Peter came there were discussions and not if Mary came there were discussions.’

This reading says that Peter’s coming is the condition for there being discussions and not Mary’s coming. This is not contradictory to the fact that Mary came. There is, of course, a third option where no exhaustivity operator is inserted into the structure. This reading is also predicted to not yield any inferences which could be contradictory to the the discourse. Only if the first option with EXH < If is chosen, the trigger should be obligatory according *Obligatory Implicatures*. Since this reading is predicted to be marginally available, leaving out the trigger should be fine in most cases.

To sum up, the theories make different predictions with regard to the insertion of presupposition triggers in antecedents of conditionals. For *Maximize Presupposition* the trigger should be obligatory as long as its presupposition is fulfilled. According to *Obligatory Implicatures*, the trigger is only obligatory if exhaustification leads to a contradiction with the context. This can only happen when an exhaustivity operator is inserted below “if”. A correlation between interpretation and pressure to insert the trigger is thus predicted. The purpose of the study presented was to test these predictions.

3.2. Material and Design

The idea behind the study was to test the predictions of the two theories *Maximize Presupposition* and *Obligatory Implicatures* regarding the obligatory insertion of the German additive particle “auch” in the antecedent of conditionals. The design of the study was simple. There was a context establishing that the presupposition of the additive was fulfilled, see the example in (23).

- (23) Teresa, Sabrina und Isa gehen in die selbe Klasse und haben gerade eine Klausur zurück bekommen. Sabrina sagt zu Teresa: Ich bin durch die Klausur gefallen. Theresa antwortet:
Teresa, Sabrina and Ida are students in the same class and just got back an exam. Sabrina says to Theresa: I failed the test. Theresa replies:

The target sentence was following the context and appeared in two conditions with and without the additive (+ADD/-ADD).

- (24) a. Wenn Ida auch durchgefallen ist, muss der Test schwer gewesen sein.
If Ida also failed the test, the test must have been hard. +ADD
 b. Wenn Ida durchgefallen ist, muss der Test schwer gewesen sein.
If Ida failed the test, the test must have been hard. -ADD

Participants were asked to read context and target sentences carefully and then judge the acceptability of the target in a given context on a scale from 1 to 5 (where 5 stands for totally

acceptable). To test the prediction of *Obligatory Implicatures* that the insertion of the trigger is only obligatory under a certain interpretation participants were moreover asked two comprehension questions. The first question addressed the interpretation of the antecedent, an example is given in (25). Participants could choose between three answer options given in (25a-c).

- (25) **Q1: According to Teresa, under which conditions must the test have been hard?**
- a. Sabrina failing (IF A)
 - b. Ida failing (IF B)
 - c. Both Ida and Sabrina failing (IF A and B)

The second question people were asked aimed at finding out whether there are inferences resulting from using the conditional which could yield contradictions, an example is given in (26). They had three options for answering, given in (26a-c).

- (26) **Q2: Does Theresa believe that Sabrina failed?**
- a. Yes (Y)
 - b. Unclear (U)
 - c. No (N)

The answers to these two questions together were supposed to tell which interpretation people had in mind when judging the acceptability of the sentences. Especially interpretation question number two was supposed to give insights into whether the sentence without the additive was perceived as contradictory to the previous discourse, i.e. whether there was an inference (antipresupposition or implicature) that created a contradiction. With the additive, the sentence should make clear that the speaker (Teresa in the example given) believes that Sabrina failed, the answer to Q2 should thus clearly be “Yes”. However, it is not clear from the sentence with the additive that the speaker considers both Sabrina’s and Ida’s failing conditions for the test being hard, i.e. the sentence with “auch” is ambiguous between the two readings in (27).

- (27) If Ida failed too, the test must have been hard.
- a. $\forall w \in \{w' : w' \text{ is compatible with the evidence available in the utterance situation in } w_{@}\} \& \text{ Ida failed in } w \& \text{ Sabrina failed in } w \rightarrow \text{ the test was hard in } w$
If both Ida and Sabrina failed, the test must have been hard.
 - b. $\forall w \in \{w' : w' \text{ is compatible with the evidence available in the utterance situation in } w_{@}\} \& \text{ Ida failed in } w \rightarrow \text{ the test was hard in } w$
If Ida failed, the test must have been hard.

The reading in (27b) is considered to be less prominent but available. It said that only Ida’s failing is a necessary condition for the test being hard (but presupposes that Sabrina failed). The contexts were set-up in a way that principally allowed for both readings. No matter which one of the two was chosen, however, the acceptability of the sentence should not be affected by since they both do not lead to a contradiction. The more interesting question was which readings arose for the sentence without the trigger. If a reading was yielded which was contradictory to the previous discourse the difference in acceptability between the sentence with and without the trigger was assumed to be significant according to *Obligatory Implicatures*. Compared to

that, the differences between acceptability of the sentence with and without the trigger should not reach significance if the sentence without the trigger was not considered being contradictory. The reading which yields a contradiction is one where the exhaustivity is inserted below “if” (IF > EXH). This reading requires the participants to answer that only Ida’s failing is a condition for the test being hard (Q1= If B). In addition, the sentence should imply that Teresa is unsure that Sabrina passed (Q2= No). One reading which is not contradictory to the previous sentence is one where the exhaustivity operator is inserted above “if” (EXH > IF). This reading is supposed to be reflected by participants saying that only Ida’s failing is a condition for the test being hard (Q1 = IF B), but in addition the speaker has no doubt that Sabrina failed too (Q2 = Yes). This reading is thus the same as the one in (27b) and available with and without “too”. The last reading does not involve any exhaustivity operator and is also not contradictory to the discourse; it is one where both Ida’s and Sabrina’s failing are considered conditions for the test being hard (Q1= If A and B) and the sentence is not perceived as a contradiction to the fact that Sabrina passed (Q2 = Yes). This reading is the one in (27a) and should hardly be available without the additive. The interpretations corresponding to the combination of answers given to Q1 and Q2 are summarized in figure 1 below.

Answer(s)	Interpretation
Q1= IF B and Q2 =No	If only B then C (IF > EXH)
Q1= IF B and Q2 =Yes	Only if B then C (EXH > IF)
Q1 = IF A and B and Q2=Yes	If A and B then C (#EXH)

Figure 1: Interpretations corresponding to answers

3.3. Predictions

Maximize Presupposition predicts sentences with the additive to overall be judged more acceptable than sentences without the additive in contexts which verify its presuppositions. This is because the sentence in (28a) in the context of (28) has the competitor in (28b). Not using this competitor should, through pragmatic reasoning, lead to hearer to calculate the “antipresupposition” in (28c), saying that the presupposition of (28b) is false.

- (28) Sabrina failed.
- If Ida failed the test was hard.
 - If Ida failed too, the test was hard.
 - $\neg \exists p \in C \ \& \ p \neq \text{Ida failed} \ \& \ p(w) = 1$

The inference in (28c) is contradictory to the fact that Sabrina failed. The sentence without the additive should thus be unacceptable in the context. Calculating this inference is supposed to be the default interpretation in the given context since the competition with “too” is made prominent by the overt alternative “Sabrina failed”. The prediction would thus be that sentences

without the additive are most often interpreted as denying the truth of (28), which would result in a high percentage of “no” answers to Q2. If, however, no such inference (“antipresuppositions”) arises the sentence should be judged acceptable without the trigger.

According to *Obligatory Implicatures* the sentence without the trigger should be less acceptable than the sentence with the trigger only if an exhaustification strategy is chosen which yields a contradiction. This is only the case if the exhaustivity operator is inserted below “if” (IF > EXH). The question under which circumstances exhaustification is mandatory versus optional is still open. However, some preferences for which exhaustivity implicatures arise in conditionals can be determined based on the research on scalar implicatures (Chierchia et al., 2012; Fox and Spector, to appear). Under the assumption that exhaustification below downward-entailing operators usually requires contextual pressure and pitch accent on the relevant alternative trigger, the exhaustification strategy which yields the contradiction (IF > EXH) should be the least likely interpretation. If one adopts the view that inserting EXH is the default if it leads to strengthening, the interpretation with EXH above “if” should be the most frequent one (EXH > IF). As a result, the insertion of the trigger in antecedents of conditional is considered not obligatory since the interpretation which triggers the insertion is a very marginal one (at least in the contexts used in the experiment). As *Maximize Presupposition*, *Obligatory Implicatures* predicts no decrease of acceptability for sentences without the trigger which do not yield a contradictory inference. The predictions of both theories are summarized in figure 2 below.

Interpretation	Predictions ObligImp	Predictions MaxPres
If only B then C (IF > EXH)	FREQUENCY LOW, ACCEPT +ADD > ACCEPT -ADD	FREQUENCY HIGH, ACCEPT +ADD > ACCEPT -ADD
Only if B then C (EXH > IF)	FREQUENCY HIGH, ACCEPT +ADD = ACCEPT -ADD	FREQUENCY LOW, ACCEPT +ADD = ACCEPT -ADD
If A and B then C (#EXH)	FREQUENCY LOW, ACCEPT +ADD = ACCEPT -ADD	FREQUENCY LOW, ACCEPT +ADD = ACCEPT -ADD

Figure 2: Interpretations corresponding to answers

3.4. Analysis and Results

One factor was manipulated for the study creating two conditions: the target items were conditionals which either were presented with or without the German additive “auch” in a context which satisfied its presupposition (+/-ADD). There were three dependent variables: the acceptability of the sentence on a Likert scale (1-5), and the answers to two comprehension questions. Six experimental items were created per condition, which made for 12 experimental items in total. 24 filler items were used. 24 German native speakers, students or former students of the university of Tübingen participated in the experiment, they received 5 Euros for their participation.

Results were analyzed with linear mixed effect models using the lmer function in R (Bates,

2005). The fixed factor was ADDITIVE, random factors were subject and items. The analysis revealed a significant effect of ADDITIVITY on acceptability. The insertion of the additive decreased acceptability of the conditional, see figure 3.

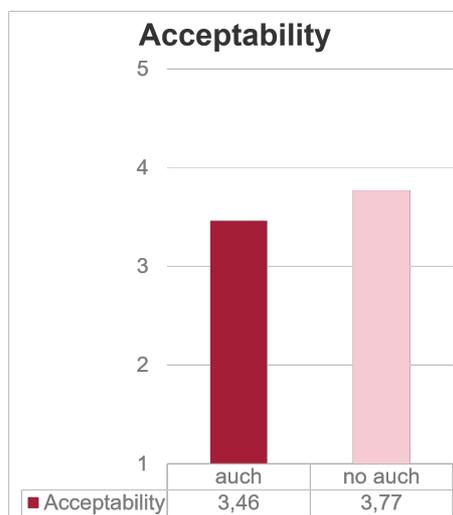


Figure 3: Acceptability of sentences with and without additive

Moreover, the additive had a marginally significant influence on which interpretation was chosen in response to Q1 (“What are the conditions for the event described by the consequent? IF A, IF B, IF A and B?”) ($p < .08$): with “auch” more “both” (IF A and B) responses were chosen. “Auch” also had a significant influence on choice of interpretation for Q2 (Does the speaker believe the previously mentioned fact that A occurred? YES, NO, UNSURE) ($p < .01$), more “no” answers were given with the presence of the additive. Since the analysis revealed that pooling “yes” answers with “unsure” answers or pooling “no” answers with “unsure” answer did not affect the analysis, the interpretations “yes”/“uncertain” were pooled together as suggesting no contrast to previous discourse, whereas “no” responses were considered as suggesting a contrast/contradiction to previous discourse. Overall, using the additive increased percentage of interpretations without any exhaustivity operator (#EXH, no contrast + IF A and B response), it decreased percentage of interpretations with high EXH (EXH > IF, no contrast + If B response) and increased interpretations with low EXH (IF > EXH, contrast and IF B response) see figures 4 and 5.

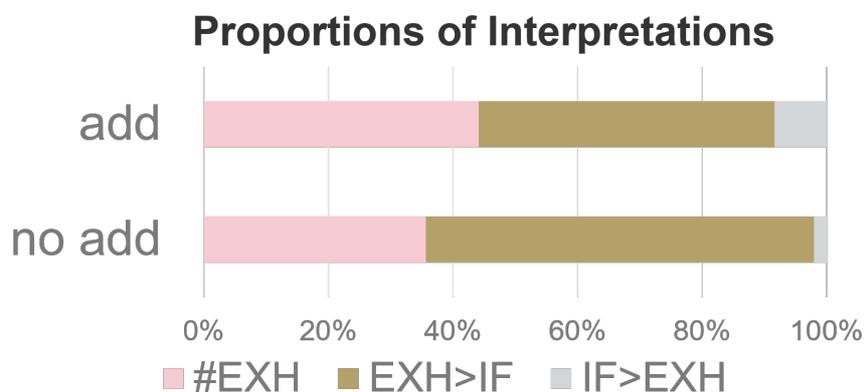


Figure 4: Proportion of interpretations chosen with and without additive

	#EXH	EXH>IF	IF>EXH
-ADD	35,7%	62,3%	2%
+ADD	44,2%	47,4%	8%

Figure 5: Proportions of interpretations chosen with and without additive

The responses to Q1 and Q2 both have a significant influence on acceptability (Q1 $p < .05$, Q2 $p < .01$). Comparing different models using a chi-square test revealed that the best model for predicting acceptability included both the factor ADDITIVITY as well as responses to Q1 and Q2. A causal mediation analysis furthermore showed that both responses had an influence on acceptability which was not influenced by the presence of the additive.

The interpretation without any exhaustivity operator (#EXH) is significantly more acceptable overall ($M = 4,15$) than the interpretation involving high or low exhaustivity operators (IF>EXH, $M = 3,25$; EXH>IF, $M = 2,8$). The interpretation with no EXH got even more acceptable with the presence of the additive, however the difference was not significant. The interpretations where there was either a low or high EXH got less acceptable with the presence of the additive, see proportions of interpretations in figures 6 and 7. This difference was only significant for the interpretation with EXH > IF.

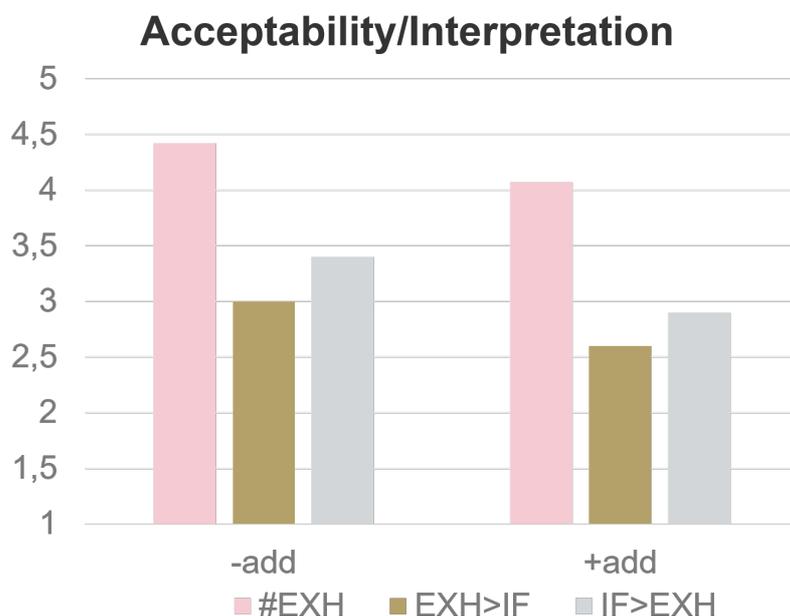


Figure 6: Acceptability by interpretation chosen with and without additive

	#EXH	EXH>IF	IF>EXH
-ADD	4,42	3	3,4
+ADD	4,07	2,6	2,9

Figure 7: Acceptability by interpretation chosen with and without additive

3.5. Discussion

As predicted by *Obligatory Implicatures* the percentage of interpretations which were perceived as contradictory to the discourse was low (<5%). This is in line with the assumption that the inference arising when the trigger is not inserted is an exhaustivity implicature, which only occurs below DE-entailing operators under special circumstances. This is because under normal circumstances it yields to weakening of the statement. The inference resulting from the LF in (29) leads to the weaker statement in (29a) which is entailed by the stronger LF without EXH, see (29b).

- (29) If EXH Peter came, there were discussions.
 Alt = {Peter came, Mary came, Peter & Mary came}
- a. If Peter and not Mary came, there were discussions.
 - b. If Peter came there were discussions.
 - ⇒ If Peter and Mary came, there were discussions.
 - ⇒ If Peter and not Mary came, there were discussions.

Usually these circumstances where EXH is inserted below DE-operators involve pitch accent on the scalar item and are analyzed using stacked exhaustivity operators (Fox and Spector, to appear). Since the implicatures discussed in this paper are particularized conversational implicatures, not generalized ones, their occurrence might be even more restricted under DE operators. Since the sentences were only read by participants and there were no contextual cues for strong pitch accent, the low availability of these interpretations is expected from the viewpoint of a grammatical approach to implicatures. More research is needed on this issue to specify the circumstances under which local particularized conversational implicatures can occur at all. The results presented suggest that obligatorily inserting additives might be a good indicator.

Theories working with *Maximize Presupposition* would have to explain why competition with the stronger version with the additive is not activated and the resulting anti-presupposition did not arise, since otherwise the sentence without “too” should have been perceived as contradictory to the previous discourse more often. Of course making *Maximize Presupposition* sensitive to discourse is not impossible. However, there seems to be a clear contrast to the anti-presupposition resulting from using the indefinite. This inference, sometimes referred to as an anti-uniqueness inference (Heim, 1991), seems to arise as a default and seems to be insensitive to DE-operators and the broader discourse, see the (obligatory) oddness of (30) (cf. Bade, 2016).

(30) A man entered the bar. # If a man is thirsty, he will order a beer.

The results thus speak in favor of an analyses which distinguishes these cases from one another and postulates two groups of presupposition triggers when it comes to obligatory insertion: one, including additives, is inserted to avoid an implicature. The other, involving definites, follows from *Maximize Presupposition* (Bade, 2016; Bade and Tiemann, 2016).

The results further show that insertion of “auch” decreases acceptability of conditionals when its presupposition is fulfilled in the context. As predicted by *Obligatory Implicatures* the trigger is not obligatory per se but must be inserted only if an exhaustivity implicature must be blocked. The results suggest that the interpretation without any exhaustivity operators is the most acceptable one (M = 4,25). Its acceptability is not significantly affected by the presence of the trigger. However, it is significantly more available with the presence of the additive (35% versus 44%). That is, the additive must be considered optional for the acceptability of sentences with this interpretation (#EXH).

For the rare cases in which the conditional was interpreted as contradicting the context, the additive did not affect the overall low acceptability either (M=3,15). What is puzzling is that the availability of these interpretations seemed to increase with the presence of the additive. One possible explanation is that the presence of an overt focus sensitive particle increased the pressure to put focus on the noun it associated with. This focus was then understood as contrastive to the previous discourse. However, that means that, to make the presupposition of “auch” true, participants must have accommodated another antecedent/true proposition in the discourse. More research is needed to understand why this option was available at all

since additives are usually considered very hard to accommodate (Heim, 1992). Since the interpretation was rarely chosen and only by few participants individual differences might be at play here as well.

The interpretation which was most often chosen (55% on average) and received the overall lowest acceptability is one which is in line with an analysis where an exhaustivity operator is present in the structure, but above the “if”-clause, see (31).

- (31) EXH If Peter came (too), there were discussions.
 ‘Only if Peter came (too), there were discussions.’
 a. $\forall w \in \{w' : w' \text{ is compatible with the evidence available in the utterance situation in } w_{@}\} \& \text{ Peter came in } w \rightarrow \text{there were discussions in } w$

This interpretation is available with and without the additive. However, its availability significantly decreased with the presence of “too” (62,3% versus 47,4%) and so did its acceptability (M=3 versus M=2,6). This interpretation must thus be considered the crucial one for explaining the overall decrease in acceptability with the presence of the additive. Whereas additional stipulations have to be made to explain this using *Maximize Presupposition* the results can straightforwardly be explained using *Obligatory Implicatures*. The relevant QUD (Question Under Discussion, Roberts (1996)) at play for this reading seems to be the one in (32), providing the set of alternatives in (32a). EXH above “if” excludes one alternative, see (32b).

- (32) If who came, there were discussions?
 a. {If Peter came,...; If Mary came...; If Peter and Mary came ... }
 b. $\neg \forall w \in \{w' : w' \text{ is compatible with the evidence available in the utterance situation in } w_{@}\} \& \text{ Mary came in } w \rightarrow \text{there were discussion in } w$

What “too” marks in this case is not that the question in (32) has been previously answered but rather that the “local” question “Who came?” has already been answered (by the previously asserted “Mary came”). As was mentioned before, exhaustifying (31) with respect to the QUD in (32) will not be contradictory to the fact that Mary came. As a result, the additive is not considered obligatory. The fact that it is even perceived as disturbing in this case can be explained by assuming that making reference to an already answered QUD which is not relevant to the current QUD anymore is a dispreferred pragmatic move.

The answer to the question whether additives are obligatory in antecedents of conditionals thus seems to depend on what interpretation is chosen for the conditional. If the context allows for an interpretation without any exhaustivity operators, the additive is optional. It does not change acceptability but can make this interpretation clearer. With an interpretation where an exhaustivity operator is inserted high, above the “if”-clause, the insertion of the additive is perceived as the dispreferred option. The results further supports *Obligatory Implicatures* and the view that additive particles can function as a window into local exhaustivity implicatures.

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