

How to interpret “expletive” negation under *bevor* in German

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1 Introduction

This article deals with a curious phenomenon in German, a construction in which a negation can be dropped without changing the meaning. Consider the following example:

- (1) *Peter wollte Potsdam nicht verlassen bevor nicht das Projekt in ruhigem Fahrwasser war.*¹
‘Peter did not want to leave Potsdam before the project was running smoothly.’

The German example contains a negation after the temporal clausal preposition² *bevor* that appears to be superfluous, given the English translation. Indeed, the example without the negation appears to have the same truth conditions:

- (2) *Peter wollte Potsdam nicht verlassen bevor das Projekt in ruhigem Fahrwasser war.*

There are other well-known examples of non-interpreted negation, viz. cases of so-called negative concord in Slavic and Romance languages, but also in dialects of German and English. But arguably, in those cases the “superfluous” negation has to be present for grammatical reasons, which is not the case here. I will show that the negation is in fact interpreted, and that, due to a complex interplay of semantic and pragmatic factors, we do get truth conditions for the two sentences that are not quite identical, but very similar.

2 A closer look at “expletive” negation under *bevor*

It is not by accident that we find a second negation in (1), in the main clause. If we drop that, it is not clear how the negation of the embedded clause should be interpreted at all.

- (3) *Peter wollte Potsdam verlassen, bevor (# nicht) das Projekt in ruhigem Fahrwasser war.*

The constructed example (1) can easily be supplemented by actually occurring data, all of which have a negation in the main clause:³

- (4) *Auch Bert kann das Tor nicht passieren, bevor nicht Rolf, der Pförtner, die Anlage, soweit sie das Tor bewacht, außer Funktion setzt. [Be 1990]*
‘Even Bert cannot pass the gate before NEG Rolf, the gate keeper, disables the system, as far as it guards the gate.’

1 This article is dedicated to Peter Staudacher on the occasion of his 70th birthday, to commemorate our joint work in the SFB 632 *Information Structure*. Thanks to Sophie Repp for a close reading of the article that has led to a number of improvements.

2 *Bevor* is classified as a preposition, not as a complementizer, because it is compatible with measure phrases, as in *drei Jahre bevor* ‘three years before’. Also, *bevor* are compatible with the complementizer *dass* in substandard forms, as in *bevor dass Peter gekommen ist*. The corresponding nominal preposition is *vor*, e.g. *(drei Jahre) vor dem Krieg* ‘three years before the war’.

3 Data are taken mostly from the corpus of the Digitales Wörterbuch des 20. Jahrhunderts, Berlin-Brandenburgische Akademie der Wissenschaften, www.dwds.de. I specify the date and the text category (“Gebrauchstexte”, “Zeitungstexte”, “Belletristik”, “Wissenschaftliche Texte”).

- (5) *Aber ich wollte meiner zärtlichen Rechnung nicht trauen, bevor nicht eine verlässliche Probe gemacht war.* [Ge 1911]
 ‘But I did not want to trust my tender computation before NEG a more reliable test was done.’
- (6) *Eine Währungsreform könne nicht eher durchgeführt werden, bevor nicht die Wirtschaft in der Lage sei, organisatorisch und technisch alle Arbeitssuchenden einschließlich der Flüchtlinge aufzunehmen.* [Wi 1986]
 ‘The currency could not be reformed before the economy NEG would be able to take care of all the people that were seeking jobs, including the refugees.’
- (7) *Er erklärte zunächst einmal, er könne sich über den Sachverhalt keine Meinung bilden, bevor er nicht den Hund gesehen hätte.* [Be 1986]
 ‘He explained first that he could not come up with a judgement about the issue before he NEG had seen the dog.’

The temporal prepositions *ehe* ‘before’ and *bis* ‘until’ show a similar behavior, as they also allow for “expletive” negation⁴:

- (8) *Von unsern Leuten darf niemand an Land, ehe nicht morgen die Behörde die Pera freigibt.* [Ge 1929]
 ‘Noone of our people should disembark before NEG the officials allow the use of the Pera.’
- (9) *Er hat erklärt, er wolle nicht eher ruhen, als bis nicht der letzte Nationalliberale aus Hannover verschwunden sei.* [Ze 1910]
 ‘He explained he would not rest before than NEG the last national liberal was gone from Hanover.’

Bevor clauses can precede the main clause, even though the frequency of such cases appears to be lower⁵:

- (10) *Bevor man nicht die Aussicht hat, zu einer für das Proletariat günstigen Verständigung zu gelangen, hat es keinen Zweck, in die Regierung einzutreten.* (Ze 1923)
 ‘Before one NEG can expect to achieve an agreement which is advantageous for the proletariat, there is no use in entering the government.’
- (11) *Bevor die DDR nicht alle volkswirtschaftlichen Daten offengelegt habe, könne darüber nicht gesprochen werden.* (Ze 1990)
 ‘Before the DDR NEG has made accessible all economic data one cannot talk about that.’

In all these examples the negation in the dependent clause appears to be uninterpreted, as the clauses without negation have the same meaning, or are at least truth-conditionally similar:

- (12) *Bert kann das Tor nicht passieren, bevor nicht Rolf die Anlage außer Funktion setzt.*
 ⇔ *Bert kann das Tor nicht passieren, bevor Rolf die Anlage außer Funktion setzt.*

But the converse test, to put a negation in an arbitrary sentence consisting of a negated main clause and a *bevor* clause, reveals that the two constructions can convey quite different meanings. This

4 The DWDS corpus (accessed January 30, 2010) contains the following data:

Instances of <i>bevor</i> : 7507	Instances of <i>bevor</i> followed by <i>nicht</i> : 63
Instances of <i>ehe</i> : 6169	Instances of <i>ehe</i> followed by <i>nicht</i> : 67
Instances of <i>bis</i> : 19389	Instances of <i>bis</i> followed by <i>nicht</i> : 19

Searches were carried out for *bevor*, *ehe* and *bis* as subordinating conjunctions (\$p=KOUS). There are in fact many more occurrences of “expletive” *nicht* after *bevor*, *ehe* or *bis* in the corpus. For example, a search of instances of *bevor* followed by *nicht* within up to two three words has 205 hits, nearly all of them relevant. *Bevor* and *ehe* differ as to text type; *ehe* occurs most prominently in literary texts, and seems to be in steady decline after the 1950’s. There also seems to be a slight decline of *bevor* with expletive negation (39 hits in the 1910’s, 10 hits in the 1990’s),

5 This is against claims by Weisgerber (1960), who states that *bevor* with expletive negation typically is preposed. Weisgerber’s data are based on a production experiment with students in secondary school. In the DWDS corpus, there are 24 cases with sentence-initial *bevor* plus “expletive” negation (search string: “Bevor #2 nicht”), and at least 150 cases with non-initial *bevor* plus “expletive” negation (“bevor #2 nicht”).

point was made by Weisgerber (1960) with examples like the following, where a negation in the *bevor* clause prevents a natural interpretation.

- (13) *Ich kam nicht mehr zur Schutzhütte, bevor (# nicht) das Unwetter losbrach.*
'I didn't reach the shelter before (# NEG) the thunderstorm started.'

Weisgerber argued that *bevor* with what he calls "pleonastic" negation is a temporal conjunction with a conditional meaning, whereas regular *bevor* has a purely temporal meaning. We can capture this intuition by rephrasing (12) as in (14), where both negations appear to be interpreted, as the English gloss shows.

- (14) *Wenn nicht Rolf die Anlage außer Funktion setzt, kann Bert das Tor nicht passieren*
'If Rolf doesn't disable the device, Bert cannot pass the gate.'

The reinterpretation of temporal to conditional conjunctions is well-known from other cases, cf. e.g. German *wenn* 'if', a cognate of English *when*.

Weisgerber's proposal is interesting, but it does not explain why we can drop the "expletive" negation without clear change of truth conditions. This can only be explained if we assume that *bevor* clauses without negation also can have a conditional meaning. This is indeed the case, as in (15), which expresses that it was a reason for Peter to stay in Potsdam as long as it was necessary to secure that the project is doing well, and under that interpretation the negation after *bevor* can be dropped without apparent change of truth conditions. The conditional interpretation is often supported by modal elements in the main clause, e.g. in our examples by *wollen* 'want', *können* and *in der Lage sein* 'be able to', *dürfen* 'be allowed to', *die Aussicht haben* 'be able to expect'. But this support is not necessary; we have a similar conditional interpretation in (16).

- (15) *Peter wollte Potsdam nicht verlassen, bevor das Projekt (nicht) im ruhigen Fahrwasser war.*

- (16) *Peter verließ Potsdam nicht bevor (nicht) das Projekt im ruhigen Fahrwasser war.*

As for the negation in the main clause, we should notice that it can be implicit, e.g. in downward-entailing quantifiers like *niemand* 'nobody', *keine* 'no', *wenige* 'few', or verbal predicates with negative implications like *warnen* 'warn' and *sich weigern* 'object':

- (17) *Niemand legt seine Serviette vom Schoß auf den Tisch zurück, bevor das nicht die Hausfrau getan hat.* [Ge 1991]
'Nobody should put his napkin from one's lap back on the table before that NEG was done by the lady of the house.'

- (18) *Großbritannien und seine Alliierten hätten wiederholt erklärt, daß keine Konferenz stattfinden könne, bevor nicht die Pariser Verträge ratifiziert sind.* [Ze 1954]
'Great Britain and her allies had declared repeatedly that no conference could take place before NEG the Paris Treaties are

- (19) *und nur wenige können das, bevor sie nicht selbst Vergebung erfahren haben*
'and only few are able to do that before they NEG have experienced forgiveness themselves'⁶

- (20) *Der Geschäftsausschuß warnt - hiermit ausdrücklich - die Mitglieder der zum Deutschen Ärztevereinsbunde gehörigen Vereine und diese selbst, auf Verträge mit sogen. Mittelstandskassen -, welche ihnen etwa angeboten werden sollten, in irgend einer Form sich einzulassen -, bevor nicht der nächste Ärztetag sein Votum in dieser Frage abgegeben haben wird.* [Ze 1906]
'The board warns [...] the members of societies belonging to the medical association [...] to accept contracts with middle class insurances, before NEG the next medical meeting has decided in this issue.'

6 <http://dev3.graphic-studio.ch/forum/viewtopic.php?t=72&sid=d44c22fd1715d361576f83fbb072d540>

- (21) *Janek weigerte sich, aufzuhören, bevor er nicht von der Gefangenendelegation aufgefordert wurde.* (Anna Seghers, *Die Gefährten*, 1932)
 ‘Janek refused to stop before he NEG was asked by the prisoner delegation.’

The negation can also be a result of pragmatic processes, as in the following case, where ‘do not want that p’ is understood as ‘want that not p’ (a case of so-called NEG raising):

- (22) *Manfred wollte nicht, dass Peter Potsdam verließ, bevor nicht die Zukunft des Projekts gesichert war.*
 ‘Manfred didn’t want that Peter left Potsdam before (NEG) the future of the project was secured.’

Interestingly, negation expressed by *es stimmt nicht* or by the *keineswegs* does not license “expletive” negation under *bevor*:

- (23) *Es stimmt nicht, dass Peter ging, bevor (# nicht) die Zukunft des Projekts gesichert war.*
 ‘It’s not true that Peter left before (# NEG) the future of the project was secured.’
- (24) *Peter ging keineswegs bevor (# nicht) die Zukunft des Projekts gesichert war.*
 ‘In no way did Peter leave before (# NEG) the future of the project was secured.’

But it should be pointed out that there are also cases without any negation in the main clause. The DWDS corpus contains one example, (25); notice that the main clause *fühlt es sich im Liegen am wohlsten* does not contain a negation. It seems that such cases have not been observed before; they were explicitly ruled out by Weisgeber (1960):

- (25) *So lange ein Kind das Köpfchen nicht selbst zu heben vermag und bevor es nicht allein sitzen kann, fühlt es sich im Liegen am wohlsten.* [Ge 1902]
 ‘As long as a child cannot lift his little head and before he NEG can sit up on his own, he feels most comfortable in a lying position.’

The negation within the *bevor* clause is somewhat peculiar. While *nicht* preceding an indefinite article *ein* normally is realized as *kein* except in contrastive interpretations –

- (26) a. *da nicht eine verlässliche Probe gemacht war*
 (o.k. only in contrastive interpretation: *not one*)
 b. *da keine verlässliche Probe gemacht war*

– there is no contrastivity with “expletive” negation before *ein*, cf. (5). But *kein* after “expletive” negation is not ruled out either.⁷ The DWDS corpus contains at least one example with *kein* (27) and one (for me slightly dubious) example with *nichts* (28), and Weisgerber uses examples like (29).

- (27) *Wie wir sahen, ist Pithecanthropus, bevor keine weiteren, besser erhaltenen Schädel aufgefunden werden, für die Stammesgeschichte des Menschen kaum zu verwerten.* [Be 1926]
 ‘As we saw, we can hardly use *Pithecanthropous* for the lineage of Man before NO other skulls that are found that are better preserved.’
- (28) *Sie tat nichts auf den Löffel, bevor das Kind nichts verlangte.* [Ge 1969]
 ‘She didn’t put anything on the spoon before the child NEG asked for something.’
- (29) *Bevor ich keine Zigarette geraucht habe, fange ich mit der Arbeit nicht an.*
 ‘Before I NEG smoke a cigarette, I do not start with the work.’

A second difference concerns the syntactic position of “expletive” negation. While definite DPs that are not interpreted contrastively normally scramble to a position left of *nicht*, cf. (30), this is not necessary with “expletive” negation, cf. (31).

- (30) a. *da er nicht den Hund gesehen hatte*
 (o.k. only in contrastive interpretation: ‘as he didn’t see the dog (but something else)’)

⁷ This is against a judgement by Schwarz & Bhatt (2006), who consider the example *Ich gehe nicht bevor du keinen Apfel gegessen hast* ‘I don’t go before you have eaten no apple’ a “semantic anomaly”.

b. *da er den Hund nicht gesehen hatte*

- (31) *Er könne sich über den Sachverhalt keine Meinung bilden, bevor er nicht den Hund gesehen hätte.*

Schwarz & Bhatt (2006) call the type of negation that occurs after *bevor* “light negation”; it is called “negation of the third kind” in the treatment of negation in Baviarian in Weiß (2000).

We find “expletive” negation under expressions meaning ‘before’ also in Romance and Slavic languages (cf. e.g. Del Prete 2008, Blaszczak 2001), and it apparently was present in Old and Middle English (cf. van der Wurff 1999, Mazzon 2004).⁸ The phenomenon has been observed for German before; Weisgerber (1960) refers to older literature; for a more recent descriptive account see the information site of the the IDS Mannheim.⁹

In the following I will argue that, against first impressions and general opinion, this negation is in fact interpreted. The task, then, is to show how the truth conditions of such sentences arise. In particular, we will have to show how it is possible that a pair of sentences that differ only in the presence or absence of negation can have nearly identical truth conditions.

3 The meaning of *bevor*

3.1 *Bevor* as a temporal negation

I assume a meaning of *bevor* similar to what Anscombe (1964) assumed for *before* (and what informally was assumed by Weisgerber 1960 as well): The *bevor* clause is negated for all times at or before the time at which the main clause is evaluated, and the meaning of the main clause and the adverbial clause are combined conjunctively. In the following, n is the time of interpretation, which is picked up by tense operators.

$$(32) \llbracket \textit{bevor B} \rrbracket^n = \lambda t \neg \exists t' [t' \leq t \wedge \llbracket B \rrbracket^n(t')]$$

$$(33) \llbracket \llbracket A \textit{ bevor B} \rrbracket \rrbracket^n = \lambda t [\llbracket A \rrbracket^n(t) \wedge \llbracket \textit{bevor B} \rrbracket^n(t)] \\ = \lambda t [\llbracket A \rrbracket^n(t) \wedge \neg \exists t' [t' \leq t \wedge \llbracket B \rrbracket^n(t')]]$$

This allows us to represent the so-called nonfactual use of *bevor* (cf. Heinämäki 1972, Ogihara 1995 for English *before*):

- (34) *Mozart starb bevor er sein Requiem vollendete.*
‘Mozart died before he finished his requiem.’

We assume that the semantics of past tense locates the event time as prior to the utterance time n , and that tense operators have clausal scope, being operators in I^0 :

$$(35) \llbracket \llbracket \textit{IP Mozart sein Requiem vollendete} \rrbracket \rrbracket^n \\ = \llbracket \llbracket \llbracket \textit{I} \rrbracket \llbracket \textit{VP Mozart sein Requiem vollend-} \rrbracket \textit{ PAST} \rrbracket \rrbracket^n \\ = \llbracket \textit{PAST} \rrbracket^n (\llbracket \textit{Mozart sein Requiem vollend-} \rrbracket^n) \\ = \lambda p \lambda t [t < n \wedge p(t)] (\lambda t [\textit{Mozart finishes his requiem at t}]) \\ = \lambda t [t < n \wedge \textit{Mozart finishes his requiem at t}]$$

8 Neither van der Wurff nor Mazzon mention any example for expletive negation under *before*. Thompson & Longacre (1985) mention Mandarin as another language, but with an example that does not contain negation in the main clause. This (and similar cases reported for Lhakota and Turkish) apparently are due to the inherent negation in the word meaning ‘before’.

Ta (mei) lai yiqian, women yijing hui jia le.
he NEG arrive before we already return home asp
‘Before he arrived, we already had returned home.’

9 http://hypermedia.ids-mannheim.de/pls/public/sysgram.ansicht?v_id=2545

The free tense variable has to be existentially bound. I assume here that this is one of the tasks of the assertion operator. The temporal variable can also be bound by other illocutionary operators, as well as by subordinators like *als* ‘when’, *wann immer* ‘whenever’ etc. Formally, assertive mood is related to movement of the finite verb to the verb second position (C^0), which also entails the requirement to fill the verb-initial position.

$$\begin{aligned}
 (36) \quad & \llbracket_{CP} \text{Mozart}_1 \llbracket_C \llbracket_{C^0} \text{vollendete}_0 \rrbracket \llbracket_{IP} \llbracket_{t_1} \text{sein Requiem } t_0 \rrbracket t_0 \rrbracket \rrbracket^n \\
 & = \llbracket \text{ASSERT} \rrbracket^n (\llbracket \text{Mozart sein Requiem vollendete} \rrbracket^n) \\
 & = \lambda p [\text{asserted: } \exists t [p(t)]] (\lambda t [t < n \wedge \text{Mozart finishes his requiem at } t]) \\
 & = \text{asserted: } \exists t [t < n \wedge \text{Mozart finishes his requiem at } t]
 \end{aligned}$$

Consider the derivation of our example:

$$\begin{aligned}
 (37) \quad & \llbracket \text{Mozart starb} \rrbracket^n = \lambda t [t < n \wedge \text{Mozart dies at } t] \\
 & \llbracket \text{bevor} \llbracket \text{er (i.e. Mozart) sein Requiem vollendete} \rrbracket^n \rrbracket^n \\
 & = \lambda t \neg \exists t' [t' < t \wedge [t' < n \wedge \text{Mozart finishes his requiem at } t']] \\
 & \llbracket \text{Mozart starb} \llbracket \text{bevor} \llbracket \text{er sein Requiem vollendete} \rrbracket^n \rrbracket^n \rrbracket^n \\
 & = \lambda t [t < n \wedge \text{Mozart dies at } t \wedge \\
 & \quad \neg \exists t' [t' < t \wedge [t' < n \wedge \text{Mozart finishes his requiem at } t']]]
 \end{aligned}$$

Applying the assertion operator, which crucially applies only at this stage at not already at the level of the clause *Mozart starb*, yields the following result (here somewhat simplified):

$$\begin{aligned}
 (38) \quad & \llbracket \text{ASSERT} \rrbracket^n (\llbracket \text{Mozart starb} \llbracket \text{bevor} \llbracket \text{er sein Requiem vollendete} \rrbracket^n \rrbracket^n \rrbracket^n) \\
 & = \text{asserted: } \exists t [t < n \wedge \text{Mozart dies at } t \wedge \\
 & \quad \neg \exists t' [t' < t \wedge \text{Mozart finishes his requiem at } t']]
 \end{aligned}$$

This is what we expect: At the time of Mozart’s death t (situated before the speech time) there is no prior time at which Mozart finished his requiem. It follows from our background knowledge that one cannot finish one’s requiem after one’s death that there is also no later time at which Mozart finished his requiem.

3.2 The implicature of likelihood

The current proposal seems insufficient, as we would use (34) only if the *bevor* clause describes a proposition that is likely at the time of the evaluation of the main clause. For this reason, the following example is odd:

$$\begin{aligned}
 (39) \quad & \# \text{Mozart starb bevor er ein Oktett für Streicher und Helikopter komponierte.} \\
 & \text{‘Mozart died before he composed an octet for string instruments and helicopters’}
 \end{aligned}$$

To explain this, Heinämäki (1972), Ogihara (1995) and Beaver & Condoravdi (2003) have proposed modal accounts of *before* (which is similar to *bevor*) which require that non-factual *before* clauses are interpreted at alternatives of the real world that are likely at the time at which the main clause is evaluated.

But I think going modal is unnecessary. The meaning component in question can be derived from pragmatic principles of informativity: A sentence $[A \text{ before } B]$ is only informative in contexts where it is considered reasonably probable that B is true some time after the time of interpretation of the main clause. If the common ground carries the information that B is highly unlikely at any time, then the statement that B is not true at any time before a time at which A is true is an unmotivated restriction. More formally: If the *a-priori* likelihood of $\exists t[B(t)]$ is close to 0, then the *a priori* likelihood of $[A \text{ before } B]$ is close to 1, and asserting it would violate the maxim of relevance.

Consequently, when uttering a sentence $[A \text{ before } B]$, the speaker creates the implicature that the *a priori* probability that $\exists t[B(t)]$ is substantially greater than 0.

3.3 The “factual” interpretation of *bevor* and the concept of reified implicatures

There is a general tendency that *bevor/before*-clauses are interpreted factually. That is, a sentence [A *bevor* B] does not only imply that B is likely, but that it is, in fact, true. Consider the following sentence:

- (40) *Herr Maier lernte Frau Schmidt kennen, bevor er Herrn Schmidt kennenlernte.*
 ‘Mr. Maier met Mrs. Schmidt before he met Mr. Schmidt.’

By default, we assume that Mr. Maier met Mr. Schmidt as well. A question meaning ‘When did Mr. Maier meet Mr. Schmidt?’ is fully appropriate after (40). But this inference can be cancelled:

- (41) *Tatsächlich hat er Herrn Schmidt nie kennengelernt, denn die Schmidts haben sich kurz darauf getrennt.*

‘As a matter of fact, he never met Mr. Schmidt because the Schmidts separated soon after.’

Cancellable inferences are conversational implicatures, according to Grice (1975). The implicature in question arises from general conversational principles, as follows: The sentence [A *bevor* B] states that B was not the case before a time *t* at which A is true. It competes with the stronger statement $\neg B$, that B never was the case. The usual mechanism for scalar implicatures is set in motion: The hearer can infer that the stronger statement $\neg B$ does not obey the maxim of quality (typically, because it is false), as otherwise the speaker would have made that stronger statement, following the maxim of quantity. This means that typically, the negation of the more general statement $\neg \neg B$, which is equivalent to B, is implicated.

- (42) $\llbracket \text{ASSERT} [A [bevor B]] \rrbracket^n$
 asserted: $\exists t [\llbracket A \rrbracket^n(t) \wedge \neg \exists t' [t' \leq t \wedge \llbracket B \rrbracket^n(t')]]$
 implicated: $\exists t' [\llbracket B \rrbracket^n(t')]$

Together with the core meaning of [A *bevor* B] that B was not the case before a time *t* at which A is true, it is implicated that B is true at some time after *t*:

- (43) implicated, given what is asserted: $\exists t [\llbracket A \rrbracket^n(t) \wedge \exists t' [t < t' \wedge \llbracket B \rrbracket^n]]$

As we do expect from conversational implicatures, this meaning component is partly independent of the lexical items involved, in particular from *bevor*, as it also occurs with expressions like *ehe* that have the same truth-conditional meaning. But it arises quite standardly whenever the meaning of *bevor / ehe* is applied, and hence can be difficult to distinguish from the lexical meaning of these expressions (except, of course, for the fact that it is cancellable). The meaning component is a generalized implicature in the sense of Grice (1975), or a default implicature in the sense of Levinson (2000).

For the following discussion I would like to “reify” this implicature as a meaning component of *bevor* that originates from general conversational principles but is “folded into” the meaning of a lexical item. It is a “hard-wired” implicature. Being part of the meaning of *bevor*, it is conventional, but it still can be cancelled; hence it is different from conventional implicatures in the sense of Grice (1975), and recently discussed in Potts (2005).

Reified conversational implicatures will be implemented in form of two-dimensional semantic representations $\langle \alpha, \beta \rangle$, where α is the core meaning, and β the implicature. This is similar to the treatment of scalar implicatures introduced by number words or Boolean disjunction in Landman (2000) and Chierchia (2004), who assume that those implicatures are built “in tandem” with truth conditions. The implicature is cancelled if it is contradicted by the core meaning in the context in which it is interpreted. If not cancelled, the overall meaning is the conjunction of α and β .

In the case at hand, the adverbial clause [*bevor* B] and the proposition expressed by [A *bevor* B] are interpreted as follows, where I underline the implicature part:

- (44) $\llbracket before B \rrbracket^n$
 = $\langle \lambda t \neg \exists t' [t' \leq t \wedge \llbracket B \rrbracket^n(t')], \lambda t \exists t' [t < t' \wedge \llbracket B \rrbracket^n(t')] \rangle$

$$(45) \llbracket A \text{ [before B]} \rrbracket^n \\ = \langle \lambda t[\llbracket A \rrbracket^n(t) \wedge \neg \exists t'[t' \leq t \llbracket B \rrbracket^n(t')]], \lambda t[\llbracket A \rrbracket^n(t) \wedge \exists t'[t < t' \wedge \llbracket B \rrbracket^n(t')]] \rangle$$

The underlying assumption for the composition of meanings is that the core meaning and the reified implicature are computed in parallel. In particular, if $\langle \alpha, \beta \rangle$ is a meaning (with core meaning α and implicature β) that is combined with a meaning γ , the result is a meaning $\langle (\gamma, \alpha), (\gamma, \beta) \rangle$, where (γ, α) and (γ, β) stand for the regular meaning combinations (e.g., functional composition or generalized conjunction).

When a proposition with a reified implicature gets asserted, the reified implicature is changed into a regular cancellable implicature, as follows:

$$(46) \llbracket \text{ASSERT} \rrbracket^n = \lambda \langle p, p' \rangle [\text{asserted: } \exists t[p(t)], \text{implicated: } \exists t[p'(t)]]$$

If the preceding and following context in which a proposition is interpreted, together with the asserted preposition, does not entail the negation of the implicature, this becomes part of what is asserted; otherwise the implicature is cancelled. The propositional part of example (40) then is interpreted as follows:

$$(47) \llbracket \text{Herr Maier Frau Schmidt kennenlernte, bevor er Herrn Schmidt kennenlernte} \rrbracket^n \\ = \langle \lambda t[t < n \wedge \text{HM meets FS at } t \wedge \neg \exists t'[t' \leq t \wedge t' < n \wedge \text{HM meets HS at } t'], \\ \lambda t[t < n \wedge \text{HM meets FS at } t \wedge \exists t'[t < t' \wedge t' < n \wedge \text{HM meets HS at } t'] \rangle$$

When asserted at a context that does not make the implicature part inconsistent, this will result in combining the core meaning and the implicature, as follows:

$$(48) \llbracket \text{ASSERT} \rrbracket((47)) \\ = \text{asserted: } \exists t[t < n \wedge \text{HM meets FS at } t \wedge \neg \exists t'[t' \leq t \wedge t' < n \wedge \text{HM meets HS at } t'] \\ \text{implicated: } \lambda t[t < n \wedge \text{HM meets FS at } t \wedge \exists t'[t < t' \wedge t' < n \wedge \text{HM meets HS at } t']$$

In case it is inconsistent to add the core meaning and the implicature, as when continued with (41) or in the Mozart's requiem example, the implicature part is cancelled.

The treatment of reified conversational implicatures proposed here would certainly have to be substantiated and defended by a consideration of a wider range of cases. One issue that has to be settled is what happens if two meanings with implicatures are combined? Also, we would need a representation that keeps apart the core assertion and what is only implicated. At this point, I will not attempt to go into these details, but turn to the main issue of this article.¹⁰

4 *Bevor* with “expletive” negation: Some attempts at explanation

4.1 Expletive negation as negative concord?

We now turn to cases in which *bevor* occurs with “expletive” negation, and consider a number of options. The first of these options is that expletive negation under *bevor* is a case of negative concord. This is a well-known phenomenon in a number of languages, where indefinites occur in a special form, as so-called “n(egative)-words”, in the scope of a negation. There are various accounts of this phenomenon: n-words have been analyzed as negative polarity items (Laka 1990, Ladusaw 1992), as expressions that trigger a negative conventional implicature (Ovalle & Guerzoni 2004), or

¹⁰ I would like to mention a possible alternative to the treatment proposed here, the assumption of a lexical ambiguity between a non-factual and a factual *bevor*, where the latter expresses a conjunction of the core meaning and the implicature. A point in favor of this interpretation is the existence of forms like *zehn Minuten bevor* ‘ten minutes before’, which appear to specify the “<” relation in the implicature $\exists t'[t < t' \wedge \llbracket B \rrbracket(t')]$ as $<_{10\text{min}}$, where $t <_{10\text{min}} t'$ iff the last point of t and the first point of t' are 10 minutes apart. This would be strange if this meaning component were an implicature. However, constructions like [*zehn Minuten bevor B*] could also be interpreted with respect to the core meaning, as $\lambda t \neg \exists t'[t' \leq t \wedge \llbracket B \rrbracket(t'+10\text{min})]$, where $t'+10\text{min}$ is the time t' extended by 10min at the end of t' .

as indefinites that check a negation feature of an expression with higher scope (e.g., Espinal 2000, Zeijlstra 2004).

Negative concord has been invoked by Espinal (2000) to explain expletive negation under ‘before’ in Catalan, with examples like the following (where *et* is an object clitic):

(49) *Albans que et vegi ningú, vés-te’n.*
before than you see.SUBJ.3SG anybody go.IMP-2SG
‘Before anybody sees you, you should go.’

(50) *Albans que (no) et vegin, vés-te’n.*
before than not you see.SUBJ.3PL go.IMP-2SG
‘Before anybody sees you [they see you], you should go’

In the non-factual reading, *albans* ‘before’ requires a subjunctive and triggers n-words. Indefinites have to occur as n-words like *ningú*, cf. (49), and we can optionally have a negation marker *no* that is not interpreted, cf. (50). Espinal explains this as a checking of the negative feature of *albans*, which is restricted to the non-factual reading.

This is certainly not the case how negation under *bevor* in German arises. First, the German case is not restricted to non-factual readings. Second, and more importantly, it nearly always comes with a negation in the main clause, whereas there is no such restriction in Catalan and other Romance languages that show the phenomenon.

But there might be another negative concord analysis for the German data. While Standard German does not obviously show negative concord (in contrast to some dialects, like Bavarian, and historic precursors, like Middle High German), it has been proposed that negative words do not express negation themselves, but indicate the presence of a non-overt negation operator OP_{NEG} , as an agreement or feature-checking operation (cf. Penka & von Stechow 2001, Zeijlstra 2004, Penka 2007). According to this analysis, *niemand* ‘nobody’ means the same as *jemand* ‘somebody’, but has the syntactic property that it must occur in the scope of a negation:

(51) *(weil) niemand da ist*
(weil) OP_{NEG} [jemand_{NEG} da ist]

We now could make use of the fact that expletive negation under *bevor* occurs with a negation in the main clause by assuming that this negation has scope over the whole sentence:

(52) *Wir fangen nicht_{NEG} an bevor (nicht_{NEG}) jemand da ist.*
‘We do not begin before (NEG) someone is present.’
 OP_{NEG} [we begin NEG before (NEG) someone is present]

Nicht in the main clause would be required to make visible the OP_{NEG} operator of the sentence, while NEG in the *bevor* clause is optional; it is not required to indicate the OP_{NEG} operator, but it still can occur, as it is c-commanded by it. This actually goes beyond the analysis of Penka and von Stechow, who analyze negative indefinites but not the adverbial negation *nicht* itself as agreeing forms.

There are a number of problems with this approach. To start with, as *nicht* in the *bevor* clause is not required, one question is: Why is it there at all? Furthermore, notice that it is in an adjunct clause, that is, in a syntactic island. In other dependent clauses NEG is not optional in the same configuration, e.g. in *if*-clauses. In the following case, the presence of negation makes the predictable semantic difference.

(53) *Wir fangen nicht an wenn (nicht) jemand da ist.*
‘We do not start if someone (noone) is present.’

Furthermore, it would be unclear why, with expletive negation, there is a tendency to avoid n-quantifiers in favor of *nicht* + indefinites. All this makes it unlikely that negation under *bevor* can be explained as a negative concord phenomenon.

4.2 Expletive negation as negative absorption?

Del Prete (2008) analyzes Italian *prima* ‘before’ as a comparative expressing comparison relating to the temporal location of events, which are analyzed as degrees on a scale ordered by temporal precedence. Comparatives are interpreted following Seuren (1973), which in the current case results in the following meaning representation, where I use times instead of Del Prete’s events, and disregard tense for simplicity. The last inference follows from the monotonicity properties of degrees.

(54) *Gianni arrivò prima che arrivasse Lea.*

‘Gianni arrived before Lea arrived.SUBJ’

$\exists d[\neg[\text{Lea arrived d-early}] \wedge \text{Gianni arrived d-early}]$

$\Leftrightarrow \exists d[\neg\exists t[\text{Lea arrived at } t \wedge t \text{ is d-early}] \wedge \exists t[\text{Gianni arrived at } t \wedge t \text{ is d-early}]]$

$\Leftrightarrow \exists t[\neg\exists t'[\text{Lea arrives at } t' \wedge t' \leq t] \wedge \exists t'[\text{Gianni arrives at } t' \wedge t' \leq t]]$

While different from the interpretation of *bevor* proposed here, Del Prete’s interpretation also contains a negation in the *prima* clause, as in the proposal discussed here.

Del Prete (2008) explains optional “expletive” negation in Italian *prima* sentences as a result of the negation \neg that appears in his analysis of the meaning of *prima*. This negation is said to “absorb” the negation in the clause headed by *prima*. This is similar as with expletive negation in comparatives in general, which also show expletive negation:

(55) *Sparerà più in alto que non pensi.*

‘He will shoot higher than you NEG think.’

Again, I think that this analysis cannot be applied to negation under *bevor* clauses in German. Some of the issues of the last section would arise for Del Prete’s account as well when applied for German. Furthermore, there is no evidence that German *bevor* is a comparative, as it does not allow for the comparative complementizer *als*. And comparatives do not license expletive negation in German to begin with.

4.3 Expletive negation as wide-scope “exceptive” negation?

Another attempt is to analyze “expletive” negation as having scope over *bevor*. The overall interpretation is an exception clause: The main clause makes a general statement, the dependent clause adds an exception.

(56) *Wir reisen nicht ab bevor nicht Peter gekommen ist.*

\Leftrightarrow *Wir reisen nicht ab, nicht bevor Peter gekommen ist.*

‘We do not leave, not before Peter arrives.’

One point in favor of this analysis is that it helps to explain the evidence that negation under *bevor* is in a syntactically higher position than regular negation. However, exceptive interpretations of clauses typically involve a clear prosodic break between the main clause and the exceptive clause, as indicated by the comma in the second sentence of (56). This prosodic break is lacking with cases of “expletive” negation. The exception clause analysis is also difficult to reconcile with cases like (25) in which a *solange* clause, an ‘as long as’ clause, which certainly is not an exception clause, is coordinated with a light negation clause.

4.4 *Bevor* + “expletive” negation as conditional marker?

Weisgerber (1960) proposed that *bevor* with “expletive” negation has a conditional interpretation. There is still a temporal element in conditional *bevor*, as the nature of the condition is a temporal one, which shows up in the use of *yet* in the paraphrase of the following paraphrase:

(57) *Bevor nicht Peter gekommen ist, reisen wir nicht ab.*

‘For every time t, if Peter has not arrived at t yet, we do not leave at t’

We could express this conditional directly with the conditional maker *wenn*, except that the following example quantifies over possible situations at a given time, not over possible times:

- (58) *Wenn Peter noch nicht angekommen ist, reisen wir nicht ab.*
 ‘If Peter has not arrived yet, we do not leave.’

Weisgerber’s proposal is interesting, but it has a number of explanatory gaps. How precisely are the conditional interpretation of *bevor nicht* and the temporal interpretation of *bevor* related to each other? Here, it is relevant that Weisgerber did not pay sufficient attention to the fact that *bevor* sentences without “expletive” negation can have a conditional interpretation as well. Furthermore, it is not obvious why *bevor* + “expletive” negation virtually requires a negation in the main clause. This is not the case with other conditionals; for example, the negation in the main clause in (58) can be dropped, with the expected change of meaning.

5 “Expletive” negation under *bevor* explained

In this section I will develop a new proposal for “expletive” negation under *bevor*. Under this proposal it turns out that the negation is in fact interpreted. Let us focus on the following example:

- (59) *Maria schlief nicht ein bevor nicht Hans zuhause war.*
 ‘Maria didn’t fall asleep before NEG Hans was home.’

I propose that the negation under the scope of *bevor* negates a proposition. That is, it yields the complement of the set of times that represents the unnegated proposition:

- (60) $[[\textit{nicht}_p A]]^n = \lambda t \neg[[A]]^n(t)$

Applying propositional negation results in the following meaning:

- (61) $[[\textit{nicht}_p [\textit{Hans zuhause war}]]]^n = \lambda t \neg[t < n \wedge \text{Hans is home at } t]$

Applying *bevor*, cf. (32), results in the following meaning, where the implicature is underlined:

- (62) $[[\textit{bevor} [\textit{nicht}_p [\textit{Hans zuhause war}]]]]^n$
 $\{ \lambda t \neg \exists t' [t' \leq t \wedge \neg [t' < n \wedge \text{Hans is home at } t']],$
 $\lambda t \exists t' [t < t' \wedge \underline{\neg [t' < n \wedge \text{Hans is home at } t']}] \}$

The core meaning applies to times t that are not equal or preceded by a time t' for which it is **not** the case that Hans is home at t' . This can be rendered more perspicuously, applying standard rules of logical equivalence, as a predicate that applies to all times t such that Hans is home at t or at some earlier time:

- (63) $\lambda t \forall t' [t' \leq t \rightarrow [t' < n \wedge \text{Hans is home at } t']]$

Whenever this applies to a time t , then it holds that Hans is home at all earlier times – in fact, Hans must be home from the beginning of time on! Models for which this is the case are unnatural and can be excluded. Hence we can replace that formula by falsity, \perp . With the implicature, the meaning contribution of the *bevor* clause then is as follows:

- (64) $\{ \lambda t [\perp], \lambda t \exists t' [t < t' \wedge \underline{\neg [t' < n \wedge \text{Hans is home at } t']}] \}$

This means that the *bevor* clause does not apply to any time t but carries the implicature that t is followed by a time t' at which Hans is not home. This is a strange meaning indeed that could not specify the time of an ordinary positive sentence. But keep in mind that it will be negated by the negation in the main clause.

I assume that negation in the main clause is assertional, in the sense that it states that there is no time for which the proposition in question is true (which might be relative to a certain reference time interval). Hence assertional negation binds the time argument, leading to a truth value. As a first approximation:

(65) $\llbracket \text{nicht}_a \rrbracket^n = \lambda p \text{ [asserted: } \neg \exists t [p(t)] \rrbracket$

The clause *Maria schlief nicht ein* is interpreted as follows:

(66) $\llbracket \text{nicht}_a \rrbracket^n (\llbracket \text{Maria einschlie\ss} \rrbracket^n)$
 = asserted: $\neg \exists t [t < n \wedge \text{Maria falls asleep at } t]$

Assertive negation, just like the assertion operator, triggers verb-second (movement of the finite verb to C^0), which itself triggers movement of one constituent to sentence-initial position (Spec-CP). This results in the following structure (I assume that the verb *einschlaf-*, with a separable prefix *ein-*, moves from V^0 to I^0 , where it receives agreement features and from where the verb stem moves to C^0):

(67) $[_{CP} \text{Maria}_2 [_{C^0} \text{schl\ae}ft_1 [_{IP} \text{nicht}_a [_{IP} t_2 [_{VP} t_2 [_{V^0} t_0]]] [_{I^0} \text{ein } t_1]_0]]]$

For our example it is crucial that the negation has scope over the *bevor* clause. This requires the *bevor*-clause to adjoin to the lower IP of the main clause:

(68) $[_{CP} \text{Maria}_2 [_{C^0} \text{schl\ae}ft_1 [_{IP} \text{nicht}_a$
 $[[[_{IP} t_2 [_{VP} t_2 [_{V^0} t_0]]] [_{I^0} \text{ein } t_1]_0]] [_{IP} \text{bevor nicht Hans zuhause ist}]]]]]$

In case assertional negation applies to a two-dimensional meaning consisting of a core meaning and a reified implicature, the most plausible assumption is that both the meaning proper and the implicature is negated (compare with the rule for ASSERT in (46)):

(69) $\llbracket \text{nicht}_a \rrbracket^n = \lambda \langle p, p' \rangle \text{ [asserted: } \neg \exists t [p(t)], \text{ implicated: } \neg \exists t [p'(t)] \rrbracket$

Let us consider what happens if a simple *bevor* sentence is negatively asserted:

(70) $\llbracket \text{Maria schlief} [\text{nicht}_a [[\dots \text{ein}] [\text{bevor Hans zuhause war}]]] \rrbracket^n$
 = $\llbracket \text{nicht}_a \rrbracket^n (\llbracket \text{Maria schlief ein} [\text{bevor Hans zuhause war}] \rrbracket^n)$
 = $\lambda \langle p, p' \rangle \text{ [asserted: } \neg \exists t [p(t)], \text{ implicated: } \neg \exists t [p'(t)] \rrbracket$
 $(\langle \lambda t [t < n \wedge \text{Maria falls asleep at } t \wedge \neg \exists t' [t' \leq t \wedge t' < n \wedge \text{Hans is home at } t']],$
 $\lambda t [t < n \wedge \text{Maria falls asleep at } t \wedge \exists t' [t < t' \wedge t' < n \wedge \text{Hans is home at } t']] \rangle)$
 = asserted: $\neg \exists t [t < n \wedge \text{Maria falls asleep at } t \wedge \neg \exists t' [t' \leq t \wedge t' < n \wedge \text{Hans is home at } t']]$
 implicated: $\neg \exists t [t < n \wedge \text{Maria falls asleep at } t \wedge \exists t' [t < t' \wedge t' < n \wedge \text{Hans is home at } t']]$

The assertion part of (70) can be simplified as follows, using standard rules of predicate logic:

(71) asserted: $\forall t [t < n \wedge \text{Maria falls asleep at } t \rightarrow \exists t' [t' \leq t \wedge \text{Hans is home at } t']]$

This states that for every time t at which Maria fell asleep there is a prior time t' at which Hans was home (and as being home is understood as coming home and staying home, Hans was home at the time at which Maria fell asleep). This is the right interpretation if we rule out quantification over a non-empty domain. Notice that in contrast to a positive assertion, the negative assertion has a conditional flavor: it expresses a condition for the time at which Mary fell asleep. This captures the subtle difference between (70) and a sentence using *nachdem* 'after':

(72) *Maria schlief ein nachdem Hans zuhause war.*
 $\exists t [t < n \wedge \text{Maria fell asleep at } t \wedge \exists t' [t' < t \wedge t' < n \wedge \text{Hans is home at } t']]$

What about the implicature part of (70)? It states that there is no time t such that Maria fell asleep at t that was followed by a time t' at which Hans was home. This contradicts the meaning part if we assume, as a natural interpretation, that Hans stayed home once he came home. Hence the implicature part is cancelled.

We now turn to the case in which the *bevor* clause contains a propositional negation, our core example (59):

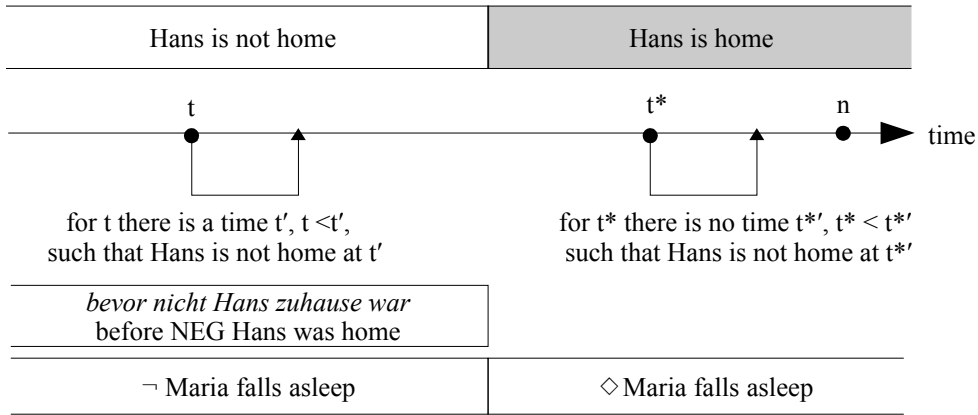
(73) $\llbracket \text{nicht}_a \rrbracket^n (\llbracket \llbracket \text{Maria schlief ein} \rrbracket [\text{bevor} [\text{nicht Hans zuhause war}]] \rrbracket^n)$

= asserted: $\neg\exists t[t < n \wedge \text{Maria falls asleep at } t \wedge \perp]$, = \top
 implicated: $\frac{\neg\exists t[t < n \wedge \text{Maria falls asleep at } t]}{\wedge \exists t'[t < t' \wedge \neg[t' < n \wedge \text{Hans is home at } t']]}$

The core meaning reduces to truth, as $\lambda t[\text{Maria falls asleep at } t \wedge \perp] = \lambda t[\perp]$, and $\neg\exists t[\perp] = \top$. This means that the core meaning is always satisfied; it is a tautology. The only meaning contribution is due to the implicature, which states that there is no t at which Maria fell asleep that is followed by a time at which Hans was not home.

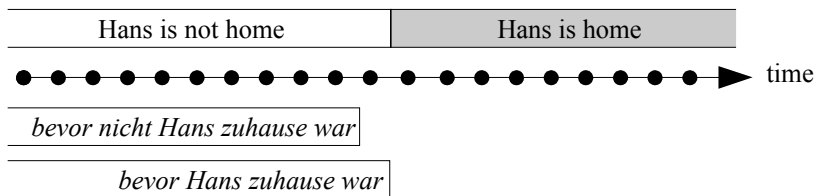
This turns out to capture the truth conditions, as the diagram (74) shows:

(74) Diagram for *Maria schlief nicht ein bevor nicht Haus zuhause war*



The diagram illustrates that the *bevor* clause excludes that the main clause is true during and up to the time at which Hans is home. To be precise: It excludes that the main clause is true right before the time at which Hans is home, a time that is still followed by a time at which Hans is not home yet. This rather fine point can be best illustrated in a model with discrete time:

(75) Diagram showing the difference between *bevor Hans zuhause ist* and *bevor Hans nicht zuhause ist*, in a model of discrete time.



The two meanings could also be distinguished in a model with truth value gaps. If we assume that at the time when Hans comes home it is neither the case that Hans is not home, nor that Hans is home, then *bevor nicht Hans zuhause ist* would exclude the arrival time, whereas *bevor Hans zuhause ist* would include it.

I would like to point out that it is crucial for this derivation that we assumed a “tandem” interpretation of the two meaning components of *bevor* clauses, and not just a conjunction. A conjunctive interpretation would yield the following result (disregarding past tense):

(76) $\llbracket \text{nicht}_a \rrbracket^n(\llbracket [\text{Maria schlief ein}] [\text{bevor} [\text{nicht Hans zuhause war}]] \rrbracket \rrbracket^n)$

= asserted: $\neg\exists t[\text{Maria falls asleep at } t \wedge \neg\exists t'[t \leq t' \wedge \neg[\text{Hans is home at } t']] \wedge \exists t[t < t' \wedge \neg[\text{Hans is home at } t']]]$

As the second conjunct of the proposition in the scope of the main negation, $\neg\exists t'[t \leq t' \wedge \neg[\text{Hans is home at } t']]$, is a contradiction in all plausible models, the proposition in the argument of the main

negation reduces to a contradictory proposition, $\lambda t[\perp]$, and the whole sentence yields tautology \top as a result. This is not what we want.

We not only get the right truth condition for sentences with “expletive” negation under *bevor*, we can also explain their conditional flavor, similar as with example (70). The resulting meaning does not state anything about a particular time, but rather expresses a statement about times in general. This becomes obvious under the standard predicate logic equivalences:

$$(77) \quad \neg\exists t[\text{Maria falls asleep at } t \wedge \exists t'[t < t' \wedge \neg[\text{Hans is home at } t']]] \\ \Leftrightarrow \forall t[\exists t'[t < t' \wedge \neg[\text{Hans is home at } t']] \rightarrow \neg \text{Maria falls asleep at } t]]$$

This formal rendering can be seen as rather direct representation of the near-paraphrase *If Hans is not yet home, Maria doesn't fall asleep*. This represents Weisgerber's intuition that *bevor* sentences with “expletive” negation have a conditional interpretation.

We also can explain why negation under *before* appears to be “expletive” – that is, why we can drop it without obvious change of meaning. The assertion part of (70), which is the only relevant meaning as the implicature is cancelled, is similar in meaning to the implicature part of (74), which is the only relevant meaning as the core meaning is a tautology. The truth conditions of these two readings are extremely similar, even though the ways by which we arrive at them are quite different. For this reason, both the version with “expletive” negation and the one without can be considered equally complex, and hence the version without negation cannot block the one with negation. Semantically, the two versions differ only insofar as *Maria schlief nicht ein bevor Hans zuhause war* excludes that Maria falls asleep at the moment when Hans comes home (or any moment before that), whereas *Maria schlief nicht ein bevor nicht Hans zuhause war* allows for Mary to fall asleep at the moment when Hans arrives (cf. diagram (75)). This is a vanishingly small difference, especially in a model with a dense structure of time.

6 The obligatoriness of negation, and the conditional interpretation

Negation in the main clause is crucial for expletive negation under *bevor*. Without it, we get a clause that is necessarily false, due to the falsity in the second conjunct of the core meaning:

$$(78) \quad * \text{Maria schlief ein bevor nicht Hans zuhause war.} \\ = \text{asserted: } \exists t[\text{Maria falls asleep at } t \wedge \perp], = \perp \\ \text{implicated: } \exists t[\text{Maria falls asleep at } t \wedge \exists t'[t < t' \wedge \neg[\text{Hans is home at } t']]]$$

However, we found examples without negation in the main clause, as in (25). But notice that this is a generic sentence that involves a quasi-universal quantification, where the *bevor* clause is in the restrictor of the quantifier. This results in a plausible interpretation.

$$(79) \quad \text{Bevor das Kind nicht sitzen kann, fühlt es sich im Liegen am wohlsten.} \\ \forall t[\llbracket \text{bevor das Kind nicht sitzen kann} \rrbracket^n(t) \rightarrow \llbracket \text{es fühlt sich im Liegen am wohlsten} \rrbracket^n(t)]$$

I have represented the generic force here by a universal quantifier, and the *bevor* clause as the restrictor of this quantifier. The meaning of the *bevor* clause is as follows:

$$(80) \quad \llbracket \text{bevor das Kind nicht sitzen kann} \rrbracket^n \\ = \langle \lambda t \neg\exists t'[t' \leq t \wedge \neg[\text{the child can sit up at } t']], \\ \lambda t \exists t'[t < t' \wedge \neg[\text{the child can sit up at } t']] \rangle \\ = \langle \lambda t[\perp], \lambda t \exists t'[t < t' \wedge \neg[\text{the child can sit up at } t']] \rangle$$

The first conjunct in the restrictor is true if the child can sit up from the beginning of time on, which is not a plausible model, and hence reduces to falsity. Now, the *bevor* clause is used as the restrictor of a universal quantifier over times:

$$(81) \quad \llbracket_{CP} [\textit{bevor das Kind nicht sitzen kann}] [C \textit{fühlt} [\textit{es sich im Liegen am wohlsten}]] \rrbracket^n$$

$$= \langle \forall t [\perp \rightarrow [\text{the child feels most comfortable lying down at } t]] (= \top),$$

$$\quad \forall t [\exists t' [t < t' \wedge \neg [\text{the child can sit up at } t']]]$$

$$\quad \rightarrow [\text{the child feels most comfortable lying down at } t]] \rangle$$

Again, the core meaning is a tautology, for all plausible models, and all the information is carried by the implicature part. It states that for all times t that are followed by a time at which the child (still) cannot sit up, the child feels most comfortable lying down. This is the right interpretation. The assertion of (81) is the conjunction of both the core meaning and the implicature, which is equivalent to the implicature. We see that the occurrence in the restrictor of a universal quantifier leads to a situation in which the core meaning of the *bevor* clause is “neutralized”, and only the implicature part survives.

Of course, *bevor* clauses as restrictors of conditionals need not contain a negation. The following statement has (nearly) the same truth conditions, as predicted by our formalization:

$$(82) \quad \llbracket_{CP} [\textit{bevor das Kind sitzen kann}] [C \textit{fühlt} [IP \textit{es sich im Liegen am wohlsten}]] \rrbracket^n$$

The *bevor* clause receives the following interpretation:

$$(83) \quad \llbracket \textit{bevor das Kind sitzen kann} \rrbracket^n$$

$$= \langle \lambda t \neg \exists t' [t' \leq t \wedge [\text{the child can sit up at } t']],$$

$$\quad \lambda t \exists t' [t < t' \wedge [\text{the child can sit up at } t']], (= \lambda t [\top]) \rangle$$

Now the implicature reduces to tautology, for all plausible models: If we assume that the child learns to sit up at some time (and never loses this ability), then the set of times t that precede a time at which the child can sit up is the set of all times. With this, the representation of (82) is as follows:

$$(84) \quad \langle \forall t [\neg \exists t' [t' \leq t \wedge [\text{the child can sit up at } t']]]$$

$$\quad \rightarrow [\text{the child feels most comfortable lying down at } t],$$

$$\quad \forall t [\exists t' [t < t' \wedge [\text{the child can sit up at } t']]] \rightarrow \top, (= \top) \rangle$$

Now it is the implicature that reduces to tautology, and the semantic weight is carried by the core meaning. It states, correctly, that for all times t at which the child still cannot sit up, he feels most comfortable lying down.¹¹

11 It should be noted here that a proper representation of *bevor* clauses in quantificational contexts is in need of certain refinements of the representations considered here, which were simplified by the fact that we considered stative clauses. Consider the following generic sentence, and the representation we would currently assign to it:

Die Glocke läutet bevor die Sonne aufgeht.

‘The bell rings before the sun rises.’

$$\langle \forall t [\neg \exists t' [t' \leq t \wedge [\text{the sun rises at } t']]] \rightarrow [\text{the bell rings at } t]],$$

$$\quad \forall t [\exists t' [t < t' \wedge [\text{the sun rises at } t']]] \rightarrow [\text{the bell rings at } t]] \rangle$$

Even if we concentrate on a single sunrise at a time t_0 , the core meaning and the implicature state something much too strong – that the bell must ring at all times before t_0 .

One way to avoid this is to assume that *bevor* clauses specify stretches of times. For example, *bevor Peter ging* ‘before Peter left’ specifies the stretch of time from the beginning up to the point where Peter left. The main clause is then said to be true at some part of this time, making the *bevor* clause effectively a way to identify, or restrict, the reference time in the sense of Klein (1994). Quantification over *bevor* clauses then would be quantification over sets of such maximal times, e.g. in the case of , quantification over all maximal times before each sunrise. Still, a number of things would have to be worked out, like guaranteeing that each sunrise is associated with its own bell ring (cf. de Swart 1991), guaranteeing that the bell ring is temporally close to its sunrise, and taking care of cases which allow for simultaneous event times, as in *Before a man is buried, a bell rings*. The solution to these problems will have to wait for another occasion.

7 The syntax of propositional vs. assertive negation

As stated in the introductory section, it has been observed that the two types of negation differ in their syntactic behavior (cf. Weisgerber 1960, Weiß 2002, Schwarz & Bhatt 2006). In particular, definite DPs (except pronouns) do not have to scramble over propositional negation, and do not have to result in negative determiners like *kein* with indefinites:

- (85) a. *Bevor nicht Hans zuhause ist, schläft Maria nicht ein.*
b. *Bevor er nicht zuhause ist ... / *Bevor nicht er zuhause ist ...*

(86) *Bevor nicht eine Nachricht von Hans gekommen ist, schläft Maria nicht ein.*

It should be mentioned that the negation with these syntactic features occurs in several other environments in addition to *bevor*-clauses, like in biased polarity questions and counterfactual conditional sentences:

(87) *Wohnt nicht Peter in Berlin?*

(88) *Wenn nicht ein Wunder passiert, sind wir verloren.*

In contrast, regular or “assertive” negation often is preceded by definite NPs, and combines with indefinite determiners to *kein*-. Otherwise, we do get a contrastive interpretation.

(89) *Weil Hans nicht zuhause ist / #Weil nicht Hans zuhause ist ...*

(90) *Weil keine Nachricht gekommen ist / #Weil nicht eine Nachricht gekommen ist ...*

Given that there are these two kinds of negations, an obvious question is why they differ in their syntactic behaviour in this way. In particular, if regular negation indeed is associated with an illocutionary function, and even if it just existentially closes the time variable, we would expect it to reside higher in the syntactic tree than propositional negation, which needs a semantic representation with a disclosed time variable. A plausible reason for this behavior of regular negation is the following: If it is indeed related to illocutionary force, then it should be sensitive to the current common ground. In particular, it should indicate the givenness status of constituents, and this is exactly what its placement indicates, as given constituents have to scramble left of it, and non-given indefinites in its scope are marked by *kein*- forms. In contrast, the need to mark givenness is relaxed for propositional negation, as it does not relate the proposition to the common ground (see also Klein 2007 for a slightly different motivation for the syntactic position of negation).

There are other kinds of negations that are not propositional, but assertive in nature – in particular, the clausal negation *es ist nicht der Fall, dass...* ‘it is not the case that...’, and rejecting or denying negation, as marked by *keineswegs*. Due to their assertive nature, they cannot be used as “expletive” negation under *bevor* either:

(91) **Maria schlief nicht ein bevor keineswegs Hans zuhause war.*

However, if these negations are assertive, why can they not serve as negations in the upstairs clause either (cf. (23) and (24))? These negations presuppose that a similar sentence without the negation was uttered or can be inferred from the conversational situation, and they are used to deny that target sentence. This makes them not suitable for our case, as their target sentence would be ungrammatical.

In concluding, I would like to turn to the question why modern English does not exhibit “expletive” negation under *before*. I would like to propose that this is related to the fact that English expresses negation by a separate head (the inflected form *do + n̄*), whereas German expresses negation primarily with a modifier (*nicht*). Under this assumption the English expression, being a head, is necessarily tied to assertion, different from the German modifier negation. Hence, English does not have “expletive” negation under *before* because it does not have a propositional negation expressing

the meaning $\lambda p \lambda t \neg p(t)$, but only an assertive negation, $\lambda p \neg \exists t [p(t)]$. It is perhaps more than a happy coincidence that expletive negation disappears in English in the 15th century (van der Wurff 1999); this is just around the time when *do*-support arises.

8 References

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