

Readings of scalar particles: *noch/still*

Abstract

The paper develops a uniform compositional analysis of the various readings of the scalar particle *still* and its German counterpart *noch*. *Noch/still* is a presuppositional scalar particle that gives rise to implicatures. Interpretive possibilities arise through different choices for the scale that the particle associates with, different attachment sites in the syntax, and interaction with focus. These interpretive parameters allow for a wide range of possible sentence interpretations, which overlap, but do not coincide for *still* and *noch*. The contrastive perspective allows us to examine the role of scales in the grammar. The implicatures triggered by the scalar item open an interesting perspective for the generation of implicatures in general.

1. Introduction

1.1. Facts to be explained

This paper is concerned with the various readings of scalar particles, focussing on German *noch* ('still') compared to English *still*. German *noch* and English *still* share a basic temporal interpretation illustrated by (1). The particle indicates continuation of the temporal property expressed by the rest of the sentence, from the past into the present, as described in (1').

- (1) Tim schläft noch. (temporal continuative)
Tim sleeps still
'Tim is still asleep.'
- (1') (i) Assertion: Tim is asleep.
(ii) Presupposition: Tim has been asleep before.
(iii) Possible implicature: Tim might/will wake up.

Temporal interpretations are at the core of the semantics of both *noch* and *still*. In addition to the normal continuative readings exemplified in (1) and (2a), the literature (e.g. Löbner (1990), Ippolito (2007)) has pointed out that different predicates give rise to different interpretive effects. Surprisingly, (2b), where the sentence predicate is a temporal property, may suggest that it is early - in contrast to (1), (2a) which may suggest that it is late for the sentence predicate to hold (e.g. that Tim is sleeping late) (the '%' marker indicates that many English speakers don't accept such structures). (2c,d) provide examples with a time adverbial - I call them 'subconstituent' uses, see below for discussion. (2c) for instance is not continuative in the way (2a) is, i.e. Lydia's leaving doesn't continue from the past into the present.

- (2) a. Es regnet noch. (temporal continuative)
It rains still
'It is still raining.'
- b. It is still morning. / %It is still 8am. (temp. 'early'; Ippolito 2007)
'It is only 8am.'
- c. Lydia ist noch am Vormittag abgereist. (temp. subconstituent)
Lydia is still in the morning left

- % 'Lydia left still in the morning.'
'It was still morning when Lydia left.'
- d. Noch 1967 schlossen die Kneipen (temp. subconstituent)
still 1967 closed the pubs
in Neuseeland um 18 Uhr.
in New Zealand at 6pm
'As late as 1967, pubs in New Zealand closed at 6pm.'

So-called **marginal** uses like (3) (e.g. König (1977), Ippolito (2007)) are intuitively related to temporal uses, but are clearly not temporal. It seems that the time scale is replaced by some other scale. (With varying plausibility, these examples can also have temporal readings - e.g. Anthea might be shrinking - , which I disregard here.)

- (3) a. Durham liegt noch in England. (marginal/spatial)
Durham lies still in England
'Durham is still in England.'
- b. Der Honda ist noch ein Kleinwagen. (marginal/degree)
the Honda is still a compact car
'The Honda is still a compact car.'
- c. Anthea ist noch gross. (marginal/degree)
Anthea is still tall
'Anthea is still tall.'

(4) and (5) illustrate '**further-to**' and **additive** uses of *noch*, which are not available for *still*.

- (4) Er duschte noch. (further-to Klein 2007/2015)
he showered still
'He took a shower before...'
- (5) a. Bruckner trank NOCH drei Bier. (additive Klein 2007/2015)
Bruckner drank STILL three beer
'Bruckner had another three beers.'
- b. Bruckner trank noch drei BIER. (further-to Klein 2007/2015)
Bruckner drank still three BEER
'Bruckner then drank three beers before ...'

The exact impact of *noch* in (4) is hard to grasp. Klein (2007/2015) introduces the name 'further-to' reading for this use. It captures the intuition that the event described in the sentence is located, by this use of *noch*, after similar events (e.g. preparing for something) and before something else happens (e.g. joining the party). The contribution of *noch* in (5a) is not hard to describe at all: it is used where English would use additives like *another* or *more* (see e.g. Thomas (2010), Greenberg (2009) for additives). But it is interesting that this effect is produced by the scalar particle *noch* 'still'. Note how stress (indicated by capitalization) affects interpretation in (5a) vs. (5b).

There is also the reverse situation, that English *still* has a use that is unavailable for German *noch*. This holds of so-called **modal** or concessive uses of *still* as in (6) which are not acceptable with (plain) *noch* (Ippolito (2007)):

(6) His doctor told him not to, but John still ran the marathon. (*modal*)

(7) Sein Arzt hat ihm abgeraten, aber Hans ist den
 his doctor has him advised against, but Hans is the
 Marathon {trotzdem/#noch} gelaufen.
 marathon {nonetheless/still} run.
 'His doctor told him not to, but Hans nonetheless ran the marathon.'

I concentrate on readings of the German particle *noch* plus the readings it shares with English *still*, first. I come back to English *still* and an explicit comparison with German in section 5. A further type of use of both particles exemplified by (8) are analysed in *Author* (2016b) as discourse related; the analysis extends the one offered in this paper and won't be reported here. I will also not offer an analysis of additive (5a) and comparative (9) *noch* - see Umbach (2009a,b) for a proposal and Ippolito (2007) for a discussion of comparative *still* in English.

(8) I am still your mother. (*discourse related*)

(9) Anthea ist noch 5cm grösser. (*comparative*)
 Anthea is still 5cm taller
 'Anthea is another (#still) 5cm taller.'

The table below gives a first impression of the similarities and contrasts between the English and German particle. We return to it in section 5 to see what light the analysis sheds on it.

type of use	<i>noch</i>	<i>still</i>
<i>temporal</i>	√	√
<i>temporal subconstituent</i>	√	??
<i>further-to</i>	√	*
<i>marginal</i>	√	√
<i>comparative</i>	√	??
<i>additive</i>	√	*
<i>modal/concessive</i>	*	√

1.2. Remarks on existing approaches

There is a considerable amount of interesting work on the semantics of *noch* and *still* (e.g. König (1977), Löbner (1989, 1990), Michaelis (1993), Mittwoch (1993), Krifka (2000), Ippolito (2007), Umbach (2009a,b)) and on the closely related particle *schon* 'already', e.g. Klein (2007/2015), Zimmermann (to appear). But some proposals do not spell out the composition (e.g. König (1977), Klein (2007/2015)), some concentrate on a subset of the data (e.g. Umbach (2009a,b)) or are not uniform (e.g. Ippolito (2007)). It seems fair to say that there is not yet a comprehensive

compositional semantic analysis of *noch/still* covering the uses described above.¹ This paper proposes such an analysis, relying heavily on the insights gained by earlier approaches:

Löbner's (1990) seminal work subsumes insights gained up to then. He concentrates on temporal uses. He proposes a variant of the lexical entry for *noch/still* given in (10) (I specify the denotation in a Heim & Kratzer (1998) notation in (10a), paraphrased in (10b)). The application to example (1) is sketched in (11a). Note that both t^* and t are time intervals. In the present tense example (1), t is the utterance time t_{now} . t^* immediately precedes (or 'left-abuts') t ; my notation for this is '<'. A situation in which (1) is predicted to be true is depicted in (11b): continued sleeping by Tim through t^* and t_{now} (where '///' is supposed to indicate in the picture that the predicate - Tim sleeping - holds).

- (10) a. $[[\textit{noch/still}]] = \lambda t^* . \lambda t . \lambda P_{\langle i, t \rangle} : t^* < t \ \& \ P(t^*) . P(t)$
 b. $[[\textit{noch/still}]] (t^*)(t)(P)$ is only defined if $P(t^*)$ and t^* immediately precedes t . Then, it is true if $P(t)$.

- (11) a. $[[\textit{Tim is still asleep}]]$
 is only defined if Tim was asleep at t^* and t^* immediately precedes t_{now} .
 Then, it is true if Tim is asleep at t_{now} .



This is roughly the semantics I am going to adopt. Löbner observes a different interpretive impact of *noch/still* in sentences of the type of (2c,d) with time adverbials as opposed to (2a) (e.g. (2c) is not about a continued departure by Lydia). This leads him to view the uses in (2a) vs. (2c) as instances of different types of *noch/still*, and (2b), where the sentence predicate is a temporal property, as different again. Löbner (like others) analyses *noch/still* as focus sensitive. While I agree that focus affects the interpretation of sentences with *noch/still*, I am going to argue against an analysis of the scalar particle as a focus sensitive item. Instead of assuming several different types of *noch/still*, my goal is to push a uniform analysis in terms of (10), and to attribute the differences in interpretation between different types of examples to separate, interacting factors.

Another milestone in the analysis of scalar particles is **Ippolito** (2007), who develops a full-fledged compositional analysis of a substantial variety of uses of *still* (as well as *already*). This includes marginal and concessive uses. Interestingly, Ippolito does not aim for one semantics of *still*; she sees the different uses as related in a more abstract manner. Roughly speaking, *still* incorporates additive, exclusive and scalar particle uses akin to the focussing particles *also*, *only* and *even*. To give the reader an impression, (12)-(14) illustrate her analyses of two different temporal and the marginal reading of *still*.

- (12) temporal continuative *still* (scalar):

¹ Unfortunately, Thomas (2018) has caught my attention too late for me to be able to appreciate it in my discussion here. He provides a unified analysis of continuative and additive readings of scalar particles, thus cutting the (empirical) cake in a different and interesting way. Future work will have to investigate the relationship of our respective proposals.

- a. $[[\text{still}_1]] = \lambda t. \lambda e. \lambda R_{\langle v, \langle i, \langle t, \rangle \rangle} : \exists t' [t' < t \ \& \ R(e)(t')=1]. \ R(e)(t)=1$
 b. Tim is still asleep.
 c. $[[\text{Tim is still asleep}]]$ is defined if
 $\exists t' [t' < t_{\text{now}} \ \& \ t' \subseteq \tau(e) \ \& \ \text{Tim is asleep in } e]$ Presupposition
 Then, it is true if $t_{\text{now}} \subseteq \tau(e) \ \& \ \text{Tim is asleep in } e$ Assertion
 "Tim is asleep now, and this event extends into the past."

(13) temporal 'early' *still* (exclusive):

- a. $[[\text{still}_3]] = \lambda w. \lambda C. \lambda p. p(w)=1. \ \forall q [q \in C \ \& \ q(w)=1 \ \rightarrow p \Rightarrow q]$
 b. % It is still 8am. / It is still morning.
 c. $[[\text{still } w \ C] [\sim C [\lambda w' [\text{it is } [8\text{am}]_F]]$
 $C = \{\text{that it is at least 7, that it is at least 8, that it is at least 9, ...}\}$
 $\forall q [q \in C \ \& \ q(w)=1 \ \rightarrow \text{'that it is at least 8'} \Rightarrow q]$
 "It is no later than 8am."

(14) marginal *still* (additive):

- a. $[[\text{still}_2]] = \lambda x. \lambda P_{\langle d, \langle e, \langle t, \rangle \rangle} : \exists y [y \neq x \ \& \ C(y) \ \& \ \exists d [P(y) \geq d]]. \ \exists d [C(d) \ \& \ P(x) \geq d]$
 b. Anthea is still tall.
 c. $[[\text{Anthea is still tall}]]$ is defined if
 $\exists y [y \neq \text{Anthea} \ \& \ C(y) \ \& \ \exists d [\text{tall}(y) \geq d]]$ Presupposition
 Then, it is true if $\exists d [C(d) \ \& \ \text{tall}(\text{Anthea}) \geq d]$ Assertion
 "Anthea is tall, and some other relevant (comparable) individual is also tall."

Details aside, my agenda is different. I want to use the same basic semantics for all of these uses. I am not satisfied with the unifying notion of focussing particle. Note that while Ippolito refers to *still* as focus sensitive, her analysis of temporal continuative *still* doesn't actually use focus. I show *noch/still* to not be focus sensitive at all. It is therefore unclear what the common denominator of the different uses of *noch/still* is under this analysis. Clearly an analysis would be preferable which identifies this.²

Krifka's (2000) analysis concentrates on the meaning component (1')(iii) for (1), and in (16)(iii) for example (15) (repeated from (2b)). This meaning component concerns the future.

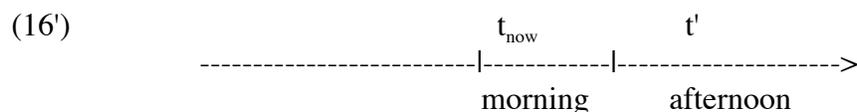
- (15) Es ist noch Vormittag_F.
 it is still morning
 'It is still morning_F.'

- (16) (i) It is morning now.
 (ii) It has been morning before.

² In addition to this central concern, let me point out two features of Ippolito's analysis that I will not go along with. First, note that in (12) the event variable remains free. This necessitates a non-standard semantics for Aspect which is normally taken to bind the event variable (see below), and raises general questions concerning the interaction with other operators (e.g. 'Everyone is still asleep'). I come back to Ippolito's motivation for this below. See von Stechow & Beck (2015) for motivation of the sentence architecture I adopt here, which is incompatible with (12). Secondly, I will argue for a stronger, scalar presupposition for marginal uses like (14). The weak additive interpretation in (14) is not sufficient and obscures the parallel to temporal readings.

- (iii) It won't be morning later / It will be afternoon later.

Like Löbner, Krifka observes that adding *noch/still* to a sentence serves to locate the eventuality described in the sentence on the time scale relative to other times. The observation that *noch/still* leads to a meaning component concerning later times is central to his analysis. For examples like (15), he further notes that alternative predicates to the sentence predicate apply at later times. This is analysed as a secondary order imposed on the alternative predicates via temporal order. Focus alternatives are a key ingredient to his analysis, e.g. the alternative *afternoon* to *morning*. The predicates $\langle \textit{morning}, \textit{afternoon} \rangle$ are aligned with temporal order $\langle t_{\text{now}}, t' \rangle$ (where $t_{\text{now}} < t'$), and *noch/still*'s function is to indicate this. (16') illustrates.



Krifka targets a different meaning component than Ippolito (who concentrates on *still*'s presupposition, (16)(ii) for (15) above), and their analyses do not come together properly (as is apparent in Ippolito's discussion of Krifka's paper). Ippolito shows that Krifka's analysis misses meaning component (1')(ii), (16)(ii), the presupposition concerning the past. A successful analysis has to include all three meaning components, as pointed out e.g. also by Klein (2007/2015).

Klein's (2007/2015) own paper develops a very comprehensive analysis of the readings of *noch* 'still' as well as *schon* 'already'. Klein agrees with me on *noch* not being focus sensitive (see section 4 below for discussion). He points out that *noch* carries a meaning component concerning the past (e.g. (16)(ii) (which he regards as part of the assertion - I disagree, see below)) as well as a meaning component concerning the future (i.e. (16)(iii)), which he identifies as an implicature. He divides a sentence into (roughly) topic and a predicate attributed to the topic. The topic is the same in the 'past' proposition and in the present, the predicate may vary. This variation helps him describe further-to readings. I render his proposal as in (17) (where x is the topic, P is the sentence predicate, and P' is a predicate different from P in a way that is not made formally precise), and illustrate with example (4) from above in (17').

$$(17) \quad [[\textit{noch}]] = \lambda t^* . \lambda t . \lambda x . \lambda P_{\langle x, t \rangle} : t^* < t \ \& \ P'(x)(t^*) . P(x)(t)$$

possible 'future' propositions: $\{P(x)(t') \mid t' > t\}$

- (17') a. Er duschte noch. (further-to)
 he showered still
 'He took a shower before...'
- b. (i) Assertion: He took a shower at t_{topic} .
 (ii) Presupposition: During the immediately preceding time, he did something similar to taking a shower.
- c. (iii) Implicature: After the topic time, he did something else.

If P' is different from P , we have a further-to reading; if $P'=P$, we get a continuative reading. P' has to be relevant. I will be more precise about the presupposition and I won't use the

topic/predicate division. But Klein's insights into the nature of the further-to reading have been the basis of my suggestions in *Author*(2016a), which I briefly summarize in section 2.3. I also incorporate Klein's insights into the three meaning components that *noch/still* gives rise to into a compositional semantic and pragmatic analysis.

All of this work provides important insights and inspiration for the analysis I develop below.³ The individual ingredients to my analysis are largely taken from this literature. What is missing is, most importantly, a comprehensive coherent proposal that puts everything together in a compositional semantic theory. This synthesis is the goal of the present paper.

1.3. The plot of this paper

My goal is to give a compositional, uniform analysis of the interpretations observed for sentences with *noch/still* in subsection 1.1. Here is a preview of this analysis:

I analyse *noch/still* as a presuppositional scalar particle that invites scalar implicatures. Its semantics is (18).

$$(18) \quad [[noch/still]] = \lambda S.\lambda x^*.\lambda x.\lambda P_{\langle x,t \rangle} : x^* <_S x \ \& \ P(x^*).\ P(x)$$

(18) says that *noch/still* combines with a scale *S*, an anaphoric element x^* , an argument x and a predicate P . It does not change the assertion; the assertion is that the predicate is true of the argument - $P(x)$. It adds the presupposition (PSP) that the anaphoric element precedes the argument on the scale and the predicate is true of the anaphoric element - $x^* <_S x \ \& \ P(x^*)$. This accounts for the first two meaning components of examples like (1), repeated below (in (1), *S* is the time scale).

(1) Tim is still asleep. *(temporal continuative)*

- (1') (i) Assertion: Tim is asleep.
(ii) PSP: Tim has been asleep before.
(iii) Possible implicature: Tim might/will wake up.

Noch/still is not focus sensitive - instead, its 'associate', the argument x , is identified structurally and combined with *noch/still* in the composition of the ordinary semantic value. But it introduces alternatives - elements x' on the scale *S* that are alternatives to the argument x . When $x' >_S x$, scalar alternatives $\{P(x') \mid x' >_S x\}$ may trigger the generation of implicatures concerning elements higher on the scale - for example $\neg P(x')$ ($x' >_S x$) - P does not hold of elements higher on the scale (the third meaning component in the example).

The focus affected interpretations that the literature has observed are derived from the interaction of structures with *noch/still* with alternative evaluating operators (concretely, Rooth's (1992) \sim operator and the EXH operator found e.g. in Chierchia, Fox & Spector (2011)).

³ Important further work on scalar particles like Umbach (2009a,b), Zimmermann (to appear) (and also Thomas (2018)) is not discussed in this short review because their empirical goals are sufficiently different so as not to make them direct precedents for the approach I develop. Extending the analysis of this paper to additive, comparative and modal uses of *noch/still* and of other scalar particles is a goal for the future.

The semantics in (18) for *noch/still* will be used throughout. Different interpretations for sentences with *noch/still* come about by variation of the following factors:

- **syntax:** *noch* needn't modify the rest of the sentence as a whole. It can adjoin to different categories, giving rise to rather different sentence interpretations.
- **alternatives:** while *noch/still* is not focus sensitive, it interacts with focus and alternative evaluating operators. This explains additional interpretive effects observed.
- **types:** and of course the scale S that x^* and x are located on varies, as anticipated earlier, giving rise to different types of uses for *noch/still*. This affects the semantic types and the domain of the ordering relation.

These options will be seen to account for the range of interpretations listed above. Thus I take a reductionist approach: the variety of interpretive effects possible in sentences with *noch/still* have lead researchers to assume a variety of uses or meanings for *noch/still* - which, however, covary with the type of predicate, the sentence structure and focus. My own analysis attempts to derive the diversity of interpretations of sentences with *noch/still* from the interaction of these factors with the particle. Given the fact that the particle does not affect the truth conditional content of the sentence it is contained in, it is expected that pragmatics plays a prominent role in its interpretive effects. This expectation is borne out.

The analysis is developed for temporal uses of *noch/still* in section 2, where S is the time scale. Section 3 extends it to uses involving scales other than temporal order, in particular spatial and degree marginal uses. I argue for a structural as opposed to a focus semantic analysis in section 4. Section 5 discusses the analysis and some of its consequences; I compare *noch* and *still*, and I point out some further issues regarding scales and scalar expressions in the grammar.

2. Temporal *noch/still*

In this section, we look at uses of *noch/still* employing the time scale, as indicated in (19). See e.g. von Stechow (2009) for a suitable ontology for times (I write ' $y \in \text{Alt}(x)$ ' for ' y is an alternative to x ', as in (19)(iii)).

$$(19) \quad [[\textit{noch/still} _]] = \lambda t^* . \lambda t . \lambda P_{\langle i, t \rangle} : t^* < t \ \& \ P(t^*) . P(t) \quad (\text{type } \langle i, \langle i, \langle \langle i, t \rangle, t \rangle \rangle \rangle)$$

The scale S is temporal order " $<$ ", the precedence relation on time intervals (type $\langle \langle i, \langle i, t \rangle \rangle$). " $<$ ", immediate precedence, is a subset of " $<$ ".

- (i) Assertion: $P(t)$
P is true of t
- (ii) PSP: $t^* < t \ \& \ P(t^*)$
the relevant other time t^* immediately precedes t & P is true of t^*
- (iii) Scalar alternatives: $\{P(t') \mid t' \in \text{Alt}(t)\}$
What times t' is P true of?

With (19), we account for the data in (2) and (4). Subsection 2.1. lays the foundation with a detailed analysis of plain temporal continuative uses like (2a). Subsection 2.2. examines the effect of ordered predicates (as in (2b)), and subsection 2.3. adds to this the possibility of variable

adjunction sites for *noch* in the clause (as in (2c,d)). The resulting variability of the interpretation of sentences with temporal *noch/still* is examined in section 2.4, with special reference to implicatures. In section 2.5. I give an interim summary of the analysis.

2.1. Plain continuative interpretation of *noch/still*

We begin with well-described and seemingly straightforward continuative uses of *noch/still*; examples are repeated below. Where English and German are the same, I present the data simply as a pair, as in (20), for convenience.

- (20) a. Tim schläft noch.
Tim is still asleep.
b. Es regnet noch.
It is still raining.

Intuitively, (20b) contributes the following meaning components:

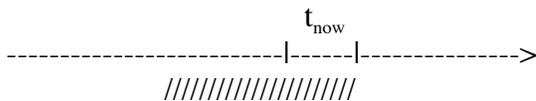
- (21) (i) Assertion: It is raining.
(ii) PSP: It rained earlier.
(iii) Implicature: It might stop raining./It will stop raining.

I discuss meaning components (i) and (ii) in subsection 2.1.1 and meaning component (iii) in subsection 2.1.2. My purpose is to provide a foundation on the basis of which to extend the analysis to further data (my primary interest here); it is not so much to provide the definitive story on temporal continuative *noch/still* (which I think would merit its own paper). I conjecture that what open questions may remain (see below) will prove orthogonal to my overall plot.

2.1.1. Presupposition and Assertion of continuative *noch/still*

Let's begin with the first two meaning components, the presupposition (ii) and assertion (i) of (20b). Their combined interpretive impact is sketched in (22).

- (22) 'rain' is true of the utterance time, and 'rain' was true of an earlier immediately preceding time interval.



How to derive this intuition? I associate the example with the Logical Form (LF) in (23). I assume (quite standardly; see e.g. von Stechow & Beck (2015) and the literature cited there) that an Aspect Phrase AspP dominates VP, which denotes a set of eventualities (type $\langle v, t \rangle$). *Noch/still* - more precisely, *noch/still* plus the accompanying variables for anaphor t^* and argument t - is adjoined to that AspP, and below Tense. English tells us that the aspect is imperfective (*ipf* - expressing that the time is included in the run time of the event, $t \subseteq \tau(e)$). The AspP hence has the denotation in (24) (type $\langle i, t \rangle$). (For ease of exposition, the analysis is presented for English where it is not specifically concerned with German.)

(23) $[_{TP} \text{PRES} [\lambda t [_{AspP} [\text{still}_< t^* t] [_{AspP} \text{ipf} [_{VP} \lambda e \text{rain } e]]]]]$

(24) $[[\text{AspP}]] = \lambda t. \exists e [t \subseteq \tau(e) \ \& \ \text{rain}(e)]$
time intervals included in the run time of a rain event

Let us suppose that the present tense is referential, referring to a time interval I call t_{now} (and similarly for past tense, to whose time variable I refer as t_{topic}), as in (25a) (see e.g. Kratzer (1998) for such an analysis of tense, and Klein (2007/2015) for its use in the analysis of *noch*). In order to simplify the discussion of the composition, we can consider a simplified structure (skipping the variable binding and lambda conversion in (23)) as in (25b), where *noch/still*'s second argument is t_{now} .

(25) a. $[[\text{PRES}]] = t_{\text{now}}$
 $[[\text{PAST}]] = t_{\text{topic}}$ (only defined if $t_{\text{topic}} < t_{\text{now}}$)
b. Simplified structure:
 $[_{AspP} [\text{still}_< t^* t_{\text{now}}] [_{AspP} \text{ipf} [_{VP} \lambda e \text{rain } e]]]$

The interpretation of (25b), applying the meaning of *noch/still* from (19) to (24), is given in (26). As desired, it says that a period of rain began before now and continues into the present, (22). (I equivocate between variables like t^* in the object language (LF) and the metalanguage.)

(26) a. $[[\text{(25b)}]]$ is only defined if $t^* < t_{\text{now}}$ & $\exists e [t^* \subseteq \tau(e) \ \& \ \text{rain}(e)]$
i.e. (25b) presupposes that there was rain at a time immediately before now. Then:
b. $[[\text{(25b)}]] = 1$ iff $\exists e [t_{\text{now}} \subseteq \tau(e) \ \& \ \text{rain}(e)]$
i.e. (25b) asserts that it is raining.

This is the interpretation standardly associated with this type of example. Let us examine some of its properties in more detail. First, it is uncontroversial that *noch/still* adds a presupposition about an earlier time. (27a) and (27b) both presuppose that it rained earlier, illustrating that this meaning component projects.

(27) a. Is it still raining?
b. If it is still raining, we should take an umbrella.

Next, notice that I have left the earlier time t^* , *noch/still*'s first argument, as a free temporal variable in (25b). Thus *noch/still*'s PSP is analysed as anaphoric (in the sense of Heim (1990); also Soames (1989) reporting work by Kripke): its content depends on the value assigned to a free variable. The classical argument for such an anaphoric analysis is sketched for *again* on the basis of example (28) from Beck (2007) (' $\sim>$ ' indicates an inference that may intuitively arise from a sentence).

(28) a. Bill was sick on John's birthday, and he was sick again on Mary's birthday.
 $\sim>$ John's birthday is before Mary's birthday
b. Bill was sick on John's birthday, and he was sick on Mary's birthday.

plot of this paper could in fact have used (32b) as the basic analysis of *noch/still*; but given the available evidence, my discussion will be phrased in terms of (19)/(32c).)

- (32) a. $[[\text{noch/still}]] = \lambda t. \lambda P_{\langle i, t \rangle}. \exists t^* [t^* < t \ \& \ P(t^*)]. P(t)$
 b. $[[\text{noch/still}]] = \lambda t. \lambda P_{\langle i, t \rangle}. \exists t^* [t^* < t \ \& \ P(t^*)]. P(t)$
 c. $[[\text{noch/still}]] = \lambda t^*. \lambda t. \lambda P_{\langle i, t \rangle}. t^* < t \ \& \ P(t^*). P(t)$

Let's examine (30) in more detail:

- (33) a. $[_{\text{AspP}} [\text{still}_{\langle _ _ \rangle} t^* t_{\text{topic}}] [_{\text{AspP}} \text{Asp} [_{\text{VP}} \lambda e \text{Bill sick } e]]]$
 b. $[[(33a)]] \text{ is only defined if } t^* < t_{\text{topic}} \ \& \ \exists e [t^* \subseteq \tau(e) \ \& \ \text{sick}(e)(B)]$
 Then: $[[(33a)]] = 1 \text{ iff } \exists e [t_{\text{topic}} \subseteq \tau(e) \ \& \ \text{sick}(e)(B)]$

If t^* were the time actually mentioned - John's birthday -, then t^* wouldn't normally extend up to t_{topic} , Mary's birthday (e.g. if Mary's birthday is a week later than John's). I am going to assume that by virtue of mentioning John's birthday, the interval from that day to t_{topic} becomes salient, and this interval (J's Bday, t_{topic}) is the value for t^* . We can take this to be a case of partial PSP accommodation (Kamp & Rossdeutscher (1994), Beck (2007)): the context provides a time at which Bill is sick (John's birthday), and the assumption that the interval extends from this time up to Mary's birthday verifies the PSP. This is the inference we observe.

(19) (=32c) says that the earlier interval which verifies the PSP immediately precedes or left-abuts the time that the assertion is about (see e.g. Löbner (1990)). This is the right interpretation for the examples we have seen. Ippolito (2007) argues that the requirement that t^* left-abut t makes the wrong prediction about (34). In (34), taking t^* to be the interval (a year ago, t_{now}) would contradict the assertion of the first sentence. Ippolito suggests that the sentence merely presupposes that John was alive at some earlier time.

- (34) John died a year ago. If he were still alive (now), he would be a hundred years old.
 a. PSP predicted if t^* abutted t_{now} : John was alive between now and a year ago.
 b. PSP proposed by Ippolito: John was alive at a time before t_{now} .

I am not convinced by this argument. I think the intuitive interpretation of Ippolito's example is (34'). To see this, consider a variant of the example, (35).

- (34') If John were alive now and had been alive in between a year ago and now, he would be a hundred years old.

- (35) a. John moved away from Paris a year ago.
 If he still lived in Paris now, he would have to pay local tax.
 b. John moved away from Paris a year ago.
 If he lived in Paris again now, he would have to pay local tax.

(35a) can be true while (35b) is false, for instance if your obligation to pay tax depends on the duration of your residency. The intuitive interpretations of (35a,b) are paraphrased in (35'a,b). The contrast between *still* and *again* allows us to see that the PSP of *still* concerns an immediately preceding/left-abutting interval rather than simply a preceding interval, in this

noch/still on a sentence are to a substantial extent pragmatic. This is also true of the meaning component discussed in the next subsection.

2.1.2. The Future

Next, let's turn to the third meaning component of *noch/still* sentences, the one concerning times later than the topic time. The mini-discourse in (38) is an example from Klein (2007/2015). The interpretive impact of the response is to suggest that Markus will not be the best German tennis player in the future (or in Klein's terms: the utterance time is the last time for which the claim can be made). The future-related meaning component is the pertinent one in this example.

- (38) Markus ist der beste deutsche Tennisspieler. - Noch.
 Markus is the best German tennis player. - Still.
 'Markus is the best German tennis player.' - 'Right now, he still is.'

I discuss this component for example (20b), repeated in (39a). The sentence may give rise to an entailment about the future, too, roughly, that it may or will stop raining, (21)(iii) repeated in (39b). How can this observation be derived, given the structure (39c)?

- (39) a. Es regnet noch.
 It is still raining.
 b. It might stop raining./It will stop raining.
 c. $[\phi \text{ [still}_< \text{ t}^* \text{ t]} \text{ [}_{\text{AspP}} \text{ ipf [}_{\text{VP}} \lambda e \text{ rain e}]]]$

To anticipate, I suggest that there are two separate entailments about later times, an obligatory PSP and a possible implicature (I have glossed over this differentiation in the informal descriptions above). The derivation of both entailments is based on the suggestion that *noch/still* introduces alternatives. Formally, *noch/still*'s argument, the time variable *t*, serves as the trigger that creates the alternative set - in the example, the alternatives in (40a). They semantically amount to the meaning of the question 'when is it raining?', which I will use as an informal paraphrase. I take these alternatives to be lexically activated when *noch/still* is used (similar to how e.g. disjunction activates alternatives). I talk informally about *noch/still* introducing alternatives.

Note that presupposition and assertion combine to ensure that it has rained in the past and is raining now. Remember that all times concerned are contained in a set of contextually given times, for example this morning. It seems reasonable to suppose therefore that frequently, the open questions concern the future, i.e. the time after the interval we regard as 'now' (as would be the case in the situation sketched in (39')). I call this the pragmatically open alternatives as indicated in (40b).⁶

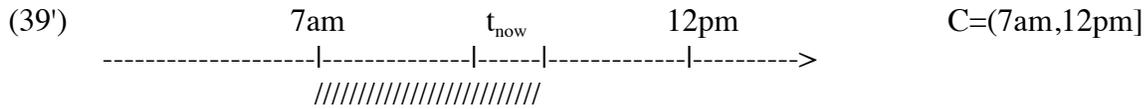
- (40) Scalar alternatives:
 a. $[[\phi]]_{\text{Alt}} = \{\exists e[t' \subseteq \tau(e) \ \& \ \text{rain}(e)] \mid t' \in \text{Alt}(t)\}$ Alt-trigger: time variable

⁶ This is not invariably the case. (i) is a coherent discourse. So there may be open alternatives concerning the past.

(i) A: It is still raining.
 B: Yes, and it was already raining before you got up. The garden will be very wet.

This is perfectly compatible with my suggestions. The pragmatic meaning component I am interested in deriving, however, concerns the future, so I'm focusing on that.

- "When is it raining?"
 b. $\{\exists e[t' \subseteq \tau(e) \ \& \ \text{rain}(e)] \mid t_{\text{now}} < t'\}$ pragm. 'open' alternatives
 "When after now is it raining?"



Next, how to derive from this set of 'open' alternatives meaning component (21)(iii)=(39b)?

First, I derive a PSP by way of an appropriateness constraint on alternative sets. This meaning component is obligatory. Spector (2010) proposes that the following appropriateness condition holds for the use of a question in a context:

(41) **Appropriateness condition on the use of a question:**

Let $Q \langle s, \langle \langle s, t \rangle, t \rangle \rangle$ be a Hamblin question intension. Q is only appropriate in a common ground cg if $\forall w[\text{cg}(w) \rightarrow \exists p[Q(w)(p) \ \& \ p(w) \ \& \ \exists w'[\text{cg}(w') \ \& \ \neg p(w')]]]$

' $\exists p[Q(w)(p) \ \& \ p(w)]$ ' says that there is an answer to the question which is true in w (w a world in the common ground). This answer is false in some other world ' $\neg p(w')$ '. This has to be the case for all worlds in the common ground. Hence, (41) entails (42). (42) says that given what we know, there are both true and false alternatives, or answers to the question (to see this, assume that p is true in w1 and false in w2; since in all worlds there must be a true answer, there is a p' such that p' is true in w2; and so on for other worlds in cg).

(42) $\forall w[\text{cg}(w) \rightarrow \exists p[Q(w)(p) \ \& \ p(w) \ \& \ \exists p'[Q(w)(p') \ \& \ \neg p'(w)]]]$

Spector's appropriateness condition derives, roughly, that the alternatives that the question raises are not already answered in the common ground. There is some further discussion of presuppositions of questions in the literature, though not exactly (41) as far as I know. For example Truckenbrodt (2013) discusses the presupposition that there is a true answer to the question. Relatedly, Abusch (2002) discusses a presupposition on focus-triggered alternative sets that some element of the set of alternatives is true. The difference is that Spector's (41) is modalized and concerns both true and false alternatives. There is also an interesting parallel to observations about the alternatives in disjunction (Zimmermann (2000)) and free choice (Menendez-Benito (2010)) that there has to be a possibility of each alternative being true. I conjecture that something like (41) is a common core presuppositional constraint on alternative sets.

My concrete proposal here is that Spector's appropriateness condition applies to alternative sets other than questions, and in particular the set of alternatives activated by *noch/still*. The result is a weak PSP regarding future times. Applied to (20b) and (40b) it yields (43):

(43) **Appropriateness condition on alternatives:**

Given what we know, there is a time after now at which it is raining &
 there is a time after now at which it is not raining.
 'It might stop raining.'

This accounts for the oddness of sentences like (44), which has been observed in the literature (e.g. Löbner (1989)). Intuitively, there has to be a question regarding future developments for the appropriate use of *noch/still*. The oddness of (44a) is precisely because it suggests that John's deadness might change in the future. This indicates that *noch/still*'s interpretive impact is not limited to meaning components (i) and (ii) about the present and the past. (44b) similarly suggests a changeability that is not there. The fact that (44a,b) are odd shows that there is an obligatory meaning component regarding future times for temporal continuative *noch/still*.

- (44) a. ? John is still dead. .
 'John is dead and he's been dead for some time.' (i) + (ii)
 'What later times is he dead?' (iii)
 b. ? 11 is still a prime number.

Next, I turn to the second entailment about the future, which I take to be an implicature: It is interesting that many examples with *noch/still* give rise to a stronger but optional expectation about the future. In our example (20b), this is the possible implicature that it will stop raining. I propose to analyse this as a scalar implicature. I implement this proposal in terms of a covert operator EXH defined (in a simplified version) in (45).⁷

- (45) $[[\text{EXH } \phi]] = 1$ iff $[[\phi]] = 1$ & $\forall q [q \in [[\phi]]_{\text{Alt}} \& \neg([[\phi] \Rightarrow q) \rightarrow \neg q]$
 "all alternatives that are not entailed are false."
 (see e.g. Krifka (1995), Chierchia, Fox & Spector (2011))

According to recent analyses (e.g. Chierchia, Fox & Spector (2011)), this operator can be adjoined in the LF. Our example thus optionally has the LF in (46a) in addition to the one in (25b)=(39c). (46b,c) is the scalar implicature that is generated by this LF:

- (46) a. $[\text{EXH } [\phi \text{ [still}_{<} t^* t_{\text{now}}] [\text{AspP ipf } [\text{VP } \lambda e \text{ rain } e]]]]$
 b. Scalar implicature:
 $\forall q [q \in \{ \exists e [t' \subseteq \tau(e) \& \text{rain}(e)] \mid t' \in \text{Alt}(t_{\text{now}}) \} \& \neg(\text{it is still raining} \Rightarrow q) \rightarrow \neg q]$
 c. pragmatically open alternatives concern the future:
 $\forall t' [t_{\text{now}} < t' \rightarrow \neg \exists e [t' \subseteq \tau(e) \& \text{rain}(e)]]$
 "it doesn't rain after now./It will stop raining."

Generally speaking, this proposal results in possible implicatures $\neg P(t')$ ($t_{\text{now}} < t'$) (within the contextually relevant time frame, for plausibly sized intervals t_{now} and t' - remember (37), (19')), if the pragmatically open alternatives concern the future and the EXH operator is present. This is the meaning component that is so prominent in (38). But this is a pragmatic phenomenon: the meaning component should be analysed as an implicature because it does not always arise (47b), and it is cancellable (47a); also, characteristic of such implicatures, it does not seem to arise in downward entailing contexts (thank you to an anonymous reviewer for (47c)).⁸

⁷ Classically, scalar implicatures are said to work on alternatives ordered on a scale of logical strength, as in (i), which is not the case here. But we know by now that scales for scalar implicatures are not purely determined by logic. Perhaps the common derivation in terms of EXH justifies my use of the term.

(i) John has three kids. $\sim \rightarrow$ John does not have four kids.

⁸ A reviewer points out to me that Michaelis (1993) observes another possible implicature in such data: (47b) may suggest that it should have stopped raining, i.e. that it is unexpected that the sentence predicate holds as late as the

- (47) a. It is still raining, and it looks like it will continue to rain. (cancellable)
 b. Es regnet immer noch.
 it rains always still
 'It is raining STILL.' (not necessarily any scalar implic.)
 c. Every student who is still asleep should get a medication.
 ≠ Every student who is asleep and expected to wake up should get a medication.

This concludes the analysis of the most basic type of use of *noch/still*. As has been observed in the literature (e.g. Löbner and Krifka), the use of the scalar particle serves to put the content described in the sentence - that P holds at t_{now} - into perspective, relating it to both earlier and later times w.r.t. P. The analysis will now be extended to the other data in (2).

2.2. 'Ordered' predicates and focus

This subsection considers *noch/still* used in sentences whose predicate is naturally part of an ordered sequence, like (2b). Some examples are given below. Inferences are possible from the predicate in the sentence to other predicates, and such examples invite entailments about 'later' predicates, e.g. afternoon, autumn. Expectedly, this could be implicatures like 'it will be afternoon/autumn later' for (48a). Maybe less expectedly, e.g. (48a) may convey that it is not afternoon/autumn yet - i.e. that it is, perhaps, earlier than expected (see e.g. Löbner (1990), Krifka (2000), Ippolito (2007) for discussion). A successful analysis should explain both kinds of interpretive effects.

- (48) a. Es ist noch Vormittag (Sommer,...)
 It is still morning (summer,...)
 b. % It is still 8am. (Ippolito (2007))
 c. Sie war noch verlobt. (Klein (2007/2015))
 She was still engaged.

The analysis from the preceding subsection is applied to (48a) below. The example asserts that it is morning now and presupposes that it was morning before now (i.e. now is not the earliest morning time), (49a). It triggers a set of alternatives amounting to 'at what times is it morning?', which may give rise to the scalar implicature that it will not be morning after now, (49b). In a next step we apply our knowledge about temporal predicates: times that are after the times that 'morning' applies to are times to which 'afternoon' applies. This is meant by 'ordered' predicates: the scale that anaphor and argument are ordered on has segments described by predicates, which are thus indirectly ordered. Given the ordering *morning* < *afternoon*, this leads to the inference that it will be afternoon after now, (49c). This alignment of times and predicates is observed by Krifka (2000).

topic time. A possible derivation of such an effect within the present analysis is to take *noch/still* to contrast with other temporal expressions, e.g. (*not*) *anymore*. The expectation would be derived from the interpretation of contrastive focus. This is supported by the fact that focus falls on *still* (also Fn. 5). As Klein (2007/2015) points out, expectations are not part of the semantics of *noch/still*, cf. e.g. (i). They must be derived in the pragmatics.

- (i) Wie von allen erwartet schlief Eva zu dieser Zeit noch.
 as by all expected slept Eva at this time still
 'As everyone expected, Eva was still asleep at that time.'

- (49) a. $[\phi [\text{still}_{<} t^* t_{\text{now}}] [\lambda t [\text{AspP morning}(t)]]]$
 (i) Assertion: $\text{morning}(t_{\text{now}})$
 (ii) PSP: $t^* < t_{\text{now}} \ \& \ \text{morning}(t^*)$
 (iii) Alternatives: $\{ \text{morning}(t') \mid t' \in \text{Alt}(t_{\text{now}}) \}$
 b. $[\text{EXH} [\phi [\text{still}_{<} t^* t_{\text{now}}] [\lambda t [\text{AspP morning}(t)]]]]$
 Scalar implicature: $\forall t' [t_{\text{now}} < t' \rightarrow \neg \text{morning}(t')]$
 times after t_{now} are not in the morning.
 c. inference: times after t_{now} are in the afternoon.

So far, nothing in this analysis introduces a meaning component that it is earlier than expected. Now, focus can be added to the picture. Let's consider the same sentence, with focus on *morning*. This would be appropriate e.g. in the context of an utterance of 'it is afternoon now', and in such a context, the 'earlier than expected' intuition would obtain.

- (50) It is still morning_F.
 $\sim \rightarrow$ it is earlier than expected

Below, I add a Roothian (Rooth (1992)) focus semantics to the analysis. Focus is evaluated by the operator \sim . The operator comes with the focus anaphor C, which has to pick up a value from the context. The \sim constrains this value to alternative semantic values of its sister. The rest of the interpretation is the same as in (49) above.

- (51) a. $[\text{EXH} [\phi [\text{still}_{<} t^* t_{\text{now}}] [\sim C [\psi \lambda t [\text{AspP morning}_F(t)]]]]]$
 b. $[[\psi]]_o = \lambda t. \text{morning}(t)$
 $[[\psi]]_{\text{Alt}} = \{ \lambda t. \text{morning}(t), \lambda t. \text{afternoon}(t), \dots \}$
 c. $C \subseteq [[\psi]]_{\text{Alt}}$

The value of C, the focus anaphor, has to be given in the context. Thus (50) would be appropriate in a context in which e.g. the proposition that it is afternoon is around. In that case, the value of C is $\{ \lambda t. \text{afternoon}(t) \}$. Focus is interpreted as contrast and the alternative is rejected. Thus contrast can account for the intuition that, depending on context, (50) may convey that it is earlier than expected. (Of course other values for C are possible, i.e. the sentence is also appropriate in a different context, and this would not lead to a suggestion that it is earlier than expected. This is correct, c.f. 'We just finished; we thought we would finish during the night, but at least it is still morning_F.') To sum up the discussion of the example, focus on *morning* may suggest a contrast with *afternoon*, and this can derive pragmatically the 'early' intuition reported.

More generally, if the predicate P in a *noch/still*-sentence is a member of a sequence, the implicature that the predicate is not true of later times ($\neg P(t')$) allows the inference that a 'later' predicate in the sequence applies instead (e.g. summer - fall; morning - afternoon; engaged - married - P'(t'); cf. Krifka's (2000) intuition). A suggestion of earlyness may arise if the predicate is focused: focus can create a contrast to a "later" predicate (e.g. it is not yet afternoon - $\neg P'(t_{\text{now}})$), which should be 'around' as an alternative (e.g. expected, feared,...).

- (52) a. $\text{-----}t^*\text{-----}t\text{-----}t'\text{-----}\rightarrow$
 morning -morning

- (54) a. Noch am Vormittag ist Lydia abgereist.
 still in the morning is Lydia left
 'It was still morning when Lydia left.'
- b. # Noch ist Lydia am Vormittag abgereist.
 still is Lydia in the morning left
 # 'Lydia still left in the morning.'
- c. # Noch ist Lydia abgereist.
 still is Lydia left
 # 'Lydia still left.'

The interpretive problem with (54b,c) is easily explained: the predicate *abreisen/leave* does not have a temporal extension, but this is required by the semantics *noch/still*. Hence such 'punctual' verbs or VPs do not straightforwardly combine with temporal *noch/still*. The German sentence (53a) is fine under an analysis in which *noch* modifies not the VP but the adverbial PP (a kind of structure that many English speakers don't seem to accept). I call this a subconstituent reading: not the main predicate, but an adjunct is targeted by the particle. Note that a temporal subconstituent reading is semantically possible when the subconstituent denotes a property of times, type $\langle i, t \rangle$. Thus we would expect temporal subconstituent readings only with temporal adverbials.

Below I provide the analysis of (53a) according to the above reasoning. (55) is the compositional interpretation. This gives rise to PSP and assertion in (56). Note that the sentence does not have a PSP that concerns Lydia leaving; compatible with the PSP predicted - that the topic time is not the earliest time in the morning -, it does not give rise to very strong PSP intuitions. This indicates that the scope of *noch* is just the subconstituent, confirming what the structural argument in (54) tells us. Optionally, the sentence may give rise to a scalar implicature on the basis of the scalar alternatives introduced by *noch/still*. This could be the implicature that the relevant time was only just in the morning, if the EXH operator deriving it is attached locally to the phrase *noch/still* modifies, cf. (56).

(55) $[_{TP} \text{PAST } [_{AspP} [_{AdvP} \lambda t \text{ [still}_< t^* t] [_{AdvP} \text{ in the morning}]]] [_{AspP} \text{ pfv } [_{VP} \lambda e \text{ Lydia leave } e]]]]$

- a. $[[[_{AspP}]]] = \lambda t. \exists e[\tau(e) \subseteq t \ \& \ \text{leave}(e)(L)]$
 $[[[_{AdvP} \text{ in the morning}]]] = \lambda t. \text{morning}(t)$
 $[[[\lambda t \text{ [still}_< t^* t \text{ [in the morning}]]]]] = \lambda t: t^* < t \ \& \ \text{morning}(t^*). \text{morning}(t)$

via Predicate Modification:

$[[[\lambda t [_{AspP} [\text{still}_< t^* t \text{ [in the morning}]]] [_{AspP} \text{ pfv } [_{VP} \lambda e \text{ Lydia leave } e]]]]]]] =$
 $\lambda t: t^* < t \ \& \ \text{morning}(t^*). \text{morning}(t) \ \& \ \exists e[\tau(e) \subseteq t \ \& \ \text{leave}(e)(L)]$
 $[[[\text{PAST}]]] = t_{\text{topic}}$

- b. $[[[\text{TP}]]]$ is defined only if $t^* < t_{\text{topic}} \ \& \ \text{morning}(t^*)$.
 Then, $[[[\text{TP}]]] = 1$ iff $\text{morning}(t_{\text{topic}}) \ \& \ \exists e[\tau(e) \subseteq t_{\text{topic}} \ \& \ \text{leave}(e)(L)]$
- c. alternatives: $\{ \text{morning}(t') \mid t' \in \text{Alt}(t) \}$ "What times are in the morning?"

- (56) (i) Assertion: Lydia left before noon.
 (ii) PSP: a relevant earlier time is also before noon.

- (iii) possible scalar implicature (local EXH, 'open' alternatives are later times):
 later times are not before noon.
 [EXH [_{AdvP} [still_< t* t [in the morning]]]]

In *Author* (2016a) I extend this analysis to examples with an overt or covert time adverbial denoting an interval surrounding the topic time. This is my proposal for the German further-to uses of the particle. An example is given in (57). The use of *noch* indicates that the shopping is part of a series of activities (e.g. household chores) which will give way, after the shopping, to something new (e.g. we go climbing). In the analysis, *noch* modifies a time adverbial denoting an interval surrounding the topic time, "now".

- (57) a. Ich geh noch (eben) einkaufen.
 I go still (just) shopping
 'I will quickly go shopping (before ...).'
- b. [_{TP} t_{topic} [_{AspP} λt [_{AdvP} noch t* t <now>] [_{λt} [_{AspP} I go shopping at t]]]
- c. Assertion: I go shopping now.
 PSP: t* < t_{topic} and now(t*)
 a relevant earlier time falls within 'now'.
 possible implicature: $\forall t' [t_{\text{topic}} < t' \rightarrow \neg \text{now}(t')]$
 later times do not fall within 'now'.
- d.
- ////////// now ////////// // \\\\\\\ later \\\\\\\
 ----- t* ----- t_{topic} ----->
 t'

The temporal perspective added by *noch/still* divides the series of activities into the ones that happen 'now' vs. the ones that happen 'later', as noted in Klein (2007/2015). The reader is referred to *Author* (2016a) for further discussion.

I think that this is a plausible analysis of examples in which *noch/still* modifies a temporal adverbial. But I think that here, too, additional interpretive components may arise. Next, I consider two possible ways in which alternatives can have an impact on examples like (53). First, focus on the temporal adverbial can be evaluated as contrast, similar to the 'it is still morning' example from the preceding subsection. Second, alternatives may play a role in the implicatures that *noch/still*-sentences give rise to.

2.3.2. Contrast focus on adverbial

(58) with focus on the adverbial is a plausible example for the first kind of effect - let's call it the contrast interpretation of *noch-Adv* (remember that " \sim >" indicates an inference plausibly arising from an example). A contrast analysis is presented below. The \sim operator evaluates focus on *morning*, (59a). Its accompanying focus anaphor C needs have as its value a subset of the alternative semantic value of the sentence, (59b)(ii). The example can be seen as parallel to example (50) from section 2.2. 'it is still morning'. Let us zoom in again on 'Lydia left in the afternoon' as the relevant alternative, (59c). A plausible way to interpret this focus is as contrast: the alternative is not true. The sentence asserts that Lydia left in the morning, so a context-available alternative like 'Lydia left in the afternoon' is rejected. But for this alternative to be

available means it has to be around, e.g. expected. Possibly, though not necessarily,¹⁰ the overall interpretation is that Lydia left earlier than expected.¹¹

- (58) Noch am Vormittag_F ist Lydia abgereist
 still in the morning is Lydia left
 'Lydia left still in the morning.'
 ~> Lydia left earlier than expected.

- (59) a. [$\sim C$ [ϕ [$\text{still}_< t^* t_{\text{topic}}$ [AdvP in the morning_F]]] [AspP pfv Lydia leave]]]
 b. (i) [[ϕ]]_o is defined only if $t^* < t_{\text{topic}}$ & morning(t^*).
 Then, it is true iff morning(t_{topic}) & $\exists e[\tau(e) \subseteq t_{\text{topic}}$ & leave(e)(L)]
 (ii) [[ϕ]]_{Alt} = { $\exists e[\tau(e) \subseteq t_{\text{topic}}$ & leave(e)(L)] & Q(t_{topic}) | Q \in Alt(morning)}
 c. context: $g(C) = \{\exists e[\tau(e) \subseteq t_{\text{topic}}$ & leave(e)(L)] & afternoon(t_{topic})\}
 contrast: $\neg(\exists e[\tau(e) \subseteq t_{\text{topic}}$ & leave(e)(L)] & afternoon(t_{topic}))
 entailed by assertion: $\exists e[\tau(e) \subseteq t_{\text{topic}}$ & leave(e)(L)]
 => Lydia's leaving wasn't in the afternoon.

The type of interpretation that will arise from this combination of formal and contextual ingredients is sketched more generally in (60). The inference comes from the interpretation of focus.

- (60) contrast interpretation of *noch*-Adv:
 a. [$\sim C$ [ϕ [$\text{still}_< t^* t$ Adv_F] P]]
 b. contrast: $\neg(P(t_{\text{topic}}) \& Q(t_{\text{topic}}))$
 assertion: $P(t_{\text{topic}}) \& \text{Adv}(t_{\text{topic}})$
 inference: $\neg Q(t_{\text{topic}})$ "It wasn't in Q that P occurred"

This is a plausible interpretation of *noch*-sentences in particular with predicates that occur just once (in the relevant time frame). (61) provides another example.

- (61) Lydia kam noch am 27. zur Welt.
 Lydia came still on the 27th to the world
 % 'Lydia was born still on the 27th.'
 ~> Lydia wasn't born on the 28th.

2.3.3. Exhaustive interpretations of Adv

Let's next consider an example for the second way in which alternatives may affect the interpretation of *noch*-sentences, (2d) repeated in (62):

¹⁰ Expectations, once again, are not part of the meaning of *noch/still*. It is fine to say (i).

(i) Noch am Vormittag ist Lydia, wie von allen erwartet, abgereist.
 still in the morning is Lydia, as by all expected, left
 'Lydia left still in the morning, as everyone expected.'

¹¹ If scalar implicatures are calculated at the level of the PP, as indicated in (56), then the EXH operator responsible for creating those has to be able to pass on alternatives to higher alternative evaluating operators like the \sim in (59). See section 2.4.

- (62) Noch 1967_F schlossen die Kneipen in Neuseeland um 18 Uhr.
 still 1967 closed the pubs in New Zealand at 6pm
 'In 1967, closing time for pubs in NZ was still 6pm.'
 ~> after 1967, pubs in NZ didn't close at 6pm.

There is no suggestion that 1967 is unexpectedly early for a 6pm closing time. A paraphrase like "it was still in 1967 that pubs closed at 6pm" doesn't capture the intuitive interpretation. Thus a contrast interpretation of the focus on the adverbial is not plausible. But, interestingly, the sentence may implicate that after 1967, pubs did not close at 6pm. Thus we see a different interpretive effect of focus on the time adverbial.¹² The crucial aspect of the implicature of (62) is that we simultaneously consider times later than the topic time, and alternatives to the time adverbial. This suggests that the alternatives triggered by the adverbial may feature in the scalar implicatures together with the alternatives triggered by *noch*. Below is an analysis to this effect, which generates the desired implicature. PSP, assertion and the alternatives triggered are familiar by now, (63), with the new feature that '1967_F' also introduces alternatives (informal paraphrases in (63')). The LF (63'') includes the EXH operator for the generation of scalar implicatures, which simultaneously evaluates the alternatives triggered by *noch/still* and the alternatives triggered by '1967_F'. This derives the implicature described for (62).

- (63) a. $[\phi \text{ [AdvP still}_< \text{ t}^* \text{ t}_{\text{topic}} \text{ 1967}_F \text{] [AspP pubs close at 6pm]}]$
 b. $[[\text{pubs close at 6pm}]] = \lambda t. \exists e [t_{\text{topic}} \subseteq \tau(e) \ \& \ \text{pubs_close_6pm}(e)]$
 $[[\text{still}_< \text{ t}^* \text{ t}_{\text{topic}} \text{ 1967}_F]] = \lambda t. t^* < t_{\text{topic}} \ \& \ 1967(t^*).1967(t_{\text{topic}})$
 c. $[[\phi]]_o$ is defined only if $t^* < t_{\text{topic}} \ \& \ 1967(t^*)$.
 Then, it is true iff $1967(t_{\text{topic}}) \ \& \ \exists e [t_{\text{topic}} \subseteq \tau(e) \ \& \ \text{pubs_close_6pm}(e)]$
 $[[\phi]]_{\text{Alt}} = \{\exists e [t' \subseteq \tau(e) \ \& \ \text{pubs_close_6pm}(e) \ \& \ Q(t')] \mid t' \in \text{Alt}(t_{\text{topic}}) \ \& \ Q \in \text{Alt}(1967)\}$
- (63') (i) Assertion: Pubs closed at 6pm in 1967.
 (ii) PSP: A relevant immediately preceding time is in 1967.
 (iii) Alternatives: 'In what years did pubs close at 6pm?'
 later 'open' Alts: 'In what later years did pubs close at 6pm?'
- (63'') a. $[\text{EXH } [\phi \text{ [AdvP still}_< \text{ t}^* \text{ t}_{\text{topic}} \text{ 1967}_F \text{] [AspP pubs close at 6pm]}]]$
 b. $\forall t' [t_{\text{topic}} < t' \ \& \ 1968\text{ff}(t') \rightarrow \neg \exists e [t' \subseteq \tau(e) \ \& \ \text{pubs_close_6pm}(e)]]$
 possible implicature: Pubs didn't close at 6pm after 1967.

- (64) ////////////// 1967 ////////////// || \\\\\\\ 1968ff \\\\\\\
 ----- t*-----t_{topic}----->
 t'

I will call this type of interpretation an exhaustive interpretation of *noch-Adv*. In this analysis, the alternatives triggered by *Adv* are part of the alternative set for the scalar implicature and negated

¹² An anonymous reviewer suggests that "1967" may be a contrastive topic. I am sympathetic to this suggestion. I am not sure if the time adverbial has to be a focus, or a contrastive topic, though it is prominent. For my analysis to go through it is sufficient that it introduces alternatives, which in this case could happen by virtue of it being a scalar element. Concretely I annotate the relevant element with a focus feature, for the sake of clarity. See also Krifka (2000) and Klein's (2007/2015) discussion of Krifka for this point.

by the same EXH that is associated with *noch*. *Noch*'s scalar alternatives are evaluated together with the *Adv* alternatives at sentence level; they are not evaluated at the adjunction site of *noch*. This gets us the desired implicature. (65a) and (65b) represent attempts to not figure in *Adv* alternatives; both are too weak to give us the desired implicature of (62), (63"). (66) is the general schema for the exhaustive interpretation of *noch* modifying a time adverbial

- (65) a. *noch*-alternatives only, local EXH operator:
 $\forall t' [t_{\text{topic}} < t' \rightarrow \neg(1967(t'))]$
 'Later times are not in 1967'
- b. *noch*-alternatives only, sentential EXH operator:
 $\forall t' [t_{\text{topic}} < t' \rightarrow \neg(1967(t') \ \& \ \text{pubs_close_6pm}(t'))]$
 'Later times are either not in 1967 or not 6pm-closing times.'
- (66) exhaustive interpretation of *noch*-Adv:
 a. [EXH [ϕ [$\text{still}_{<} t^* t \text{ Adv}_F$] P]]
 b. assertion: $P(t_{\text{topic}}) \ \& \ \text{Adv}(t_{\text{topic}})$
 implicature: $\forall t' [t_{\text{topic}} < t' \ \& \ Q(t') \rightarrow \neg P(t')]$
 'In later time periods, not P.'

I suggest that this is generally possible. *Noch*-Adv-sentences with predicates that occur more than once (in the relevant time frame) or are ongoing can bring out this interpretation. A couple of further examples with this type of potential implicature are given below.

- (67) a. Noch am 27. Dezember haben wir draussen gefrühstückt.
 still on the 27th december have we outside breakfasted
 'We still had breakfast outside on December 27.'
 ~> We didn't have breakfast outside after December 27.
- b. 1990 konnte ich noch Französisch.
 1990 could I still French
 'I still spoke French in 1990.'
 ~> I wasn't able to speak French after 1990.

The exhaustive interpretation of *noch*-Adv and the contrast interpretation of *noch*-Adv have the same assertion (informally: $P(t_{\text{topic}}) \ \& \ \text{Adv}(t_{\text{topic}})$) and PSP (informally: $t^* < t_{\text{topic}} \ \& \ \text{Adv}(t^*)$). What distinguishes them is meaning components that arise from the interpretation of focus in the case of the contrast interpretation versus scalar implicatures in the case of the exhaustive interpretation. The contrast interpretation may lead to an 'earlier than expected' intuition if contrast is with a 'later' Adv. The exhaustive interpretation may be perceived in terms of 'as late as', with no suggestion of earliness. Though both times, 'later' Adv(s) is/are negated, the overall effect is different. Example (68), which permits both interpretations, allows us to see how.

- (68) Wir haben noch 2002_F Dirks Bus geliehen.
 We have still 2002 Dirk's van borrowed
 'We (still) borrowed Dirk's van in 2002.'
- (i) ~> It wasn't in 2003 that we borrowed Dirk's van.
 (ii) ~> After 2002, we no longer borrowed Dirk's van.

It is possible to understand the borrowing of Dirk's van as a one time occurrence. To make this visible, I choose the perfective Aspect *pfv* in the LF below. In this case, it makes no sense to consider continuations of the borrowing after 2002. Accordingly, focus on the adverbial is interpreted as contrast.

- (68') a. $[\sim C [\phi [\text{AdvP } \text{still}_{<} t^* t_{\text{topic}} 2002_F] [\text{AspP } \text{pfv } \text{we borrow Dirk's van}]]]$
 b. (i) $[[\phi]]_o$ is defined only if $t^* < t_{\text{topic}} \ \& \ 2002(t^*)$.
 Then, it is true iff $2002(t_{\text{topic}}) \ \& \ \exists e[\tau(e) \subseteq t_{\text{topic}} \ \& \ \text{we_borrow_van}(e)]$
 (ii) $[[\phi]]_{\text{Alt}} = \{\exists e[\tau(e) \subseteq t_{\text{topic}} \ \& \ \text{we_borrow_van}(e) \ \& \ Q(t_{\text{topic}})] \mid Q \in \text{Alt}(2002)\}$
 c. context: $g(C) = \{\exists e[\tau(e) \subseteq t_{\text{topic}} \ \& \ \text{we_borrow_van}(e)] \ \& \ 2003(t_{\text{topic}})\}$
 contrast: $\neg \exists e[\tau(e) \subseteq t_{\text{topic}} \ \& \ \text{we_borrow_van}(e) \ \& \ 2003(t_{\text{topic}})]$
 entailed by assertion: $\exists e[\tau(e) \subseteq t_{\text{topic}} \ \& \ \text{we_borrow_van}(e)]$
 \Rightarrow The borrowing of Dirk's van wasn't in 2003. ((68)(i))

Alternatively, it is possible to understand the borrowing of Dirk's van as a habit. To make this visible, I choose the imperfective Aspect *ipf* in the LF below. Then, it makes sense to see this habit as ceasing after 2002. An exhaustive interpretation including the adverbial is salient. Since the run time of the borrowing includes the topic time but stops afterwards, there is a suggestion of continuation from the past (i.e. up until and including 2002, we borrowed the van).

- (68'') a. $[\phi [\text{AdvP } \text{still}_{<} t^* t_{\text{topic}} 2002_F] [\text{AspP } \text{ipf } \text{we borrow Dirk's van}]]]$
 b. $[[\text{ipf } \text{we borrow Dirk's van}]] = \lambda t. \exists e[t_{\text{topic}} \subseteq \tau(e) \ \& \ \text{we_borrow_van}(t_{\text{topic}})]$
 $[[\text{still}_{<} t^* t_{\text{topic}} 2002_F]] = \lambda t. t^* < t_{\text{topic}} \ \& \ 2002(t^*). 2002(t_{\text{topic}})$
 c. $[[\phi]]_o$ is defined only if $t^* < t_{\text{topic}} \ \& \ 2002(t^*)$.
 Then, it is true iff $2002(t_{\text{topic}}) \ \& \ \exists e[t_{\text{topic}} \subseteq \tau(e) \ \& \ \text{we_borrow_van}(t_{\text{topic}})]$
 $[[\phi]]_{\text{Alt}} = \{\exists e[t' \subseteq \tau(e) \ \& \ \text{we_borrow_van}(t') \ \& \ Q(t')] \mid t' \in \text{Alt}(t_{\text{topic}}) \ \& \ Q \in \text{Alt}(2002)\}$
 d. $[\text{EXH } [\phi [\text{AdvP } \text{still}_{<} t^* t_{\text{topic}} 2002_F] [\text{AspP } \text{ipf } \text{we borrow Dirk's van}]]]$
 $\forall t'[t_{\text{topic}} < t' \ \& \ 2003ff(t') \rightarrow \neg \text{we_borrow_van}(t')]$
 We didn't borrow Dirk's van after 2002. ((68)(ii))

The discussion in this section relates to Löbner's observation that the interpretation of *noch*-sentences is affected by the presence of a temporal adverbial, by focus and by properties of the predicate. But I utilize syntax and independent mechanisms of alternative evaluation (\sim and EXH) to analyse these effects.

2.4. Alternatives and *noch/still*

If the analyses in section 2.3 are on the right track, there is interaction of the alternatives introduced by *noch/still* with other alternatives and alternative evaluating mechanisms. I adopt the standard view (see e.g. Beck (2016) for recent discussion and references) that there is a set of expressions in natural language that introduces alternatives (e.g. focus and scalar items) and a set of operators that evaluates those alternatives (in particular the \sim operator and the EXH operator). This section explores some possible interactions between these elements.

Let us first concentrate on EXH. The exhaustive interpretation observed in section 2.3.3. suggests that the *noch/still*-triggered alternatives can be combined with alternatives triggered by other

expressions. EXH can evaluate all these alternatives jointly. We would expect this to be possible from the kind of theory represented by the EXH operator. The operator adjoins to an LF and evaluates the alternatives in its scope. An early observation about combined scalar alternatives in scalar implicatures comes from Sauerland (2004), who brings (69a) to our attention (the alternative triggers are *or* and *some*). (69b) is another example with two scalar expressions (two occurrences of *two*). The alternatives from the two triggers co-vary in the alternatives and jointly give rise to the relevant scalar implicature.

- (69) a. Kai ate the peas or some of the broccoli.
 (i) \sim > not: Kai ate the peas and all of the broccoli;
 Kai ate the peas and some of the broccoli;
 Kai ate the peas or all of the broccoli.
 (ii) alternatives:
 {Kai ate the peas Conj Q of the broccoli | Conj \in Alt(*and*) & Q \in Alt(*some*)}
- b. Two customers bought two computers.
 \sim > not: three customers bought four computers; ...

Relating this to *noch/still*, we expect that other alternative triggers can combine with the *noch*-triggered alternatives. We have seen an example in (62), and I think this may generally be the case. (70) provides some examples with their relevant prospective implicatures. The alternative triggers in (70) are *noch*, *2013*, and *and*. The relevant implicature of (70a) is one in which alternatives to the time variable (triggered by *noch*) and the conjunction co-vary in the alternative set, and what is negated is that there will be cranes **or** barriers **later**. In (70b), the alternatives to the time variable, the time adverbial and conjunction may co-vary; what is negated is that there will be cranes **or** barriers **after 2013**. An analysis of (70a) under the intended interpretation is sketched in (71). My intuitions for (70a,b) match these expectations.¹³

- (70) a. Noch stehen hier Baukräne und Absperrungen.
 still stand here cranes and barriers
 'There are still cranes and barriers here.'
 \sim > later, there will be neither cranes nor barriers here.
- b. Noch 2013 standen hier Baukräne und Absperrungen.
 still 2013 stood here cranes and barriers
 'There were still cranes and barriers here in 2013.'
 \sim > After 2013, there weren't cranes or barriers here.

- (71) [EXH [_{AspP} [noch t* t] [_{AspP} Baukräne und Absperrungen hier stehen]]]
- (i) Assertion: cranes_and_barriers_stand_here(t_{now})
 Cranes and barriers stand here now.
- (ii) PSP: t* < t_{now} & cranes_and_barriers_stand_here(t*)
 Cranes and barriers stood here immediately before now.
- (iii) Alternatives: { cranes Conj barriers stand here(t') | t' \in Alt(t_{now}) & Conj \in Alt(*and*) }
 'When are there cranes and/or barriers here?'
- (iv) \forall t'[t_{now} < t' -> \neg (cranes or barriers stood here (t'))]
 possible implicature: Neither cranes nor barriers will be here later.

¹³ See Zimmermann (to appear) for a thorough discussion of the interaction of *schon/already* with alternatives.

(72a) is another prospective example with the scalar element *two* as an alternative trigger in addition to *noch/still* and the time adverbial. The question is whether an implicature like (72b) (derivable as in (72')) is possible; I am less sure here and offer the example for discussion.

- (72) a. 1990 konnte ich noch zwei Fremdsprachen.
 1990 could I still two foreign languages
 'I still spoke two foreign languages in 1990.'
 b. ~> after 1990 I didn't speak any foreign language.

- (72') a. [EXH [[still_< t* t_{topic} 1990_F] [I speak two_F foreign languages]]]
 b. {I speak n foreign lgs(t') & Q(t') | t' ∈ Alt(t_{topic}) & Q ∈ Alt(1990) & n ∈ Alt(2)}
 $\forall t' [t_{\text{topic}} < t' \& 1991 \text{ff}(t') \& n \in \text{Alt}(2) \rightarrow \neg (\text{I speak } n \text{ foreign lgs } (t'))]$

We consider a different case next. There are examples that indicate that the EXH associated with *noch/still* doesn't always evaluate other alternatives. This is not what happens e.g. in (73a) (example after Krifka (2000)). I describe its intuitive interpretation in (73b).

- (73) a. Noch ist Lydia drei Monate alt. (after Krifka (2000))
 still is Lydia three months old
 'Lydia is still three months old.'
 b. Lydia is now three months old and no older,
 and later, she won't be three months old and no older.

The paraphrase makes it clear that we have two separate scalar implicatures: one due to the numeral *three* and one due to *noch/still*. Moreover, the *noch/still* triggered implicature takes scope over the numeral implicature. An analysis to this effect is sketched in (74). The word *oder* in (73a) shows that the structure is (74); that is, we have basic temporal *noch* here modifying the whole sentence (I have given the numeral *three* a focus feature for perspicuity; see once more Fn. 12 and the discussion e.g. in Klein (2007/2015) as to what exactly is focused in these sentences; what is important is that the scalar expression triggers alternatives).

- (74) [EXH [ϕ [still_< t* t_{now}] [λt EXH [ψ Lydia is three_F months old]]]]

[[EXH ψ]: Lydia is 3 months old &
 $\forall q [q \in \{L. \text{ is } n \text{ months old} \mid n \in \text{Alt}(3)\} \& \neg (L. \text{ is } 3 \text{ months old} \Rightarrow q) \rightarrow \neg q]$
 = Lydia is 3 months and no older

- ϕ : (i) Assertion: Lydia is 3 months and no older at t_{now}.
 (ii) PSP: Lydia is 3 months and no older at t* and t* < t_{now}.
 (iii) Alternatives: { Lydia is 3 months and no older at t' | t' ∈ Alt(t_{now}) }

[[EXH ϕ]: $\forall t' [t_{\text{now}} < t' \rightarrow \neg \text{Lydia is 3 months and no older at } t']$

This accounts for Krifka's (2000) intuition that 'higher' predicates (here: higher ages) are excluded. Instead of ordering the alternative predicates and making *noch/still* sensitive to this order, the effect is composed from the combined contributions of *noch/still* and two separate scalar implicatures, derived here by nested EXH operators. If one EXH jointly evaluated the

noch-alternatives and the alternatives triggered by the numeral, the resulting scalar implicature would be (75). This is obviously implausible.

- (75) $\forall t' [t_{\text{now}} < t' \rightarrow \forall n [n \in \text{Alt}(3) \rightarrow \neg (\text{Lydia is } n \text{ months old}(t'))]]$
 'Later, Lydia has no other (relevant) age than 3 months.'

It is an interesting question which alternatives are accessed by a given EXH operator. The examples above indicate that there is more than one possibility, but not all of them appear to be available for each example. The question what goes into the alternative sets that an EXH operator operates on is a general question that arises in other places as well (see e.g. Fox & Katzir (2011), Crnic et al. (2015), Trinh & Haida (2015) for recent discussion).

Next, let us consider the \sim operator in this general context. *Noch/still*-sentences can contain a focus which is evaluated by \sim . A case in point is (58) repeated in (76), our example of a contrast interpretation of *noch*-Adv. A complete LF in which EXH marks the place where *noch*'s scalar implicature (77b) is calculated is given in (77a). But this LF will only have the desired interpretation if EXH passes on the alternatives triggered by focus on *morning*, (77c), so that the \sim can access them (this was anticipated in Fn.11). That is, when we define both ordinary and alternative semantic values for structures containing EXH as in (78), EXH should pass on the alternatives triggered by focus, as would the semantics in (78b).¹⁴

- (76) Noch am Vormittag_F ist Lydia abgereist
 still in the morning is Lydia left
 'Lydia left still in the morning.'
 \sim > Lydia didn't leave in the afternoon.

- (77) a. $[\sim C [\phi [\text{EXH} [\text{AdvP still}_< t^* t_{\text{topic}} [\text{in the morning}_F]]] [\text{AspP pf Lydia leave}]]]$
 b. scalar implicature: times after t_{topic} are not in the morning.
 c. $[[\phi]]_{\text{Alt}} = \{\exists e [\tau(e) \subseteq t_{\text{topic}} \& \text{leave}(e)(L)] \& Q(t_{\text{topic}}) \mid Q \in \text{Alt}(\text{morning})\}$
 d. context: $g(C) = \{\exists e [\tau(e) \subseteq t_{\text{topic}} \& \text{leave}(e)(L)] \& \text{afternoon}(t_{\text{topic}})\}$
 contrast: $\neg \exists e [\tau(e) \subseteq t_{\text{topic}} \& \text{leave}(e)(L)] \& \text{afternoon}(t_{\text{topic}})]$
 \sim > Lydia's leaving wasn't in the afternoon.

- (78) a. $[[\text{EXH } \phi]]_o = 1 \text{ iff } [[\phi]] = 1 \& \forall q [q \in [[\phi]]_{\text{Alt}} \& \neg ([\phi] \Rightarrow q) \rightarrow \neg q]$
 b. $[[\text{EXH } \phi]]_{\text{Alt}} = [[\phi]]_{\text{Alt}}$

This is an interesting aspect of the analysis of an alternative evaluating operator, cf. Beck (2016) for discussion. See also Crnic (2011, chapter 3 section 3) for an analysis that imposes the same requirement (78b) on the EXH operator for completely different reasons.

¹⁴ In *Author* (2016a) I observe that the example of further-to *noch* below leads us to the same conclusion. The LF in (ic) will allow the desired interpretation only if EXH passes on focus alternatives to the higher \sim .

- (i) a. context: Bruckner had a schnaps.
 b. Bruckner hat noch [drei Bier]_F getrunken. (Klein 2007/2015)
 Bruckner has still three beer drunk
 'Bruckner further had three glasses of beer.'
 \sim > Then, he stopped drinking.
 c. $[[\text{EXH} [\text{noch } t^* t_{\text{topic}} <\text{now}>] [\text{Bruckner} [\text{drei Bier}]_F \text{ trink}]] \sim C]$

The issue of what alternatives are passed on by which evaluating operator is important to much recent research (e.g. Fox (2007), Fox & Spector (2018)). I must leave it for further research. Concentrating on *noch/still*, the analysis proposed here composes focus effects with *noch/still* from several ingredients: *noch/still* triggers alternatives, focus and scalar items trigger alternatives, evaluation of these alternatives impacts sentence meaning via EXH and \sim . We have seen in particular the following options:

- (79) a. basic structure:
 $[_{\text{AspP}} [\text{still } t^* t_{\text{topic}}] [_{\text{AspP}} \dots]]$
 b. contrast:
 $[_{\text{AspP}} [\text{still } t^* t_{\text{topic}}] [\sim C [_{\text{AspP}} \dots F\dots]]]$ (cf. 'it is still morning_F')
 c. exhaustive:
 $[\text{EXH } [_{\text{AspP}} [\text{still } t^* t_{\text{topic}}] [_{\text{AspP}} \dots F\dots]]]$ (cf. 'there are still cranes and barriers')
- (80) a. subconstituent *noch/still*:
 $[[_{\text{AdvP}} [\text{still } t^* t_{\text{topic}}] \text{Adv}] [_{\text{AspP}} \dots]]$
 b. contrast interpretation of *noch-Adv*:
 $[\sim C [[_{\text{AdvP}} [\text{still } t^* t_{\text{topic}}] \text{Adv}_F] [_{\text{AspP}} \dots]]]]$ (cf. 'Lydia left still in the morning_F')
 c. exhaustive interpretation of *noch-Adv*:
 $[\text{EXH } [[_{\text{AdvP}} [\text{still } t^* t_{\text{topic}}] \text{Adv}_F] [_{\text{AspP}} \dots]]]]$ (cf. 'still in 1967_F, pubs closed...')

More possibilities can be generated (for instance nested EXH operators as in the Krifka example), but I leave it at that for present purposes.

2.5. Section summary

This section has concentrated on the instantiation (19) of (18):

- (18) $[[\text{noch/still}]] = \lambda S. \lambda x^*. \lambda x. \lambda P_{\langle x, t \rangle}. x^* <_S x \ \& \ P(x^*). P(x)$
 (19) $[[\text{noch/still}_{\langle \rangle}]] = \lambda t^*. \lambda t. \lambda P_{\langle i, t \rangle}. t^* < t \ \& \ P(t^*). P(t)$ $\langle i, \langle i, \langle \langle i, t \rangle, t \rangle \rangle \rangle$

We have seen that three meaning components need to be investigated in order to understand the interpretation of sentences with *noch/still*: assertion, presupposition and implicature. The scope of *noch/still* can be seen from its presupposition. *Noch*, in particular, can modify the main predicate or another constituent in the sentence. Taking this syntax into account saves us from having to distinguish several types of *noch* depending on the sentence predicate.

The implicatures are not indicative of *noch/still*'s scope. *Noch/still* is responsible for introducing scalar alternatives. Those may be evaluated at sentence level, even for 'subconstituent' modifying *noch*, i.e. they are not necessarily parallel to the presupposition. Focus may play a role either as contrast or in the scalar implicatures. The analysis captures the interpretations of temporal *noch/still* discussed in the literature while sticking to the one temporal meaning for the scalar particle in (19). Pragmatics plays an important role in accounting for the interpretive effects observed for the particle. This entails that an interpretive effect observed for one example, under one set of circumstances, may not obtain in another case. This is a source of the seemingly diverse effects of adding *noch/still* to a sentence.

We have seen analyses of the several types of temporal *noch/still* illustrated by (2) in the introduction, as well as further-to *noch* illustrated in (4). We have also seen a first difference between English *still* and German *noch*: constituent readings are readily available in German, but not in English. The unavailability of further-to *still* follows from this.

If the analysis is on the right track, then *noch/still* is not focus sensitive in the sense that its semantics operates on focus alternatives (like *only*) (see section 4 for further discussion). But *noch/still* introduces alternatives, and those alternatives interact with other alternatives and give rise to implicatures. Those effects prompted the earlier literature to consider *noch/still* focus sensitive. This intuition is captured above without having *noch/still* make direct reference to focus. Theoretical advances in other areas (\sim , EXH) allow the present analysis to remove the burden from *noch/still* of having to explain extra interpretive effects, making possible the synthesis of earlier, diverse analyses of the particle. Conversely, the investigation of *noch/still* has added some interesting data points for further research on EXH and alternative evaluation.

3. Other Scales

This section analyses uses of *noch/still* which instantiate the interpretation in (18) with arguments other than times and a scale S other than temporal order.

$$(18) \quad [[noch/still]] = \lambda S. \lambda x^*. \lambda x. \lambda P_{\langle x, t \rangle}: x^* \prec_S x \ \& \ P(x^*). P(x)$$

The plot is to simply carry over the analysis from the preceding section to other semantic types, covering the data in (3). I discuss spatial uses in subsection 3.1., and degree marginal uses in subsection 3.2. In 3.3. I provide a summary.

3.1. Spatial *noch/still*: paths

The most straightforward instance of transfer from the temporal domain is spatial or locative uses of *noch/still* as in (81) (e.g. König (1977), Löbner (1990)):

- (81) a. Durham ist noch in England. (marginal/spatial)
 Durham is still in England.
 b. Du musst noch vor der Kreuzung abbiegen. (subconstituent)
 you must still before the intersection turn
 % 'You have to turn still before the intersection.'

I propose, with Löbner, to replace the time scale by the notion of a path (see e.g. Cresswell (1978), Krifka (1998)), leading us to (82), with $\langle l \rangle$ the type of paths:

$$(82) \quad [[noch/still_{\langle l \rangle}]] = \lambda l^*. \lambda l. \lambda P_{\langle l, t \rangle}: l^* \prec l \ \& \ P(l^*). P(l) \quad \langle l, \langle l, \langle \langle l, t \rangle, t \rangle \rangle \rangle$$

The scale S ' \prec ' is a path with the precedence relation between locations on the path (type $\langle \langle l, \langle l, t \rangle \rangle$) (immediate precedence ' \prec ' is once more a subset of precedence).

- (i) Assertion: the argument has the property - P(l).
- (ii) PSP: the anaphoric element immediately precedes the argument and has the property - $l^* \prec l \ \& \ P(l^*)$.

- (iii) Alternatives: What places (further down the path) have the property?

A simplified notion of a path will suffice, where it is simply an ordered set of locations. (81a) is analysed below. I assume that composition of path related expressions happens within the VP, and that the subject *Durham* is reconstructed. I omit the upper layer of the clause (with tense and aspect etc.) for the sake of simplicity. Note that we need to consider the space that Durham occupies on the path, not the city as such. I indicate this as 'place(Durham)' and I assume that a corresponding meaning shift is available. l^* is a region on the path before Durham. A plausible path for (83) would be e.g. the A1 as we drive north to Edinburgh from Ipswich.

- (83) a. $[_{VP} [still_{<} l^* Durham] [\lambda l [_{VP} l \text{ be in England }]]]$
 b. $[[(83a)]]$ is only defined if $l^* < \text{place(Durham)}$ & l^* is in England;
 i.e. (83a) presupposes a place before Durham on the given path is in England.
 Then, $[[(83a)]]$ = 1 iff Durham's location is in England.

(83') adds to the analysis the alternatives and the meaning component concerning 'later' elements on the scale. *Noch/still* on the spatial use activates alternatives with different locations on the path (83'a). Just as before, pragmatically 'open' alternatives are plausibly locations further down the path (83'b). The PSP of alternative sets requires the possibility of places that are and places that aren't in England (83'c). The EXH operator may generate a scalar implicature as before, (83'd).

- (83') Scalar alternatives:
- a. $[[VP]]_{Alt} = \{l' \text{ is in England} \mid l' \text{ a location on the path}\}$ Alt-trigger: place
 "What places on the path are in England?"
- b. $\{l' \text{ is in England} \mid \text{place(Durham)} < l'\}$ 'open' alternatives
 "What place after Durham on the path is in England?"
- c. Places further down the path may or may not be in England. PSP of Alt set
- d. $[EXH [_{VP} [still_{<} l^* Durham] [\lambda l [_{VP} l \text{ is in England }]]]]$
 Scalar implicature: $\forall l' [\text{place(Durham)} < l' \rightarrow l' \text{ is not in England}]$
 "You leave England after Durham."

Let's consider some aspects of the analysis in more detail. The PSP derived here is scalar, not additive. Evidence in favour comes from (84), which is modeled after the temporal example (30). In (84a) but not in (84b) you infer that Propiac is after Tulette on the path, the D94. This is because of *still*, and it can be understood as partial PSP accommodation, in analogy to (30). A parallel argument can be made that the PSP requires an immediately preceding location to have the relevant property, not merely a preceding location. (84c), in which *still* is replaced by *again*, invites the inference that you leave Drôme in between Tulette and Propiac. (84a) by contrast means that you do not leave Drôme. The difference between (84a) and (84c) shows that immediate precedence is correct for *still*; i.e. the region on the path between Tulette and Propiac is in Drôme.

- (84) context: In France, as you drive east along the D94 from Bollène to Buis-les-Baronnies:
- a. Tulette is in Drôme, and Propiac is still in Drôme.
 b. Tulette is in Drôme, and Propiac is in Drôme, too.
 c. Tulette is in Drôme, and Propiac is in Drôme again.

Turning to the 'later' meaning components: The example in (85b) is parallel to (44) and supports the PSP of alternative sets, that there must be true and false 'open' alternatives (John O'Groats is on the northern coast of Scotland, making it hard to imagine a path on which you leave Scotland after John O'Groats). (85a) shows that the scalar implicature is cancellable.

- (85) a. Durham is still in England, and even Newcastle is still in England.
 b. ? John O'Groats is still in Scotland.
 "What later places are in Scotland?"

This covers the basic spatial use of the particle, which is parallel to temporal continuative uses. Next, we look at an example that is parallel to temporal *noch* modifying a temporal adverbial PP, (86). Here, *noch* modifies a locative PP as shown by (86b); similarly to the temporal case, this is a subconstituent of the clause, not the main predicate. As before, such structures don't seem to be so great in English.

- (86) a. Du musst noch vor der Kreuzung abbiegen.
 you must still before the intersection turn
 ? 'You have to turn still before the intersection.'
 b. Noch vor der Kreuzung musst Du abbiegen.
 still before the intersection must you turn
 ? 'You have to turn still before the intersection.'

The analysis is parallel to the 'Lydia left still in the morning' example:

- (86') a. [[λ [_{PP} still_< I* I [_{PP} before the intersection]]] [λ [you must turn at I]]]
 b. [[λ [_{PP} still_< I* I [_{PP} before the intersection]]]] =
 λ : I* < I & I* < place(the_intersection). I < place(the_intersection)

- (86") (i) Assertion: You have to turn before the intersection.
 (ii) Presupposition: An earlier place on the path is before the intersection.
 (iii) Possible Implicature: Later places are not before the intersection.

Here, too, it is possible that contrast with 'at/after the intersection' may suggest 'earlier than expected'. Focus on *vor/before* brings this out. Thus we get a contrast interpretation of the spatial marginal subconstituent *noch*, parallel to temporal subconstituent *noch* (example (58)). An exhaustive subconstituent interpretation parallel to the 'Still in 1967, pubs closed...' example seems possible as well. I offer (87) as a candidate, without going into further detail. A connection can also be made to section 2.4 when we consider data like (88), in which a marginal (spatial) reading of *noch/still* is combined with another alternative trigger (in the example, *and*). Parallel to example (70b) in section 2.4., an exhaustive interpretation of the *noch/still*-triggered alternatives, the PP's and *and*'s alternatives simultaneously seems possible (an appropriate path would be walking North on Colombo St. through the business district of Christchurch, NZ).

- (87) a. Noch auf km 36 verläuft die D94 durch das Departement Drôme.
 still on km 36 runs the D94 through the Departement Drôme
 'As far as km 36, the D94 runs through the Departement Drôme.'
 b. (i) Assertion: The D94 runs through the Dept. Drôme on km 36.

- (ii) PSP: Another place on the D94 is up to km 36.
- (iii) scalar implicature: After km 36, the D94 doesn't run through the Dept. Drôme.

- (88) a. Noch auf Kilmore St. stehen Baukräne und Absperrungen.
 still on Kilmore St. stand cranes and barriers
 'There are still cranes and barriers on Kilmore St.'
- b. (i) Assertion: There are cranes and barriers on Kilmore St.
 (ii) PSP: A preceding place is on Kilmore St.
 (iii) scalar implicature: Beyond Kilmore St, there are no cranes or barriers.

As far as I can see, paths may simply replace times and *noch/still* stays exactly the same.

3.2. Marginal *noch/still*: degree scales

The analysis in (18) is extended to degree marginal readings of the particle, examples (3b,c). Subsection 3.2.1. applies the basic analysis. Subsection 3.2.2. discusses some further issues that arise with degree marginal *noch/still*.

3.2.1. Applying the analysis

The examples below suggest the generalization to diverse scales in the semantics of *noch/still*:

- (89) a. Der Honda ist noch ein Kleinwagen. (*marginal* - scale: size)
 The Honda is still a compact car.
- b. 400.- Euro sind noch steuerfrei. (amount)
 400.- Euros are still tax free.
- c. D ist still a passing grade. (quality)

Intuitions about the meaning of (89a)=(3b) are sketched in (90):

- (90) (i) Assertion: The Honda is a compact car.
 (ii) PSP: A car is smaller than the Honda is a compact car.
 (iii) Scalar implicature: Cars larger than the Honda are not compact cars.

Following these intuitions, we are lead to the version of *noch/still*'s semantics given in (91). There is an ordering of individuals which is derived from a degree sale. On this scale, the anaphoric element x^* and the argument x are ordered by virtue of their relevant measures.

- (91) $[[noch/still_{<}]] = \lambda x^*. \lambda x. \lambda P_{\langle e, t \rangle}: x^* <_x \& P(x^*). P(x)$ $\langle e, \langle e, \langle \langle e, t \rangle, t \rangle \rangle \rangle$

$S/'<'$ is derived from a degree scale (type $\langle d, \langle d, t \rangle \rangle$) (e.g. Size, Amount,...).

The individuals (anaphor, argument) are measured in order to be ranked on the scale.

E.g. in (89a): $x <_{Size} y$ iff $Size(x) < Size(y)$ and $x <_{Size} y$ iff $Size(x) < Size(y)$.

The analysis of the Honda example is given in (92),(93). The predicate 'be a compact car' is a property of individuals. Use of the scalar particle requires the inference of a scale that orders the argument and the anaphor. Presumably the sentence context 'compact car' makes the size scale

salient as the scale that *noch/still* operates on. *Noch/still*'s argument is overt, the NP 'the Honda' in the example. Other than having to measure the argument and the anaphor in order to rank them, the example is parallel to the temporal continuative *noch/still*. (I once more concentrate on the VP part of the structure and assume that the subject is reconstructed into the VP in (92).)

- (92) a. $[_{VP} \text{ [still}_< \text{ x* [the Honda]] } [\lambda x \text{ } [_{VP} \text{ x be a compact car}]]]$
 b. $[[\text{(92a)}]]$ is only defined if $\text{Size}(x^*) < \text{Size}(\text{Honda}) \ \& \ \text{compact}(x^*)$;
 i.e. the anaphoric element is below the Honda in size and a compact car.
 Then, $[[\text{(92a)}]] = 1$ iff $\text{compact}(\text{Honda})$; i.e. the Honda is a compact car.
- (93) a. $[[\text{VP}]]_{\text{Alt}} = \{x' \text{ is a compact car} \mid x' \in D\}$ alternatives
 "Which cars are compacts?"
 b. $\{x' \text{ is a compact car} \mid \text{Size}(\text{Honda}) < \text{Size}(x')\}$ 'open' alternatives
 "What larger cars are compacts?"
 c. Larger cars may or may not be compacts. PSP of alternative set
 d. $[\text{EXH } [_{VP} \text{ [still}_< \text{ x* [the Honda]] } [\lambda x \text{ } [_{VP} \text{ x is a compact car}]]]]]$
 Scalar implicature: $\forall x' [\text{Size}(\text{Honda}) < \text{Size}(x') \rightarrow x' \text{ is not a compact car}]$
 'Larger cars are not compact cars.'

(94) sketches the same analysis for (89b). The scale is simply the numerical ranking of sums/amounts of money.

- (94) a. $[_{VP} \text{ [still}_< \text{ x* [400,-]}] [\lambda x \text{ } [_{VP} \text{ x is tax free}]]]$
 b. (i) Assertion: 400,- is tax free.
 (ii) PSP: a sum below 400 is tax free.
 (iii) Possible implicature: sums above 400,- are not tax free.

Let us consider the PSP and implicature some more detail here, as well. In marginal uses like (89), the PSP is easily accommodated. (89b) for instance would probably be accepted in a context in which there hasn't been any mention of a particular tax free sum. But the PSP can be detected:

- (95) context: You want to bet a sum of money on the outcome of the women's soccer world championship final in the department pool.
 a. 20 Euros is ok. 40 Euros is a permissible amount, too.
 b. 20 Euros is ok. 40 Euros is still a permissible amount.
 c. 20 Euros is ok. 40 Euros is a permissible amount again.

(95b) suggests that sums in between 20 and 40 Euros are permissible. (95a) does not suggest this. (95c) suggests that sums in between 20 and 40 Euros are not permissible. Clearly, this is due to the items *too*, *still* and *again*. The argument is by now familiar (from (30), (84)): The intuitive inference is a case of partial PSP accommodation. What is accommodated in the case of *still* is that sums immediately preceding 40 Euros on the amount scale are permissible (starting from 20 Euros).¹⁵ The PSP is not simply additive (cf. the contrast to (95a), *contra* Ippolito's (14)). The

¹⁵ What is accommodated is intuitively parallel to the time interval in the case of temporal continuative *still* in (30). In the case of degree marginal *still*, this would in general be an 'interval' of individuals in dependence on an interval on the degree scale. Investigation of the details is left for another occasion.

PSP requires immediate precedence rather than precedence, cf. the contrast to (95c). The parallel to the PSPs of *noch/still*'s other types of use is clear.

The same holds for the third meaning component, the one concerning 'later' or higher elements on the scale. (96a) shows that with degree marginal *noch/still*, too, we can detect the obligatory meaning component regarding 'later'/higher degrees: alternatives concerning higher degrees of fullness are not normally plausible with this adjective, and hence only the temporal reading is readily available. (96b) shows that the scalar implicature, on the other hand, is cancellable. In (96c) in the downward entailing context, the scalar implicature doesn't arise.

- (96) a. # Das Glas ist noch voll. (temporal, ??marginal)
 The glass is still full.
 "What higher degrees are full?"
 b. 400.- Euros are still tax free, and even 450.- Euros are still tax free.
 c. If 400.- Euros are still tax free, I don't need to fill out this form.
 ≠If 400.- Euros are tax free and larger sums aren't, I don't need to fill out this form.

Thus we see the same patterns for marginal uses of *noch/still* as for temporal *noch/still*, varying only in terms of the scale. This unites Ippolito's (2007) three *stills* from section 1.

3.2.2. Further Properties of degree marginal *noch/still*

Nonetheless, a couple of things ought to be said about degree marginal *noch/still* specifically.

First, the example below illustrates that the gradable property that ranks the individuals can be complex and is inferred from the (sentence) context. No degree expression is needed in the clause to infer the scale. Inferring the appropriate scale (i.e. the relevant ranking of individuals) is part of the effect of adding the scalar particle to the sentence.

- (97) a. Den Paul kann ich noch schlagen. (after König (1977))
 the Paul can I still beat
 'I can still beat Paul.'
 b. [[still_< x* Paul] [λx [I can beat x]]
 c. (i) Assertion: I can beat Paul.
 (ii) PSP: I can beat some person ranked below Paul.
 (iii) Scalar implicature: I can't beat individuals ranked higher than Paul.
 d. $x < y$ iff $\max(\lambda d. \text{I can beat } x \text{ d-easily}) < \max(\lambda d. \text{I can beat } y \text{ d-easily})$
 'beatability'

(98) is an example in which it is hard to infer any plausible scale, hence only a temporal reading in which the tarantula may lose legs is readily available.

- (98) Die Tarantula ist noch sechsbeinig. (temporal, #marginal)
 The tarantula is still six-legged.

Secondly, consider (99), whose the implicature can go in both directions on the size scale. The continuations suggested in (99') bring this out: (99'a) goes with (99(i)) and (99'b) with (99(ii)).

- (99) Der Honda ist noch ein Mittelklassewagen.
The Honda is still a medium size car.
- (i) \sim > larger cars are not medium size cars.
 - (ii) \sim > smaller cars are not medium size cars.

- (99') a. Der Lexus ist schon eine Luxuskarosse.
The Lexus is already a luxury model.
- b. Der Fiat ist schon ein Kleinwagen.
The Fiat is already a compact car.

I suggest the size scale can be looked at from two different directions, as implemented below.

(100) $[_{VP} [\text{still}_S x^* [\text{the Honda}]] [\lambda x [_{VP} x \text{ is a medium size car}]]]$

(100') '**smaller than**' scale <:

- a. $[[(100)]]$ is only defined if $\text{Size}(x^*) < \text{Size}(H)$ & medium size(x^*).
i.e. the anaphoric element is just **below** the Honda in size & a medium size car.
Then, $[[(100)]]$ = 1 iff medium size(H); i.e. the Honda is a medium size car.
- b. $\{x' \text{ is a medium size car} \mid \text{Size}(H) < \text{Size}(x')\}$ open alternatives
"What **larger** cars are medium size cars?"
- c. Larger cars are not medium size. (\sim >Lexus) scalar implicature

(100'') '**larger than**' scale >:

- a. $[[(100)]]$ is only defined if $\text{Size}(H) < \text{Size}(x^*)$ & medium size(x^*).
i.e. the anaphoric element is just **above** the Honda in size & a medium size car.
Then, $[[(100)]]$ = 1 iff medium size(H); i.e. the Honda is a medium size car.
- b. $\{x' \text{ is a medium size car} \mid \text{Size}(x') < \text{Size}(H)\}$ open alternatives
"What **smaller** cars are medium size cars?"
- c. Smaller cars are not medium size. (\sim >Fiat) scalar implicature

The example is conducive to a change of perspective because the predicate 'medium sized car' covers a central interval on the size scale. The predicate 'compact car' is naturally situated at the bottom of the size scale and invites upward implicatures. Krifka (2000) makes a parallel point about perspective on the basis of the predicate 'weigh in on 80 kilograms' in (101): if John is at a weight gain clinic, the open alternatives are larger weights. If John is at a weight loss clinic, the open alternatives are smaller weights.

(101) John still weighs in on 80 kilograms. (after Krifka (2000))

This detour about scale direction was required to gain a solid understanding of data in which *noch/still* combines with an adjective in the positive (unmarked) form, like (3c) (repeated in (102)) and (103). (102) with the positive antonym adjective invites downward implicatures. (103) with the negative antonym adjective prefers upward implicatures, similar to the 'compact car' version of the Honda example.

(102) Anthea ist noch gross.
Anthea is still tall.

- (i) ~> Shorter people are not tall. <- preferred
 - (ii) ~> Taller people are not tall (but very tall).
- (102') a. Britta is already rather short. <- preferred
 b. Britta is already very tall.
- (103) Anthea ist noch klein.
 Anthea is still short.
- (i) ~> Taller people are not short. <- preferred
 - (ii) ~> Shorter people are not short (but very short).

The analysis of the preferred reading of (102) is worked out below (assuming a simple semantics for the positive; see e.g. Beck (2011) for the relevant references). Note that the semantics in (104b) licenses inferences: if x counts as tall, then taller individuals are also tall, (104c).

- (104) a. $[_{VP} [still_s x^* \text{Anthea}] [\lambda x [_{VP} x \text{ is tall}]]]$
 b. $[[[\lambda x [x \text{ is tall}]]]] = \lambda x. Height(x) \geq s_c$
 "x's height is above the contextual standard"
 c. -----s_c----->
 ... not tall || tall ...

- (104') 'larger than' height scale >:
- a. $[[(104a)]]$ is only defined if $Height(\text{Anthea}) < Height(x^*) \ \& \ Height(x^*) \geq s_c$
 i.e. the other relevant individual's height is just **above** Anthea's & s/he is tall.
 Then, $[[(104a)]]=1$ iff $Height(\text{Anthea}) \geq s_c$; i.e. Anthea is tall.
 - b. $\{x' \text{ is tall} \mid Height(x') < Height(\text{Anthea})\}$ open alternatives
 "What **shorter** individuals are tall?"
 - c. **Shorter** individuals are not tall. scalar implicature

Thus we see that the ordering relation on a degree scale can be viewed in both directions (99), (101). If the predicate picks out a set located centrally on the scale, both options are plausible (*Mittelklasse* ('medium size')). If the predicate picks out a set near the bottom of the scale, the direction tends to be < and the open alternatives are above the argument (*compact car*). In the case of adjectives in the positive form, entailment (if x is tall, then individuals above x in height are tall) makes one scale direction preferable (> for *tall* and < for *short*). The alternative options are available, but may require an effort (e.g. mutually exclusive predicates *tall* vs. *very tall*).

To complete the discussion of degree marginal readings, let's take a brief look at subconstituent readings here, i.e. interpretations would be parallel to the temporal subconstituent readings in section 2.3. What would this amount to for the <e,<e,<<e,t>,t>>> version of the particle, (91)? Instead of the predicate P being the VP or main verbal predicate of the sentence, some other property of individuals <e,t> should be able to be targeted by degree marginal *noch/still*. This is possible. I offer some examples in (105), but I will not enter into a more detailed discussion.

- (105) a. Eine 3 ist eine $[_{AP} \text{ gerade noch brauchbare}]$ Note.
 a 3 is a just still useful grade
 'C is a grade still useful.'/'C is a grade that is only just useful.'

- b. Eine [_{AP} noch schnelle] Spielerin wurde gegen eine eher langsame ausgewechselt.
 a still fast player.fem was against a rather slow substituted
 'A player who was still fast was substituted by a rather slow one.'
- c. Odilia hat ihr Zimmer [_{AP} noch hell] gestrichen.
 Odilia has her room still bright painted
 'Odilia painted her room still bright.'
- (i) Assertion: Olivia painted her room a bright colour.
 (ii) PSP: A lighter colour is bright.
 (iii) implicature: A darker colour would not have been bright.

Similarly, we have not yet considered the further interaction with \sim and EXH. In general, we expect that parallel interaction should occur in marginal readings as in temporal readings. (106) is an example, parallel to temporal (70a). In the interest of space, I refrain from detailed discussion.

- (106) a. Der Honda ist noch klein und billig.
 The Honda is still small and cheap.
 \sim -> Cars beyond the Honda are neither small nor cheap.
- b. (i) Assertion: The Honda is small and cheap.
 (ii) PSP: A car below the Honda is small and cheap.
 (iii) alternatives: $\{x' \text{ is small Conj cheap} \mid x' \in \text{Alt}(H) \ \& \ \text{Conj} \in \text{Alt}(\text{and})\}$

3.3. Section summary

The preceding sections have developed an analysis of *noch/still* according to which one core semantics accounts for a large variety of possible uses. At the heart of the proposal is the lexical entry in (18).

$$(18) \quad [[\textit{noch/still}]] = \lambda S. \lambda x^*. \lambda x. \lambda P_{\langle x, t \rangle}: x^* < x \ \& \ P(x^*). P(x)$$

The denotation exists in differently typed versions, depending on the scale that is made use of. The scale argument of *noch/still* is a free variable in the LF. In addition to the time scale, other scale structures may be made available by the (sentence) context. Examples are paths and degree scales. The semantic types of the anaphor x^* , the argument x and the predicate P vary with the scale. The accompanying ranking of individuals may be part of the interpretive impact of the scalar particle in degree marginal uses.

Marginal readings of *noch/still*-sentences are parallel to temporal readings in that three meaning components play a role: an anaphoric PSP (as seen in (18)) and scalar implicatures in addition to the assertion. *Noch/still* lexically activates alternatives which vary in the place of the argument x . It enters, by way of the alternatives, into an interaction with alternative evaluating operators - specifically, EXH which accounts for scalar implicatures. And, again parallel to temporal readings, the particle can have different adjunction sites in the syntactic structure. The argument x and the predicate P are identified by syntax. These properties determine a range of possible sentence interpretations.

The informed reader may have missed comparative *noch* in this discussion of marginal uses. It is illustrated in (107). Comparative *noch* seems to belong in a discussion of (degree) marginal *noch/still* because it seems based on the same degree scales.

- (107) a. Berta ist noch grösser. (comparative - plain)
 Berta is still taller
 'Berta is even taller.!'/'Berta is taller still.'
- b. Berta ist noch 3cm grösser. (comparative - differential)
 Berta is still 3cm taller
 'Berta is another 3cm taller.'

I will not offer an analysis of comparative *noch* in this paper and refer the reader to Umbach (2009a,b). (108) shows that comparative *noch* has a different constituency than marginal *noch*, forming a constituent with the differential '3cm'. This suggests that the similarity between (107) and (102) is not as close as it seems; Umbach in fact analyses comparative *noch* as additive (which would explain its (relative) unavailability in English).

- (108) a. Noch ist Berta 3cm grösser. (temporal)
 still is Berta 3cm taller
 'It is still the case that Berta is 3cm taller.'
- b. Noch 3cm ist Berta grösser. (comparative)
 still 3cm is Berta taller
 'Berta is another 3cm taller.'
- c. Noch Berta ist (3cm) grösser. (marginal)
 still Berta is (3cm) taller
 'Berta is still taller (Cecilia isn't taller anymore).'

The next section examines the effects of focus on marginal *noch/still*-sentences more closely and supports the structural analysis presented above.

4. In favour of a structural approach

In the literature, we find the claim that *noch/still* are focus sensitive particles, parallel to how *only* is focus sensitive (e.g. König (1991), Löbner (1990), Krifka (2000), Ippolito (2007)). According to such a view, the interpretation of a *noch/still*-sentence (e.g. marginal vs. temporal etc.) would be determined by focus, by way of association of *noch/still* with a focus contained in its sister constituent. My proposal does not analyse *noch/still* as focus sensitive. By this I mean concretely that the meaning of a structure [*noch/still* ϕ] is not defined on the basis of the focus alternatives of *noch/still*'s sister ϕ , either directly as illustrated for *only* in (109) or via the \sim as in (110).¹⁶

- (109) [[only ϕ]] = 1 iff $\forall q[q \in [[\phi]]_{Alt} \ \& \ \neg([\phi]_o \Rightarrow q) \rightarrow \neg q]$

¹⁶ An anonymous reviewer relates the issue of the (non-) focus-sensitivity of *noch/still* to the discussion found in Beaver & Clark (2008). This is *a propos* in so far as Beaver & Clark argue that focus affected readings can come about in more than one way, e.g. via direct association with focus or not. The connection is not analytically that strong, however, in that Beaver & Clark distinguish between (roughly) (109) and (110) as two ways in which focus can impact sentence interpretation, while I argue that neither (109) nor (110) applies in the case of *noch/still*. *Noch/still* doesn't directly work with focus semantic values, and it does not associate with a \sim that does. In other words, focus effects are even more indirect than option (110) for *noch/still*. Even so, my investigation is in the spirit of Beaver & Clark in that it critically questions hard-wiring focus sensitivity into an item's lexical contribution.

- (110) a. [only C [$\phi \sim C \phi$]]
 b. [[only C ϕ]] = 1 iff $\forall q [q \in C \ \& \ \neg([\phi]_o \Rightarrow q) \rightarrow \neg q]$
 c. semantics of \sim : $g(C) \subseteq [[\phi]]_{Alt}$ and $[[\phi]]_o = [[\phi]]_o$

Instead I claim that *noch/still* finds its arguments structurally. Consequently, the type of interpretation depends on syntactic structure. This is the analysis we have seen in the preceding two sections. I argue that the fact that the interpretation of sentences containing *noch/still* can be affected by focus can be derived regardless, relying on general mechanisms employed in the interpretation of focus.

What made people suggest that *noch/still* is focus sensitive? Aside from the effects we have already discussed and analysed, consider (111).

- (111) a. Ich kann dem PETER Aufgabe zwei noch erklären.
 I can the.Dat PETER exercise zwei still explain
 'I can still explain exercise two to PETER - Paul is beyond my help.'
 b. Ich kann dem Peter Aufgabe ZWEI noch erklären.
 I can the.Dat Peter exercise TWO still explain
 'I can still explain exercise TWO to Peter - exercise 3 is too hard.'

(111) is a degree marginal use of *noch/still*. They involve the $\langle e, \langle e, \langle \langle e, t \rangle, t \rangle \rangle \rangle$ version of the particle in (91), where the argument x is overt. This makes it possible to investigate the effects of (possible) focus on *noch/still*'s argument x .

$$(91) \quad [[noch/still_{\langle \rangle}]] = \lambda x^* . \lambda x . \lambda P_{\langle e, t \rangle} : x^* \langle x \ \& \ P(x^*) . P(x) \quad \langle e, \langle e, \langle \langle e, t \rangle, t \rangle \rangle \rangle$$

This is what happens in (111). When focus falls on *Peter*, we get a degree marginal reading which ranks people w.r.t. how easily I can explain exercise 2 to them, (111a). When focus falls on *exercise 2*, we get a degree marginal reading ranking exercises w.r.t. how easily I can explain them to Peter. It looks like focus disambiguates. This is the focus effect we will be concerned with here. (The discussion of focus and alternatives in section 2, concerning temporal readings of *noch/still*, looks rather different from the data to be discussed in this section because it is not possible to stress the time variable (and similarly for spatial readings). Section 2 was concerned with focus on or inside the predicate P instead. Hence the focus related effects discussed in the preceding sections are of a different nature from the effects to be discussed below.)

I argue that a structural analysis is necessary, and then show how we can nonetheless derive interpretive effects of focus. Section 4.1. shows that structure identifies the argument, section 4.2. argues against an analysis in terms of association with focus, and section 4.3. analyses the focus effects that we do find with marginal *noch/still*, like (111).

4.1. Structure determines the interpretation of *noch*

Let's first observe that constituency determines the interpretation of *noch*. (112) applies the now familiar constituency test for German, movement to the prefield. (112a), interestingly, is ambiguous, but other than that, surface structure clearly determines interpretation. The LFs for (112b), (112c) are given in (113) and (113'). On the marginal reading 'noch Peter' is forms a constituent which can be moved to the prefield. On the temporal reading, *noch* plus its (invisible)

time arguments is the constituent that occurs in the prefield. (Movements are reconstructed in the LFs sketched, and in the marginal readings, the top layer of the clause with tense and aspect is omitted for simplicity's sake.)

- (112) a. Den Peter kann ich noch schlagen. (*ambiguous*)
 the.Acc Peter can I still beat
 b. Noch den Peter kann ich schlagen. (*marginal*)
 still the.Acc Peter can I beat
 c. Noch kann ich den Peter schlagen. (*temporal*)
 still can I the.Acc Peter beat
 'I can still beat Peter.'

- (113) a. $[_{VP} [\text{noch } x^* \text{ Peter}] [_{<e,t>} \lambda x [_{VP} \text{ ich } x \text{ schlagen kann}]]]$
 b. (i) Assertion: I can beat Peter.
 (ii) PSP: I can beat an individual ranked lower than Peter.
 (iii) Implicature: I cannot beat individuals ranked higher than Peter.

- (113') a. $[_{AspP} [\text{noch } t^* t_{\text{topic}}] [_{<i,t>} \lambda t [_{AspP} \text{ ich den Peter schlagen kann } t]]]$
 b. (i) Assertion: I can beat Peter now.
 (ii) PSP: I have been able to beat Peter earlier.
 (iii) Implicature: I will not be able to beat Peter later.

The argument is extended in (114)¹⁷ where two different marginal readings can be considered. In (112b,c) and (114b,c,d) syntactic structure unambiguously determines a constituent '[noch x* x]' - the particle plus anaphor and argument. In each case, this constituent is moved to the prefield. Interpretation is faithful to this constituency, hence structure fixes the reading of *noch*.

- (114) a. Ich kann dem Peter Aufgabe 2 noch erklären. (*ambiguous*)
 I can the.Dat Peter exercise 2 still explain
 'I can still explain exercise 2 to Peter.'
 b. Noch kann ich dem Peter Aufgabe 2 erklären. (*temporal*)
 still can I the.Dat Peter exercise 2 explain
 'I am still able to do this: explain exercise 2 to Peter.'
 LF: $[_{AspP} [\text{noch } t^* t] [\lambda t [_{AspP} \text{ ich dem Peter Aufgabe 2 erklären kann}]]]$
 c. Noch dem Peter kann ich Aufgabe 2 erklären. (*marginal Peter*)
 still the.Dat Peter can I exercise 2 explain
 'To Peter, I can still explain ex. 2 (Paul is beyond my help).'
 LF: $[_{VP} [\text{noch } x^* \text{ Peter}] [\lambda x [_{VP} \text{ ich } x \text{ Aufgabe 2 erklären kann}]]]$
 d. Noch Aufgabe 2 kann ich dem Peter erklären. (*marginal ex2*)
 still exercise 2 can I the.Dat Peter explain
 'Exercise 2, I can still explain to Peter (ex.3 is too hard).'

¹⁷ Some of these sentences are not natural in isolation, presumably because of the information structural constraints mentioned in Fn.9. (114c), for instance, becomes more natural in a context like (i), and (114d), the one in (ii).

- (i) How are the students doing? Do they understand exercise 2?
 Well, Anna and Buket have no problems with exercise 2, and I can explain it to Chris.
 (ii) How is Peter doing with the exercises?
 Well, he figured out exercise 1a. immediately, and I can explain 1b,c to him fairly easily.

LF: $[_{VP} [\text{noch } x^* \text{ ex2}] [\lambda x [_{VP} \text{ ich } x \text{ dem Peter erklären kann}]]]$

What about the ambiguous examples? (115) provides an analysis of the temporal reading of (112a). The object NP is moved to the prefield, an option generally available in German. At LF I have reconstructed those movements that are semantically unmotivated, for perspicuity. This LF yields the familiar temporal interpretation of *noch*. The marginal reading of the same example is derived in (116). For this reading, '[den Peter]' is *noch*'s argument. I assume that the NP can be moved from this interpretive position to the prefield, to be reconstructed at LF.

- (115) a. Surface Structure 1 (*temporal*):
 $[_{CP} [\text{den Peter}]_2 [\text{kann}_3 [\text{ich}_1 [\dots [_{AspP} [\text{noch } t^* \text{ t}] [_{AspP} \text{ asp } [_{VP} [_{VP} t_1 t_2 \text{ schlagen}]] t_3]]]]]]]$
 b. LF 1 (*temporal*):
 $[_{AspP} [\text{noch } t^* \text{ t}] [_{AspP} \text{ asp } [_{VP} [_{VP} \text{ ich den Peter schlagen}]] \text{kann}]]]$
- (116) a. Surface Structure 2 (*marginal*):
 $[_{CP} [\text{den Peter}]_2 [\text{kann}_3 \text{ich}_1 [\dots [_{VP} [\text{noch } x^* \text{ t}_2]_4 [_{VP} [_{VP} t_1 t_4 \text{ schlagen}]] t_3]]]]]$
 b. LF 2 (*marginal*):
 $[_{VP} [\text{noch } x^* \text{ den Peter}] [\lambda z [_{VP} [_{VP} \text{ ich } z \text{ schlagen}]] \text{kann}]]]$

The ambiguity of (114a) is derived in a similar way - for illustration I derive the 'marginal Peter' reading below. The movement here is Scrambling instead of movement to the prefield.

- (117) a. Surface Structure of 'marginal Peter' reading:
 $[_{CP} \text{ich}_1 [\text{kann}_4 [[\text{dem Peter}]_5 [\text{Aufgabe 2}]_3 [\text{noch } x^* \text{ t}_5]_2 [_{VP} [_{VP} t_1 t_2 t_3 \text{ erklären}]] t_4]]]]]$
 b. corresponding LF:
 $[_{VP} [\text{noch } x^* \text{ dem Peter}] [\lambda x [_{VP} [_{VP} \text{ ich } x \text{ Aufgabe 2 erklären}]] \text{kann}]]]$

Overall, the data show that *noch* + argument forms a constituent, *modulo* the possibility of overtly moving the argument from this position via Scrambling or movement to the prefield. I conclude that structure identifies *noch*'s argument. This is the syntactic foundation that has been made use of throughout the paper.

4.2. Focus doesn't identify the argument

Wolfgang Klein (2007/2015) argues that focus does not identify *noch*'s argument. It is hard to make a watertight argument to the effect that the argument is not identified by focus. But note that appearances certainly do not suggest that the argument is the focus. In (118b), question/answer congruence (Rooth (1992)) requires the predicate to be focused, while *noch/still*'s argument is most likely a topic. Thus a marginal reading is possible when the argument does not appear to be a focus. Klein notes that conversely, a temporal reading is possible when there is a focus in the sentence, so *noch* does not associate with that focus, (119). Thus there is no obvious evidence that the argument has to be focused, or that a focus has to be the argument. I refer the reader to Klein (2007/2015).

- (118) a. Wie gross ist der Honda?
 How big is the Honda?
 b. Der Honda ist noch [ein Kleinwagen]_F.

The Honda is still [a compact]_F.

- (119) MEIN Auto/mein AUto sieht noch ganz gut aus. (temporal ok)
 MY car/ my CAR looks still quite good Part.
 'MY car/my CAR is still looking good.'

What's more, there is direct evidence that focus is not responsible for providing *noch*'s argument. A first type of evidence comes from focus in syntactic islands. Rooth (1985) observes that the associate of a focus sensitive particle like *only* can be embedded inside syntactic islands like relative clauses. An example is given in (120). I provide a parallel example for German in (121). Association is possible, although the movement that would bring the focus next to the particle is ruled out, (120c), (121c). This is classical evidence that the particle finds its associate by a focus semantics, not structurally.

- (120) a. I only bought a book [_{CP} that MARY recommended].
 b. There is no $x \neq$ Mary such that I bought a book that x recommended.
 c. * [[only Mary][_I I bought a book [_{CP} that t_1 recommended]]]
- (121) a. Nur ein Auto, [_{CP} das KARL gekauft hat], ist ein Kleinwagen.
 only a car that KARL bought has is a compact car
 'Only a car that KARL bought is a compact.' =
 'There is no $x \neq$ Karl such that a car that x bought is a compact.'
 b. Ein Auto, [_{CP} das KARL gekauft hat], ist auch ein Kleinwagen.
 a car that KARL bought has is also a compact car
 'A car that KARL bought is a compact car, too.' =
 'There is an $x \neq$ Karl such that a car that x bought is a compact.'
 c. * [nur/auch Karl] [_I ein Auto [_{CP} das t_1 gekauft hat]] ist ein Kleinwagen]

Let's compare this to *noch/still*. (122a) is parallel to (121b). An interpretation according to which focus would identify *noch*'s argument is given in (122b). While the sentence is acceptable, this is not an available reading. This indicates that (123a) is not an available LF for (122a). (The ok interpretation (122c) is associated with the structure (123b) which does not violate any island constraints.) The absence of the reading (122b) can be derived as a constraint on movement, provided that *noch*'s argument is identified structurally, and not by a focus semantics.

- (122) a. # Ein Auto, das KARL gekauft hat, ist noch ein Kleinwagen.
 a car that KARL bought has is still a compact car
 'A car that KARL bought is still a compact.'
 b. not available - scale ranking people:
 (i) Assertion: There is a car that Karl bought which is a compact.
 (ii) PSP: A car that x^* bought is a compact ($x^* <$ Karl)
 (iii) implicature: No car that JENNI bought is a compact any more,
 (no car that a higher ranked person bought is a compact.)

----- x^* -----Karl-----Jenni----->

- c. available - scale ranking cars:

- (i) Assertion: There is a car that Karl bought which is a compact.
- (ii) PSP: A smaller car is a compact.
- (iii) implicature: Larger cars are not compacts.

- (123) a. *[noch x* Karl] [λx . a car [CP that x bought] is a compact]
 b. [[a car [CP that Karl bought]] [λz [[noch x* z] [λx . x is a compact]]]

A second type of evidence comes from intervention effects. Focus sensitive particles are problematic interveners in *wh*-constructions (e.g. Beck (2006a)). An example is given in (124): a focus sensitive particle intervening e.g. between the two *wh*-phrases in a multiple question leads to unacceptability (124a) (this can be remedied by changing the word order (124b)). If *noch* were a focus sensitive particle, it should trigger an intervention effect as well. This is not the case; (125) where *noch* intervenes between two *wh*-phrases, parallel to (124a), is fine. This is evidence against analysing *noch* as focus sensitive.

- (124) a. ?? Wo gelten nur für Tischtennispieler welche diskriminierenden Gesetze?
 where hold only for table tennis players which discriminatory laws
 b. Wo gelten welche diskriminierenden Gesetze nur für Tischtennispieler?
 where hold which discriminatory laws only for table tennis players
 'Which discriminatory laws are in force where for table tennis players only?'

- (125) a. Wo gelten noch welche diskriminierenden Gesetze?
 where hold still which discriminatory laws
 'Which discriminatory laws are still in force where?'
 b. Wo galten noch 1977 welche diskriminierenden Gesetze?
 where held still 1977 which discriminatory laws
 'Which discriminatory laws were in force where as late as 1977?'

I conclude that *noch* is not focus sensitive. The argument is found by regular syntactic compositional means.

4.3. Why focus effects then?

At this point, the question arises why linguists have thought about *noch/still* as focus sensitive. This will be explained as a tendency for the argument to attract focus, arising from appropriate contexts for *noch/still*-sentences. First, let's take another look at the structurally ambiguous example (114a) from above. Intonation disambiguates, as noted in (111): we get the interpretation according to which the stressed expression is *noch*'s argument.

- (126) a. Ich kann dem PETER Aufgabe zwei noch erklären.
 I can the.Dat PETER exercise two still explain
 'I can still explain exercise two to PETER - Paul is beyond my help.'
 b. Ich kann dem Peter Aufgabe ZWEI noch erklären.
 I can the.Dat Peter exercise TWO still explain
 'I can still explain exercise TWO to Peter - exercise 3 is too hard.'

- (126') a. [[noch x* Peter] [λx [I can explain exercise 2 to x]]]

- b. [[noch x* exercise 2] [λx [I can explain x to Peter]]]

In terms of my analysis, the LF (126'a) goes with focus on *Peter*, and the LF (126'b) with focus on *exercise 2*. Now remember that P(x*) is presupposed. This means that an appropriate context for (126'a) is one that entails that I can explain exercise 2 to x* (x* < Peter). Thus P(x*), that I can explain exercise 2 to x*, is given (see Patel-Grosz & Beck (accepted) for this connection between presupposition and givenness). The argument x, *Peter* in the example, contrasts with x*. Therefore *Peter*, or more generally the argument x, may be expected to attract focus. This is what we see in (126) and (126').¹⁸

Implicatures (127), similarly, work with alternatives to the argument x. The scalar implicatures target x' ranked higher than x, x tends to be focused, hence focus seems to determine implicatures. However, in my analysis, the argument is always an alternative trigger, hence intonational focus coincides with *noch/still*'s lexically triggered alternatives. Alternatives to the argument are active even in the temporal readings, where (intonational) focus is not possible, and in (105), where the argument is of type <e> but not overt.

- (127) a. [EXH [[noch x* Peter] [λx [I can explain exercise 2 to x]]]]
 ∀x'[x' > Peter] → ¬(I can explain exercise 2 to x')
 b. [EXH [[noch x* exercise 2] [λx [I can explain x to Peter]]]]
 ∀x'[x' > ex2] → ¬(I can explain x' to Peter)]

In a larger context, focus need not necessarily be assigned in exactly the way sketched above. In (128), pitch accent on *Peter* goes with a reading in which *Aufgabe 2* is *noch*'s argument.

- (128) A: Ich kann allen Aufgabe 1 erklären. Aufgabe 2 kann ich noch einigen erklären.
 I can explain exercise 1 to everyone. To some, I can still explain exercise 2.
 B: Ach ja? Wem denn?
 Oh yeah? To who?
 A: Ich kann dem PETER Aufgabe zwei noch erklären.
 I can the.Dat PETER exercise two still explain
 'I can still explain exercise two to PETER.'

To sum up section 4, focus clearly has interpretive effects in sentences with *noch/still*. This does not mean that there is association with focus. In this section we have seen that the tendency of the argument on the marginal reading to attract focus can and must be explained without claiming that *noch/still* associates with it in terms of focus semantics. Previously, we have seen that focus on or inside the predicate affects the interpretation of sentences with *noch/still*, but this was also explained without an association-with-focus semantics for the particle. I agree with Klein (2007/2015) that the association of *noch/still* with its argument is structural - *contra* the earlier literature (e.g. König (1991), Krifka (2000), Ippolito (2007)) which claims *noch/still* are focus sensitive.

¹⁸ The editor Malte Zimmermann points out to me that *noch*'s argument in these data is plausibly a contrastive topic rather than a plain focus, and I concur. This would fit the discussion equally well since contrastive topic also attracts phonological prominence and semantically provides contrast. I stick to the term focus for simplicity; see also Fn 12 and Fn. 17.

5. Summary and discussion

This section explores some consequences of the analysis. Subsection 5.1. is the summary. In subsection 5.2. I investigate the differences between English *still* and German *noch* and examine what the analysis can tell us about them. Subsection 5.3. looks at scales in the grammar from the perspective of our results. In subsection 5.4. I highlight some consequences of my analysis for the theory of the semantics/pragmatics interface.

5.1. Summary

This paper has offered an analysis of a large variety of possible uses of the scalar particles *noch* and *still*. The driving idea has been to identify a core meaning common to all these uses. According to the meaning proposed, the particle does not affect the claim asserted by the sentence with the particle. It introduces the presupposition that a parallel claim holds of an item lower on the scale. It activates alternatives, leading to the question of what other, higher elements on the scale the claim is true of. This core meaning, when combined with its sentence context, allows variation at several points: The semantic types available for the particle matter, giving rise to different types of use with different underlying scales (time, locations, degrees and more). The syntax of the particle matters, in particular German *noch* need not modify the main predicate of the clause. It can syntactically modify an adjunct instead. And importantly, the alternative semantics of sentences with *noch/still* interacts with alternative sensitive operators, deriving pragmatic effects including scalar implicatures.

We have seen that these variables and their interaction account for a range of interpretations. They also allow us to describe general differences between the English and the German particle.

5.2. Contrasting *still* and *noch*

In a few places in the preceding sections, we have noted differences between *noch* and *still*. Let's collect them here: English *still* in contrast to *noch* does not readily allow subconstituent readings, e.g. (129a). Further-to *noch* has been analysed as a special case of temporal subconstituent *noch* and is likewise unavailable for English *still*, (129b) (in fact, this reading is completely unavailable and hence apparently worse than regular temporal subconstituent uses; perhaps this has something to do with the assumed subconstituent being covert). *Author* (2016b) observes that order of mention uses like (130a) are not possible with *still*. Neither are additive or comparative uses, (130b,c). At the same time, discourse related readings like (131) are possible. And of course, *noch* and *still* share the basic continuative temporal use as well as marginal uses with paths or degrees. The table below gives an overview. It includes the so-called concessive use of *still*, which German *noch* does not allow. Examples are given in (132).

- (129) a. Noch 1967 schlossen die Kneipen um 18:00 Uhr. (*temp. subconstit.*)
 still 1967 closed the pubs at 6pm
 'As late as 1967, pubs closed at 6pm.'
- b. Er duschte noch. (*further-to*)
 he showered still
 'He took a shower before...'
- (130) a. Ich hab noch Schokolade gekauft. (*order of mention*)

- I have still chocolate bought
'Moreover, I have bought chocolate.'
- b. Ich schäle NOCH einen Apfel. (additive)
I peel still an apple
'I will peel another apple.'
- c. Britta ist noch 3cm grösser. (comparative)
Britta is still 3cm taller
'Britta is taller by another 3cm.'

(131) Ich bin immer noch Deine Mutter. (discourse related)
I am always still your mother
'I am still your mother.'

- (132) a. John studied all night, but still he failed the test. (concessive -Ippolito)
b. His doctor told him not to, but John still ran the marathon.

type of use	<i>noch</i>	<i>still</i>
<i>temporal</i>	√	√
<i>temporal subconstituent</i>	√	??
<i>further-to</i>	√	*
<i>marginal</i>	√	√
<i>comparative</i>	√	??
<i>order of mention</i>	√	*
<i>additive</i>	√	*
<i>discourse related</i>	√	√
<i>modal/concessive</i>	*	√

Let's take a quick look at modal uses of *still*. Ippolito (2007) provides a detailed analysis. I sketch below an extension of the semantics for *noch/still* pursued throughout this paper to modal uses which follows her lead, but is different in detail. (132b) conveys (133).

- (133) (i) Assertion: John ran the marathon.
(ii) PSP: John would have run the marathon under better circumstances.
(iii) Implicature: Had circumstances been any less ideal, John would not have run the marathon.

We can think about this in terms of an ordering of possible worlds according to how well suited to running the marathon they are. The version of *still*'s lexical entry would be (134). The LF of the example is (135) and the resulting interpretation (136). (137) illustrates.

- (134) $[[\text{still}_c]] = \lambda w^* . \lambda w . \lambda p : p(w^*) \ \& \ w^* < w . p(w)$ <s,<s,<<st>,t>>>
 scale <: closeness to ideal marathon worlds
 w*: plurality of relevant worlds closer to ideal marathon worlds than w

(135) $[\lambda w [\text{still}_z w^* w [\lambda w'. \text{John run the marathon } w']]]$

(136) a. $[[(135)]] (@)$ is only defined if $\text{John_run_the_marathon}(w^*)$ and $w^* < @$.
Then, $[[(135)]] (@)$ is true if $\text{John_run_the_marathon}(@)$.

b. Possible implicature: $\forall w' [@ < w' \rightarrow \neg (\text{John_run_the_marathon}(w'))]$
In worlds further removed from ideal marathon worlds, John doesn't run.

(137) $//////// \text{marathon } ////////// | \backslash\backslash\backslash \neg \text{marathon } \backslash\backslash\backslash$
----- w^* ----- $@$ ----- w' ----->

Order of mention uses (130a), additive uses (130b) and comparative uses (130c) were not analysed in this paper. *Author* (2016b), following Klein (2007/2015) and Umbach (2009a,b), suggests that these uses relate to the order in which things are introduced in the discourse. For example, in (130a) some other proposition 'I have bought x' has been stated before. In (130b), an apple has to have been introduced into the discourse before. The scale is the order in which things have been mentioned. Other than that, the contribution of the particle is the same as what we have seen in this paper. Thus modal, order of mention and additive uses are parallel to the other uses but involve particular scales and hence semantic types.

This leads us to the following picture of the differences between English and German: There are two kinds of differences between *noch* and *still*. The first concerns semantic type. Clearly, both *still* and *noch* can operate on various scales. But there are differences in detail: order of mention is an available scale for *noch* but not *still*. The modal scale is available for modal/concessive *still*, but not available for *noch*.

The second difference concerns syntax. It seems that in contrast to *noch*, *still* needs to modify the main predicate of the clause for most Present Day English speakers. Subconstituent readings are not allowed. This has other consequences besides unavailability of temporal subconstituent readings. Unavailability of further-to readings follows from this, since according to the analysis in section 2 and in *Author* (2016a) they are subconstituent readings, and similarly for the marginal subconstituent readings from section 3.

If this is right, then we have reduced differences in the range of possible uses of *noch* vs. *still* to two grammatical properties: constituency and scale. We do not yet know how those grammatical properties come about.

Regarding differences in what scales are accessible, it seems to be simply a matter of the lexical item which particular shifts to other semantic types are available. It is interesting that *already* doesn't have a modal reading, but its German counterpart *schon* 'already' does (e.g. Zimmermann (to appear)). I don't see a principled reason behind this.

(138) Mein Arzt hat mir abgeraten, aber ich kann den Marathon schon laufen.
my doctor has me advised_against, but I can the marathon already run
'My doctor told me not to, but I can run the marathon nonetheless/still.'

(139) # My doctor told me not to, but I can already run the marathon.

Regarding the syntax of *noch* vs. *still*, it seems that *still* most easily adjoins to verbal or clausal categories, while *noch* seems more flexible and can adjoin to AP or PP as well. I leave this as an open issue regarding the syntax of particles.

5.3. A remark on diachronic development and scales in grammar

The contrastive perspective has been quite instructive, however. I would like to suggest that essentially, we have seen that 'scale' is not a concept that is in the grammar. Rather, it seems to be a cognitive construct that has an impact on the grammar. To illustrate, the historical source of English *still* is an adverb with the meaning 'motionless', 'soundless' (e.g. Schimmelpfennig (2015) for an overview and analysis). The source of German *noch* seems to be an expression meaning 'and now' or 'now also' (e.g. Kluge (1990)). It seems that there is a need or desire to add a scalar perspective to statements about time, paths or even individuals. Thus expressions can be adapted to express such a scalar perspective (see also e.g. Hohaus (2012) for the expression of comparison in Samoan, where something related happens). That is, lexicon and syntax adjust to cognitive pressure in order to allow expression of a scalar concept. However, it is not the case that once the language includes such a scalar term, it automatically covers all available scales. As we have seen, German *noch* does not work with modal scales, while English *still* does not work with order of mention scales. What determines the distribution is the semantic type or types that an expression has, plus its syntactic constraints. This is what is in the grammar.

If this view is right, we should see more variation when we look at the counterparts of *noch/still* in further languages, and similar variation with other scalar expressions. Let's take a quick look at *noch/still*'s relatives: In the literature, *schon/already* is seen as the counterpart of *noch/still* (see in particular Löbner (1990) who analyses them as duals; also e.g. Ippolito (2007), Klein (2007/2015) aim for a parallel analysis). It will be interesting to see to how the analysis developed in this paper can be extended; we have already seen that there is variation between expressions in a given language as well as across languages ((132), (138), (139)). Natural translations of the non-overlapping uses of *noch* vs. *still* involve the particles *even*, *erst* 'only'/'still' and *only* (e.g. (2b), (107)). A comprehensive investigation should include them as well as *noch nicht* 'not yet', *nicht mehr* 'not anymore', *yet* and *anymore*. For example, (140a) could allow us to make a connection to further-to uses and (140b) to additive uses of scalar particles. At any rate, the data indicate that an individual investigation of each particle is merited.

- (140) a. As yet, there isn't a good solution.
b. I peeled yet another apple.

5.4. Some questions for semantic theory

My strategy in this paper has been to compose the meanings of *noch/still*-sentences from the particle on the one hand and from independently motivated semantic mechanisms on the other. My goal has been to avoid multiplying lexical entries for the scalar particle and distinguishing grammatically different uses, of which there would have to be quite a few.

This modular view includes seeing *noch/still* as an alternative trigger: the time variable (or more generally the argument) associated with *noch/still* introduces (time) alternatives into the calculation. So do other expressions, e.g. items on a scale and focused expressions. This leads us

to expect an interaction of *noch/still* with the interpretation of focus, and the generation of scalar implicatures. This expectation is borne out.

I have implemented the analysis in terms of the operator \sim for the evaluation of focus and the operator EXH for the generation of scalar implicatures. I repeat here some questions from section 2.4 that my data raise given such an implementation: There is some evidence that the EXH associated with *noch/still* can simultaneously evaluate alternatives triggered elsewhere in the sentence. In other cases, it doesn't. So when does and when doesn't an EXH operator evaluate certain alternatives? Also, the EXH operator associated with *noch/still* needs to pass on focus semantic values, for evaluation by the \sim higher up in the clause. Is this generally the EXH operator's impact on focus semantic values? And is there any generalization as to the impact an alternative evaluating operator has on alternative sets? These important questions for current theoretical development (e.g. Fox (2007), Chierchia, Fox & Spector (2011), Beck (2016), Fox & Spector (2018)) must be left for further research.

All in all, scalar particles have significantly extended the set of data we can consider for the future development of theories of the semantics/pragmatics interface.

References

- Abrusan, Marta (2016). Presupposition Cancellation: Explaining the Soft-Hard Distinction *Natural Language Semantics* 24(2): 165-202, 2016. doi:10.1007/s11050-016-9122-7
- Abusch, Dorit (2002). Lexical Alternatives as a Source of Pragmatic Presuppositions. In Brendan Jackson (ed.), *Semantics and Linguistic Theory (SALT)* 12, 1-19. Ithaca, NY: CLC. doi: 10.3765/salt.v12i0.2867.
- Author (2016a).
- Author (2016b).
- Beaver, David & Brady Clark (2008). *Sense and Sensitivity*. Oxford, Blackwell.
- Beck, Sigrid (2006a). Intervention effects follow from focus semantics. *Natural Language Semantics* 14.
- Beck, Sigrid (2006b). Focus on Again. *Linguistics and Philosophy* 29, 277-314.
- Beck, Sigrid (2007). Quantifier dependent readings of anaphoric presuppositions. In Sauerland, Uli & Penka Stateva (eds.): *Presupposition and implicature in compositional semantics*. Palgrave Macmillan, 12-33.
- Beck, Sigrid (2011). Comparison Constructions. C. Maienborn, K. von Heusinger and P. Portner (eds.): *Semantics: An International Handbook of Natural Language Meaning* . Bd. 2. Berlin (u.a.): De Gruyter Mouton, 1341-1389..
- Beck, Sigrid (2016). "Focus Sensitive Operators", In: Caroline Féry and Shinichiro Ishihara (eds.), *The Oxford Handbook of Information Structure*. Oxford University Press.
- Chierchia, Gennaro, Danny Fox and Benjamin Spector (2012). The Grammatical View of Scalar Implicatures and the Relationship between Semantics and Pragmatics. In Claudia Maienborn, Paul Portner & Karl von Heusinger (eds.), *Semantics: An International Handbook of Natural Language Meaning* Vol 3, 2297-2332. Berlin: De Gruyter.
- Cresswell, Max John (1978). Prepositions and points of view. *Linguistics and Philosophy* 2 (1), 1-41. doi: 10.1007/BF00365129.
- Crníc, Luka (2011). *Getting even*. Doctoral dissertation. MIT.
- Crníc, Luka, Emmanuel Chemla & Danny Fox (2015). Scalar Implicatures of Embedded Disjunction. *Natural Language Semantics* 23, 271-305.

- Fanselow, Gisbert & Denisa Lenertova (2011). Left peripheral focus. Mismatches between syntax and information structure. *Natural Language & Linguistic Theory* 29, 169-209.
- Fox, Danny (2007). Free Choice and the theory of scalar implicatures. In Sauerland, Uli & Penka Stateva (eds.): *Presupposition and implicature in compositional semantics*. Palgrave Macmillan, 71-120.
- Fox, D., and R. Katzir (2011). On the characterization of alternatives. *Natural Language Semantics* 26(1): 87–107.
- Fox, Danny & Benjamin Spector (2018). Economy and embedded exhaustification. *Natural Language Semantics* 19(1): 1–50.
- Greenberg, Yael (2010). Additivity in the Domain of Eventualities. Martin Prinzhorn, Viola Schmitt & Sarah Zobel (eds.), *Sinn und Bedeutung* 14, 151-167. Vienna: Universität Wien.
- Hamblin, Carl Lee (1973). Questions in Montague English. *Foundations of Language* 10 (1): 41-53.
- Heim, Irene (1990). Presupposition Projection. In R. van der Sandt (ed.) *Reader for Nijmegen Workshop on Presupposition*, University of Nijmegen, 1990.
- Heim, Irene & Angelika Kratzer (1998). *Semantics in Generative Grammar*. Blackwell.
- Hohaus, Vera (2012). Directed Motion as Comparison: Evidence from Samoan", *Proceedings of SULA 6 and SULA-bar*, 335-348
- Ippolito, Michela (2007). On the meaning of some focus-sensitive particles. *Natural Language Semantics* 15 (1):1–34. doi: 10.1007/s11050-007-9004-0.
- Kamp, Hans & Antje Rossdeutscher (1994). DRS-construction and lexically driven inference. *Theoretical Linguistics* 20, 165-235.
- Klein, Wolfgang (2007/2015). Über die Partikeln *schon* und *noch*. Talk given at the U. Tübingen. (Based on Wolfgang Klein. 2007. About the German particles *schon* and *noch*. Manuscript.)
- Kluge, Friedrich (1995). *Etymologisches Wörterbuch der deutschen Sprache*. De Gruyter, Berlin, New York, 23. erweiterte Auflage.
- König, Ekkehart (1977). Temporal and non-temporal uses of *schon* and *noch* in German. *Linguistics and Philosophy* 1 (2), 173-198.
- König, Ekkehart (1991). Particles. In: A. von Stechow and D. Wunderlich (eds.): *Handbook of Semantics*. Mouton De Gruyter.
- Kratzer, Angelika (1998). More structural analogies between pronouns and tenses. In Devon Strolovitch & Aaron Lawson (eds.), *Semantics and Linguistic Theory (SALT)* 8, 92–110. doi: 10.3765/salt.v8i0.2808.
- Krifka, Manfred (1995). The semantics and pragmatics of polarity items. *Linguistic Analysis* 25, 1-49.
- Krifka, Manfred (1998). The origins of telicity. In Susan Rothstein (ed.), *Events and grammar*, 197-235. Dordrecht: Kluwer.
- Krifka, Manfred (2000). Alternatives for aspectual particles: Semantics of *still* and *already*. Paper presented at the Berkeley Linguistics Society.
- Löbner, Sebastian (1989). German *schon* – *erst* – *noch*: An integrated analysis. *Linguistics and Philosophy* 12 (2), 167-212. doi: 10.1007/bf00627659.
- Löbner Sebastian (1990). *Wahr neben Falsch. Duale Operatoren als die Quantoren natürlicher Sprache*. Tübingen: Niemeyer.
- Menendez-Benito, Paula (2010). On Universal Free Choice Items. *Natural Language Semantics* 18, 33-64
- Michaelis, L. (1993). Continuity within three scalar models: The polysemy of adverbial *still*. *Journal of Semantics* 10, 193-237.

- Mittwoch, A. (1993). The relationship between *schon/already* and *noch/still*: A reply to Löbner. *Natural Language Semantics* 2, 71-82.
- Patel-Grosz, Pritty & Sigrid Beck (accepted). Different Again. *Semantics & Pragmatics*.
- Rooth, Mats (1985). *Association with Focus*. PhD dissertation, University of Massachusetts at Amherst.
- Rooth, Mats (1992). A Theory of Focus Interpretation. *Natural Language Semantics* 1: 75-116.
- Sauerland, Uli (2004). Scalar implicatures in complex sentences. *Linguistics and Philosophy* 27(3): 367–391.
- Schimmelpfennig, Lara (2015). Diachronic Development of *still* – A corpus study from Middle English to Early Modern English. Zulassungsarbeit, Universität Tübingen.
- Soames, Scott (1989). Presupposition. In Gabbay, D. & F. Günthner (eds.), *Handbook of Philosophical Logic*. Kluwer, Dordrecht.
- Spector, Benjamin (2010). Topics in the Semantics of Interrogative Clauses, Hand-Out 3, Vienna, March 2010. website for this class: <http://lumiere.ens.fr/~bspector/Questions2010>
- von Stechow, Arnim (2009). Tenses in compositional semantics. In Wolfgang Klein and Ping Li (ed.): *The Expression of Time*. Berlin, De Gruyter, 129-166.
- von Stechow, Arnim & Wolfgang Sternefeld (1988). *Bausteine syntaktischen Wissens*. Opladen, Westdeutscher Verlag.
- von Stechow, Arnim & Sigrid Beck (2015). Events, Times and Worlds - An LF Architecture. C. Fortmann (ed.): *Situationsargumente im Nominalbereich*. *Linguistische Arbeiten* Bd. 562, Berlin: De Gruyter, 2015, 13-46.
- Tiemann, S., M. Kirsten, S. Beck, I. Hertrich, B. Rolke: Presupposition Processing and Accommodation: An Experiment on *wieder* ('again') and Consequences for Other Triggers. F. Schwarz (ed.): *Experimental Perspectives on Presuppositions*. *Studies in Theoretical Psycholinguistics* Bd. 45, Heidelberg: Springer, 2015, 39-65.
- Thomas, Guillaume (2010). Incremental *more*. In Nan Li & David Lutz (eds.), *Semantics and Linguistic Theory (SALT)* 20, 233-250. Ithaca, NY: CLC.
- Thomas, Guillaume (2018). Underspecification in degree operators. *Journal of Semantics* 35, 43-93.
- Trinh, Tue & Andreas Haida (2015). Constraining the derivation of alternatives. *Natural Language Semantics* 23(4). 249–270.
- Tonhauser, J., D. Beaver, C. Roberts, and M. Simons (2013). Toward a taxonomy of projective content. *Language* 89(1), 66–109.
- Truckenbrodt, Hubert (2013). An analysis of prosodic F-effects in interrogatives: prosody, syntax and semantics. *Lingua* 124, 131-175.
- Umbach, Carla (2009a). Another additive particle under stress: German additive *noch*. *Symposium on Logic and Language (LoLa)* 10, 149-156. Budapest: HAS.
- Umbach, Carla (2009b). Comparatives combined with additive particles: The case of German *noch*. In Arndt Riester & Torgrim Solstad (eds.), *Sinn und Bedeutung (SuB)* 13, 543-558. Stuttgart: OPUS:
- Zimmermann, Thomas Ede (2000). Free Choice Disjunction and epistemic possibility. *Natural Language Semantics* 8, 255-290.
- Zimmermann, Malte (to appear). A unified semantics of *schon* as a degree operator. *Journal of Semantics*.