

Comparatives Combined with Additive Particles: The Case of German *noch*

Carla Umbach
Institute of Cognitive Science
University of Osnabrück

carla.umbach@uos.de

Abstract

This paper investigates comparatives combined with the German particle *noch* ('still'). Such comparatives trigger – in some but not all contexts – the entailment that the comparison base exceeds the standard of the comparison class, which is surprising since comparatives in general are assumed to be insensitive to the standard of the comparison class. It is shown that the entailment results from the fact that comparatives combined with *noch* are anaphoric. An interpretation is proposed which accounts for the fact that comparative *noch* is both scalar and additive.

1 Introduction

It is well-known that the unmodified positive form of a gradable adjective relates to a contextually given standard of comparison. Thus (1) entails that Berta is taller than some standard given by, e.g., the class of ten-year old girls. Following Bierwisch (1989) constructions relating to a contextually given standard of comparison will be called *norm-related* in this paper. The unmodified comparative form of a gradable adjective is clearly not norm-related – the sentence in (2) neither entails that Adam is tall nor that Berta is tall. Surprisingly, the comparative form seems to be norm-related when combined with the particle *noch* ('still'). The sentence in (3a), if presented out of the blue, entails that Adam, and thus Berta are tall. Similarly, from (3b) it will be concluded that the old web pages of the advertising company were customer-friendly and informative. There are, however, also contexts where the comparative form combined with *noch* is not norm-related. In (4a), for example, it is not entailed that the male brain is big, and in (4b) it is not entailed that the range of activities of physiotherapists was large at the end of the last year.

- (1) Berta ist groß.
'Berta is tall.'
- (2) Berta ist größer als Adam.
'Berta is taller than Adam.'
- (3) a. Berta ist noch größer als Adam.
'Berta is still taller than Adam.'
- b. (A company praising their new web pages)
Unsere neuen Webseiten sind noch kundenorientierter und informativer.
'Our new web pages are still more customer-friendly and informative.'
- (4) (from the web:)
- a. Bei der Frau ist die Hemisphäreneinteilung in links und rechts nicht so stark. Das weibliche Gehirn ist kleiner als das männliche, also das männliche ist größer. Das Gehirn eines ausgewachsenen Ochsen ist noch größer.
'In women the division into a left and a right brain hemisphere is not that clear. The female brain is smaller than the male one, that is, the male one is bigger. The brain of a full-grown ox is still bigger.'
- b. Der Betätigungsbereich für Physiotherapeuten ist im letzten Jahrzehnt größer geworden; er könnte aber durchaus noch größer sein.
'The range of activities of physiotherapists increased in the last decade, but it could be still larger.'

First of all, the above examples raise the question of why the comparative construction turns out to be norm-related when combined with the particle *noch*. How does *noch* affect the comparative to yield this effect? Secondly, what is the role of the context? Why do the contexts in (4a,b) prevent norm-relatedness? Thirdly, there is the question of what the particle *noch* in (3) and (4) means. The use of *noch* in (3) and (4) will be called the *comparative use of noch* in this paper.¹ Assuming that this use of *noch* does not constitute a separate reading, how does it relate to the other uses of *noch*?

In the literature, the comparative use of *noch* is widely ignored. In the field of comparison, side remarks can be found, for example in Bierwisch (1989) and Varnhorn (1993), acknowledging the fact that comparative *noch* may cause norm-relatedness. Prominent papers on the particle *noch*, e.g. Löbner (1989), Krifka (2000), disregard the comparative use, with the exception of König (1977), who makes an elegant proposal that will be basic for the analysis proposed in this paper.

The paper is organized as follows: Section 2 provides a brief survey of the uses of *noch* discussed in the literature. In section 3 König's (1977) proposal is examined. In section 4 an analysis of the comparative use of *noch* is presented which explains why, in some but not all contexts, it induces norm-relatedness of the comparative form. It will be argued that comparative *noch* is an instance of the additive use of *noch*, and

¹ Please note that there are combinations of *noch* plus comparative which are not subsumed by the notion of *comparative noch*, cf. (9) and (10) below.

that norm-relatedness is the result of an anaphoric relation of the comparative to an unmodified (i.e. norm-related) positive form. The final section points out open questions for future work.

2 Readings of *noch*

There are three major readings of the particle *noch* discussed in the literature, the temporal reading, the marginality reading and the additive reading. In all of these readings the particle presupposes an underlying scale and induces a "dynamic perspective". *Noch* is closely related to the particle *schon* ('already') which also presupposes an underlying scale but indicates a different perspective. Since *schon* is irrelevant for the analysis of comparative *noch* it will be ignored in this paper.

The temporal reading of *noch* is demonstrated in (5). The particle indicates that it has been raining before and might stop soon. Temporal *noch* (but not marginality and additive *noch*) may be positioned in the beginning of the sentence, and it usually occurs in imperfective sentences (for details see König 1991).

- (5) Es regnet noch. / Noch regnet es.
'It is still raining.'

The second reading of *noch* is the marginality reading. The use of *noch* in (6) indicates that Osnabrück is a marginal case of being in the Lower Saxony territory. If Osnabrück were located further away from the center of Lower Saxony, it would be beyond the border. Marginality is enhanced by adding *gerade* ('just').

- (6) Osnabrück liegt (gerade) noch in Niedersachsen.
'Osnabrück is still in Lower Saxony.'

The third reading of *noch* is the additive one. There is a stressed and an unstressed variant which differ in that the unstressed variant requires an additional entity distinct from the associated constituent (i.e. the NP *einen Schnaps* in (7a,b), whereas the stressed variant requires the additional entity to be an instance of the same kind. In (7a), *noch* being unstressed, there has to be another drink ordered by Otto distinct from schnaps. In (7b), with stressed *noch*, the additional drink has to be a schnaps.

- (7) a. Otto bestellte noch einen SCHNAPS (zusätzlich zu seinem Bier).
'Otto ordered a schnaps (in addition to his beer).'
- b. Otto bestellte NOCH einen Schnaps (zusätzlich zu seinen anderen Schnäpsen).
'Otto ordered another schnaps (in addition to his other ones).'

The additive reading of *noch* is closely related to the additive particle *auch* ('also') which also appears in a stressed and an unstressed variant. Unstressed *auch* is similar in meaning (though not identical, cf. section 4.3) to unstressed *noch* presupposing an additional entity distinct from the associated constituent. For example, (8a) as well as

(7a) presuppose another drink distinct from schnaps. Stressed *auch* is clearly different from stressed *noch*, since it is associated with the subject (or contrastive topic, cf. Krifka 1999). Whereas stressed *noch* in (7b) presupposes another schnaps, stressed *auch* in (8b) presupposes another person ordering schnaps.

- (8) a. Otto bestellte auch einen SCHNAPS (zusätzlich zu seinem Bier).
'Otto also ordered a schnaps (in addition to his beer).'
- b. Otto bestellte AUCH einen Schnaps (zusätzlich zu anderen Gästen).
'Otto also ordered a schnaps (in addition to other guests).'

Considering the initial question of how the comparative use of *noch* in (3) and (4) relates to the readings of *noch* discussed in the literature, it is important to note that each of the uses mentioned above – temporal, marginality, additive – may combine with comparative forms. The example in (9) has a temporal reading indicating that Adam might be taller than Berta in the future (which is the only available reading if *noch* is positioned in the beginning of the sentence). In (10) the prominent reading is marginality (enhanced by adding *gerade*): The letter is a marginal case of weighing less than 20g.

- (9) Berta ist noch größer als Adam. / Noch ist Berta größer als Adam.
'Berta is still taller than Adam.'

- (10) Der Brief ist (gerade) noch leichter als 20g. (Eine 55 Cent Briefmarke reicht.)
'The letter still weighs less than 20g. (A 55 Cent stamp will be o.k.)'

As shown in (9) and (10), *noch* combined with a comparative form may have a temporal as well as a marginality reading. But if we try an additive reading we get the comparative use we were looking for. The additive reading of (11) presupposes an additional comparison, or an additional span of height, distinguishing Adam from someone else, which is characteristic for the comparative reading. Although comparative *noch* is usually stressed, stress may also be on the comparative form instead of the particle, for example in the context of an antonym as in (11b).² So we find the same pattern as in (7): the stressed variant presupposes the occurrence of the same adjective and unstressed variant presupposes the occurrence of a distinct one.

- (11) a. (Adam ist groß/ größer als 1,80m.) Aber Berta ist NOCH größer.
'(Adam is tall / taller than 1,80m.) But Berta is still taller.'
- b. (Adam ist nicht klein.) Aber Berta ist noch GRÖßER.
'(It is not the case that Adam is small.) But Berta is still taller.'

² For ease of presentation, comparative *noch* will be marked by caps (NOCH) in the rest of the paper, which is not meant to exclude unstressed occurrences.

This suggests that the comparative use of *noch* is an instance of the additive reading.³ But what does it mean to "add another comparison", and why does it (in some contexts) trigger norm-relatedness? We will come back to these question in section 4.

3 The meaning of *noch*

The discussion of the meaning of *noch* in the literature has mainly been focused on the question of whether *noch/still* and *schon/already* are duals related by inner and outer negation, cf. Löbner (1989). Since the relation between *noch* and *schon* is irrelevant in this paper – comparative *noch* does not have a *schon* counterpart – we need not go into the problem of duality. It is commonly assumed that temporal and non-temporal uses of *noch/still* differ only with respect to the scale they make use of and presuppose the existence of an additional element ranked lower than the associated constituent.⁴ For example, *It is still raining* presupposes a time t_i immediately preceding the reference time such that it is raining at t_i . The existence of an additional element has often led to the idea that *noch/still* is in general additive. König (1991), for example, argues that *noch* is both additive ('adding up to a larger whole') and scalar ('ranking elements along a scale'). Similarly, Ippolito (2007) claims for the temporal as well as the marginality reading of English *still* that they are additive ('presupposing an additional item') relating to the scale of times and degrees, respectively. While it seems plausible that the readings of *noch/still* differ only with respect to the underlying scale, the nature of the non-temporal scales is rarely discussed. Employing degrees in the case of marginality, as suggested by Ippolito, raises the question of which degrees are employed if the associated constituent is not gradable.⁵ Obviously we have to make use of degrees of membership or prototypicality (cf. Kamp & Partee 1995). More vitally, if *noch/still* is always additive, what distinguishes the genuine additive reading

³ It has been suggested by one of the referees that comparative *noch* is scalar instead of additive, where *scalar* refers to the scale of likeliness. This suggests itself from the point of view of the English translations which often use *even* instead of *still*. But if comparative *noch* were scalar in the sense of likeliness, it should be equivalent to German *sogar* ('even'), which can't be true since it yields different entailments. For example, while *noch* in (i) triggers the entailment that the old web pages have been customer-friendly, substituting *sogar* for *noch* would entail that it is unlikely that the new web pages are more customer-friendly than the old ones, cf. (ii), which is clearly not intended. If you assume that any use of *noch* is scalar in presupposing an order relation, the comparative use of *noch* is, of course, scalar in addition to being additive.

- (i) (A company praising their new web pages)
Unsere neuen Webseiten sind noch kundenorientierter.
'Our new web pages are still more customer-friendly.'
- (ii) Unsere neuen Webseiten sind sogar kundenorientierter.
'Our new web pages are even more customer-friendly.'

⁴ It is also agreed that *noch* triggers a conversational implicature about, in the case of the temporal interpretation, the future. Krifka (2000) offers a convincing account of how the implicature is induced by the alternative set triggered by *noch*.

⁵ Ippolito (2007) considers only marginality readings of *still* involving gradable adjectives, like *Compact cars are still safe; subcompacts start to get dangerous*.

(cf. the schnaps example in (7)) from the other uses, and what is the underlying scale in this case? We will go into these questions at the end of section 4.

3.1 The proposal in König (1977)

König (1977) seems to be the only account in the literature including the comparative use of *noch*. König distinguishes between temporal and non-temporal uses and proposes the truth conditions presented in (12) and (13) (in a slightly adapted manner). The basic idea is that *noch* imposes an existential presupposition about an additional element – time point or individual – ranked lower on a scale. In the temporal case, *noch* combines with a sentence and presupposes a time point preceding the reference time such that the proposition is true at that time. In the non-temporal case *noch* combines with an individual and a predicate. The presupposition requires that there is an additional individual ranked lower according to an order on individuals, such that the predicate applies to this individual.

(12) temporal

noch (t_i, Φ)	assertion	$\Phi(t_i)$
	presupp.	$\exists t_j (j < i)$ such that for all $t_k (j \leq k \leq i) \Phi(t_k)$

(13) non-temporal

noch ($a, \lambda x.P(x)$)	assertion	$P(a)$
	presupp.	$\exists y. y \neq a \ \& \ (y < a) \ \& \ P(y)$

Applying the temporal interpretation is straightforward. Applying the non-temporal interpretation raises the question of how to determine the order of individuals, which is left unspecified in König's proposal. Let us assume that it is provided by the degree of marginality – or inverse prototypicality – of an individual with respect to a given predicate. In (14), for example, the order is taken to be the order of being marginal in Lower Saxony ($<_{\text{marg_in_LS}}$).

(14) a. Osnabrück liegt (gerade) noch in Niedersachsen.
'Osnabrück is still in Lower Saxony.'

b. noch(osna, $\lambda x.inLS(x)$)
 assertion inLS (osna)
 presupp. $\exists y. y \neq osna \ \& \ (y <_{\text{marg_in_LS}} osna) \ \& \ inLS(y)$

Before going into König's proposal for the comparative use of *noch*, we will consider the case of genuine marginality combined with a comparative form, cf. (15). The associated predicate in (15) is *being-taller-than-Adam* (for short: *taller-Adam*). How to spell out the marginality order of this predicate? Let us assume that an individual y is less marginal than an individual x in *taller-Adam* if y exceeds Adam's height by a larger span than x , cf. (15c). This order of marginality yields the intended

interpretation, that is, the presupposition that there is an individual which is taller than Adam and taller than Berta, cf. (15d).

- (15) a. Berta ist (gerade) noch größer als Adam.
'Berta is still taller than Adam.'
- b. noch (berta, λx . taller-adam(x))
assertion taller-adam(berta)
presupp. $\exists y. y \neq \text{berta} \ \& \ (y <_{\text{marg_in_taller-adam}} \text{berta}) \ \& \ \text{taller-adam}(y)$
- c. $(y <_{\text{marg_in_taller-adam}} x)$ iff $(x \text{ taller adam}) \ \& \ (y \text{ taller } x)$
- d. $\text{adam} <_{\text{height}} \text{berta} <_{\text{height}} y$

Following König (1977), the comparative use of *noch* is a special case of marginality. That is, (16a) is understood as expressing that Adam is such that Berta is marginally taller than Adam. Compared to the genuine marginality case in (15) the roles of the participants are reversed: While in (15) the associated predicate is *being-taller-than-Adam*, in (16) it is taken to be *being-such-that-Berta-is-taller* (for short: *Berta-taller*). As before, König does not spell out the marginality order. So what would be a less marginal case of *Berta-taller*? Obviously, an individual y is less marginal than an individual x in *Berta-taller* if it falls below Berta's height by a larger span than x , cf. (16c). This yields the correct requirement that the presupposed individual is smaller than Adam and smaller than Berta, cf. (16d).

- (16) a. Berta ist NOCH größer als Adam.
'Berta is still taller than Adam.'
- b. noch (adam, λx . berta-taller(x))
assertion berta-taller (adam)
presupp. $\exists y. y \neq \text{adam} \ \& \ (y <_{\text{marg_in_berta-taller}} \text{adam}) \ \& \ \text{berta-taller}(y)$
- c. $(y <_{\text{marg_in_berta-taller}} x)$ iff $(\text{berta is taller than } x) \ \& \ (x \text{ is taller than } y)$
- d. $y <_{\text{height}} \text{adam} <_{\text{height}} \text{berta}$

Tracing back the comparative use of *noch* to a particular marginality reading is a truly elegant solution. And, provided that the marginality order is defined as above, it gives the correct results. But as it stands, it does not explain the finding we started out from, that is, the fact that the comparative use of *noch* may make the comparative form norm-related. König briefly mentions a second comparison. But he does not comment on the problem of norm-relatedness. More importantly, there is no hint on how to derive the proposed interpretation in a compositional way. Why should it be licensed to reverse the roles of the participants and take a sentence like (16a) to be about the comparison base? Is it just a trick giving correct results by mere chance?

3.2 How to license role reversal

The puzzle of how to license the reversal of participants in König's analysis of comparative *noch* is easily solved by assuming the syntactic structures in (17) and (18).⁶ While in the genuine marginality case *noch* combines with a DegP including the comparison base, in the comparative reading it combines with an AP. Let us assume that the presupposition triggered by *noch* is composed compositionally and is linked to the outer most argument of the function given by the associated constituent. Then, in the marginality case, the presupposition relates to the predicate *being-taller-than-Adam*, whereas in the comparative case it relates to the predicate *being-such-that-someone-is-taller*, cf. (17c) and (18c). When combined with the remaining arguments we get presuppositions at the sentence level exhibiting the "role reversal" we found in König's original proposal.

- (17) a. Berta ist (gerade) noch größer als Adam.
'Berta is still taller than Adam.'
- b. [CP Berta [VP ist [DegP **noch** [DegP [AP**größer**] [als Adam]]]]]
- c. *noch* (λx . taller-adam(x)):
 assertion λx . taller-adam(x)
 presupp. λx . $\exists z$. $z \neq x$ & ($z <_{\text{marg_in_taller-adam}} x$) & taller-adam(z)
- (18) a. Berta ist NOCH größer als Adam.
'Berta is still taller than Adam.'
- b. [CP Berta [VP ist [DegP [AP **noch** [AP **größer**]]] [als Adam]]]
- c. *noch* ($\lambda y \lambda x$. x taller y):
 assertion $\lambda y \lambda x$. x taller y
 presupp. $\lambda y \lambda x$. $\exists z$. $z \neq y$ & ($z <_{\text{marg_in_x-is-taller}} y$) & (x taller z)

According to the analyses above, the reversal of roles in the interpretation is just the outcome of different syntactic structures. Assuming the structure in (18) König's interpretation of comparative *noch* is fully justified. Still, it does not answer the initial question of why the comparative may trigger norm-relatedness when combined with comparative *noch*. And it does not explain why the comparative use patterns with the additive reading of *noch*.

⁶ Many thanks to my colleague Stefan Evert for pointing that out to me.

4 The interpretation of comparative *noch*

It has been argued in section 2 that the comparative use of *noch* is just the additive reading of *noch* combined with comparatives, which is intuitively plausible assuming that the addition consists in another comparison and, as a result, in an additional span of height. In König (1977), on the other hand, the comparative use of *noch* is analyzed as a marginality reading with "reversed roles", which yields the correct predictions but does not account for the norm-relatedness effect.

In this section, it will first be shown that the comparative use of *noch* is anaphoric. The problem of norm-relatedness will turn out to be a consequence of anaphoricity. An interpretation of comparative *noch* will be proposed that takes anaphoricity into account. Finally, we will come back to the question of why the comparative reading appears to be an instance of the additive reading.

4.1 Contexts

There are basically three types of contexts of the comparative use of *noch*: The sentence containing comparative *noch* may (i) be preceded by a sentence containing the same comparative form, or (ii) be preceded by a sentence containing the positive form or its antonym, or (iii) occur 'out of the blue'. The first type of context is shown in (19a,b). The preceding sentence expresses a comparison between the comparison base of the *noch* comparative (i.e. the comparative combined with *noch*) and a third person or a measure phrase. The second type of context is shown in (20a,b). The preceding sentence either ascribes the positive form of the adjective to the comparison base of the *noch* comparative, or it denies the positive form of the antonym. In the third type of context there is no preceding sentence involving the adjective in question, cf. (21).⁷

(19) a. Adam ist größer als Chris. Aber Berta ist NOCH größer (als Adam).
'Adam is taller than Chris. But Berta is still taller (than Adam).'

b. Adam ist größer als 1,80m. Aber Berta ist NOCH größer (als Adam).
'Adam is taller than 1,80m. But Berta is still taller (than Adam).'

(20) a. Adam ist groß. Aber Berta ist NOCH größer (als Adam).
'Adam is tall. But Berta is still taller (than Adam).'

b. Adam ist nicht klein. Aber Berta ist NOCH größer (als Adam).
'Adam is not small. But Berta is still taller (than Adam).'

(21) Berta ist NOCH größer als Adam.
'Berta is still taller than Adam.'

⁷ There are other contexts licensing comparative *noch*, which are taken to be subsumed by the above classification, e.g. *Adam ist so groß wie Chris*. ('Adam is as tall as Chris.') and *Adam ist ein Riese*. ('Adam is a giant.')

Following, e.g., Bierwisch (1989), the unmodified positive form of an adjective relates to a contextually given standard of comparison (what we called 'norm' in the introduction). Thus a statement involving the positive form is traced back to a comparative statement. As a result, the antecedent sentences in (20a,b) express comparative statements – in (a) Adam exceeds the norm of tallness (given by the comparison class), while in (b) he falls short of the norm of smallness. Thus, (19) as well as (20) express statements of the form "Adam is taller than degree *d*, and Berta is taller than Adam".

Now consider norm-relatedness: Neither (19a,b) nor (20b) entail that Berta is taller than the norm. Norm-relatedness is only entailed in the example in (20a), where the antecedent comparison involves the positive form of the same adjective. This suggests that the use of comparative *noch* triggers norm-relatedness, if and only if the comparison base of the antecedent statement is given by the norm of the adjective in the *noch* comparative. Norm-relatedness is not entailed if the comparison base of the antecedent is given by a third individual's height or a measure phrase, as in (19a,b), and if the comparison base of the antecedent is given by a different norm, as in (20b) (if someone is not small, he need not be tall).

Coming back to the third type of contexts, as shown in (21): Although there is no overt antecedent, the sentence clearly entails that Adam and Berta are tall. This suggests an analysis analogous to (20a), while accommodating the antecedent. The accommodated antecedent will be composed out of the comparison base of the *noch* comparative and the norm of the adjective (with respect to the comparison class), that is in (21): Adam is taller than the tallness norm.⁸

Accordingly, *noch* comparatives without overt antecedent mostly contain an explicit comparison base, and if they don't, reconstruction is straightforward. The sentence in (22), for example, is preferably interpreted such that the new web pages are more customer-friendly and informative than the old ones, and it clearly entails that the old ones were customer-friendly and informative.

(22) Unsere neuen Webseiten sind noch kundenorientierter und informativer.

'Our new web pages are still more customer-friendly and informative'

So finally, the finding that *noch* combined with comparatives entails norm-relatedness in some but not all contexts turns out to be a consequence of the fact that comparative *noch* is anaphoric requiring an antecedent comparison. The contexts triggering norm-relatedness are those where the antecedent comparison is related to the norm of the adjective of the *noch* comparative.

⁸ It is important to note that the accommodated proposition is not an existential one, which would be trivially satisfied, but instead is about the comparison base of the *noch* comparative. Accommodation of mere existential propositions is a well-known problem for analyses of *auch* ('also/'too') leading to the insight that particles do not allow for accommodation (of existential propositions), cf. Zeevat (2003).

4.2 Semantics

The examination of contexts revealed that the comparative use of *noch* is anaphoric relating to a preceding comparison. The subject of the antecedent comparison is identical to the comparison base of the *noch* comparative, and the comparison base of the antecedent comparison may be given by a third individual or a measure phrase or – if the preceding sentence contains an unmodified positive – a contextually determined standard of comparison, i.e. norm value.

Comparing the proposal in König (1977) with these findings there are two major shortcomings. König's presupposition requires the existence of an additional individual satisfying the associated predicate. But what we find is anaphoricity instead of mere existence, and the antecedent is not an individual but a comparison – a pair in a degree relation – such that the first element is equal to the degree of the comparison base of the *noch* comparative.

Since *noch* is known to be a focus particle, a satisfactory interpretation would have to be spelled out in a focus semantic framework (cf. Krifka 2000). Due to limitations of space we will not go into focus semantics in this paper, and instead base the interpretation on the notions of presupposition and anaphor. Following, e.g., Kennedy & McNally (2005), gradable adjectives denote relations between individuals and degrees and come with measure functions mapping their arguments onto the scale associated with the adjective. The adjective *groß* ('tall') thus denotes a relation between an individual x and a degree of height d such that the height of x is at least d , cf. (23a). For comparative forms, the degree argument picks up the degree of the comparison base, cf. (23c), and for positive forms the degree argument is bound by a contextually determined standard degree of tallness depending on the comparison class, $d_{S\text{-tall}}$, cf. (23d) ($d_{S\text{-tall}}$ is regarded as a free variable to be bound by the context).

- (23) a. $[[[A \textit{groß}]]] = \lambda d \lambda x. \textit{ht}(x) \geq d$
 b. $[[[AP \textit{größer}]]] = \lambda y \lambda x. \textit{ht}(x) > \textit{ht}(y)$
 c. $[[[DegP \textit{größer als Adam}]]] = \lambda x. \textit{ht}(x) > \textit{ht}(\textit{adam})$
 d. $[[[DegP \textit{groß}]]] = \lambda x. \textit{ht}(x) \geq d_{S\text{-tall}}$

The interpretation of comparative *noch* is spelled out in (24). Following the *presupposition-as-anaphors* paradigm (cf. van der Sandt 1992) the comparison anaphor is formulated as a presupposition (underlined). It is of the form $\textit{ht}(y) > d$, where y will be instantiated by the comparison base of the *noch*-comparative, and d is a free variable to be bound by the antecedent comparison.⁹

- (24) $[[[AP \textit{noch} [AP \textit{größer}]]]] = \lambda y \lambda x. : \underline{\textit{ht}(y) > d}. \textit{ht}(x) > \textit{ht}(y)$

Applying the interpretation in (24) to the example in (25a) yields the sentence representation in (25b). When updating the sentence (i.e. merging it with the previous

⁹ For ease of presentation " $>$ " will be taken to subsume " \geq " in (24)-(26) as a special case.

discourse, cf. Kamp & Reyle 1993) the presupposed part has to be bound to a suitable antecedent. A suitable antecedent will be one of (26a-d) (cf. the examples in (19) and (20)). Binding the comparison anaphor to one of these antecedents will result in binding the free variable *d* to one of the following degrees: *ht(chris)*, *1,80m*, *d_{S-tall}*, *d_{S-small}*. As a result, it will be entailed that Berta is taller than Chris, or taller than 1,80m, or taller than the tall-standard or the small-standard. Thus only the antecedent in (26c) triggers the entailment that Berta is tall, which is exactly what we want.

- (25) a. Berta ist NOCH größer als Adam.
'Berta is still taller than Adam.'
- b. ht(adam) > d. ht(bertha) > ht(adam)
- (26) a. ht(adam) > ht(chris) 'Adam is taller than Chris.'
b. ht(adam) > 1,80m 'Adam is taller than 1,80m.'
c. ht(adam) > d_{S-tall} 'Adam is tall.'
d. ht(adam) > d_{S-small} 'Adam is not small.'

The analysis of comparative *noch* as requiring an antecedent comparison explains the initial puzzle about its norm-relatedness in some but not all contexts: Norm-relatedness is a consequence of the nature of the antecedent. But although the interpretation of comparative *noch* in (24) yields the correct results, there seems to be something missing when comparing it to the proposal in König (1977): Where is the order – of time or marginality – which is commonly regarded as essential for the meaning of *noch*?

4.3 Additivity of comparative *noch*

In contrast to the additive particle *auch* ('also') additive *noch* has mainly been ignored in the literature (apart from Nesterstigt 2003, who focuses on language acquisition). It will be argued in Umbach (in prep.) that additive *noch* – like *auch* – is always anaphoric. Thus the additional item has to be previously mentioned. The difference between the stressed and the unstressed variant (cf. the example in (7)) is accounted for by deaccenting requirements in the case of type-identical antecedents. The difference between additive *auch* and additive *noch* is attributed to the fact that additive *noch* – unlike *auch* – relates to a scale, as do the temporal and the marginality readings of *noch*. While temporal *noch* relates to the order of time and marginality *noch* relates to the order of (inverse) prototypicality, additive *noch* simply relates to the order of mentioning. The order of mentioning is, however, frequently aligned with a contextually given 'semantic' scale, for example, time in narratives.

Comparative *noch* requires an antecedent. This is what makes it additive. The related scale is, first of all, to the order of mentioning. But the order of mentioning is aligned to the order of degrees given by the adjective of the *noch*-comparative such that the latter preserves the former: If comparison1 one precedes comparison2 in mentioning,

the comparison subject of comparison1 has to precede the comparison subject and the comparison base of comparison2 with respect to the order of degrees. For example, the sequence in (27a) yields the order of mentioning of the comparison statements in (27b) which is preserved by the order of height, cf. (27c). This finally explains why for comparative *noch* the antecedent has to be such that its comparison subject is identical to comparison base of the *noch*-comparative. If it were the other way around, as shown in (27d), structure preserving alignment would not be possible.

- (27) a. Adam ist größer als Chris. Berta ist NOCH größer als Adam.
'Adam is taller than Chris. Berta is still taller.'
- b. (Adam >_{height} Chris) <_{mention} (Berta >_{height} Adam)
- c. Chris <_{height} Adam <_{height} Berta
- d. # Chris ist größer als Adam. Berta ist NOCH größer als Adam.
'Chris is taller than Adam. Berta is still taller.'

Unlike additive *noch*, the additive particle *auch* does not relate to an underlying order. The order of mentioning, though trivially given, is not aligned with the order of the degree scale when *auch* is associated with a gradable adjective. So we find the sequence in (28a) where Berta may be taller than Adam or vice versa. And we even find sequences employing different adjectives relating to different scales of degree, cf. (28b).

- (28) a. Adam ist größer als Chris. Berta ist AUCH größer als Chris.
'Adam is taller than Chris. Berta is also taller.'
- b. Berta ist stärker als Adam. Sie ist auch größer.
'Berta is stronger than Adam. She is also taller.'

To conclude, the particle *noch* is commonly agreed to be scalar. At the same time it is said to be additive because it presupposes the existence of an element ranked lower than the one associated with *noch*. This conception of additivity, however, fails to characterize the genuinely additive reading of *noch* (which is, in fact, excluded in König 1977).¹⁰ Viewing additive *noch* as anaphoric relating to the order of mention supports the idea that all uses of *noch* are scalar, while distinguishing the additive reading from the temporal and the marginality reading. Moreover, the comparative use of *noch* is subsumed as a particular instance of the additive reading relating primarily to the order of mention and secondarily to the order of degrees given by the adjective.

¹⁰ Ippolito (2007), while maintaining the idea that English *still* is always additive, does not come across the problem of genuine additivity because English *still* does not have that reading.

5 Conclusion

The problem we started out from in this paper was the problem of norm-relatedness: In some but not all contexts the comparative use of *noch* triggers norm-relatedness, which is at odds with the fact that comparatives in general are not norm-related. A closer examination revealed that comparative *noch* is anaphoric relating to an antecedent comparison. An interpretation of comparative *noch* has been proposed which accounts for anaphoricity. The puzzle of norm-relatedness is explained by the nature of antecedents: Norm-relatedness is entailed if and only if the antecedent comparison is norm-related.

There are many open questions. Although the particle *noch* is undoubtedly focus-sensitive, the semantics of *noch* suggested in this paper has not been spelled out in a focus-semantic framework. The main obstacle is the fact that comparative *noch*, like additive *noch* in general, may carry an accent. It is unclear, however, how to interpret this accent: Is it a focus? If so, what are the alternatives? Unfortunately, an interpretation along the lines of Krifka's (1999) account of stressed *auch* is not viable because the associated constituent is the same for the unstressed and the stressed version of additive *noch*. The problem will be taken up in Umbach (in prep.).

Taking focus-sensitivity into account, it suggests itself to rephrase the present interpretation of comparative *noch* analogous to Krifka's (2000) proposal for temporal *noch*, where alternatives are ordered. The ordering yields a surprisingly simple explanation for the implicatures triggered by temporal as well as marginality *noch* (for example, *It is still raining* implicates that it might stop soon). But there are no such implicatures in the case of comparative *noch*. Why is that?

Another open issue is the relation of comparative *noch* to the scalar particle *sogar* ('even'). It has been argued that comparative *noch* does not relate to the scale of likeliness, since it cannot be substituted by *sogar* (cf. footnote 4). On the other hand, comparative *noch* is frequently translated into English by *even* indicating that the scale of likeliness must be close in some sense to the scale of degrees.

The meaning of *noch* is just one side of *noch* comparatives, the other one being gradability. Although the norm-relatedness of the *noch* comparative turned out to be harmless from the point of view of the semantics of gradability, it gives rise to subsequent questions. How to explain, for example, that with evaluative adjectives *noch* comparatives seem preferred to unmodified comparatives, the latter triggering a negative implicature? In (29) the (a)-example, but not the (b)-example, entails norm-relatedness, which has been discussed in this paper. But in addition, the latter but not the former gives rise to the implicature that the paintings are not impressive. What does that predict for the structure of evaluative adjectives?

(29) (about an art exhibition)

- a. Die Foto sind NOCH beeindruckender als die Bilder.
'The photos are still more impressive than the paintings.'
- b. Die Foto sind beeindruckender als die Bilder.
'The photos are more impressive than the paintings.'

In general, it would be interesting to investigate absolute adjectives like *voll* ('full') in *noch* comparatives, since they make use of the maximum of the scale instead of a contextually given threshold (cf. Kennedy & McNally 2005). What does it mean to be *NOCH voller* if *voll* is maximum standard?

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References

- Bierwisch, Manfred (1989) The semantics of gradation. In M. Bierwisch & E. Lang (eds) *Dimensional adjectives*. Springer, Berlin, 71–262.
- Ippolito, Michela (2007) On the meaning of some focus-sensitive particles. *Natural Language Semantics* **1**, 1–34.
- Kamp, Hans & Barbara Partee (1995) Prototype theory and compositionality. *Cognition* **57**, 129–191.
- Kamp, Hans & Uwe Reyle (1993) *From Discourse to Logic*. Kluwer, Dordrecht.
- Kennedy, Christopher & Louise McNally (2005) Scale Structure, Degree Modification, and the Semantics of Gradable Predicates. *Language* **81**, 345–381.
- König, Ekkehard (1977) Temporal and non-temporal uses of *noch* and *schon* in German. *Linguistics & Philosophy* **1**, 173–198.
- König, Ekkehard (1991) The Meaning of Focus Particles. *A Comparative Perspective*. Routledge, London, New York.
- Krifka, Manfred (1999). Additive particles under stress. In D. Strolovitch & A. Lawson (Eds.), *Proceedings of SALT 8*. Ithaca, NY: CLC Publications, 111–128.
- Krifka, M. (2000). *Alternatives for aspectual particles: Semantics of still and already*. Paper presented at the Berkeley Linguistics Society, February 2000.
- Löbner, Sebastian (1989) German *schon* - *erst* - *noch*: An Integrated Analysis. *Linguistics & Philosophy* **12**, 167–212.
- Nederstigt, Ulrike (2003) *Auch and noch in child and adult German*. Mouton de Gruyter, Berlin.

van der Sandt, Rob 1992: Presupposition projection as anaphora resolution. *Journal of Semantics* **9**, 333-377.

Varnhorn, Beate (1993) *Adjektive und Komparation*. Narr, Tübingen.

Umbach, C. (in prep.) *Another additive particle under stress: German additive NOCH*.

Zeevat, Henk (2003) Particles: presupposition triggers, context markers or speech act markers. In Blutner & Zeevat (eds.) *Optimality Theory and Pragmatics*. Palgrave-McMillan 2003.