

# A typed account of adverbial quantifiers

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## Abstract

The paper presents a *constructional* treatment of quantification and argues that quantification essentially is an agreement phenomenon. The distribution of quantifiers and related adverb classes almost falls directly out of this treatment (linking is a lexical hypothesis or inferred). Some remaining observations about the distribution of quantifiers are explained on logical and non-grammatical grounds. In effect, no additional constructions or lexical redundancies are needed to explain the empirical facts.

## 1 Empirical data

### 1.1 Danish

This paper is concerned with a subset of adverbs at the locus of quantifiers, agent-oriented adverbs and manner adverbs. The quantifiers we are concerned with are often called *floaters* quantifiers, but for neutrality they are here referred to as adverbial quantifiers;<sup>1</sup> the agent-oriented adverbs are usually called subject-oriented adverbs, but it is evident from the data presented here that they are in fact agent-oriented. The adverbial quantifiers are either *light* or *heavy*, i.e. either they are just atomic lexemes, or they are somehow compounded or phrasal. A distinction is made later on between intersective and scopal adverbs, but for now this preliminary terminology suffices. The data presented here con-

<sup>1</sup>The class of adverbial quantifiers is usually more inclusive, e.g. it includes temporal quantifiers.

cerns representatives of four different adverbial subclasses in Danish:

|                             |                                    |
|-----------------------------|------------------------------------|
| light adverbial quantifiers | <i>alle</i> ('all')                |
| heavy adverbial quantifiers | <i>allesammen</i> ('all together') |
| manner adverbs              | <i>sammen</i> ('together')         |
| agent-oriented adverbs      | <i>gladeligt</i> ('happily')       |

In Danish, adverbs occur in both the *Mittelfeld* and the *Nachfeld*. In this section, we test the distribution of the four adverbial classes. In addition, it is investigated if constituents of those classes in certain positions link to agents, subjects or objects. Finally, it is relevant to test if they are event-modifying. Distribution is easily tested, whereas the orientation of adverbs is tested by the entailments of appropriate passive constructions, and whether adverbs are event-modifying is tested by entailments of conjunctions. Consider first the distributional data:

- (1) *pingvinerne spiller alle badminton om*  
penguins.the play all badminton in  
*eftermiddagen*  
afternoon.the  
'all the penguins play badminton in the afternoon'
- (2) \**pingvinerne spiller badminton om eftermiddagen*  
penguins.the play badminton in afternoon.the  
*alle*  
all  
'all the penguins play badminton in the afternoon'
- (3) *pingvinerne spiller allesammen badminton om*  
penguins.the play all-together badminton in  
*eftermiddagen*  
afternoon.the  
'the penguins play badminton in the afternoon all together'
- (4) *pingvinerne spiller badminton om eftermiddagen*  
penguins.the play badminton in afternoon.the  
*allesammen*  
all-together  
'the penguins play badminton in the afternoon all together'
- (5) *pingvinerne spiller sammen badminton om*  
penguins.the play together badminton in  
*eftermiddagen*  
afternoon.the

- 'the penguins play badminton together in the afternoon'
- (6) *pingvinerne spiller badminton om eftermiddagen*  
 penguins.the play badminton in afternoon.the  
*sammen*  
 together  
 'the penguins play badminton together in the afternoon'
- (7) *pingvinerne spiller gladeligt badminton om*  
 penguins.the play happily badminton in  
*eftermiddagen*  
 afternoon.the  
 'the penguins happily play badminton in the afternoon'
- (8) *pingvinerne spiller badminton om eftermiddagen*  
 penguins.the play badminton in afternoon.the  
*gladeligt*  
 happily  
 'the penguins happily play badminton in the afternoon'

The adverbs which are grammatical in the *Nachfeld* can also precede the temporal adverb. Secondly, it is tested if the adverbs can be coindexed (in a loose sense) with the subject in a passive to see, if the adverbs are subject-oriented or agent-oriented.

- (9) *pingvinerne<sub>i</sub> blev alle<sub>i</sub> fodret*  
 penguins.the became all fed  
 'all the penguins were fed'
- (10) *pingvinerne<sub>i</sub> blev allesammen<sub>i</sub> fodret*  
 penguins.the became all-together fed  
 'the penguins were fed all together'
- (11) *pingvinerne<sub>i</sub> blev sammen<sub>i</sub> fodret*  
 penguins.the became together fed  
 'the penguins were fed together'
- (12) *\*pingvinerne<sub>i</sub> blev gladeligt<sub>i</sub> fodret*  
 penguins.the became happily fed  
 'the penguins were happily fed'

In the *Nachfeld* position, some adverbs can orient toward the object too:

- (13) *\*pingvinerne så isbjørnene<sub>i</sub> alle<sub>i</sub>*  
 penguins.the saw polar-bears.the  
 all-together  
 'the penguins saw the polar bears all together'
- (14) *pingvinerne så isbjørnene<sub>i</sub> allesammen<sub>i</sub>*  
 penguins.the saw polar-bears.the  
 all-together  
 'the penguins saw the polar bears all together'
- (15) *pingvinerne så isbjørnene<sub>i</sub> sammen<sub>i</sub>*  
 penguins.the saw polar-bears.the together  
 'the penguins saw the polar bears together'
- (16) *\*pingvinerne så isbjørnene<sub>i</sub> gladeligt<sub>i</sub>*  
 penguins.the saw polar-bears.the happily  
 'the penguins saw the polar bears happy'

If the object is pronominal, however, both light and heavy quantifiers can orient towards the object:

- (17) *pingvinerne så dem<sub>i</sub> alle<sub>i</sub>*  
 penguins.the saw them all  
 'the penguins saw all of them'
- (18) *pingvinerne så dem<sub>i</sub> allesammen<sub>i</sub>*  
 penguins.the saw polar-bears.the all-together  
 'the penguins saw them all together'

Conjunctions are used to tell if an adverb is event-modifying.

- (19) *pingvinerne går alle og synger*  
 penguins.the walk all and sing  
 'all the penguins walk and sing' → 'all the penguins sing'
- (20) *pingvinerne går allesammen og synger*  
 penguins.the walk all and sing  
 'the penguins walk all together and sing' → 'the penguins sing all together'
- (21) *pingvinerne går sammen og synger*  
 penguins.the walk together and sing  
 'the penguins walk together and sing' ↗ 'the penguins sing together'
- (22) *pingvinerne går gladeligt og synger*  
 penguins.the walk happily and sing  
 'all the penguins walk happily and sing' ↗ 'the penguins happily sing'

The inference in (22) is licensed if the adverb is substituted with a predicative adjective, since predicatives only modify sets of individuals. The results are summarized (pronominal object readings aside) in Figure 1.

## 1.2 Cross-linguistic data

In the cross-linguistic section, only the results are displayed, not the actual data. Native speakers were of course consulted. Only light and heavy quantifiers are included. See Figure 2-4.<sup>2</sup>

### 1.2.1 Other languages

Light quantifiers behave in similar ways across the language set. It is interesting that with respect to strong quantifiers the European languages seem to bundle into three classes, exemplified by Danish, English and Swedish. German behaves exactly like Swedish, while Bulgarian,

<sup>2</sup>The exact definition of *Mittelfeld* and *Nachfeld* in languages such as English and Romanian is ignored. The *Mittelfeld* in a standard SVO construction is below the subject and above the object, and *Nachfeld* is below the object. The terms are clearly not universals, but used here for abbreviation.

|                   | pronominal | <i>Mittelfeld</i> | <i>Nachfeld</i> | agent | subject | object | event |
|-------------------|------------|-------------------|-----------------|-------|---------|--------|-------|
| <i>alle</i>       | ✓          | ✓                 |                 |       | ✓       |        |       |
| <i>allesammen</i> | ✓          | ✓                 | ✓               |       | ✓       |        |       |
| <i>sammen</i>     |            | ✓                 | ✓               |       | ✓       |        | ✓     |
| <i>gladelig</i>   |            | ✓                 | ✓               | ✓     |         | ✓      | ✓     |

Figure 1: Danish

|                     | pronominal | <i>Mittelfeld</i> | <i>Nachfeld</i> | agent | subject | object | event |
|---------------------|------------|-------------------|-----------------|-------|---------|--------|-------|
| <i>all</i>          | ✓          | ✓                 |                 |       | ✓       |        |       |
| <i>all together</i> |            |                   | ✓               |       | ✓       | ✓      |       |

Figure 2: English

Danish, Norwegian Bokmål behaves in similar ways. In fact, if a blocking effect is assumed to prevent heavy quantifiers in French to appear as pronouns, French seems to group with Danish too. English seems to be the odd one out. Are there exceptions to this behavior in the European language families?

In Romanian SVO, quantifiers and the coindexed noun phrases agree in gender and number. Romanian also has a light quantifier that appears in both the *Mittelfeld* and the *Nachfeld*, and orients toward both the subject and the object. It is clear from languages outside the European language families that quantifiers are syntactically bound, not semantically. The observations presented here come from Donohue (2003). Palu’e has two adverbial quantifiers, for instance. One is a sentence-final quantifier which orients toward the subject or the object (core arguments). The second construction involves duplication of the head noun in question and insertion of a quantificational clitic. The quantifier then orients toward non-subjects (obliques or object).

Consider then the data from Tagalog. AV is “active voice”, while PV is “patient voice”.

- (23) *humuling lahat ng mga bata ang mga ina*  
 catch.AV all GEN PL child NOM PL mother  
 ‘all the mothers caught the children’
- (24) *hinuling lahat ng mga bata ang mga bata*  
 catch.PV all GEN PL mother NOM PL child  
 ‘the mothers caught all the children’

In Tagalog, the quantifier always orients toward the nominative (subject) argument. In Mandarin, the adverbial quantifiers also orient toward the subject, not the agent, but in addition, a topicalized noun phrase can also be in the restriction of the quantifier:

- (25) *nà-bian de shítáng lǎoshī dōu=[<sub>VP</sub> qù-guò]*  
 there-side GEN cafeteria teacher all=go  
 ‘the cafeterias over there, the teachers have been to all of them’

## 1.2.2 Summary

A relatively consistent pattern was observed in the European data set (the pronominal status of heavy quantifiers aside). Our solution to the English data is simple. The word *all together* is not really a quantifier, but a predicative adverb. It has all the properties of standard predicative adverbs. It is evident from the data of Donohue (2003) that the linking of adverbial quantifiers is syntactically specified (at a level where there is access to grammatical functions). On our analysis, this is different from agent-oriented adverbs.

## 2 Related work

Sportiche (1988) famously claims that adverbial quantifiers are in fact not adverbial, but are no different from pronominal quantifiers. They only appear adverbial because the noun phrase in question has moved. The quantifier is stranded with the original subject position, so to speak. Unfortunately, Sportiche does not formally define the principles of extraction that govern the stranding effect, but see Shlonsky (1991) for a supplementary account.

Some other analyses exist in the literature. Tsoulas (2002) analyzes adverbial quantifiers as some sort of scope markers. This view is partially adopted on our analysis. Rochman (2005) explains the distribution of adverbial quantifiers in terms of focus and prosody. Focus and prosody seem to be important aspects of the nature of adverbial quantifiers, but they will not be addressed here; in part for clarity of exposition,

|                      | pronominal | Mittelfeld | Nachfeld | agent | subject | object | event |
|----------------------|------------|------------|----------|-------|---------|--------|-------|
| <i>alle</i>          | ✓          | ✓          |          |       | ✓       |        |       |
| <i>alle zusammen</i> | ✓          | ✓          | ✓        |       | ✓       | ✓      |       |

Figure 3: German

|                    | pronominal | Mittelfeld | Nachfeld | agent | subject | object | event |
|--------------------|------------|------------|----------|-------|---------|--------|-------|
| <i>alla</i>        | ✓          | ✓          |          |       | ✓       |        |       |
| <i>allesammans</i> | ✓          | ✓          | ✓        |       | ✓       | ✓      |       |

Figure 4: Swedish

in part because our analysis is meant to have applications in natural language parsing.

## 2.1 Objections to stranding

- (i) No explanation for the limitations on the set of quantifiers that can occur adverbially is given.
- (ii) Adverbial quantifiers do not strand with the original subject position in passives, unaccusatives and transitives with overt accusative case checking.
- (iii) Stranding does not explain *wh*-trace restrictions.

The three objections are illustrated by corresponding data, respectively:

- (26) *\*pingvinerne blev mange fodret*  
 penguins.the were many fed  
 'many of the penguins were fed'
- (27) *\*pingvinerne blev fodret alle*  
 penguins.the became fed all  
 'the penguins were all fed'
- (28) *\*hvor sulten tror du pingvinerne alle var?*  
 how hungry think you penguins.the all were  
 'how hungry do you think all the penguins were?'

Generally, the analyses which rely on movement seem to be motivated, implicitly or explicitly (e.g. Sportiche, 1988), by the adjunct projection principle.

If some semantic type  $\alpha$  modifies some semantic type  $\beta$ , and  $\alpha$  and  $\beta$  are syntactically realized as  $a$  and  $b$ ,  $a$  is projected as adjacent either to  $b$  or to the head of  $b$ .

Unfortunately, this principle seems invalid in the case of adverbials. Consider, for instance, (47), discussed at the end of this paper. This adverbial is non-adjacent to the noun phrase in its restriction, it is clearly not stranded (it is a prototypical adverb), and it does not refer to the event, as is evident from:

- (29) *pingvinerne går uden undtagelse og synger*  
 penguins.the walk without exception and sing  
 'the penguins walk without exception and sing' → 'the penguins sing without exception'

## 2.2 Objections to adverbial analyses

Various researchers suggest to analyze adverbial quantifiers as proper subject-oriented adverbs. Unfortunately, the analogy is incomplete, as is evidenced by the data above. Subject-oriented adverbs are in fact agent-oriented, whereas adverbial quantifiers are truly subject-oriented.<sup>3</sup> Further evidence comes from impersonal passives (30-33) and *there*-sentences (34-35).

- (30) *der danses gladeligt*  
 there is.danced happily  
 'some dance happily'
- (31) *\*der danses alle*  
 there is.danced all  
 'everyone dances'
- (32) *der gives gladeligt gaver til pingvinerne*  
 there is.given happily presents to penguins.the  
 'some are happy to give presents to the penguins'
- (33) *\*der gives alle gaver til pingvinerne*  
 there is.given all presents to penguins.the  
 'everyone gives presents to the penguins'
- (34) *der løber gladeligt pingviner rundt på isen*  
 there run happily penguins round on ice.the  
 'penguins run happily around on the ice'
- (35) *\*der løber alle pingviner rundt på isen*  
 there run all penguins round on ice.the  
 'all penguins run happily around on the ice'

A second difference between quantifiers and adverbs is that quantifiers in some languages agree with the head noun in question, incl. Icelandic, Romanian and Tagalog. In addition, Sportiche (1988; and references cited therein) points out that there exists languages in which the distributions of adverbial quantifiers and adverbs do not overlap. In Moore, for instance, an adverbial quantifier may appear “between I and VP”, but no adverb may.

<sup>3</sup>This strictly holds for Danish. In English, subject-oriented adverbs seem to be ambiguous in the passive (Wyner, 1998).

Sag and Fodor (1994) argue that adverbial analyses more elegantly account for the ungrammaticality of (36):

(36) \*How satisfied do you think they were all?

On stranding analyses, this is explained by a rather complex interaction of various constraints, e.g. surface filters and traces. On an adverbial analysis, the ungrammaticality of (36) is the simple result of the fact that the quantifier has no constituents to its right to attach to. Certain dialects of English behave differently, though, e.g. West Ulster English (McCloskey, 2000):

(37) I can't remember what I said all.

The arguments against adverbial analyses are summarized:

- Adverbial quantifiers tend to be subject-oriented, whereas “subject-oriented” adverbs are really agent-oriented.
- Adverbial quantifiers agree with the head nouns in their restrictions. Adverbs don't.
- In certain languages, adverbial quantifiers and true adverbs have split distributions.
- How is the adverbial analyses to account for the West Ulster English data?

### 3 Distribution

#### 3.1 Word order

The word order of the Danish main clause can be pictorially represented (Diderichsen, 1946) as in Figure 5. “a\*” corresponds to our *Mittelfeld* position, and “A\*” corresponds to our *Nachfeld* position. The two positions constitute ordered sublists of adverbial classes (Nimb, 2004):

|    |  |                  |            |             |           |
|----|--|------------------|------------|-------------|-----------|
| a* |  | sent./free adv.  | neg. adv.  | manner adv. |           |
| A* |  | manner/free adv. | pred. adv. | bound adv.  | free adv. |

The adverbial quantifiers precede the manner adverbs in the *Mittelfeld* position, but they cannot precede the predicative adverbs in the *Nachfeld* position:

(38) *så har pingvinerne alligevel (alle) ikke*  
 then have penguins.the unexpectedly (all) not  
*(alle) velvilligt vist igloerne ordentligt*  
 (all) willingly presented iglos.the properly  
*frem for nogen*  
 forward to anyone  
 'unexpectedly, the penguins have then (all) not (all) willingly presented the iglos properly to anyone'

(39) \**så har pingvinerne alligevel ikke*  
 then have penguins.the unexpectedly not  
*velvilligt alle vist igloerne ordentligt*  
 willingly all presented iglos.the properly  
*frem for nogen*  
 forward to anyone

'unexpectedly, the penguins have then not all willingly presented the iglos properly to anyone'

(40) *så har pingvinerne alligevel ikke*  
 then have penguins.the unexpectedly not  
*velvilligt vist igloerne ordentligt frem for*  
 willingly presented iglos.the properly forward to  
*nogen begge to*  
 anyone both two

'unexpectedly, the penguins have then not both willingly presented the iglos properly to anyone'

(41) \**så har pingvinerne alligevel ikke*  
 then have penguins.the unexpectedly not  
*velvilligt vist igloerne ordentligt begge to*  
 willingly presented iglos.the properly both two  
*frem for nogen*  
 forward to anyone

'unexpectedly, the penguins have then not both willingly presented the iglos properly to anyone'

Note that the scope of adverbial quantifiers can interact with negation in the *Mittelfeld*.

#### 3.2 Logical properties

The quantifiers in Figure 6 roughly cover the fragment of quantifiers discussed in Barwise and Cooper (1981) and their translations in Danish:

The *Mittelfeld* position is restricted to the set of light logical and (positive) strong quantifiers. This makes perfect sense. In fact, the distribution can be explained on entirely (onto-)logical grounds. Consider the standard test for quantifier strength (Barwise and Cooper, 1981). If

(42) D N is a N/are Ns

is valid or contradictory for any noun N, D is a strong quantifier, but if the truth of (42) is contingent on the interpretation, then D is weak. This contingency is important in the processing of adverbial quantifiers. If postponed quantifiers suddenly make the interpretation of their coindexed noun phrases contingent on a specific interpretation, the parser and model generator is forced to backtrack. Consequently, the quantifiers in the *Mittelfeld* are restricted for logical and computational reasons. If this is a matter of strict grammaticality or soft preferences is not discussed here.

|             |  |      |              |            |                  |                  |       |
|-------------|--|------|--------------|------------|------------------|------------------|-------|
| word order  | $\begin{Bmatrix} N \\ A \end{Bmatrix}$ | v    | n            | a*         | V <sup>1,2</sup> | N <sup>1,2</sup> | A*    |
| example     | så                                     | har  | pingvinerne  | vist       | spillet          | badminton        | igen  |
| translation | then                                   | have | penguins.the | apparently | played           | badminton        | again |

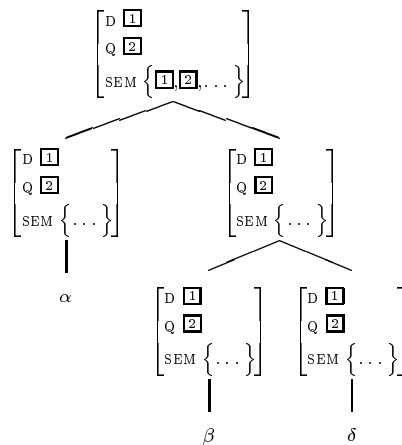
Figure 5: Word order

| quantifier         | translation          | logical | strenght | monotonic | weight |
|--------------------|----------------------|---------|----------|-----------|--------|
| nogen/en           | some/a               | yes     | w        | ↑         | l      |
| alle               | all                  | yes     | +s       | ↑         | l      |
| hver               | each                 | yes     | +s       | ↑         | l      |
| ingen              | no                   | yes     | w        | ↓         | l      |
| (mindst) 1,2,3,... | (at least) 1,2,3,... | yes     | w        | ↑         | h      |
| de(n) 1,2,3,...    | the 1,2,3,...        | yes     | +s       | ↑         | h      |
| begge              | both                 | yes     | +s       | ↑         | l      |
| de fleste          | most                 | no      | +s       | ↑         | l      |
| mange/adskillige   | many/several         | no      | +s       | ↑         | l      |
| få                 | few                  | no      | w        | ↓         | l      |
| denne/dette        | this/that            | no      | +s       | ↑         | l      |
| præcis 1,2,3,...   | exactly 1,2,3,...    | yes     | w        | -         | h      |
| højest 1,2,3,...   | at most 1,2,3,...    | yes     | w        | ↓         | h      |

Figure 6: Properties of Danish quantifiers.

## 4 Semantics

This section introduces a grammatical theory of the distribution of adverbial quantifiers and their compositional effects. Our claim is that all the relevant observations fall out as consequences of the theory. The major factor in our explanation is *agreement*. In part, this is based on earlier work. In [anonymized], determination and quantificational force are treated as agreement phenomena, i.e. the constituents of the prenominal field collectively determine the determination and quantification of the entire noun phrase, and the actual operator is then inserted at the maximal projection:



The second factor is the distinction between intersective and scopal modification.

### 4.1 Quantification as agreement

For a theory of determination, the revision of the (typed) “givenness hierarchy”, presented in Borthen and Haugereid (2006), is adopted. Crucially, the theory makes reference to any connected span of this list of determination values (DET) possible:

in focus (*it*) × activated (*this*) × familiar (*that*) × uniquely identified (*the*) × identified as type (*a*)

The domain of values of quantificational force is unimportant for our present purposes. The crucial idea for how we employ agreement of determination now is illustrated in Figure 7.

Our data tells us that adverbial quantifiers can only appear in nominal and adverbial positions, but cannot be topicalized.<sup>4</sup> The more detailed annotations of determination values ensure, for instance, that light quantifiers combine with pronominal objects. Consequently, the ungrammaticality of (13) falls out of disagreement.

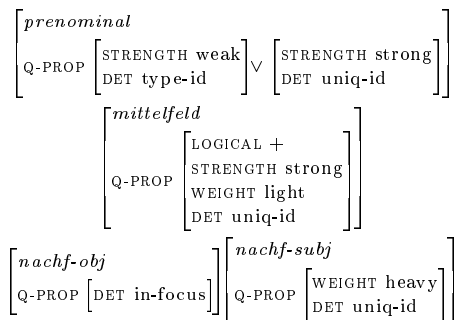
The intuition is then that the prenominal, the *Mittelfeld* and the two *Nachfeld* positions constrain the type of quantifiers which can appear in them. The quantifiers are lexically underspecified, except for specification of quantifier weight, but the context of the positions enforce the quantifiers to inherit the features of

<sup>4</sup>The  $\begin{Bmatrix} N \\ A \end{Bmatrix}$  position is also used for subjects. Of course the “ $\emptyset$ ” is not intended to exclude quantifiers in subject noun phrases.

|            |  |   |            |            |                  |                  |                   |                    |
|------------|--|---|------------|------------|------------------|------------------|-------------------|--------------------|
| word order | $\left\{ \begin{array}{c} N \\ A \end{array} \right\}$ | v | n          | a*         | V <sup>1,2</sup> | N <sup>1,2</sup> | A* <sub>OBJ</sub> | A* <sub>SUBJ</sub> |
| light q.   |  | ∅ | underspec. | underspec. |                  | underspec.       | in focus          | ∅                  |
| heavy q.   |  | ∅ | in focus   | underspec. |                  | in focus         | in focus          | underspec.         |

Figure 7: Quantificational force

the greatest lower bound of the contextual constraints and its own lexical specification.



If the reader cares about logical complexity, the disjunctions are unnecessary; everything can be enforced by type inference.

## 4.2 Intersective and scopal modification

### 4.2.1 Semantic index

The majority of adverbial quantifiers is oriented toward the subject. Coindexing is possible, if external arguments percolate to every branch of the tree. Such percolation is motivated by a large set of linguistic phenomena, incl. raising and binding. The use of the external argument for the compositional semantics of adverbial quantifiers is advocated by Yoo (2001:11):

The subject-oriented property of floating quantifiers is accounted for, since the index of the quantifier is related to that of the VP or AP subject.

The index of the *Mittelfeld* quantifier can uniformly be coindexed with the external argument. How is the ambiguity of the *Nachfeld* then accounted for? In the cross-linguistic section, it was seen that, in certain languages the object noun phrase can be the restriction of a *Nachfeld* quantifier, incl. German and Norwegian, while in others, incl. Bulgarian and Danish, only subject noun phrases can do this.

One obvious solution is to identify two positions, one for subject-oriented quantifiers and another for object-oriented quantifiers. This of

course seems cumbersome. It is motivated, however. (40-41) demonstrate how *Nachfeld* quantifiers apparently cannot precede predicative adverbs. In fact, this is only true for subject-oriented quantifiers. The converse holds for object-oriented ones.

- (43) *så har pingvinerne vist dem begge to*  
 then have penguins.the presented them both two  
*frem for nogen*  
 forward to someone  
 'the penguins have then presented them both to someone'

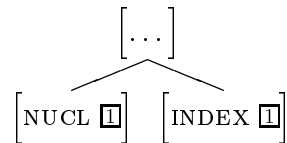
### 4.2.2 Nuclear scope

The *Mittelfeld* quantifiers interact with the scope of negation and modals, e.g.:

- (44) The penguins (all) can (all) play badminton?  
 (45) The penguins (all) do not (all) play badminton?

The quantifiers seem to outscope all operators introduced to its right. Consequently, a right branching analysis can be adopted, and the scope relation will correspond to c-command. The nuclear scope of the quantifier is simply its c-command domain.

If this is implemented in a typed theory, similar in feature geometry to the one introduced earlier, what we get is, roughly:



### 4.2.3 Intersective and scopal adverbs

Some adverbs are intersective while others are scopal. Consider the German example in (46) for evidence (adopted from Schäfer, 2004):

- (46) *Hans hat geschickt die Frage dumm*  
 Hans has skilfully the question stupidly  
*beantwortet*  
 answered  
 'Hans skilfully answered the question stupidly'

The distinction is used to explain agent- and subject-orientedness. Agent-orientedness falls out of being scopal. A scopal adverb has no

access to the external argument, but is only resolved by inference, when all grammatical information is lost. Some manner adverbs are scopal, others are intersective, while all quantifiers are of course non-modificational. An important distinction must be drawn among intersective adverbs. Our data shows that some adverbs refer to events, while others do not. Consequently, adverbs come at least in three logical types, namely,

$$\lambda x.P(x), \lambda x.e.P(e, x) \text{ and } \lambda Q.P(Q).$$

## 5 Conclusions

- Adverbial quantifiers are not stranded, nor adverbs, but they are simply base generated quantifiers which appear in the adverbial field to disambiguate content.
- The restricted set of adverbial quantifiers is explained on logical grounds. The only alternative explanation in the literature is that this is simply a lexical coincidence (see Yoo, 2001).
- The distinction between light and strong quantifiers and their determination properties explain the distributional differences between quantifiers such as *alle* and *allesammen* in Danish.
- The semantic properties of adverbial quantifiers and related adverbs fall out of the division into intersective and scopal ones.
- Adverbial quantifiers have three distinct positions in most languages, incl. Danish. A *Mittelfeld* position for subject-oriented quantifiers and two *Nachfeld* positions, one for subject-oriented quantifiers and one for object-oriented ones.

The adverbial quantifiers usually enforce a referential reading and bind their nuclear scope. Only a second order generic is also licensed. The discussion was omitted for brevity.

### 5.1 Complications

Kobuchi-Philip (2004), for instance, reminds us that *every* and *all* not only differ in their ability to function as entire noun phrases, but also in their distribution. The quantifier *every* has no adverbial appearances. The natural question to ask is if there is some connection here?

Consider also borderlines adverbials such as *uden undtagelse* ('without exception'):

- (47) *pingvinerne spiller badminton uden undtagelse*  
 penguins.the play badminton without exception  
 'the penguins play badminton without exception'

Their distributional paradigm includes all (table) fields except pronominal and event. One suggestion is that *uden undtagelse* is ambiguous between an intersective and a scopal reading.

A third challenge: In West Ulster English, adverbial quantifiers cannot appear to the right of adjuncts:

- (48) what did she buy (all) in Derry (\*all) yesterday (\*all)?

What is there to be said about the interaction of linearization effects and performance and scopal constraints? In Japanese, there are apparently no distributional restrictions on adverbial quantifiers. How is this reconciled with our logical considerations?

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