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Adverbs in unusual places*

Martin Schäfer

University of Jena

This article discusses adverbs in the post-head position of English and German noun phrases. It gives an overview of the relevant data and discusses possible category revisions for the items under discussion. While both languages show considerable overlap in the semantic functions served by the post-head modifiers, the result is often the existence of doublets adjective-noun noun-adverb without any apparent semantic distinction. One meaning distinction made in both languages via the variation between pre-head and post-head position is discussed in detail, namely pairs like *international organization* vs. *organization internationally*. It is argued that this semantic difference can be captured by treating the post-head modifiers as collective predicates and the attributive modifiers as singular predicates. Furthermore, it is shown that there is a link to a prototypical adverbial function of the items in post-head position. When appearing within subject NPs, their overall semantic contribution is similar to that of standard frame adverbials. This is shown to be an epiphenomenon of two quite different derivational paths.

1. Introduction

One common assumption concerning adverbs is that they are unable to modify nouns. Contrary to this assumption, they can sometimes occur in the post-head position of noun phrases, cf. the German example in (1) and the English example in (2).

- (1) der Kampf **gestern** ‘the fight yesterday’
- (2) health organizations **internationally**

In order to gain more insight into the relevant data and into the reasons for the existence of this construction, this article gives an overview of the English data,

* I thank the audience at the adverb-and-adverbial workshop in Bochum in September 2013 for comments on the material presented here. Further, I am deeply indebted to the comments of the anonymous reviewer. I hope that my revisions justify his or her trouble. Finally, I thank Christoph Rzymiski for his very helpful comments on two versions of this article.

compares the English data to corresponding German data, and specifically looks at the semantics of one set of examples that allows one to form minimal pairs via the placement of the modifier in pre-head vs. post-head position. I argue that for these minimal pairs, the variation in modifier placement corresponds semantically to whether the modifier is interpreted as a collective predicate or not. This in turn semantically often corresponds to the effect of standard frame adverbials, showing that these instances of the construction can be linked to prototypical usages of adverbs.

The paper is structured as follows: after the introduction, I discuss my understanding of the term adverb in section two. Section three presents the English data involving adverbs in post-head position, section four investigates the same phenomenon in German. Section five delves more deeply into the semantic analysis of those data that yield minimal pairs. The final section summarizes.

2. The word class ‘adverb’

Before examining adverbs in unusual places, it is necessary to clarify my understanding of the term ‘adverb’. The starting point of my considerations will be the approach of Maienborn and Schäfer (2011). In their view, the term ‘adverb’ refers to a word class or a lexical category.¹ In the following discussion, they single out two different kinds of criteria that can be used to distinguish members of the lexical class adverb from members of other categories: morphological criteria and usage-based criteria. I will discuss both of them in more detail here. As the focus of this paper is on English and German, the examples will also focus on these two languages.

2.1 The morphological criteria

According to Maienborn and Schäfer (2011: 1392), adverbs are typically characterized as not having any inflectional forms, allowing one to distinguish them from nouns, adjectives, and verbs, while prepositions likewise show no inflection.² In addition, so Maienborn and Schäfer (2011: 1392), while their missing inflection is

1. Here, I am using the two terms synonymously, following others like e.g. Sasse (1993). See Rauh (2010:2–4) for an eye-opening overview of the terminological murkiness that lies behind even these two seemingly innocent terms.

2. As far as the differentiation between adverbs and prepositions is concerned, Maienborn and Schäfer (2011) note that the latter differ from adverbs in having phrasal status. But see there for pointers to reductionist approaches analyzing adverbs as intransitive prepositions.

a good negative diagnostic, adverbs typically lack positive morphological characteristics. That is, there is often no clear morphological marker for the class adverb. English *again* and *soon* and their German translation equivalents, *wieder* and *bald*, are examples for such adverbs: they do not inflect, nor does their morphological form signal them as belonging to the class adverb. For many other lexemes, morphological criteria like missing inflection and having or not having a dedicated morphological form are not straightforwardly applicable. A notorious case in point are the English *-ly* forms. Either they are analyzed as adverbs, derived from adjectival bases with the help of the suffix *-ly*, or *-ly* is not analyzed as a derivational suffix but as an inflectional suffix. In this view, a form like *intelligently* is simply an inflected adjective. Both positions have found support in the literature, see Payne et al. (2010: 35–36) for a comprehensive overview of previous literature and the whole article for an argument in favor of *-ly* as a derivational suffix and Giegerich (2012) for a recent defense of the inflectional analysis. As the discussion in the next section will show, I follow Payne et al. (2010) in assuming *-ly* to be a derivational suffix.

2.2 Usage-based criteria

Different usage-based criteria have been proposed in the literature. Firstly, I discuss the criterion of prototypical adverbial usage from Maienborn and Schäfer (2011), secondly, I discuss the so-called complementarity claim as presented in Huddleston & Pullum et al. (2002), and finally, I discuss the conceptual-basis based approach of Payne et al. (2010). Maienborn & Schäfer (2011: 1391) state that “adverbs [...] often do not possess clear markers for category membership and can only be defined via their syntactic function of being prototypically used as adverbials.” Thus, successful identification of a form class as the word class ‘adverb’ presupposes a definition of adverbials, to which I now turn.

Adverbials, following Maienborn and Schäfer (2011: 1391), refer to a sentence-level syntactic function, that is, a function on a par with subject, object etc. In addition, Maienborn and Schäfer note that adverbials traditionally are perceived as specifying the circumstances of the verbal or sentential referent. Finally, they state that adverbials are semantically restricted to specific usages, prototypically specifying time, place, or manner. Accordingly, the bold-faced items in (3) are prototypical instances of adverbials.³

3. All example sentences in this article that are taken from a corpus are followed by a short identifier. See the appendix for the full sources and the corpora used (except for BNC examples).

- (3) a. They were winless **the year before** and had scored only three touchdowns **the whole year**. COCA-1
- b. I'm a photographer and some of my first photography classes were taught **in the park**. COCA-2
- c. Her thoughts ran **fast**. COCA-3

Maienborn and Schäfer (2011:1392) note further that “the prototypical adverbial is optional and corresponds syntactically to an adjunct.” Thus, take *awkwardly* in (4).

- (4) His chin tucked in, he fell **awkwardly** onto the slope of the mound, the angle and impact fracturing his neck. COCA-4

Awkwardly serves as an adverbial: it has a sentence-level function, and it is an instance of one of the prototypical usages of adverbials, further characterizing the verbal referent by specifying the manner of the falling-event.

Serving as an adverbial, however, turns out not to exclude a quite considerable set of usages. Again, the large group of English *-ly* adverbs can be used to illustrate this. *-ly* adverbs like *awkwardly* or *surprisingly* can also be used as modifiers of other adjectives or adverbs, cf. (5) and (6), respectively.

- (5) Usually, though, he covered the dining room table with **awkwardly** large charts and stacks of related papers and Mrs. Miyakoda would gently push the whole mass towards him to create a perimeter where we could set placemats and eat. COCA-5
- (6) Given the most cynical interpretation, although one that seems to be **surprisingly** widely held in New York, ‘those four beautiful books have become the most glamorous mail order catalogue in history.’ BNC A5R 200

As Maienborn and Schäfer (2011:1392) acknowledge, this type of usage is not covered by their definition, and they do not discuss how to handle cases like e.g. English *very*, which occurs in this usage but does not occur as an adverbial on its own.

The following claim covers these usages: “The words used to modify nouns are typically **adjectives**, and the words that similarly modify verbs are **adverbs**: [...] The primary syntactic distinction, therefore, is between adjectives, which modify only nouns, and adverbs, which modify all the other categories – verbs, adjectives, prepositions, determinatives, and other adverbs” Huddleston & Pullum et al. (2002:526). Payne et al. (2010:32) refer to this generalization as “the complementarity claim”, and I will adopt this term here.⁴ Note that this paper is actually

4. Payne et al. (2010:32) introduce this claim as consisting of a second part, concerning the generalization that only adjectives are permitted in complement function.

written by the same authors that wrote the noun phrase chapter containing the complementarity claim in Huddleston and Pullum et al. (2002), John Payne and Rodney Huddleston, joined by Geoffrey K. Pullum.⁵ All the adverb usages discussed in this section so far fall under this generalization.

However, Payne et al. (2010) show that their earlier complementarity claim does not hold, because there is a group of usages of lexical items that are morphologically adverbs and that are not covered by any of the characteristics discussed so far, because they appear in the post-head positions in noun phrases. A pertinent example is given in (7), their (19b).

- (7) During the early 1990s [a timber shortage **internationally**] led to an increase in timber prices and export opportunities for premium timber grades.

That is, *internationally* in (7) cannot be identified as an adverb, because it is neither used as an adverbial, nor does it fit the wider generalization of Huddleston and Pullum et al. (2002), since it modifies a noun.

If there are items that do not fit these criteria, why should we continue to consider them as adverbs? Here, I find the argumentation in Payne et al. (2010) extremely convincing. The most important point they make is that distribution alone is not enough to establish the correct category for a form like *internationally*. Rather, so they argue, one needs a clear conceptual basis for this kind of category assignment. In their argumentation, they combine these two aspects.

As far as distribution is concerned, they use two different environments, Det X N and Subj Y V, cf. Payne et al. (2010:37, example (9)), to establish the distributional cores of adjectives and adverbs, respectively. Thus, if a given lexeme can occur as a pre-head modifier of a noun, it belongs to the distributional core of adjectives, if it can occur as a pre-head modifier of a verb, it belongs to the distributional core of adverbs. As an additional distributional measure, they looked at the sixty most frequent adjectives and adverbs in the BNC (as tagged in the BNC, except for some small modifications, cf. Footnotes 21 and 22 in Payne et al. 2010:78).

As far as the conceptual basis for adverbs is concerned, Payne et al. (2010:65–72) establish it largely in contrast to the conceptual basis of adjectives. The general strategy for both groups follows Dixon's (2004 and earlier) typological argument, starting out with the identification of a core set of adverbs by looking at languages which have only a small category of adjectives, or adverbs, respectively. They use Palauan as a starting point, noting that items that plausibly can be identified as adverbs fall into the semantic classes DEGREE/FREQUENCY, DEGREE,

5. I have to thank the anonymous reviewer for this clarification.

FOCUSSING, ASPECTUAL, and MODAL. These semantic types are also the types that the textually most frequent adverbs from the BNC belong to.

In addition, the semantic types of the sixty most frequent adverbs in English are largely different from the semantic types of the sixty most frequent adjectives in English, and there is “at most a marginal overlap” between the tokens in the sets (Payne et al. 2010: 72).

Given all this, Payne et al. (2010: 72) conclude that there is enough evidence to assume that adverbs and adjectives are conceptually different word classes in English. “[...] where adjective/adverb pairs exist, the relationship should be thought of as a derivational one”.

If we circle back to the post-head modifiers in English, and restrict ourselves temporarily to the semantic types found by Payne et al. (2010: 48) in the BNC, we see that two types, temporal location and serial order, both occur in this position and as types of the core adverbs in English, cf. their Table 2 and the listing in Example (58). In addition, the items in question, *recently*, *immediately*, *initially*, *shortly*, and *again* are also part of the distributional core of adverbs, cf. (8), where they all occur in the Subj Y V environment.

- (8) a. The group **recently** opened a shop in Birmingham selling only crueltyfree products. BNC A17 464
- b. The Irish hierarchy **immediately** campaigned against what was for them a drastic solution. BNC A07 1301
- c. Disney **initially** claimed the vultures died while in a holding shed in which the ventilation system failed. BNC A28 545
- d. Leeds went ahead in the second half with a goal by Wallace but their period of domination **shortly** came to an end and Everton pressed hard before Cottee got the equaliser. BNC J1H 3303
- e. Chancellor Kohl **again** urged East Berlin not to isolate itself and to open the way for change. BNC A1V921

In contrast, none of the semantic types exhibited by the BNC post-head adverbs in their table five is overlapping with the semantic types of the core adjectives in English, cf. the listing in their example (57). Therefore, these items are best treated as adverbs. Note that this whole approach is not incompatible with the prototypical adverbial usage idea from Maienborn and Schäfer (2011). Rather, it can be seen as an attempt to spell out how one can establish and delineate a lexical category based on prototypicality, not on categorical decisions. Note also that in the environment that is chosen to establish the distributional core of adverbs, these adverbs all serve as adverbials.

The focus of this paper will be on the use of adverbs as post-head modifiers. I will first introduce the relevant English data in detail, and then turn to corresponding data from German.

3. The English data

The main sources for the discussion here will be Huddleston and Pullum et al. (2002) and Payne et al. (2010). I will first discuss data that is argued to not consist of adverbs, and then turn to data where clear cases of post-head usages of adverbs occur.

3.1 English data: 'yesterday', 'here', and the like

Perhaps the first kind of data which initially suggest we might have to allow adverbs to modify nouns in post-head position resembles the data in (9), cf. (6iii) in Huddleston & Pullum et al. (2002: 564) or (10).

- (9) Their behaviour **yesterday** was quite embarrassing.
 (10) The chair **here** is broken.

However, Huddleston and Pullum et al. (2002), in the context of defending their complementarity claim, convincingly argue that there is in fact an alternative way to analyze this data. More concretely, they distinguish the two cases in arguing that *yesterday* is a pronoun whereas *here* is an intransitive preposition.

The pronoun-argument runs as follows: Firstly, Huddleston and Pullum et al. (2002: 564) note that traditional grammar classifies an item like *yesterday* as either a noun or an adverb, depending on its function. In particular, in subject position it would be treated as a noun, cf. (11a), their (6i), but in (11b–c), their (6ii–iii), it would be treated as an adverb. Here and throughout, square brackets are used to indicate the edges of the relevant noun phrases.

- (11) a. **Yesterday** was the first day for weeks that it hasn't rained.
 b. They arrived **yesterday**.
 c. [Their behaviour **yesterday**] was quite embarrassing.

However, these different functions do not motivate a different categorization, especially since noun phrases can also function as adjuncts in clause structure. This is illustrated with *last week* and *the next day*, which function as temporal adverbials in (12) but as subjects in (13).

- (12) a. She read a reporter an e-mail she received **last week**.
 COCA-6
 b. **The next day** Spanier offered more details. COCA-7
 (13) a. **Last week** was hard. COCA-8
 b. **The next day** was similar to the day before. COCA-9

Secondly, Huddleston and Pullum et al. (2002: 564–5) argue that modifying a noun like *behaviour* in (11c) makes *yesterday* quite unlike an adverb, as they illustrate with the contrast between (14) and (15).

- (14) Their behaviour **yesterday** was quite embarrassing.
- (15) a. *Their behaviour **so badly** was quite embarrassing.
 b. Their behaving **so badly** was quite embarrassing.
 c. Their **bad** behaviour was quite embarrassing.

While *yesterday* can occur as the post-modifier of *behaviour* quite unproblematically, this is impossible for *so badly*. The difference between *yesterday* and *so badly* is then further highlighted by (a) the fact that only for *so badly* there is a sensitivity to whether the head of the NP has more of a verbal character and (b) only for *so badly* does a morphological alternative for the attributive position exist. As will become apparent when discussing more data below, this point in all its categorical strictness does not hold. However, a relativized version of the claim seems likely to be true, namely that an item like *yesterday* occurs in the post-head position with a considerably higher frequency than *-ly* adverbs.

The preposition-argument, again following Huddleston and Pullum et al. (2002), follows a different line of argumentation: Firstly, prepositional phrases can function as adjuncts, cf. (16).

- (16) President Nicolas Sarkozy announced the French deaths **in Paris** and the suspension of training programs. COCA-10

Secondly, there is no reason for prepositions not to be intransitive. And finally, items like *here* and *there* are available as a *be*-complement, in contrast to *-ly* adverbs, cf. (17) vs. the pair in (18).

- (17) The train is **here**.
- (18) a. The train is **visible**.
 b. *The train is **visibly**.

To classify *here* as a preposition also fits squarely with one of the prototypical usages of these items mentioned in their attempt at a general definition of the category, cf. (19), reproducing (9) in Huddleston & Pullum et al. (2002: 603).

- (19) preposition:
 a relatively closed grammatically distinct class of words whose most central members characteristically express spatial relations or serve to mark various syntactic functions and semantic roles.

Note that these tests give *-ly* adverbs a very privileged status. This seems justified by Huddleston and Pullum et al. (2002:5 65) finding that *de*-adjectival *-ly* forms constitute a very high proportion of all adverbs, and the following assessment in Payne et al. (2010: 73): “Most certainly its [the adverb category’s] most salient feature is the pervasiveness of the formative *-ly*, which can be used to derive adverbs

in all semantic types. This indeed is a unifying characteristic of the category. While there are of course some other word-formation processes afoot, for example derivatives in *-wise* and *-ways* and compounds such as *maybe*, the affix *-ly* is to a large extent a marker of category membership.”

So, for this class of data at least, Huddleston and Pullum et al. (2002) showed that there are alternative accounts for the data that initially looked like we might have to assume that adverbs can modify nouns. However, in the next section (3.2.1), I will turn to discuss data that Payne et al. (2010) showed clearly allow no option but to accept cases in which adverbs can unequivocally modify nouns.

3.2 English: The Payne et al. data

Payne et al. (2010) discuss the post-head modifier position for adverbs in English in some detail. After giving an overview of their methods and findings, I will single out a small set of minimal pairs which I will then investigate more extensively.

They first present a series of examples based on web searches (yielding 27 examples in all), and secondly, they check the representativity of their examples by comparing them to the results of a BNC search (yielding 18 examples). For the BNC searches, they used ‘the N Adv PP [of]’ as their search string (cf. Payne et al. 2010: 48), whereas no details are given with regard to the web-based searches, although out of the 27 examples, 18 also correspond to this search pattern.⁶

Important findings from their data are that (a) sometimes there is no structural alternative to the placement of the adverb, (b) a set of recurring usages can be distinguished, most notably temporal and spatial location, (c) post-head adverbs are not bound to deverbal nominal heads, and (d) if it is possible to form minimal pairs with the corresponding adjective-noun ordering, we sometimes find intriguing semantic distinctions. I will go through these four major observations step-by-step.

3.2.1 *Post-head position as the only possibility*

For some adverbs, no adjectival variant is available, for others, the adjectival variant is not able to occur in the attributive position. Payne et al. (2010: 43–44) mention *again* and *already* as examples of the former case, *soon* exemplifies the latter case. (20) is an example for *again*, their (30).

(20) But into this situation there is the intervention **again** of Moscow, of Stalin.

Payne et al. (2010: 56) take *soon* to be homonymous between adjective and adverb, citing as evidence for the adjectival *soon* sentences like (21), cf. their (45c).

6. For the original sources of their examples, see Payne et al. (2010).

- (21) I know it may seem **soon** to be unleashing yet another 1980's teen comedy after 'Back to the Future' just last week.

In any case, the post-modifying construction is without alternatives if it has to be exactly this lexical material.

Note that this kind of structural constraint needs to be differentiated from the well-known constraint working in the other direction, that is, the requirement that the adjective phrase in attributive position may not contain any dependents following the head, disallowing e.g. **the proud of his children father*.

3.2.2 *Kinds of semantic usages*

Payne et al. (2010: 43–44) observe that their web-attested data falls mainly into five groups: (a) temporal location and extent, frequency, aspectual and serial order, (b) spatial, (c) domain, (d) distributional, and (e) maximal adverbs.

(22) gives one example for every group, all taken from their data (cf. their 18a, 19a, 20a, 21a and 22a). The only terminological choice that is perhaps not so obvious is maximal adverbs. For these, Payne et al. (2010) follow Huddleston and Pullum et al. (2002: 721), where maximal adjuncts form a subgroup of degree adjuncts, containing items indicating a degree at the top end of the relevant scale.

- (22) a. In comparing the infection of humans with BSE and the possibility of infection from CWD we can look at [the situation **recently** in England with the Mad Cow Disease outbreak].
- b. The eighteenth century miners recognised that they were following in the steps of much earlier workers, an observation that was then linked to [the discovery **locally** of copper ingots bearing Roman inscriptions].
- c. These major strides forward have been accomplished due to [the support **financially** of the local community].
- d. Obtaining the information requested would entail [the scrutiny **individually** of nearly 1,500 written answers] and could be undertaken only at disproportionate cost.
- e. One difficulty that I have with some thinking of the organic movement is [the rejection **outright** of genetic modification].

As far as the distribution over these different classes is concerned, the temporal adverbs occur six times, followed by the spatial and maximal adverbs with four tokens each. Distributional adverbs are illustrated with three and domain adverbs with two examples. For the BNC data, Payne et al. (2010) identify an even clearer pattern in the distribution over different semantic classes, with six of the examples each falling into the categories of temporal and spatial location, two each into the categories of domain modification and distributional interpretation, and one

example each for reason and serial-order modifiers (note that the latter could be grouped with the temporal adverbs, just as was done for the web-attested data).

3.2.3 *Dependency on deverbal heads*

While adverbs in post-head position were first observed a considerable time ago (see for an overview and references Payne et al. 2010:75, Footnote 6), the only two newer works that treat them in any detail are Fu et al. (2001) and Payne et al. (2010). Both works point to the possible role deverbal heads might play in this context. The first aim of this section is to present the argumentation from these two papers with regard to a possible relation. The second aim of this section is to argue that even for cases where the head noun appears to be event-denoting, this does not force an event-based analysis of these nouns, because alternative analyses are available: for locative modifiers, an analysis based on frame adverbials, for temporal modifiers, an analysis based on times or temporal intervals is available.

Fu et al. (2001) use the availability of post-head adverbs as a diagnostic for whether or not the nominal is a derived process nominal containing a verb phrase, cf. their examples reproduced in (23) and (24).

- (23) a. His explanation of the accident **thoroughly** (did not help him).
 b. *His version of the accident **thoroughly** (did not help him). [Cf. his thorough version of the accident]
- (24) a. His transformation into a werewolf **so rapidly** was unnerving.
 b. ^{??}His metamorphosis into a werewolf **so rapidly** was unnerving.

The use of adverbs as a diagnostic is called into question in Payne et al. (2010). Payne et al. (2010:46) note that the majority of their examples occur in noun phrases denoting events, using the possibility to occur in the ‘X took place/ occurred at time Y’ as a diagnostic (a test introduced in Grimshaw 1990: 58). The corresponding head nouns are “typically derived from or related to verbs and aspectually dynamic” Payne et al. (2010:46). This holds, for example, for the head nouns *discovery*, *scrutiny* and *rejection* in (22b), (22d) and (22e), respectively. As Payne et al. (2010:47) point out, there are two kinds of exceptions. Firstly, eventive nouns that are neither derived or related to verbs nor aspectually dynamic, cf. *situation* in (22a) and *shortage* in (25), their (19b).⁷

7. Payne et al. (2010:47) correctly state that there is no synchronic relation to the verb *situate* (*situation* neither refers to the process of situating nor to its result). Historically, they were also independently borrowed into English, cf. the respective entries in the Oxford English Dictionary.

- (25) During the early 1990s [a timber shortage **internationally**] led to an increase in timber prices and export opportunities for premium timber grades.

Secondly, a number of head nouns does not refer to events. Again, these fall into two groups. On the one hand, the noun is deverbal or clearly related to the verb, but it nevertheless does not denote an event. A very clear example is given in (26), their (24a), where *winner* denotes the agent of an event of winning.

- (26) [The winner **recently** of both a Gramophone award and the Royal Philharmonic Society Award for Best Chamber Ensemble], the Endellion Quartet is renowned as one of the finest quartets in the world today.

Other examples include result readings of event nouns, for example *support* in (22c).

On the other hand, Payne et al. (2010) present data that contains neither deverbal heads nor eventive nouns, cf. e.g. *role* or *building* in (27), their (17a) and (24h).

- (27) a. [The unique role **globally** of the Australian Health Promoting Schools Association], as a non-government organization specifically established to promote the concept of the health promoting school, is described.
 b. Many of our members manufacture construction products providing [buildings **internationally**] with structural fire protection.

Now, while it is thus clear that there is more to this construction than Fu et al. (2001) thought, Payne et al. (2010: 47) write: “Nevertheless, in the case of event-denoting nouns, we have a natural explanation at least for the occurrence of temporal and spatial adverbs: the adverbs indicate the time or place of the event just as they would in clauses.” This statement deserves some further comment. The following reasoning lies behind their assessment: Temporal and spatial modifiers in their standard adverbial uses are typically semantically analyzed as predicates over events, cf. (28) and the corresponding representations in (29).

- (28) a. Kim kissed Lee **in the living room**.
 b. Kim kissed Lee **yesterday**.
 (29) a. $\exists e$ [KISS(e, kim, lee) & IN(e, living-room)]
 b. $\exists e$ [KISS(e, kim, lee) & YESTERDAY(e)]

Likewise, adverbs in their function as verb phrase modifiers may be analyzed as predicates of events.⁸ This would concern adverbial usages of adverbs like *recently*

8. But see e.g. Schäfer (2013: 188–198), where manner adverbials are analyzed as predicates of manners, not events.

or *temporarily*. If we assume that it is part of their lexical semantics to select only events as their arguments, it seems plausible that their occurrence as post-head modifiers in an NP is facilitated if the referential argument of the head noun is in fact an event argument.

However, this line of reasoning has some clear limitations. Firstly, the examples involving local modification do not correspond to predicates of events in their adverbial usage. Some examples can be analyzed as frame adverbials (more on their analysis later). Other examples are clearly neither frame nor event adverbials but come with their own complex semantics. Relevant examples are e.g. *clockwise* and *sideways*. Irrespective of the final analysis, they are surely not predicates of events.⁹ Secondly, the temporal modifiers can alternatively be modeled as predicates of intervals or of times. This is particularly interesting because it has been argued that nouns come with time arguments anyways. Thus, Musan (1999) discusses (30), her (1.1), and points out that we have at least two different readings.

(30) The college student invented a time travel machine.

The noun phrase *the college student* can be interpreted either as temporally dependent or temporally independent. In the first case, there is a connection between the situation time of inventing a time travel machine and the period of being a college student, in the second case, there is no such connection. An example for the former case is somebody who invented a time machine while being a college student at that specific time. An example for the latter case is a scenario where the student of today had already invented a time travel machine as a child. In order to be able to handle these different readings, Musan (1999) assumes that all predicates come with their own time arguments. If we follow her analysis, it seems plausible that adverbs that serve as temporal modifiers target the time argument made available through the head noun, as exemplified in (31).

(31) the arrival **recently**
ARRIVAL(x, t) & RECENT(t)

Note that it is not clear from (31) whether we can define RECENT(x) in a way that guarantees the automatic accessing of the correct reference time, but this is not important for the general point.

9. The anonymous reviewer points out that these adverbs could be special in that e.g. the modification is licensed by the fact that the corresponding event comes with a direction or, alternatively, they could be part of complex event nominalizations. While either one of these two possibilities might be plausible, my point here is that even in that case, it is not clear whether this would force us to assume an event in the analysis. What would have to be shown is that non-deverbal NP heads can never license a modifier of direction.

In fact, the suspicious scarcity of manner modifiers in post-head position which was already noted by Payne et al. (2010) speaks against an event-based account of their occurrence, whereas the high frequency of temporal modification can be taken to support Musan's approach.

Interestingly, the non-deverbal, non-event denoting nouns lead to the most interesting minimal pairs.

3.2.4 *Minimal pairs*

Perhaps the most intriguing aspect concerning adverbs in the post-head position of nouns is the existence of minimal pairs involving a variation between the adjectival form in attributive position versus the adverb-form in post-head position. These minimal pairs are the best place to look for any functional or semantic motivation for introducing adverbs into the noun phrases, since there clearly can be no structural reason for doing so if the alternative attributive construction is readily available. Somewhat surprisingly, references to clear minimal pairs are rare. Fu et al. (2001) provide the minimal pair in (32), their (4), including their comments.

- (32) [at the promotions and awards ceremonies]
- a. A **separate** presentation of awards was attended by parents.
[= promotion separate from awards]
 - b. A presentation of awards **separately** was attended by parents.
[= each award given separately or promotions separate from awards]

Payne et al. (2010:43) explicitly mention a meaning difference for two minimal pairs, based on (33) and (34), their (17a) and (17b).

- (33) [The unique role **globally** of the Australian Health Promoting Schools Association], as a non-government organization specifically established to promote the concept of the health promoting school, is described.
- (34) [The NHS and other health organisations **internationally**] clearly need methodologies to support benefit analysis of merging healthcare organisations.

Comparing *The unique role globally of the Australian Health Promoting Schools Association* with *the unique global role of the Australian Health Promoting Schools Association*, Payne et al. (2010:43) remark "the meaning of the NP is subtly different from that of the NP in (17a). Whereas in (17a) we are talking simply about the location in which the role is performed (globally as opposed, say, to nationally), the use of the adjective strongly invites the inference that the role is an important one". And with regard to *organisations internationally* vs. *international organisations* they note an 'even sharper' contrast: "the phrase *the NHS and other international health organisations* implies that the NHS is an international health organisation,

whereas *the NHS and other health organisations internationally* does not” Payne et al. (2010:43). Both attributive orders can also be found on the web, and confirm their impression, cf. (35) and (36).

- (35) Over time, the British established [a unique **global** role] for themselves by maintaining a balance of power in Europe and while laying the foundations for today’s economically integrated world system. [WEB-1]
- (36) The Ministry of Health maintains active links with [**international** health organisations] and other health Ministries to achieve the following goals. [WEB-2]

In general, the order adjective-noun leads to a more or less straightforward intersective interpretation, e.g. *international health organisations*: λx [health organisation(x) & international(x)]. In this case, *international* behaves on a par with other qualitative adjectives like *big*, *successful* etc. In contrast, the order noun-adverb in these cases leads to distributional readings: *health organisations internationally* refers to health organizations all over the world, that is, it provides a spatial specification, not a quality. This is consistent with the observation that at least for institutions, the distributional readings are restricted to plural head nouns, because single institutions cannot be distributed over the whole world: *an international organization* vs. **an organization internationally*. In the terminology of Landman (1989), *internationally* is a collective predicate (an example for a collective predicate from the verbal domain would be *to meet*: *Kim and Lee met* vs. **Kim met*). In contrast, *international* in attributive position is a standard singular predicate.

If *internationally* in post-head position is a collective predicate, one would assume the same for *globally* in post-head position. And in fact, on the face of it this seems to be borne out, as can be seen by taking standard common nouns like *child*, where the post-head position is available for *children*, cf. (37), but not for the singular: **the child globally*.

- (37) It remains one of the leading causes of death among [young children **globally**], despite the availability of a safe and effective vaccine. WEB-3

What, then, licenses *the unique role globally* in (33)? A complicating factor is the adjective *unique*, so we will first look at an example without a pre-head modifier, cf. (38).

- (38) Work with Claire Mahaffrey and Ric Williams (University of Liverpool) has shown the role of mineral aerosols in supplying iron for nitrogen fixation in the North Atlantic during field campaigns, while work with Dave Siegel and others at UCSB have looked at the role **globally** of mineral aerosols in fertilizing ocean biota using satellite data. WEB-4

Intuitively, it seems that the fact that the role of mineral aerosols is evaluated from the point of view of all places in the world licenses the post-head position. That is, we look at a distribution of roles all over the whole world, and filter out what these individual roles have in common. As the result of this filtering is just one shared role, the singular is justified. A similar story can be told for (33): The uniqueness of the role is evaluated from the point of view of all the other countries in the world, which again licenses the post-head position, as we again have a distribution over the whole world. At the same time, since the result of the evaluation is the assessment of uniqueness, the head noun is in the singular. We will come back to these issues when discussing the semantic analysis in more detail.

3.3 Conclusion: The English data

To conclude our survey of the English data, we can say that (a) sometimes the non-availability of an attributive variant may lead to the usage of the post-head construction (b) the post-head usages are dominated by temporal and local modifiers (c) deverbal heads are not a necessary prerequisite for post-head adverbs and (d) the minimal pairs await an explanation, but there is an interesting link between position and collective vs. individual predicates.

In Section 5, I will focus on the minimal pairs involving examples like *global/ly*, and I will argue that the post-head adverb construction still shows some link to prototypical adverbial usages.

However, before we start an attempt at an explanation, we will first look at the German data.

4. The German data

The aim of this section is to inquire whether we also can find post-nominal adverbs in German, and how these findings compare to the English data. In particular, we will also check at whether the recategorization strategy is feasible.

Before we look at the data in more detail, a general comment on the most obvious differences between English and German adverbs is in order. Although German has a *-weise* suffix in order to derive adverbs from adjectives, there is no class of adverbs in German that is equivalent to the class of English *-ly* adverbs. English *-ly* adverbs can typically be used either as verb-related adverbials or as sentence adverbials, cf. the pair in (39).

- (39) a. No matter how **cleverly** the flyweight boxes he is going to be stuffed. BNC HCX 74
- b. Dr Mortimer **cleverly** noted the cigar ash, so we know how long Sir Charles stood there. BNC H7V 342

In (39a), *cleverly* serves as a verb-related adverbial, specifying the manner the fly-weight boxes. In (39b), it serves as a sentence adverbial, evaluating Dr Martimer's noting the cigar ash as clever. In German, the translations of most non-sentential adverbial usages of English *-ly* adverbs are typically adjectives in their short form (alternatively, these forms have been argued to be zero-marked adverbs, cf. Schäfer (2013:21–23) for more discussion and references). In contrast, the sentence-adverbial usages of English *-ly* adverbs are typically realized by German *-weise* adverbs. There is thus a class of morphologically marked deadjectival adverbs in German, but this class is much more restricted in its usage and therefore does not play such a formative role for the adverb category as *-ly* does for the English data.

-weise adverbs do not occur in the nominal post-head position. Similarly, German does not allow adverbs like e.g. *bald* 'soon' or *wieder* 'again' in post-head position, using instead attributive adjectives, either de-adverbial, as *bald-ig* 'soon. ADJ], or unrelated, e.g. *erneut* 'anew' as an alternative to *wieder* 'again'.

In fact, the only forms that, just as in English, occur in the post head position are forms like *hier* 'here' and *gestern* 'yesterday', cf. (40) and (41).

- (40) Die Arbeit **hier** bedeutet für mich Stillstand, oder
 the work here means for me stagnancy, or
 gar ein Schritt zurück. A09/MAI.09364
 even a step back
 'The work here means stagnancy or even a step backwards for me.'

- (41) Nach dem sonnigen Tag **gestern** bestimmt heute wieder
 After the sunny day yesterday dominates today again
 feuchte Luft unser Wetter. RHZ09/FEB.02637
 humid air our weather
 'After the sunny day yesterday our weather today is again dominated by humid air.'

This means that if we can successfully pursue the same strategy for German as Huddleston & Pullum et al. (2002) did for English, then German simply does not have any adverbs in post-head position. However, there are some important differences between the English and the German data that make a one to one transfer of this strategy problematic.

One first problem in applying the same strategy to the German data is the above-mentioned lack of an equivalent to the English *-ly* adverbs. As could be seen in Section 3.1, *-ly* adverbs are used by Huddleston & Pullum et al. (2002) very much like a prototypical adverb. One reason why this appears to be a plausible strategy is that *-ly* adverbs, in their function as degree and manner modifiers, are in fact the typical forms used to modify verbs. However, as detailed above, while the suffix *-weise* is also productive and *weise*-adverbs predominantly occur in

adverbial positions and are in this way comparable to *-ly* adverbs, they are almost exclusively used as sentence adverbials and therefore are not as prototypical as *-ly* adverbs. Thus, although we will be using this diagnostic, it should be taken with some caution.

4.1 ‘*Gestern*’ and the pronoun analysis

Recall the argumentation in Section 3.1: there is the traditional view that an item like *yesterday* in subject position is analyzed as a noun. However, since nouns or rather noun phrases can also fulfill all the other functions of *yesterday*, it is plausible to argue that *yesterday* is always a noun. Can we adopt the same argument for the corresponding German items? Below, I will argue that this is in fact not possible, because not all environments which allow *yesterday* allow noun phrases.

In German, the view that forms in subject positions cannot be adverbs is sometimes codified in attempts to define adverbs, cf. e.g. Schmöe (2002), who explicitly states that one of five necessary properties for *Adverbien* ‘adverbs’ is that they cannot function as the subject of a sentence. Accordingly, if one takes *gestern* ‘yesterday’ in (42) to be the subject, it cannot possibly be an adverb.

- (42) **Gestern** war ätzend. WEB-G1
 Yesterday was cauterising
 ‘Yesterday sucked.’

We can use two diagnostics to clarify that *gestern* in (42) in fact occurs in subject position. First, it takes part in plural/singular agreement, cf. (43).

- (43) **Freitag und gestern** waren ätzend, besonders gestern -
 Friday and yesterday were cauterising, especially yesterday -
 schwül ohne Ende. WEB-G2
 humid without end
 ‘Friday and yesterday sucked. Especially yesterday, it was just too humid.’

Secondly, in these usages, *gestern* can be replaced with the synonymous full NP *der gestrige Tag*, which has to occur in the nominative case, another indicator of subjecthood, cf. (44).

- (44) **Der gestrige Tag** war ätzend.
 The.ADJ.NOM yesterday.NOM day.NOM was cauterising
 ‘Yesterday sucked.’

Up until this point the discussion of the German data resembles the discussion of the English data. On to the next step: can all other occurrences of *gestern* be

accounted for by a NP analysis? Notice first that just like noun phrases in English, German NPs can be used as adverbials. Of particular interest are nominal phrases in the accusative case, which can either be used to indicate temporal order, cf. (45), or temporal extent, cf. (46) (cf. e.g. Heidolph et al. 1981:367–368).

- (45) **Diese Woche** waren wir mit unserem Arbeitskreis beim
 This week were we with our team at.the
 Zentralen Psychologischen Dienst in München. PBW/W16.00059
 central psychological service in Munich
 ‘This week, our team visited the central psychological service in Munich.’
- (46) Die Spezialisten arbeiten **den ganzen Tag**
 The specialists work the whole day
 in staubfreien Zimmern. BRZ13/APR.04484
 in dust-free rooms
 ‘The specialists work in dust-free rooms the whole day.’

However, these usages are restricted in important ways and do not match the usages of *gestern*. In particular, an NP headed by *Tag* seems to be available only for the modification of temporal extension and not for the expression of temporal location, cf. (47).

- (47) a. **Gestern** haben wir im Garten gegrillt.
 Yesterday have we in.the garden grilled
 ‘Yesterday, we grilled in the garden.’
- b. ***Den gestrigen Tag** haben wir im
 The.ACC yesterday.ADJ.ACC day have we in.the
 Garten gegrillt.
 garden grilled
- c. **Den ganzen gestrigen Tag** haben
 The.ACC whole.ACC yesterday.ADJ.ACC day have
 wir im Garten gegrillt.
 we in.the garden grilled
- d. **Am gestrigen Tag** haben wir im Garten gegrillt.
 On yesterday.ADJ.DAT day have we in.the garden grilled

(47a) is fine, *gestern* specifies the temporal location of the grilling event. (47b) is bad, a temporal location interpretation is not possible. If we add the attributive modifier *ganzen* ‘whole’, cf. (47c), the sentence becomes acceptable, and we get the temporal extension reading. The only possibility to get a temporal location interpretation is by using the NP as the head of a prepositional phrase, cf. (47d).

We find the same pattern, if we look at the contrast between *gestern* and *der gestrige Tag* in subjectless sentences, cf. (48).¹⁰

- (48) a. **Gestern** war schönes Wetter.
 Yesterday was nice weather
- b. ***Der gestrige** Tag war schönes Wetter.
 The.NOM yesterday.ADJ.NOM day was nice weather
- c. ***Den gestrigen** Tag war schönes Wetter.
 The.ACC yesterday.ADJ.ACC day was nice weather
- d. **Am gestrigen** Tag war schönes Wetter.
 On yesterday.ADJ.DAT day was nice weather

The usage of *gestern* ‘yesterday.ADV’ in sentence-initial position is unproblematic, but both bare NP variants lead to ungrammatical sentences. In contrast, the usage of the same noun phrase as the complement of a preposition is again OK.

What does this tell us? If we stick by the definition that adverbs cannot serve as subjects, then the most plausible analysis is to uphold the view that *gestern* and similar items are adverbs with homonymous noun forms. Furthermore, the analysis as a noun is only motivated by these items’ occurrence as subjects. In all other environments, I will continue to assume that we are dealing with the adverb form.

4.2 ‘Hier’ and the preposition analysis

As detailed in Section 3.1, Huddleston and Pullum et al. (2002) support the prepositional status of an element like *here* by three argumentative steps: Firstly, prepositional phrases can function as adjuncts. Secondly, there is no principled reason why prepositions should not be intransitive. Finally, in contrast to *-ly* adverbs, prepositional phrases, and therefore also intransitive prepositions, can occur as *be* complements. If we accept the first two points, we can use the contrast with

10. I have to thank the anonymous reviewer for pointing to the analysis of the sentences in (48) as subjectless sentences and not as ascriptive copula sentences. Evidence for the subjectless nature of these sentence comes from three sources. Firstly, *gestern* ‘yesterday’ does not show number agreement: *Gestern und heute war schönes Wetter* ‘Yesterday and today was nice weather’ vs. **Gestern und heute waren schönes Wetter* ‘*Yesterday and today were nice weather’. Secondly, replacement with the corresponding noun phrase in the nominative is impossible, cf. (48-b), and, finally, constructions like (i) are possible.

- (i) Wir waren glücklich, weil schönes Wetter war.
 We were happy, because nice weather was
 ‘We were happy, because we had nice weather.’

In (i), the subordinate clause does not have a (surface) subject.

German *-weise* adverbs instead of the English *-ly* adverbs to make a similar point with regard to the possibility of occurring as complements to *sein* ‘be’, cf. (49), where *hier* and *dort* are contrasted with *unglücklicherweise* ‘unfortunately’.

- (49) Peter ist **hier/dort**/***unglücklicherweise**.
 Peter is here/there/unfortunately
 ‘Peter is here/there/*unfortunately.’

Note, though, that this does not carry half the force of the argumentation for the English data, due to the above-mentioned usage restrictions on *-weise* adverbs. The adjectival short-forms that correspond to most non-sentential usages of English *-ly* adverbials are in fact also the standard forms used in the *sein*-complement position, cf. (50).

- (50) Er/Sie/Es ist **unglücklich**.
 He/She/It is unhappy
 ‘He/She/It is unhappy.’

To conclude my discussion of the possibility of using the Huddleston & Pullum et al. (2002) strategy for German, one can cautiously conclude that the same arguments that were used for the English data lose considerable force when applied to the German data: Firstly, while it is true that the class of *gestern/heute/today* items can occur in subject position, the data give strong support for the assignment of double category membership, since noun phrase adverbials have a more restricted distribution than *gestern/heute/today*. Secondly, the German *-weise* adverbs are far less prototypical instances of adverbs than the English *-ly* adverbs, weakening the argumentation for the group of *hier/dort*-items. During this discussion, I have already made use of de-adverbial adjectival variants of the relevant items, forms which English apparently lacks. I turn to their discussion now.

4.3 German de-adverbial adjectives

While the reclassification exercise above has shown that such a reclassification is problematic for the German data, the discussion above already revealed that German has adjective counterparts for the *gestern/heute/morgen* adverbs, all formed by adding the suffix *-ig* to the adverb. The same suffix can also be used to derive adjectives from *hier/dort* type adverbs. With these adjectives available, we can form minimal pairs with the *-ig* form in attributive position and the base form in the post-head position, cf. (51) and (52) for illustration.

- (51) der/die/das (**gestrige**) Abend/Ausgabe/Spiel (**gestern**)
 the (yesterday.ADJ) evening/issue/game (yesterday.ADV)
 ‘the evening/issue/game yesterday’

- (52) der/die/das (**hiesige**)
 the (here.ADJ)
 Bundestagsabgeordnete/Wirtschaft/Publikum (**hier**)
 representative/economy/audience (here.ADV)
 ‘the representative/economy/audience here’

Sometimes, specific combinations tend to occur more often in either of the two variants, thus, ‘Ausgabe gestern’ as in (53) occurs far less often than *gestrige Ausgabe* as in (54) (the raw ratio for just the pure strings in the DeReKo is 52 to 427).

- (53) Andrea Barzagli Berater war der Erste, der diese Regel
 A. B.’s advisor was the first, who this rule
 zu spüren bekommen hat, berichtete die “La Gazzetta dello
 to feel got has, reported the L. G. d.
 Sport” in ihrer Ausgabe **gestern**. BRZ08/MAI.15968
 S. in her issue yesterday
 ‘Andrea Barzagli’s advisor was the first who got a taste of this new rule
 writes the “La Gazzetta dello Sport” in its issue yesterday.’
- (54) Leider hat sich in die **gestrige** Ausgabe der
 Unfortunately has itself in the yesterday issue the
 Fehlerteufel eingeschlichen. HMP05/SEP.00527
 mistake.devil in.crept
 ‘Unfortunately, there was a slip of the pen in yesterday’s issue.’

As far as I can tell, though, there is no semantic distinction, and they can in many if not most contexts be used interchangeably. There seems to be, however, a register distinction, in that the *-ig* forms appear to belong to a more formal registers and some native speakers claim to never use them. If we look at the token frequency of the items, it is clear that the de-adverbial variants are far less frequent; however, it has to be kept in mind that these de-adverbial variants typically occur only in one environment, the attributive prehead position in NPs, whereas the adverb forms occur in a large number of different environments. If we look at the ratio of adverb and de-adverbial forms in a written and a spoken corpus, and equate the written corpus with a more formal register, we find that the distributions are in fact independent, showing us that the usage of these items indeed differs significantly with register.¹¹

11. This can be seen when comparing the ratios in the DeReKo with those in the FOLK corpus, cf. the appendix for details.

On those occasions where they cannot be used interchangeably, the source for the impossibility is not entirely clear, cf. (55) vs. (56).

- (55) Hast Du die **gestrige** Ausgabe schon gelesen?
 Have you the yesterday.ADJ issue already read
 ‘Did you already read yesterday’s issue?’
- (56) Hast Du die Ausgabe **gestern** schon gelesen?
 Have you the issue yesterday.ADV already read?
 ‘Did you already read this issue yesterday?’

(55) receives the expected interpretation, but (56) cannot be interpreted in the same way. One plausible explanation is that here the construction stands in competition with the usage of *gestern* as a standard temporal adverbial and is therefore not available.

4.4 German translations for the English minimal pairs

As mentioned above, German does not have form equivalents to *-ly* adverbs, and *-weise* adverbs in general do not occur in post head position. How, then, are the minimal pairs realized in German?

The first pair, with the different interpretations due to the placement of *separate/separately*, cannot be realized in any similar way in German. According to my intuition, the contrast that comes closest to the one expressed in the English example is realized by (57a) and (57b), where in (57a) *getrennt* ‘separated’ is an adjective (format-wise a past-participle) in attributive position, and *einzel* ‘individual’ is an adjective in the modifier position of a determinative compound.

- (57) a. Die **getrennte** Übergabe der
 The separated handing.over the.GEN.PL
 Auszeichnungen wurde von den Eltern besucht.
 awards.GEN.PL was by the parents visited
 ‘A separate presentation of awards was attended by the parents.’
- b. Die **Einzelübergabe** der
 The separated.handing.over the.GEN.PL
 Auszeichnungen wurde von den Eltern besucht.
 awards.GEN.PL was by the parents visited
 ‘A presentation of awards separately was attended by the parents.’

Of more interest are the translations to the *international/global-ly* variation, on which I will henceforth concentrate.

For at least one translation, *weltweit* ‘world.wide’, a similar effect as far as the different interpretations are concerned can be observed when the position of the

adjective is varied in a comparative fashion, cf. the following four examples, the first two with the order *weltweit N*, the second two with the order *N weltweit*:

- (58) Die Massenflucht der Investoren an den
The mass.exodus the.GEN.PL investors.GEN.PL at the
Weltbörsen und Rohstoffmärkten spielte sich
world.stock.markets and commodity.markets played itself
vor dem Hintergrund [der **weltweiten**
before the background the.GEN.SG worldwide.GEN.SG
Rezession] und der ungelösten
Recession and the.GEN.SG unresolved.GEN.SG
Finanzkrise ab. A09/JAN.00052
financial.crisis PART
'The mass exodus of investors from the world stock markets and the commodity markets took place against the backdrop of the global recession and the unresolved financial crisis.'
- (59) Doch sei es ihm dabei stets ums
But be.SUBJ.SG it him doing.that always for.the
Engagement gegangen – gegen die Dämonen des
commitment went against the demons the.GEN.SG
Nationalsozialismus, gegen Umweltzerstörung
national.socialism.GEN.SG, against environment.destruction
oder den **weltweiten** Kriegswahnsinn. A09/JAN.00358
or the.ACC.SG worldwide.ACC.SG war.craze
'But for him, it was always about commitment – against the demons of national socialism, against the destruction of our environment, and against the global war craze.'
- (60) Der Autoabsatz **weltweit** sackte um 11% auf 8,35
The car.sale world.wide dropped by 11% to 8,35
Mio. Autos ab. A09/FEB.07846
Million cars down
'Car sales globally dropped down by 11% to 8,35 million cars.'
- (61) 115 Millionen Kinder **weltweit** gehen nicht zur Schule –
115 millions children world.wide go not to school –
because they too poor are or work must A09/JAN.00938
weil sie zu arm sind oder arbeiten müssen.
'115 million children globally don't go to school – because they are too poor or because they must work.'

Note that the possibility of appearing in the post-head position in the environments in (60) and (61) seems to be a peculiarity of *weltweit*, other translations like *global* or *international* do not allow this position in the two sentences. The standard position for adjectival attributive is before the noun, cf. e.g. Eisenberg (1999:232–233).¹² However, since *weltweit* in the post-head position again occurs in the adjectival short form, it should still be analyzed as an adjective, not an adverb. Note that in English the post-head position is also not exclusively unavailable for adjectives, see the discussion of the relevant data in Payne et al. (2010: 51–52).

The German data otherwise shows the same patterns as the English data, especially with regard to the usage of *weltweit* ‘world.wide’ as a collective predicate. Thus, *115 Millionen Kinder weltweit* does not allow the formation of a minimal pair, because *weltweite Kinder* lacks an interpretation. In contrast, (60) allows the formation of a minimal pair *der weltweite Autoabsatz* vs. *der Autoabsatz weltweit*. Again, the post-head position is licensed, because *Autoabsatz* ‘car sales’ is inherently collective.

4.5 Conclusion: The German data

What the short survey of the German data has shown is that by and large one finds many correspondences between the German and the English situation in terms of the semantic types of modifiers that can occur in post-head position. However, there are also many differences. Firstly, although *here* and *yesterday* and their German counterparts *hier* and *gestern* both occur in the post-head position, I have shown that the strategy of reassigning them to other categories than adverbs does not work very convincingly for the German data. Secondly, German does not have adverbs corresponding to English *soon*, *already*, *yet*, that is, adverbs that can occur in the post-head position but cannot occur in the attributive position. Thirdly, as far as the minimal pairs are concerned, German applies a completely different strategy for the *individual/-ly*-type minimal pairs. Finally, for the variation of the *international/-ly*-type I found a correspondence in the German data, namely the placement of *weltweit* either before or after the head. In the semantic part to follow, I will therefore concentrate on these readings.

12. Eisenberg (1999:233) notes that the adjective might also directly follow the core noun (*Kernsubstantiv*) in *poetischer Freiheit* ‘given poetic license’. His example is *Zwei Knaben froh und heiter bestiegen eine Leiter* ‘Two boys, happy and carefree, climbed a ladder’. This example, a rhyming couplet, is clearly marked, whereas the *weltweit* constructions here are not marked at all.

5. Towards a semantic analysis

Focusing on the minimal pairs involving *global/international/ly* in English and the positioning of *weltweit* in German, the general pattern is that the placement of the modifier in post-head position leads to an interpretation of that modifier as a collective predicate, whereas the placement of the modifier in pre-head position corresponds to a singular predicate and therefore more to standard subsective modification.

Another interesting observation with regard to the function of the post-head modifiers as collective predicates is the following finding: sentences with collective predicates as post-head modifiers can often be paraphrased with sentences using the same modifier as a sentential adverbial, more particularly, as a frame adverbial. To see this, confer the pair in (62), where both sentences can be interpreted in the exactly same way.

- (62) a. Children **globally** love toys.
 Kinder weltweit lieben Spielzeug.
 b. **Globally**, children love toys.
 Weltweit lieben Kinder Spielzeug.

One pathway that suggests itself is to take a look at the semantics of frame adverbials, and see whether they can be exploited for the analysis of the post-head modifiers. Here, I am going to discuss the proposal by Maienborn (2001), who discusses frame readings of locative prepositional phrases and advocates a structured meanings approach where the location is provided with a pragmatically mediated target.

I will start with one of her original examples involving prepositional locative modifiers, her (1c), and then port this example to the data of interest here.

- (63) **In Argentina**, Eva still is very popular.

One first observation by Maienborn is that the exact interpretation of *in Argentina* is not fixed. Frame adverbials do not modify the event variable of the sentence, but instead enter into a relationship with the proposition asserted by the sentential base, that is, the sentence minus the frame adverbial. Therefore, frame adverbials can occur in sentences independent of the type of main verb used in the sentence. Even if it is a main verb that introduces an event variable, the frame adverbial does not target this variable. The natural reading seems to be: if we restrict our evaluation domain for this sentence to Argentina, then the proposition is claimed to hold. However, for evaluation domains outside of Argentina, no claim is made. Other readings that Maienborn discusses include temporal readings (that is, whenever Eva is in Argentina, she is very popular)

or epistemic readings (according to a source of belief in Argentina, Eva is still very popular).

In establishing the context-independent meaning contribution, Maienborn makes use of the topic notion as introduced in Chafe (1976), in particular of the notion of Chinese style topics (which Chafe differentiates from English style topics, which according to him always involve some kind of contrast): “Typically, it would seem, the topic sets a spatial, temporal, or individual framework within which the main predication holds. [...] In brief, ‘real’ topics (in topic-prominent languages) are not so much ‘what the sentence is about’ as ‘the frame within which the sentence holds’” Chafe (1976: 50–51). It is important to note that the topic is not necessarily restricted to syntactic elements.

An example for the straightforward case of frame modification is given in (64).

- (64) **In Germany**, the shunning of local butchers amounts to the repudiation of a cultural heritage. COCA-10

If, for the sake of simplicity, we assume that the topic of the sentential base is in this case identical with the subject, we get the structured meaning representation in (65).

- (65) The shunning of local butchers amounts to the repudiation of a cultural heritage.
 $\langle \llbracket \lambda x [\text{amount-to}(x, \text{repudiation-of-cult-herit})] \rrbracket \rangle$, the-shunning-of-loc-butchers \rangle

In Maienborn’s framework, it is the work of a topic phrase to access the topic, cf. the functional head Top^0 in (66).

- (66) $\text{Top}^0: \lambda P \lambda x [\langle P, x \rangle]$

To represent the locative prepositional phrases, we use the slightly simplified representation in (67), where LOC serves as a stand-in for the meanings expressed by locative predicates.

- (67) $\text{PP}_{\text{LOC}}: \lambda x [\text{LOC}(x)]$

The operator MOD^v , cf. (68), allows to combine $\langle e, X \rangle$ expressions.

- (68) $\text{MOD}^v \lambda Q \lambda P \dots \lambda x [P(\dots)(x) \ \& \ Q(v^x)]$

A notable feature of Maienborn’s MOD^v operator is the mediating effect of the v^x variable. The idea is that only those variable assignments to v are permitted which are anchored with respect to the conceptual structure accessible through x . A very similar operator where this relation is explicitly modeled via a free relational parameter is proposed in Dölling (2003). Combining MOD^v with the

representation for the locative PPs and the contribution of Top^0 yields the general form of frame-setting modifiers in (79).

- (69) frame-setting modifiers
 $\lambda x [\langle P, x \rangle \& \text{LOC}(v^x)]$

The whole sentence is then represented as in (70).

- (70) $\langle [\lambda x [\text{amount-to}(x, \text{repudiation-of-cult-herit})]] \text{ , the-shunning-of-loc-butchers} \rangle \& \text{IN_GERMANY}(v^x)$

At this point, and before circling back to the cases of post-head modification, it is helpful to recall the main properties of this analysis. The link of frame adverbials to topic-hood has two advantages. The syntactic position of frame adverbials is higher than the syntactic position of the subject, so that at the level of the semantic form we already have a proposition. But locative prepositional phrases take objects of type $\langle e \rangle$, not full propositions as arguments. Structured meanings allow accessing such an object after the subject position has been filled.

5.1 The post-head position and topic sensitivity

Can we explain why sentences with a modifier like *globally* either as a sentence adverbial or as a post-head modifier of a noun can receive a very similar interpretation? The properties of the analysis of frame adverbials sketched above seem to be of little help for the post-head modifiers. Since a post-head modifier attaches to an entity of type $\langle e, t \rangle$, there is no need to introduce a tool to essentially break open a proposition. What, then, can explain the similarity between the readings? I suggest that the reason for the semantic similarity does not so much lie in the same derivational pathways, but in the same result of derivation. Thus, consider again the pair in (71):

- (71) a. Children **globally** love toys.
 Kinder weltweit lieben Spielzeug.
 b. **Globally**, children love toys.
 Weltweit lieben Kinder Spielzeug.

A reasonable representation for (71a) is given in (72), where for the sake of convenience the relevant parts of the noun phrase internal semantics are explicitly represented:

- (72) $\text{LOVE}(x, \text{toys}) \& ((\text{CHILDREN}(x) \& \text{GLOBALLY}(x)))$

Compare this with the corresponding representation of the sentence containing the framesetting modifier:

- (73) Globally, children love toys.
 < [[λx [love(x, toys)]]], children > & GLOBALLY(v^{children})

The only important difference is the mediating variable v in the second formula, otherwise the effect of introducing *globally* as a frame-setting modifier is much the same as the effect of introducing *globally* as a post-head modifier.

In other words, as long as the post-head modifier occurs after the head of the subject noun phrase the effect of the modifier is very similar to the effect of adding a frame-setting modifier to the same sentential base and having the subject as the topic. If the subject noun phrase of these sentences is in the plural, the topic that is selected as the argument of the frame adverbial predicate will also refer to a plural individual, accounting for the correspondence between the two readings even though the frame adverbial predicates themselves need not be collective predicates. If the subject noun phrase is not in the plural, as in the *the role globally* examples discussed in Section 3.2.4, then a distributive interpretation must be pragmatically licenced.

Interestingly, Fu et al. (2001) already observe that post-head adverbs tend to occur after NPs in subject position. And as expected, if the post-head modifier does not modify the subject, a paraphrase with a frame-adverbial is indeed impossible, cf. (74), repeating (22b) from above and (75).

- (74) The eighteenth century miners recognized that they were following in the steps of much earlier workers, an observation that was then linked to [the discovery **locally** of copper ingots bearing Roman inscriptions].

- (75) **Locally**, the observation was then linked to the discovery of copper ingots bearing Roman inscriptions.

Very clearly, (75) can only receive the standard frame adverbial interpretation while no such reading is available for (74). In other words, for all post-heads reading the simple analysis of the post-head modifier as a collective predicate yields good results. The semantic similarity of sentences with post-head modifiers in the subject NP with corresponding sentences with frame adverbials is an epiphenomenon of two different derivational pathways.

For the attributive readings of the corresponding words, we simply need to treat them as singular predicates, taking care that they are combined with the predicate provided by the head noun before the plural meaning is applied.

What this section has shown is that at least for noun phrases in the subject position, the fact that they semantically seem to serve the same function as standard frame adverbials can be accounted for by the surprisingly similar semantic representations that these two very different constructions give rise to. However, these considerations are far from a full analysis of the construction under

observation and should rather be considered as pointers in the direction of a more detailed future analysis.

5.2 The semantic properties and the adverbial/adverb connection

One of the questions behind this paper was whether the post-head usage could still be linked to typical adverbial functions. As the overview of the English data has shown, we have a number of scenarios that are quite unrelated to this question. Thus, the post-head placement of *soon* and *again* can be seen as a purely structural requirement, and even the high number of temporal and locational adverbs in post-head position cannot as such be clearly linked to a vestige of an adverbial function. We looked in detail at the behavior of those adverbs that lead to minimal pairs, in particular focusing on local adverbs. Here, the sentence with the post-head modifier often corresponds to frame adverbials and with that to a standard function of adverbial modifiers. While I have shown that this semantic similarity can be explained by quite different derivational paths, it is nevertheless a possible motivation for the usage of this construction, especially given the observed tendency of these modifiers to occur in subject NPs.

However, while serving an adverbial function might in some way be linked to post-head position, being an adverb is quite another matter. This is already obvious from our look at the German data, where the same semantic distinction was found, but in both cases the word form used was that of an adjective. And similarly, both the post-modification as well as the frame modification are possibilities that are also open to prepositional phrases.

6. Summary

This article aimed to take a closer look at one particular construction covered by none of the standard definitions of adverbs, namely their usages as noun phrase modifiers in the post-head position of noun phrases. I first gave an overview of the situation in German and English, in doing so extensively discussing whether the proposal by Huddleston & Pullum et al. (2002) to reclassify some 'traditional' adverbs as prepositions and pronouns respectively could also be applied to the German data. It turned out that for the German data the case for the reclassification looks far less convincing than the case for the English data. In addition, while for the English data some usages of adverbs in post-head position can be explained purely by structural pressure, no such cases could be identified for German. In contrast, German has structural alternatives which English lacks, namely the de-adverbial forms in *-ig*, e.g. *heut-ig* 'today.ADJ'. For both languages, the availability

of the construction leads to doublets of pairs of related adjectives and adverbs occurring either in attributive or post-head position, in most cases apparently without any noticeable semantic distinction. For English, clear semantic distinctions were noted only for (a) *individual/ly*-type variation and (b) *international/ly*-type variation. While the former has no similarly structured counterpart in German, the latter contrast can be realized by varying the positioning of *weltweit* ‘world-wide’ between either attributive and post-head position. As for the semantics of this last contrast, I argued that this can best be captured by treating the adverbs in post-head position as collective predicates and their counterparts in attributive position as singular predicates. This correctly predicts part of their behavior with respect to plural and singular head nouns, while usages involving nouns such as *role* must be explained differently. Furthermore, I have shown that the semantic similarity of the modifiers in post-head position to that of sentential frame adverbials can be explained without taking recourse to a topic-based analysis as Maienborn (2001) suggested for the latter. Rather, the similarity is the result of two quite different derivational paths. Finally, this similarity can be argued to provide some link between the post-head position and prototypical adverbial functions. However, to be an adverb is not a necessary condition for this specific function, as the availability of prepositional phrases or the usage of adjectives in German for the same purpose show.

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Appendix

Example sources

The additional corpus data used in this article comes from (a) the BNC, the British National Corpus, cf. BNC (2007), (b) the COCA, the Corpus of Contemporary American English, cf. Davies (2008-), (c) the DeReKo, *das deutsche Referenzkorpus*, provided by the IDS Mannheim and accessed through their Cosmas II web-interface, and (d) other web-based sources, accessed via Google. In the text, the COCA examples are indexed with COCA-1, COCA-2 etc, the DeReKo examples are followed by their short identifier, and the web-examples by WEB-1, WEB-2 etc. for the English examples and WEB-G1, WEB-G2 etc for the German examples. The exact sources as retrieved from the corpora are given below.

COCA DATA

Example	Source
COCA-1	Saunders, Patrick, 1999 (19991024), O.G. The Broncos are learning what those who shaped Olandis Gary already know: He's someone you can rely on. Denver Post, Sports, Pg. L-06
COCA-2	Summer 2011, LETTERS, Anonymous, National Parks
COCA-3	Adam, Christina, 1996, Horse heaven hills. The Atlantic Monthly Vol. 278, Iss. 5; pg. 81, 6 pgs
COCA-4	Renck, Troy E., 2012 (120226), SPORTS; Pg. 1C, Rebound on the mound, Denver Post
COCA-5	Rhett, Kathryn, Summer2001, Vol. 42 Issue 2, p177, 19p, The Travelers, Massachusetts Review
COCA-6	Singer, Natasha, 2012 (120428), With Support Off as Events Begin, Komen Works to Revive Its Image, New York Times, Section A; Column 0; National Desk; Pg. 10
COCA-7	Armas, Genaro C., 2012 (120120), PSU trustees ousted Paterno over lack of action, DOMESTIC NEWS, Associated Press
COCA-8	2001 (20010709), When panic attacks control your life; guests discuss panic and anxiety that has taken over their lives, Ind_Oprah
COCA-9	Rao, Elahzar 2011 (Summer 2011), Saudade Literary Review
COCA-10	Blechman, Andrew D, 2010 (Jan 2010) WURST CASE SCENARIO Smithsonian Vol. 40, Iss. 10; pg. 72, 13 pgs

WEB DATA

Example	Source
WEB-1	http://blogs.the-american-interest.com/wrm/2010/01/21/2010s-9-the-european-world-order-breaks-up/ , accessed 2010-12-08
WEB-2	http://www.moh.govt.nz/moh.nsf/indexmh/aboutmoh-international , accessed 2010-12-07
WEB-3	http://www.who.int/mediacentre/factsheets/fs286/en/ , accessed 201403-24
WEB-4	http://www.cgd.ucar.edu/asr/asr03/tss/tss.htm accessed 2014-08-08
WEB-G1	http://forum.glamour.de/threads/88699-Bet%C3ijddeln-XV-auch-die-Minist%C3ijddeln-mit!/page132 , accessed 2014-07-29
WEB-G2	http://bfriends.brigitte.de/foren/forum-30-plus/67834-motorrad-fuehrerschein-929-print.html , accessed 2014-07-29

DeReKo DATA

Example	Source
A09/MAI.09364	St. Galler Tagblatt, 29.05.2009, S. 64; Neues Stadttor steht – erneut
RHZ09/FEB.02637	Rhein-Zeitung, 04.02.2009; Gut zu wissen Fahrten zum EU-Parlament...
BRZ08/MAI.15968	Braunschweiger Zeitung, 30.05.2008; Kurios: Neuer VfL-Star unterschreibt auf Hotel-Parkplatz
HMP05/SEP.00527	Hamburger Morgenpost, 07.09.2005, S. 32; NEWS
A09/JAN.00052	St. Galler Tagblatt, 03.01.2009, S. 7; Börsen in Aufruhr
A09/JAN.00358	St. Galler Tagblatt, 05.01.2009, S. 26; «Der erste Pop-Autor»
A09/FEB.07846	St. Galler Tagblatt, 27.02.2009, S. 9; Tiefrote Zahlen bei General Motors
A09/JAN.00938	St. Galler Tagblatt, 07.01.2009, S. 31; Bleistifte für die Zukunft
PBY/W16.00059	Protokoll der Sitzung des Parlaments Bayerischer Landtag am 11.11.2010. 59. Sitzung der 16. Wahlperiode 2008-. Plenarprotokoll, München, 2010
BRZ13/APR.04484	Braunschweiger Zeitung, 13.04.2013, Ressort: 1Beruf; Vom Handy bis zum Hörgerät

6.1 Comparison written/spoken German

The comparison between the ratios of German de-adverbial adjectives and their adverb bases used the DeReKo (DeReKo-2014-I) as the source for the frequencies in written German and the FOLK corpus (*Forschungs- und Lehrkorpus Gesprochenes Deutsch* ‘research and teaching corpus spoken German’), accessed via the DGD2 (*Datenbank für Gesprochenes Deutsch* ‘database for spoken German’), as the source for the frequencies in spoken German. The token frequencies are listed in Table 1.

That the two ratios belong to independent distributions is shown by the results of the chi-square test: $\chi^2 = 4359.11$, d.f. = 9, $p = 0$.

Table 1. Token frequencies of de-adverbial adjectives and their bases in the DeReKo and the FOLK

	DeReKo	Folk
hier	4262670	3462
dort	2642647	513
gestern	2032840	200
heute	3972446	448
morgen	816013	291
hiesig	66711	5
dortig	121933	1
gestrig	134157	0
heutig	763493	22
morgig	89315	1