Boys buying two sausages each: On the syntax and semantics of distance-distributivity
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Chapter III  The Syntax of Distance-Distributivity

The main results of chapter II are the following. There are two instances of the distributive element jeweils: Jeweils can occur both in adverbial and in adnominal position. The difference in syntactic position is accompanied by a difference in interpretation. Furthermore, adnominal jeweils was shown to behave like a distance-distributive quantifier. As such, it poses a problem for compositionality. Finally, it was shown that distance-distributive quantifiers occur in a variety of languages in systematic fashion. This fact calls for a unified explanation.

The objectives of this chapter are threefold. The first objective is to present a complete syntactic analysis of both instances of jeweils. The syntactic analysis identifies the syntactic structures that will be interpreted in chapter IV.

The second objective is to shed more light on the syntactic nature of the phenomenon of distance-distributivity in German and other languages. Of course, this enterprise goes hand in hand with providing a general syntactic account of adnominal jeweils. It will emerge that jeweils-DPs exhibit characteristic properties of so-called ‘Inverse Linking Constructions’ (henceforth ILCs), illustrated in (1):

(1) \[
[\text{DP One apple [pp in [QP every basket]]}] \text{ is rotten.}
\]

‘In every basket, there is rotten apple.’

The syntactic analysis of ILCs will then form the basis for the syntactic analysis of adnominal jeweils. The upshot of the discussion will be that adnominal jeweils involves a regular QP that is embedded inside a complex DP. The quantifier Q syntactically combines with its restriction (in line with compositionality). This restriction is realised as an overt or covert proform which is co-indexed (hence co-referent) with the DistKey antecedent.

The third objective of chapter III is to provide an explanation for the cross-linguistic variation observed with distance-distributive elements (DDs). The discussion, which is based on relatively few, mostly Indo-European languages, is intended merely as laying the basis for a more comprehensive typology of distance-distributivity. The languages under discussion will be shown to differ regarding two parameters. This leads to a cross-classification into four potential language types.

The first parameter concerns the possibility of DP-internal (predicate) fronting for information structure reasons. It turns out that the DD can occur in prenominal position in languages that allow for such DP-internal fronting (e.g. German, Dutch, French, Slavic, Japanese, Romanian). The DD follows the DistShare in languages that disallow discourse-driven DP-internal movement (e.g. English). This way, the relative order of DD and DistShare is reduced to a general syntactic property of the languages under discussion. The second parameter concerns the morphological shape of the DD, which I take to reflect its feature content overtly. It turns out that those DDs that contain D-features, and that for this reason are formally identical with regular D-quantifiers, cannot distribute over non-DP antecedents (e.g. pluralities of events as denoted by verb conjunction), nor can they occur with underlying subjects. This is the case in English, Dutch, Norwegian, Icelandic,
Russian, and the Romance languages. The impossibility to occur with underlying subjects will be attributed to the obligatory checking of D-features (between the DistKey and the DD) under agreement, which is subject to c-command in line with Chomsky (1998). DDs in underlying subject position are not c-commanded by the DistKey, and are consequently excluded from this position in languages where D-feature checking is obligatory. In contrast, DDs that do not contain D-features can distribute over any pluralic entity expressed in the clause. Furthermore, they can appear in subject position for they do not have D-features to check under agreement.

The structure of chapter III is as follows. In section 1, I present the syntactic analysis of adverbial jeweils. In section 2, we will take the first steps towards a syntactic analysis of adnominal jeweils, the more interesting case because of the compositionality problem. More arguments for the constituency of jeweils and the DistShare expression are provided. This constituent is argued to form a complex DP syntactically. Section 3 discusses the syntax of ILCs in form of an interlude. In 4, we turn back to the syntactic analysis of adnominal jeweils, which will be based on the syntactic analysis of ILCs. In section 5, the analysis is extended to other languages. There, d-distributivity is approached from a cross-linguistic perspective along the lines sketched in the preceding paragraph. The chapter concludes in section 6.

1 The Syntax of Adverbial Jeweils

This section discusses the syntax of adverbial jeweils. In 1.1, I present evidence for the analysis of adverbial jeweils as an adverbial quantifier. In 1.2, I propose that the base position of adverbial jeweils is adjoined to VP, as with all adverbial quantifiers. I briefly compare the VP-adjunction analysis with Cinque’s (1999) analysis, which treats all adverials as located in the specifier of a functional projection.

1.1 Adverbial Jeweils and Adverbial Quantifiers

The claim that adverbial jeweils is an adverbial quantifier is based on the observation that it has the same syntactic distribution as other adverbial quantifiers, e.g. oft ‘often’, manchmal ‘sometimes’, selten ‘seldom’, or nie ‘never’.

First, adverbial jeweils occurs in all and only those positions where other adverbial quantifiers occur. Jeweils can occur as the sole constituent before the finite verb in V2 (cf.2). It can occur between complementiser (or finite verb) and the subject (cf.3). It can occur between subject and object in transitive clauses (cf.4). And it can occur between direct object and V_final in transitive clauses with direct objects (cf.5).

(2) a. Jeweils hat Peter als Erstes aufgegeben.
   each.time has Peter as first given up
   ‘Each time, Peter was the first to give up.’
   b. Oft / manchmal/ selten/ nie haben die Russen gewonnen.
      often/ sometimes/ seldom/ never have the Russians won
      ‘The Russians often/ sometimes/ seldom/ never won.’

(3) a. …, weil jeweils die Russen gewonnen haben.
   because each.time the Russians won have
   ‘…because the Russians won each time.’
b. …, weil oft/ manchmal/ selten/ nie die Russen gewonnen haben.
   because often/ sometimes/ seldom/ never the Russians won have
   ‘…because the Russians often/ sometimes/ seldom/ never won.’

(4) a. …, weil Peter jeweils Maria geküsst hat.
   because Peter each time Maria kissed has
   ‘…because Peter kissed Maria each time.’

b. …, weil Peter oft/ manchmal/ selten/ nie geküsst hat.
   because Peter often/ sometimes/ seldom/ never kissed has
   ‘…because Peter often/ sometimes/ seldom/ never kissed Maria.’

(5) a. …, weil Peter Maria jeweils geküsst hat.
   because Peter Maria each time kissed has
   ‘…because Peter kissed Maria each time.’

b. …, weil Peter Maria oft/ manchmal/ selten/ nie geküsst hat.
   because Peter Maria often/ sometimes/ seldom/ never kissed has
   ‘…because Peter often/ sometimes/ seldom/ never kissed Maria.’

On the other hand, adverbial jeweils is impossible between a non-specific object DP and Vfinal in embedded clauses (cf.6a). The same holds for other adverbial quantifiers (cf.6b).

(6) a. *…, weil Peter keine Leute jeweils angerufen hat.
   because Peter no people each time called has
   ‘…because Peter has often/ sometimes/ seldom/ never called.

b. *…, weil Peter keine Leute oft/ manchmal/ selten/ nie angerufen hat.
   because Peter no people often/ sometimes/ seldom/ never called has
   ‘…because, each time, Peter has won often/ sometimes/ seldom/ never.’

Notice directly that (5a) and (6a) together argue for a position of jeweils at the left edge of VP. In German (as in Dutch), specific objects are generally assumed to scramble out of the VP at surface structure (cf. e.g. deHoop 1992, Diesing 1992), while non-specific objects stay behind in their base position as sister to the verb. Given this assumption, the ungrammaticality of (6a) shows that jeweils is not base-generated inside the VP between the base position of the object and the verb. (5a) shows that the base-position of jeweils is located between the surface position of the specific object (outside VP) and its trace (inside VP), i.e. at the left edge of VP.

The second argument for the status of adverbial jeweils as an adverbial quantifier comes from the fact that it cannot easily co-occur with other adverbial quantifiers (cf.7ab). Co-occurrence (no matter in which order) leads to considerable semantic complexity. The semantic effect is also visible in the English paraphrases. What is relevant here is that the same effect is observed when two other adverbial quantifiers co-occur. This is shown in (8).

(7) a. ?…, weil Peter oft/ manchmal/ selten/ nie jeweils gewonnen hat.
   because Peter often/ sometimes/ seldom/ never each time won has
   ‘…because Peter has often/ sometimes/ seldom/ never won each time.’

b. ?…, weil Peter jeweils oft/ manchmal/ selten/ nie gewonnen hat.
   because Peter each time often/ sometimes/ seldom/ never won has
   ‘…because, each time, Peter has won often/ sometimes/ seldom/ never.’
(8) ?…, weil Peter machmal nie gewonnen hat.
    because Peter sometimes never won has
    ?‘…because Peter sometimes never won.’

(7ab) and (8) can only be interpreted as opening up a secondary time or event frame. The
sentences are about different event levels, e.g. a round of games (quantified over by the
lower quantifier) that is played repeatedly (and quantified over by the higher quantifier).
A plausible explanation for this phenomenon is that both elements are adverbial
quantifiers over events. Since both elements compete for the same event argument, a
second event layer is introduced in order to save the structure from violating the ban on
‘vacuous quantification’ (cf. Chomsky 1981, Kratzer 1995). See the discussion of event
semantics in chapter IV.1 for details.

A third argument for treating adverbial jeweils alike with other adverbial quantifiers is
that they all show the same relative order with respect to other adverbials. They must
precede manner adverbials (9ab). The reverse order is impossible on a neutral intonation.¹

(9) jeweils AND Advquant >> manner adverbials
    a. …, weil Peter jeweils langsam geschwommen ist.
       because Peter each.time slowly swum is
       ‘…because Peter swam slowly each time.’
    b. …, weil Peter oft langsam geschwommen ist.
       because Peter often slowly swum is
       ‘…because Peter often swam slowly.’

(10) a. *?…, weil Peter langsam jeweils geschwommen ist.
      because Peter slowly each.time swum is
b. *?…, weil Peter langsam oft geschwommen ist.
      because Peter slowly often swum is

The data in (9) and (10) find a natural explanation if manner adverbs are located inside the
VP (see Ernst 1998:130, where manner adverbs are treated as ad-Vs), whereas jeweils and
other adverbial quantifiers are located at the edge of VP.

Adverbial jeweils and other adverbial quantifiers also precede event-modifying
adverbials, such as the time and place adverbials in (11ab). The reverse order is distinctly
odd (12ab).²

(11) jeweils AND Advquant >> (event) modifying adverbials
    a. …, weil Peter jeweils am Tag geschlafen hat.
       because Peter each.time on.the day slept has
       ‘…because Peter slept during the day each time.’

¹ The reverse order is only possible with contrastive focus stress on the manner adverb, indicating that it has
moved for information structural reasons.
² (12b) is possible if the temporal adverbial does not modify the event, but denotes the restriction of the adverbial
quantifier oft ‘often’. This reading is excluded for adverbial jeweils because jeweils needs a plural antecedent to
distribute over. As expected, (12a) improves if a plural temporal expression is substituted:
(i) … weil Peter an den Tagen jeweils geschlafen hat.
    because Peter on the days each.time slept has
    ‘…because Peter has slept on each of those days.’
b. ... weil Peter *oft* am Tag geschlafen hat.
   because Peter *often* on.the day slept has
   ‘...because Peter often slept during the day.’

(12) a. *, weil Peter am Tag *jeweils* geschlafen hat.
   because Peter on.the day *each.time* slept has
   ‘...because Peter each.time slept.’

b. ?, weil Peter am Tag *oft* geschlafen hat.
   because Peter on.the day *often* slept has
   ‘...because Peter often slept.’

Speaker-oriented adverbs precede adverbial quantifiers and adverbial jeweils (cf.13ab). In
the reverse case, the speaker-oriented reading is impossible (14ab). In (14ab), the adverb
following the adverbial quantifier must be interpreted as a manner adverb.

(13) Speaker-oriented adverbs >> jeweils AND Adv_quant

a. ..., weil Peter *glücklicherweise* jeweils gewonnen hat.
   because Peter *fortunately* each.time won has
   ‘...because Peter fortunately won each time.’

b. ..., weil Peter *oft* gewonnen hat.
   because Peter *often* won has
   ‘...because Peter often won.’

(14) a. ..., weil Peter jeweils *glücklicherweise* gewonnen hat.
   because Peter each.time *fortunately* won has
   ‘...because, each time, Peter won with luck.’

b. ..., weil Peter *oft* glücklicherweise gewonnen hat.
   because Peter *often* fortunately won has
   ‘...because Peter often won with luck.’

Finally, modal adverbs precede adverbial jeweils and adverbial quantifiers (cf. 15ab). The
reverse order is odd, if not ungrammatical (cf. 16ab). It is not clear to me what a plausible
reading for (16ab) would be.

(15) modal adverbs >> jeweils AND Adv_quant

a. ..., weil Peter *möglicherweise* jeweils gewonnen hat.
   because Peter *possibly* each.time won has
   ‘...because Peter possibly won each time.’

b. ..., weil Peter *oft* möglicherweise gewonnen hat.
   because Peter *often* possibly won has
   ‘...because Peter possibly won often.’

(16) a. ??..., weil Peter jeweils *möglicherweise* gewonnen hat.
   because Peter each.time *possibly* won has
   ‘...because Peter possibly won each time.’

b. ??..., weil Peter *oft* möglicherweise gewonnen hat.
   because Peter *often* possibly won has
   ‘...because Peter possibly won often.’

To conclude, I have shown (i.) that adverbial jeweils and adverbial quantifiers have the
same syntactic distribution; (ii.) that they give rise to the same semantic effects when co-
occurring with other adverbial quantifiers; and (iii.) that they have the same relative order
with respect to other adverbs. All this leads to the conclusion that adverbial jeweils is an
adverbial quantifier. The quantificational nature of jeweils is supported by the fact that
jeweils, like other adverbial quantifiers, cannot be used as a predicate over propositions (17b).³

    that you me kissed has was here/ in the evening/ necessary/ fortunate
    ‘That you have kissed me was here / in the evening/ necessary/ fortunate.’

    that you me kissed has was each time/ often
    *‘That you have kissed me was each time/ often.’

The reader is referred to chapter IV.2 for the semantic analysis of the adverbial quantifier jeweils.

1.2 The Syntactic Position of Adverbial jeweils

In this section, I forward the claim that adverbial jeweils is base-generated in a position adjoined to VP (section 1.2.1). The adjunction analysis of adverbials follows the syntactic analyses of adverbials found e.g. in Jackendoff (1972) and Ernst (1998). It clashes with a recent proposal by Cinque (1999), where all (classes of) adverbials are treated as located in the specifier of some functional projection, i.e. in a fixed position created specifically for them. Cinque’s proposal is sketched in 1.2.2. Following this, I briefly state my reasons for keeping with the adjunction analysis.

1.2.1 The VP-Adjunction Analysis

The central claim regarding the syntax of adverbial jeweils is that it is adjoined to VP. Notice that an adoption of the VP-internal subject hypothesis obviates the need to postulate different adjunction sites for different classes of non-manner adverbs.⁴ Since the subject trace is located inside the VP, adverbials that take scope over the entire proposition including the subject need no longer be assumed to occur higher than IP (the surface position of the subject). For the semantics, it is sufficient that the adverb occurs higher than the subject’s trace, whose presence turns the VP into a proposition-denoting expression. This requirement is met if the adverb is adjoined to VP. As a result, adverbials that operate over entire propositions (e.g. speaker-oriented adverbs), or sets of events (adverbial quantifiers), can occur adjoined to VP.

If all adverbs (except for manner adverbs inside the VP) are adjoined to VP in their base-position, we expect them to be freely interchangeable. The question arises, then, of how to account for the restrictions on the relative order of different (semantic) classes of adverbials that were observed in the previous section. Following Jackendoff (1972:90) and Ernst (1998), I assume that the relative order of adverbials is syntactically free, but that the order restrictions follow from semantic considerations. Only certain orders of adverbials are interpretable, while others lead to semantic gibberish. Consider the relative order between the adverbial quantifiers and the event-modifying time or place adverbials in (11) and (12) above. In chapter IV.1, it will be argued that VPs denote sets of events, just as NPs denote sets of individuals. Such a set of events can be ascribed a place or time of occurrence (an event property) by an event-modifying adverbial, just as a set of

³ This test for classifying adverbs is found in Bartosch (1976).
⁴ In the literature, adverbs are grouped into different classes according to differences in their syntactic distribution and interpretation. Modal and speaker-oriented adverbs are treated e.g. as sentence, or IP-adverbials. Other adverbials are treated as VP-adverbials (cf. e.g. Jackendoff 1972, Ernst 1998)
individuals (denoted by an NP) can be ascribed certain properties by a modifying adjective. Once a set of events is described in all its relevant properties, an adverbial quantifier can quantify over it, thus closing off the VP-denotation to further modification. A parallel situation is found in the nominal domain where quantifying expressions must also precede modifying expressions within the DP. The parallel order of quantifiers and modifiers in VPs and DPs is schematised in (18).

(18)  a. adverbial quantifier >> event-modifying adverbial >> VP
    jeweils ‘each time’ am Tag ‘during the day’ geschlafen ‘slept’

     b. adnominal quantifier >> NP-modifying adjective >> NP
     jedes ‘each’ weiße ‘white’ Haus ‘house’

When a time or place adverbial precedes an adverbial quantifier in violation of the scheme in (18a), it loses its modifying function because the adverbial quantifier has closed off the domain of modification. As a consequence, the adverbial cannot be interpreted at all (cf.12a), or it must receive an alternative interpretation. This happens in (12b), where the time adverbial denotes the restriction of the adverbial quantifier.

Similar arguments can be made concerning the other restrictions on the relative order of adverbials. From this, it follows that there is no need to fix the linear order of adverbs in the syntactic component. This conclusion is in line with an analysis which treats all (non-manner) adverbials as adjoined to VP, no matter what their specific semantic class, and which fixes their relative order by filtering out the non-interpretable orders in the semantic component. The interested reader is referred to chapter IV.1 for a further discussion of the semantics of events and event-quantifying adverbials.

1.2.2 The Specifier Analysis

The VP-adjunction analysis disagrees with Cinque’s (1999) proposal concerning the syntax of adverbs. Cinque suggests that the order of adverbial is not governed by semantic requirements, but fixed in the syntactic component. In Cinque’s feature-based ‘specifier analysis’, adverbs of different semantic classes occupy the specifier position of different functional heads against which they can check their mood, modal, or aspectual features. By way of illustration, sentence (19a) with three adverbial expressions would receive the structure in (19b) on a Cinque-style analysis (I leave out tense and agreement projections).

(19)  a. Frankly, Peter has fortunately always won the game.

  b. [MOODspeech-act Frankly F0, Peter has [MOODevaluative fortunately F0  [ASPfrequentative(I) always F0 [VP won the game]]]]

Apart from the functional projections in (19b), Cinque assumes many more functional projections, each of which hosts its own class of adverbials in the specifier position. The “at first sight, outrageously rich” (Cinque 1999:106) functional architecture of the clause is indicated in (20).

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5 For instance, adverbials that operate over propositions (speaker-oriented adverbs: glücklicherweise ‘fortunately’, modal adverbs: möglicherweise ‘possibly’) take scope over the adverbial quantifier for the latter forms part of the proposition. Therefore, they are free to adjoin to the left of adverbial quantifiers.
Cinque’s analysis is based on the cross-linguistic observation that not all languages convey adverbial meanings by means of free adverbial forms. Many languages express the same meanings by way of suffixes that are incorporated in the verb. Now, the striking fact is that the order of these suffixes is the mirror image of the order of the corresponding adverbs in ‘adverb languages’. Based on Baker’s (1988) ‘Mirror Principle’, Cinque concludes that these suffixes are heads of functional projections underlyingly, which are picked up by the verb on its way to I (or T in his terminology). On the strong hypothesis that the same inventory of functional projections is present in all languages, it follows that (20) is also the functional structure of a language like English. With the structure present anyway (because of universality), there is no additional cost involved in placing the respective adverbials in the specifier of their functional projection. This way, we arrive at the structure in (19b). In addition, the observed restrictions on the relative order between adverbials and between adverbials and other functional heads fall out for free. The order of adverbials follows directly on the hierarchy of functional projections in (20).

The chief merit of Cinque’s analysis is that it derives the order of adverbs in adverb languages and the order of suffixes in non-adverb languages from a universal underlying structure. It establishes a plausible connection between two - at first sight – disparate phenomena. As such, it is a very strong hypothesis about the position of adverbs (or elements with adverbial readings) across languages, which furthermore seems to maintain the autonomy of syntax.

In contrast, the VP-adjunction analysis does not say anything directly about the conspicuous mirror image of the order of adverbs in adverb languages and the order of suffixes in non-adverb languages. However, on the plausible assumption that the semantic content of an ‘adverbial suffix’ matches that of its corresponding free adverb, the fixed relative (mirror) order of suffixes is due to the same reason as it is with free adverbials. Alternative orders of suffixes are uninterpretable and therefore ruled out for semantic reasons. More generally, the combined options of free base-generation and movement (for discourse reasons) make the VP-adjunction analysis somewhat weaker in its empirical predictions than Cinque’s. The VP-adjunction analysis predicts a more graded, less clear picture of the relative order of adverbs. The only restriction is that the resulting structure must be interpretable.

Pending a decisive answer as to which analysis is more adequate, I will assume the VP-adjunction analysis for adverbial jeweils (and other adverbials). I do so for the simple
reason that the VP-adjunction analysis does the job for the purpose at hand. It captures
the fact that adverbial quantifiers are located somewhere at the left edge of VP. Since this
thesis is not mainly concerned with the syntactic position of adverbs, this is all that is
required.

Finally, observe that an account which excludes certain relative orders of adverbs on
the base of semantic considerations is in line with one of the basic assumptions of the
thesis, namely that interpretive requirements can have an effect on syntactic structure,
e.g. in the form of a semantic filter which rules out certain structures as uninterpretable.7
Therefore, the order of adverbs can be derived at no additional cost in the present
framework. There is no need, then, to encode the order of adverbs in the syntactic
component.

1.3 Summary
In this section, I have shown that adverbial jeweils has the same syntactic distribution as
adverbial quantifiers. On the base of this, adverbial jeweils is analysed as an adverbial
quantifier, in a position adjoined to VP (above modifying adverbials). This is in contrast
to Cinque’s specifier analysis, which would locate jeweils in the specifier position of a
frequentative aspectual head.

2 The Syntax of Adnominal Jeweils: First Steps

With the syntactic analysis of adverbial jeweils accomplished, it is now time to turn to the
central topic of this chapter, namely the syntactic analysis of adnominal jeweils. As a first
approximation, I will show in section 2.1 that adnominal jeweils and the DistShare form a
constituent, which has the categorial status of DP. This conclusion accounts for the
generalisation that adnominal jeweils must stand adjacent to the DistShare (see chapter
II.2). Section 2.2 looks at the internal structure of ‗jeweils-DPs‘ in more detail. I argue
that adnominal jeweils is a maximal projection at the left edge of DP. This raises a
number of questions, such as where adnominal jeweils is base-generated, and what its
exact position is inside the DP (2.3). These questions are difficult to answer for jeweils-
DPs in isolation. For this reason, I present a number of syntactic constructions with
analogous properties in 2.4., arguing that a unified analysis of these constructions and
adnominal jeweils is desirable.

2.1 The Constituency of Adnominal Jeweils and DistShare
The claim to be defended in this section is that adnominal jeweils and the DistShare form
a constituent. The constituency of jeweils and the following DistShare is supported by a
number of standard constituency tests.

2.1.1 Applying the Constituency Tests
The complex expression formed by adnominal jeweils and a DistShare satisfies standard
constituency tests. To begin with, the elements can be displaced together, both under A-
movement (passivisation) in (21a) and under A‘-movement (topicalisation) in (21b).

7 See Fox(2000) for a proposal along these lines in the framework of the Minimalist Program.
CHAPTER III

(21) *Displacement Test:*

a. \([XP \text{ jeweils zwei Geschenke}], \) werden den Kindern \(t_1\) gerade gegeben.  
   Each two presents are the children just given  
   ‘Each of the children is being given two presents.’

b. \([XP \text{ jeweils einen Artikel}], \) haben die Gutachter gerade \(t_1\) bewertet.  
   each one article have the reviewers just evaluated  
   ‘One article each, the reviewers have evaluated.’

The paraphrase of (21b) shows that English each and its DistShare also form a constituent.

Second, adnominal jeweils and DistShare occur together in pseudocleft (22a) and it-cleft structures (22b) (Pollard & Sag 1994:111). The paraphrases confirm the constituency of each and DistShare in English.8

(22) *Occurrence in Pseudocleft and It-Cleft Structures:*

a. Was die Jungen gerade kaufen, sind jeweils zwei Würstchen.  
   what the boys just buy are each two sausages  
   ‘What the boys are buying, are two sausages each.’

b. Es sind jeweils zwei Würstchen, was die Jungen gerade kaufen.  
   It are each two sausages what the boys just buy  
   ‘It is two sausages each what the boys are buying.’

Third, the V2-requirement, which is normally strictly observed in modern German9, argues for the constituency of adnominal jeweils and the DistShare in subject position.

(23) *Jeweils zwei Bewunderer verfolgen die Diven.*  
   each two admirers stalk the divas  
   ‘Each of the divas is stalked by two admirers.’

Fourth, jeweils and the DistShare can be co-ordinated with other nominal expressions (more on this in section 2.1.3):

(24) *Coordination Test:*

Die Jungen kauften \([\text{Fritten}]\) und \([\text{jeweils zwei Currywürste}]\).  
the boys bought chips and each two curry sausages  
‘The boys bought chips and two curry sausages each.’

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8 Displacement test (ia) and clefting test (ib) also confirm the constituency of distance-distributive chacun and the DistShare in French (Junker 1995:69):

(i) a. Combien de filles chacun ont-ils vu?  
   how many of girls each have-they seen  
   ‘How many girls each did they see?’

b. C’est trois filles chacun que les garçons ont vues.  
   that’s three girls each that the boys have seen  
   ‘Its three girls each what the boys have seen.’

9 But see Büring & Hartmann (2001), who argue that the focus particle nur ‘only’ in the initial position of root clauses such as (i) is adjoined to CP, leading to a V3-structure.  
(i) Nur die Harten kommen in den Garten.  
   only the hard come into the garden  
   ‘Only the tough ones make it into the garden.’

Büring & Hartmann restrict the capacity to violate the V2-requirement to focus particles. Since adnominal jeweils does not have the typical properties of focus particles, we expect it to comply with the V2 requirement.
Fifth, the string composed of jeweils and DistShare can be used to answer wh-questions. This shows that a single constituent, the question word, can replace the string. Again, this test also applies to English each.

(25) *Question Test:*
A: Was kaufen die Jungen gerade? B: Jeweils zwei Bücher.
What buy the boys just each two books
‘What are the boys buying?’ ‘Two books each.’

In light of the empirical evidence, I conclude that adnominal jeweils and DistShare form a constituent. This claim is at odds with Link’s (1986/98) treatment of je(weils) as a distributivity operator. This seems to be the appropriate place, then, for showing that Link’s analysis does not account for the properties of adnominal je(weils).

### 2.1.2 Adnominal Jeweils ≠ Distributivity Operator

Link (1986/98) argues that the short form je is an overt spell out of, or indicator for the presence of the usually covert distributivity operator DIST. Presence of DIST is often postulated in order to account for the existence of distributive readings with plural subjects in the absence of overt distributive material. On this analysis, the two readings of (26) differ in that the distributive reading in (26b) involves the presence of an additional operator DIST. This operator is adjoined to the VP, as shown in (27).

(26) The boys carried the table.
   a. The boys carried the table together. \(\rightarrow\) collective reading
   b. The boys carried the table individually. \(\rightarrow\) distributive reading

(27) The boys [VP DIST [VP carried the table]].

The precise semantics of DIST have been a matter of dispute (cf. Link 1991, Schwarzschild 1996), but all accounts assume that DIST attaches to a property-denoting expression (the VP), and applies this predicate to parts of a plural individual, usually denoted by the subject. This can be formalised as follows (cf. Link 1991):

(28) \([\text{DIST}] = \lambda P \lambda x. \forall x' \{ x' \Pi x \rightarrow P(x') \} \) (\(\Pi = \) the individual part-of relation)

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10 A similar analysis for English binominal each can be found in Roberts (1987).
11 See e.g. Link (1991), Schwarzschild (1996), and Lasersohn (1998). Lasersohn proposes a generalised version of the distributivity operator that can also account for distribution over plural objects and other plural arguments in the clause.
12 The crucial difference between the analyses in Link (1991) and Schwarzschild (1996) is that DIST distributes over atomic parts of the plural individual on the former analysis, whereas Schwarzschild claims that DIST (or in his terminology: PART) can also distribute over a set of subsets, a so-called cover, of this individual. The value of the cover is determined by the context. Schwarzschild bases his cover-account of so-called ‘generalized distributivity operators’ on data like (i) where the preferred reading of (i) involves distribution over the two subsets of cows and sheep and not over individual animals.

(i) The cows and the sheep were separated.

For our purposes, it does not matter which analysis is more adequate, since the objections against treating jeweils as an overt instance of DIST hold for both.
(28) reads as ‘DIST takes a property P and a plural individual x, such that each (atomic) i-part x’ of x has the property P. In the case of the distributive reading of (26), this means that each individual boy has the property of having carried the table.

For Link (1986/98), je in (29a) distributes over the subject denotation just like the covert operator DIST in (29b). Both yield a distributive reading.

(29) a. Die Jungen haben je einen Tisch getragen.
the boys have each one table carried
‘The boys carried one table each.’

b. The boys [VP DIST [VP carried one table]].
‘The boys each carried one table.’

Strictly speaking, Link makes no claim that this analysis applies to the long form jeweils as well. Nevertheless, an extension of his proposal to adnominal jeweils seems legitimate, since we can substitute jeweils for je in (29a) without a change in meaning (ignoring, for the time being, the additional adverbial reading), and because je was shown to be a short form of adnominal jeweils in chapter II.1.9.

(30) Die Jungen haben jeweils einen Tisch getragen.
the boys have each one table carried
‘The boys have carried one table each.’

A Link-style analysis of jeweils or je in terms of the distributivity operator DIST is problematic for the following reasons. First, DIST is not subject to the indefiniteness restriction on DistShare (cf.31a). It does not even require a nominal argument for well-formedness, and can occur with intransitive verbs (cf.32a). The respective variants with je in the (b)-sentences are ungrammatical, the variants with jeweils only allow for the adverbial reading.

(31) a. Die Jungen haben [VP DIST [VP den Tisch getragen]].
the boys have the table carried
‘The boys have each carried the table.’

b. Die Jungen haben *je / jeweils [VP den Tisch getragen]].
the boys have each / each.time the table carried
‘The boys have carried the table each time.’

(32) a. Die Jungen sind [VP DIST [VP gegangen]].
The boys are left
‘The boys have each left.’

b. Die Jungen sind *je / jeweils [VP gegangen].
the boys are each / each.time went
‘The boys have left each time.’

Second, adnominal jeweils (or je) in subject position licenses backwards distribution of the subject over the object when occurring in subject position. This has been shown in

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13 Link (1986/98:128) notes that jeweils “introduces a much stronger temporal connotation”. Clearly, this remark pertains to adverbial instances of jeweils.
chapter II.1.6 and in example (24), repeated as (33a). In contrast, the DIST-operator does not easily give rise to backwards distribution over an object denotation, as witnessed by the absence of such a reading for (33b). Presumably, the asymmetry between subject- and object-distributive readings with DIST is due to the syntactic position of DIST, which is adjoined to VP.

\[(33)\]
\begin{align*}
\text{a. } & \text{Je jeweils zwei Verehrer verfolgen die Diven. } \rightarrow \text{backwards distribution} \\
& \text{each two admirers chase the divas} \\
& \text{‘For each of the divas } x, \text{ there are two admirers who chase } x.\text{’}
\\
\text{b. } & \text{Zwei Verehrer verfolgen die Diven. } \rightarrow \text{no backwards distribution} \\
& \text{two admirers chased the divas} \\
& \text{i. } \text{‘There are two admirers } x,y \text{ that chase (together) the divas.’} \\
& \text{ii. } \text{*‘For each of the divas } x, \text{ there are two admirers who chase } x.\text{’}
\end{align*}

The third problem arises in connection with compositionality and is acknowledged by Link (1986/98:131). Any analysis of adnominal jeweils or je as (indicating) an overt distributivity operator DIST, which is adjoined to and modifies VP, disregards the syntactic constituency of jeweils/je with the DistShare expression. This constituency was convincingly shown to exist in section 2.1.1. On the other hand, there is an instance of jeweils (though not of je) which adjoins to VP, but this adverbial jeweils gives rise to the adverbial reading (distributing over pluralities of events), not to the adnominal reading (distributing over subjects). The question arises, then, why adnominal jeweils, or je should be considered to be operators on VP if they clearly belong to a nominal constituent inside VP.\(^{14,15}\) I conclude that neither adnominal jeweils nor its short form je are overt instantiations of the distributive VP-operator DIST. We will now continue the discussion of the syntax of adnominal jeweils.


\(^{15}\) This argument extends to proposals (Sakaguchi 1998, Stowell 1999) that treat each as an operator on VP in a structure analogous to that proposed by Kayne (1998) for onlyVPs (cf. ia). On these proposals, movement into the specifier of each, followed by remnant movement of the “emptied” VP to a higher specifier position, licenses the DistShare. This accounts for the postnominal occurrence of each in (ib).

\[(i)\]
\begin{align*}
\text{a. } & \text{the boys } [\text{X}\text{P each } [\text{VP bought two sausages}]] \\
\text{b. } & \text{the boys } [\text{FP[V bought t1]} [\text{eachP two sausages1 each t2}]]
\end{align*}

Apart from the constituency problem, there is yet another empirical problem, which has to do with the occurrence of d-distributive each in prepositional constructions (thanks to Hans den Besten for pointing this out to me). An analysis of (ii) in the spirit of Kayne is presented in (iiiia-c).

\[(ii)\]  The men talked to two persons each.

\[(iii)\]
\begin{align*}
\text{a. } & \text{each } [\text{VP talk to two person]} \\
\text{b. } & \text{each } [\text{VP talk to t1}]; [\text{two persons; each } t2]]
\end{align*}

The relevant step is (iiiib), in which the preposition is stranded by the DistShare. Since stranding of the preposition is vital for deriving the correct word order, we expect structures like (ii) to be ungrammatical in languages that do not allow for preposition stranding. This expectation is not borne out, as witnessed by the following examples from French, which are grammatical (Ferret, p.c.).

\[(iv)\]
\begin{align*}
\text{a. } & \text{Les hommes ont parlé à deux personnes chac-un.} \\
\text{b. } & \text{Les hommes ont parlé chac-un à deux personnes.}
\end{align*}

Since French does not allow for preposition stranding, I conclude that the derivation of (iva) and (ivb) cannot proceed along the lines in (iii). Given the additional constituency facts, I conclude that the analysis in (ii) is incorrect for English as well.


2.1.3 The DP-Status of jeweils and DistShare

In section 2.1.1, adnominal jeweils and its DistShare were shown to form part of a nominal constituent. In this section, I argue that this nominal constituent is a complex DP (henceforth: jeweils-DP), as shown in (34).

\[ (34) \quad \text{[DP jeweils DistShare]} \]

The categorial status as DP follows from the assumption that all nominal arguments have the syntactic status of DP (see Szabolcsi 1989, 1994, Stowell 1989, 1991 and the discussion in chapter I.2.4). Since the constituent formed by adnominal jeweils and DistShare occurs in subject and object position, both prototypical argument positions, it follows that the complex constituent must be a DP.

Furthermore, the entire constituent can be coordinated with full DPs (cf. Link 1986:98:124, where the same is shown for the short form je):

\[ (35) \quad \text{Die siegreichen Jungen erhielten [DP[DP den Pokal] und [jeweils eine Medaille]].} \]

The victorious boys received the cup and each one medal

‘The victorious boys received the cup and one medal each.’

The DP-status of the second conjunct in (35) follows on the common assumption that constituents must be of the same syntactic category in order to be coordinated. Notice that (35) does not involve the deletion of subject and verb under gapping (Ross 1970), as indicated in (36).

\[ (36) \quad \text{Die siegreichen Jungen erhielten [DP den Pokal] und [die siegreichen Jungen erhielten [XP jeweils eine Medaille]].} \]

This can be seen from the fact that the coordinated DP in (35) can be topicalised:

\[ (37) \quad \text{Den Pokal und jeweils eine Medaille] erhielten die siegreichen Jungen t1.} \]

‘As for the cup and one medal each, the victorious boys received them.’

If (36) was the underlying structure of (35), such topicalisation would be impossible because the fronted element in (37) does not form a constituent in (36).16

The final argument that the constituent formed by adnominal jeweils and DistShare is a DP has to do with A-movement taking place for case reasons. In chapter I.2.4, it was argued that the D-head of a nominal argument is the locus of case features. It follows that the full DP must undergo A-movement (e.g. passivisation) if it cannot be assigned case in its base position. If this assumption is valid, the following contrast is telling. (38) shows

\[ (38) \quad \text{Die siegreichen Jungen erhielten den Pokal und gestern auch noch eine Medaille.} \]

As expected, fronting of the italicised string, which does not form a constituent, leads to ungrammaticality:

\[ (i) \quad \text{Die siegreichen Jungen erhielten den Pokal und gestern auch noch eine Medaille.} \]

\[ (ii) \quad \text{Den Pokal und gestern auch noch eine Medaille erhielten die siegreichen Jungen.} \]

The argument from fronting gets additional support from the fact that fronting is impossible with structures that unmistakably are the result of gapping (Hans den Besten, p.c.). Presence of the temporal adverbial gestern ‘yesterday’ in the second conjunct in (i) signals that this conjunct is a reduced (independent) clause with its own temporal reference.

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As expected, fronting of the italicised string, which does not form a constituent, leads to ungrammaticality:

\[ (ii) \quad \text{Den Pokal und gestern auch noch eine Medaille erhielten die siegreichen Jungen.} \]

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\[ (i) \quad \text{Die siegreichen Jungen erhielten den Pokal und gestern auch noch eine Medaille.} \]

\[ (ii) \quad \text{Den Pokal und gestern auch noch eine Medaille erhielten die siegreichen Jungen.} \]
the basic word order of a transitive sentence. Following Diesing (1992), the particle *ja doch* ‘after all’ is used to mark the left edge of VP. (39a) shows that topicalisation of the *jeweils*-DP is possible (see also (21b) above). (39b) shows that topicalisation of the DistShare alone, stranding *jeweils* inside the VP, is also possible.\(^{17}\)

\[(38)\]  
\begin{align*}  
\text{Peter hat den Kindern ja doch gerade } & \text{[jeweils zwei Geschenke]} \text{ gegeben.} \\
& \text{Peter has given the children two presents each after all.} 
\end{align*}

\[(39)\]  
\begin{enumerate}  
\item \[
\text{[Jeweils zwei Geschenke]}_1 \text{ hat Peter den Kindern ja doch gerade } t_1 \text{ gegeben.} \\
\text{each two presents have Peter the children just given} \\
\text{‘The children have received two presents each after all.’}
\]  
\item \[
\text{[Zwei Geschenke]}_1 \text{ hat Peter den Kindern ja doch gerade } \text{[jeweils } t_1\text{]} \text{ gegeben.} \\
\text{two presents has Peter the children just given} \\
\text{‘The children have received two presents each after all.’}
\]  
\end{enumerate}

Looking at passivisation (i.e. movement for case reasons), an interesting asymmetry emerges even though intuitions are subtle. In (21a), it was shown that A-movement of the entire *jeweils*-DP to SpecIP, followed by A’-movement to SpecCP is possible. (40a) illustrates the same point. In contrast, the sentence becomes degraded if only the DistShare moves, leaving *jeweils* behind in its base position inside the VP (40b).

\[(40)\]  
\begin{enumerate}  
\item \[
\text{[Jeweils zwei G.]_1 \text{ sind } t_1 \text{ den Kindern ja doch gerade } t_1 \text{ gegeben worden.}} \\
\text{each two presents have the children just given been} \\
\text{‘The children have received two presents each after all.’}
\]  
\item \[
\text{[Zwei G.]}_1 \text{ sind } t_1 \text{ den Kindern ja doch gerade } \text{[jeweils } t_1\text{]} \text{ gegeben worden.} \\
\text{two presents have the children just each given been}
\]  
\end{enumerate}

Since extraction of the DistShare out of the *jeweils*-DP is possible in principle, as shown by (39b), the reason for the degraded status of (40b) must lie elsewhere. I would like to suggest that (40b) is ungrammatical because the remnant DP formed by *jeweils* and the trace of the DistShare remains in its base position inside the VP. In contrast, the DistShare *zwei Geschenke* ‘two presents’ moves out of the DP. It is plausible to assume that the DistShare moves through SpecIP on its way to SpecCP, just as the full *jeweils*-DP does in (40a). This means that the DistShare moves through a position in which it can be assigned NOM case (presumably this would involve re-analysing the DistShare as a full DP with an empty determiner). Given that NOM is assigned only once, the remnant DP inside VP cannot be assigned case, leading to a violation of the case filter. Again, if the constituent containing *jeweils* and the trace of DistShare in (40b) were not a DP, it would not need to be assigned case and the structure should be well-formed, contrary to fact.\(^{18}\)

\(^{17}\) The question what licenses extraction of the DistShare out of DP is discussed in chapter III.4.5.

\(^{18}\) Possibly, (40b) is outright ungrammatical because there is a derivation for (40b) which complies with the requirement that the entire DP move to SpecIP. Recall from the discussion in chapter II.2 that left-edge markers of VP never show with absolute certainty that an element to the right of them is really VP-internal. This is because the VP-edge-markers can scramble themselves across material that has been moved outside the VP for certain discourse reasons. Later in this chapter, it will be argued that it is possible for *jeweils* to raise out of its embedding DP. Therefore, *jeweils* in (40b) could have moved out of DP and VP on its own, followed by scrambling of the particle, and by remnant movement of the entire DP, which contains the trace of *jeweils*, to SpecIP (for case) and onwards to SpecCP. The resulting structure is given in (i) (I ignore the exact position of the indirect object for reasons of transparency):
I conclude that there are both theoretical and empirical reasons to assume that the constituent formed by *jeweils* and the DistShare is a DP. In the next step, we will turn to the internal structure of this DP.

### 2.2 The Internal Structure of *Jeweils*-DPs

I would like to argue that the internal structure of *jeweils*-DPs is as shown in (41):

\[
(41) \quad \text{DP} \\
\quad \text{YP} \\
\quad \ldots \\
\quad \text{jeweils} \\
\quad \text{NP} \\
\quad \text{zwei Bücher}
\]

In (41), *jeweils* is a maximal projection that occurs in the left periphery of a DP. The covert functional head D of the DP selects for a DistShareNP as complement.

The above claim entails that the structure of *jeweils*-DPs is not as in (42a-c).

\[
(42) \quad \text{a. DP} \\
\quad \text{b. DP} \\
\quad \text{c. DP} \\
\quad \text{D} \quad \text{NP} \\
\quad \text{jeweils} \quad \text{zwei Bücher} \\
\quad \text{D} \quad \text{NP} \\
\quad \text{jeweils} \quad \text{zwei Bücher} \\
\quad \text{AP} \quad \text{NP} \\
\quad \text{YP} \quad \text{jeweils} \\
\quad \text{AP} \quad \text{zwei}
\]

In (42a), *jeweils* is the head of the DP and takes a DistShareNP as its complement. In (42b), *jeweils* forms a complex D-head with the numeral *zwei* 'two'. In (42c), *jeweils* is a maximal projection adjoined to the adjectival numeral *zwei* 'two'.

At first sight, the syntactic structures in (42b) and (42c) seem plausible. Analogous structures have been proposed for the morphologically related *s*-expressions *wenigstens* 'at least' and *höchstens* 'at most' (more on these in section 4.4). Keenan & Stavi (1986:262) analyse the corresponding English phrases *at least two*, *at most two* etc. as complex determiner heads, i.e. as in (42b). Link (1987) takes *at least* and *at most* (and presumably their German counterpart as well) to be adverbial modifiers of an adjectival numeral (cf. 42c). Furthermore, a treatment of adnominal *jeweils* along the lines in (42b) or (42c) would formally assimilate d-distributive constructions in German to those in (i) *Zwei Geschenke* sind den Kindern gegeben.

The massive involvement of scrambling operations (which are triggered by special discourse requirements) may be responsible for the degraded status of (40b).

Of course, the argument in the main text is only valid as long as there is no other way for the VP-internal remnant DP to receive NOM, say by means of case transfer (under co-indexation) from the intermediate trace, or even a covert expletive in SpecIP.

The structures in (41) and (42a-c) are formulated in the traditional X-bar-format of GB-theory. However, the four-way distinction can be reduplicated in alternative frameworks, e.g. Chomsky's (1995) 'Bare Phrase Structure'. The corresponding representations would be {zwei Bücher, {jeweils, zwei Bücher}} (41), {jeweils, {zwei Bücher, {jeweils, zwei Bücher}}} (42a), {zwei Bücher, {jeweils, zwei Bücher}}} (42b), and {Bücher, {zwei Bücher, {jeweils, zwei Bücher}}}} (42c) respectively.
languages which express d-distributivity by reduplicating the numeral. (43) repeats an example from Hungarian from chapter II.4.

(43) A gyerekek hoztak egy-egy könyvet.  [Hungarian]
    the children bought a-a book
    ‘The children bought a book each.’

On the assumption that reduplication affects the numeral itself, the structure of (43) would be very similar to those in (42bc).

Nonetheless, I would like to maintain that the structure of jeweils-DPs is not that in (42b) or (42c).\(^{20}\) Evidence for this claim comes in form of the extraction data from the previous section. The grammaticality of (39b), repeated as (44), shows that the DistShare can be extracted out of the jeweils-DP, leaving jeweils behind.

(44) [Zwei Geschenke] hat Peter den Kindern ja doch gerade [jeweils t] gegeben.
    two presents has Peter the children PART just each given

Such an extraction is predicted to be impossible by (42b) and (42c). In these structures, the numeral zwei ‘two’ and the plural NP Bücher ‘books’ do not form a constituent to the exclusion of jeweils. The extraction facts clearly show, then, that jeweils does not form a constituent with the numeral. Instead, the numeral seems to form a constituent with the plural NP (henceforth ‘DistShareNP’). This conclusion is corroborated by the observation that an extraction as in (44) is impossible with genuine numeral modifiers. In (45a), the modifier genau ‘exactly’ cannot stay behind when the numeral NP zwei Würstchen ‘two sausages’ moves. This fact supports the underlying syntactic structure in (45b).\(^{21}\)

(45) a. *Zwei Würstchen haben sie gerade genau t gekauft.

The contrast between (44) and (45a) argues against adopting (42b) or (42c) as syntactic structures for jeweils-DPs.

This conclusion is supported by the fact that adnominal jeweils can combine with a complex DistShareNP in form of two conjoined numeral NPs, as in (46).\(^{22}\)

(46) Peter schuldet seinen Großvätern jeweils 200 Euro und fünf Konzertkarten.
    Peter owes his grandfathers each 200 Euro and five concert tickets
    ‘Peter owes his grandfathers 200 Euro and five concert tickets each.’

Since only constituents can be co-ordinated, (46) shows that numeral and NP form a constituent, and that the structure of jeweils-DPs cannot be as in (42bc).

At the same time, there is reason to doubt that jeweils is the head of the jeweils-DP, as in (42a). To begin with, unlike other overt D-heads in German\(^ {23}\), jeweils does not inflect

\(^{20}\) In chapter V.4.4, I offer a speculation to the effect that the structure of the Hungarian (43) is not as in (42bc) either. There, (43) is assigned the structure in (43a), and is therefore parallel to German jeweils-DPs.

\(^{21}\) The structure in (45b) is supported by semantic considerations. Unlike the non-modified NP zwei Bücher ‘two books’, the modified structure genau zwei Bücher ‘exactly two books’ is best interpreted as a generalised quantifier with the complex head genau zwei ‘exactly two’ as the quantificational D-head of the structure.

\(^{22}\) Thanks to Daniel Büring (p.c.) for providing this piece of evidence.
for number or gender of the DP. Also unlike other D-heads, jeweils does not inflect for external case. As argued in chapter II.1.3, jeweils is invariably case marked for genitive, no matter if the jeweils-DP occurs in a nominative, accusative, or dative environment. All this casts doubt on the assumption that the D-features of the DP (case, number, gender) are represented on jeweils, as they should if jeweils was the head of the DP.

Second, the genitive marking on jeweils argues against its head status since case is usually assigned to maximal projections. A final argument against the head of jeweils comes from the optional occurrence of jeweils in postnominal position. This was discussed in chapter II.4.2.1, and is illustrated again in (47a).

(47) a. [DREI Würstchen jeweils] haben die Jungen gegessen.
    three sausages each have the boys eaten

b. [Jeweils drei Würstchen] haben die Jungen gegessen.

If jeweils were the head of the DP, the optional positioning of jeweils in (47ab) would force us to assume that this head is able to occur to the left and to the right of its complement, a behaviour quite atypical of heads. Of course, it is conceivable that the NP drei Würstchen ‘three sausages’ in (47a) has moved overtly around the D-head to SpecDP. Unlike in Scandinavian languages, where the definite determiner often follows its (NP)-complement (e.g. in Swedish hus-et ‘house-the(nom,sing)’), NP-complements in German generally do not precede their D-head (e.g. *drei Jungen die ‘three boys the’). It would be peculiar if jeweils-DPs were the only instance of such a configuration in German. Also notice that NP-movement to SpecDP in the Scandinavian languages is obligatory, whereas NP-movement around jeweils would be optional. I conclude that jeweils is not the head of the DP, and that (42a) is not the structure of jeweils-DPs.

By way of exclusion, we therefore arrive at the conclusion that jeweils is a maximal projection which forms part of a larger nominal constituent, a jeweils-DP, together with the DistShareNP. The discussion is summarised by means of the structure in (48).

(48) The Structure of Jeweils-DPs:
    [DP … [VP jeweils]… [NP DistShare]]

Adnominal jeweils is usually located in the left periphery of the jeweils-DP, but it can also follow the DistShareNP in particular contexts.

2.3 The Problem of Multiple Analyses and a Way Out

Having established the structure in (48), a number of questions about the syntactic structure of jeweils-DPs remain. The open questions are listed in (49).

(49) i. What is the exact position of jeweils in (48)? Is it a specifier (in SpecDP), or an adjunct to DP?24
ii. Is jeweils base generated in this position, or has it moved there?
iii. If movement has applied, what is the base position of jeweils?
iv. What is the internal syntactic structure of jeweils (a maximal projection)?

23 Cf. the paradigms for definite determiner dermasc.sing.NOM, dierfem.sing.NOM, dasnet.sing.NOM, denmasc.sing,ACC, diepl.masc.sing,ACC, dierfem.pl.NOM, ...
24 or for the distributive D-quantifier jeder, jede, jedes,… ‘every’.
24 This question is irrelevant in Kayne’s (1994) framework of ‘antisymmetry’, in which all specifiers are adjuncts to a maximal projection.
v. What is the categorial status of jeweils?

Finding answers to the questions in (49) is the objective of sections 3 and 4. The search for these answers is complicated by the fact that it appears impossible to give definite answers to all the questions in (49) by looking at jeweils-DPs in isolation. Many different analyses are in line with the general structure in (48). In response to the ‘problem of multiple analyses’, I suggest the following approach to the analysis of jeweils-DPs.

Whenever it is hard or impossible to answer a question in (49) by looking at jeweils-DPs in isolation, we will look for related constructions, both in German and cross-linguistically, which share characteristic properties with jeweils-DPs, and which provide us with more overt clues about their syntactic structure. This approach is based on the assumption that identical properties of two constructions follow from an identical underlying structure (possibly forced by identical underlying semantic requirements). For instance, if jeweils has moved to its surface position in (48), we expect to find corresponding structures without movement in other languages, or in related German constructions. Obvious candidates in question are distance-distributive constructions in languages in which the distance-distributive element occurs after the DistShareNP, as e.g. in English. Regarding related constructions in German, it will be argued that ‘inverse linking constructions’ (cf. May 1985) and what I call ‘jeNP-constructions’ have the same underlying structure as jeweils-DPs. Looking at these related structures, then, will help to answer the questions in (49i) and (49ii). In addition, looking at inverse linking and jeNP-constructions (and at distance-distributive constructions in other languages) will provide us with clues concerning the internal structure and categorial status of jeweils itself (cf.49iv,v). As will be demonstrated in sections 4 and 5, the same underlying analysis can be postulated for all these constructions as well as for jeweils-DPs.

Instead of postulating individual analyses for a number of – at first sight – disparate constructions in German and cross-linguistically, the present account aims at a unified analysis for all of them. A uniform analysis is warranted by the set of properties shared in common by the different constructions. The analysis to be proposed is unifying in two ways. It is unifying cross-linguistically, accounting for both syntactic similarities and differences between distance-distributive constructions across languages. And it is unifying intra-linguistically, accounting for identical properties of three nominal constructions in German that appear to be unrelated at first sight. Its high degree of generality is taken to be a virtue of the analysis proposed. It also motivates the use of evidence from other syntactic structures in our search for the correct analysis of jeweils-DPs.

In the following section, I introduce the related syntactic constructions that will assist us in formulating an adequate syntactic analysis of jeweils-DPs.

2.4 Related Structures

As discussed in the preceding section, the syntactic analysis of jeweils-DPs makes use of the following principle: What we cannot find out by looking at jeweils-DPs in isolation, we may find out by looking at constructions which are related syntactically and semantically. At the end of the discussion, a unified analysis of jeweils-DPs and related constructions will have emerged. This section is devoted to a brief presentation of the

25 There is also direct evidence from jeweils-DPs concerning (49ii) and (49iii). In (47ab), it was observed that jeweils can optionally occur in postnominal position. A movement analysis can account for the optional positioning of jeweils by assuming optional movement (e.g. for discourse reasons).
relevant constructions which have a bearing on the analysis of jeweils-DPs. Section 2.4.1 recapitulates distance-distributive constructions from languages in which the distance-distributive element follows the DistShareNP. Section 2.4.2 presents inverse linking and jeNP-constructions in German, and shows that they share some characteristic properties with jeweils-DPs. In section 2.4.3, I highlight the differences between the constructions that a unified analysis must account for.

2.4.1 Postnominal Distance-Distributive Elements

As discussed in greater detail in chapter II.4.2.1, the distance-distributive element (henceforth ‘DD’) follows the DistShareNP in a number of languages (including, optionally, German). Here, I will concentrate on English and Korean, where the DD follows the DistShareNP. As pointed out in chapter II.4.2, languages with postnominal DDs share a number of properties with jeweils-DPs. First, they form a constituent with the DistShareNP. The constituent can be displaced as a whole (cf. 50ab).

(50) a. [One interpreter each] was assigned t₁ to the visiting diplomats.
   b. [noray-han-kok-ssik-ul] sonim-motwu-ka t₁ pwul-ess-ta
   song one CL each-ACC guest all - NOM sing-PST
   ‘The guests a song each.’ (Choe 1987:48, ex.12; from Kim 1985:107-126)

Second, the DistShareNP must be indefinite (Safir & Stowell 1988:428).

(51) a. The boys adore two / some / many / at least five / more than five pop stars each.
   b. *The boys adore the / every pop star each.

   child-pl NOM balloon one ACC bought
   The children bought one balloon each.’ (Choe 1987:49,ex.13)
   b. *Sonyen-tul-un ku chayk-ssik-(ul) ilk-et-ta. (S. Kim, p.c.)
   boy-PL-TOP the book-each-ACC read-PAST-DEC/IND

Third, their DistKey must be a plural expression (Safir & Stowell 1988:428, Choe 1987:58). Korean sentences with no over plural antecedent are grammatical, but must be interpreted as distributing over an implicit pluralic entity in the context (cf.53c):

(53) a. The boys/ Peter and Paul / All the boys / Two boys bought two sausages each.
   b.* Paul / the boy bought two sausages each.
   c. na-nunphwungsen-hana-ssik-ul sa-ess-ta. [Korean]
   I-TOP balloon one ACC bought
   ‘I bought a balloon each time / on each occasion.’ (Choe 1987:52, ex.18)

Fourth, DistKey and DD must be clausemates. The DD cannot distribute over a DistKey in a higher clause (Safir & Stowell 1988:446, Choe 1987:55-57).

(54) a. *The store clerks, said that John had bought a balloon each, from Mary.

---

26 The indefiniteness restriction is subject to the same qualifications as in chapter II.1.5, fn.8. In particular, the DistShareNP must denote a count noun expression, not a mass term:
   (i) *The boys bought sugar each.
b. chemwen-tul-i [John-i Mary-hantheyse phwungsen-hana-ssik-ul clerk-pl NOM John- NOM Mary-from balloon one each- ACC 
sa-ess-ta]-ko malha-ess-ta bought said

**Each store clerk said that John had bought a different balloon from Mary.**

(50)-(54) show that the postnominal DDs in English and Korean have the characteristic properties of adnominal jeweils. On the null hypothesis, these shared properties are the reflex of a shared underlying structure. This implies that either the German surface order is derived from the English and Korean surface order, or vice versa. Taking up proposals made in Lipták & Zimmermann (2000) and Zimmermann (to appear, a), I propose the hypothesis in (55).

(55) Adnominal jeweils in German jeweils-DPs is base-generated in postnominal position and moves overtly to DP-initial position (in the unmarked case).

The same holds for DDs in the other languages in which they occur before the DistShare in DP-initial position (see chapter II.4.2.1 for details). In languages like English and Korean, on the other hand, the DD never moves overtly, but remains in its base position. The decision to take the English word order as basic is supported by theoretical considerations (movement is mostly to the left, universally27). In addition, there are two German constructions that somewhat resemble distance-distributive constructions to a certain extent, and that exhibit the English word order as their unmarked “basic” word order. The assumption of the English word order as basic allows for an extension of the analysis to these constructions as well.

2.4.2 Related DP-Constructions in German

There are two German DP-constructions that exhibit the underlying (English) word order overtly. These are inverse linking constructions (henceforth: ILCs) and jeNP-constructions.28 ILCs occur in English and German, whereas jeNP-constructions are confined to German. The English equivalent of the jeNP-construction is the perNP-construction, as shown in the gloss of (56b).

The interesting observation is that ILCs and jeNP-constructions behave like jeweils-DPs in a number of respects despite surface differences in their syntactic structure. Consider (56a) with a jeweils-DP, (56b) with a jeNP-construction, and (56c) with an ILC (all in italics)

(56) a. Der Direktor hat den Gefangenen jeweils drei Bewacher bereitgestellt.
the director has the inmates each three guards assigned

b. Der Direktor hat drei Bewacher je Gefangenen bereitgestellt.
the director has three guards per inmate assigned

c. Der Direktor hat drei Bewacher für jeden Gefangenen bereitgestellt.
the director has three guards for each inmate assigned

‘The director has assigned the inmates three guards each.’

27 For Kayne (1994), all movement is to the left without exception.
28 The DP-status of these constructions is inferred from the fact that they occur in argument position.
Before we look at the similarities, it is worth pointing out three differences between the jeweils-DP in (56a) and the constructions in (56bc). First, On the unmarked word order, the universally quantified expression precedes the DistShareNP drei Bewacher ‘three guards’ in (56a), but follows it in (56bc). Second, the structures in (56bc) differ from jeweils-DPs in that they both contain an NP (Gefangenen) which restricts the universal quantifier semantically, and which appears to be its complement syntactically. In contrast, the restricting NP (the DistKey) of the jeweils-DP in (56a) appears to form an independent constituent. Finally, (56c) differs from (56ab) in that the ILC contains an overt preposition. I will come back to these differences shortly, observing that a unified analysis will have to account for them.

Turning to the similarities, the first observation is that jeweils-DPs, jeNP-constructions, and ILCs can be substituted for one another without a change in meaning. (56a-c) are synonymous. In all three sentences, the universal quantifier takes scope over the numeral expression. On the null hypothesis, this synonymy is the result of a shared underlying structure. Assuming that the universally quantified expression is base-generated in postnominal position (in line with the cross-linguistic considerations above), it follows that the prenominal position of jeweils in (56a) is derived from an underlying postnominal position by movement.

The three constructions share more properties in common, supporting the assumption that they have the same underlying structure. In all three constructions, the quantified phrase forms a constituent with the DistShareNP. For jeweils-DPs, this was shown in 2.1.1. For jeNP-constructions and ILCs, this is shown in (57ab), where the two elements topicalise together.

(57) a. jeNP-Construction:
[Drei Bewacher je Gefangenen]$_1$ hat der Direktor $t_1$ bereitgestellt.
three guards per inmate$_{DAT}$ has the director assigned
‘It was three guards per inmate that the director has assigned.’

b. ILC:
[Drei Bewacher für jeden Gefangenen]$_1$ hat der Direktor $t_1$ bereitgestellt.
three guards for each inmate$_{ACC}$ has the director assigned
‘It was three guards to each inmate that the director has assigned.’

Second, jeNP-constructions and inverse linking constructions show optional movement of the quantified phrase to DP-initial position. To make sure that this movement is indeed DP-internal (and not, say, an instance of middle field-internal scrambling out of the embedding DP), this is shown for topicalised DPs in sentence initial position.

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29 This is the only reading for (56a) and (56b). (56c) has an additional ‘surface’ reading on which the numeral expression takes scope over the universal quantifier. This reading is irrelevant for our present purposes because ILCs on the surface reading do not behave like jeweils-DPs. In section 3, I show that the two readings are derived from different surface structures. Of these, only the structure for the reading in the main text, the ‘inverse reading’, is of interest here. In what follows, whenever I talk about ‘the parallel behaviour of jeweils-DPs and ILCs’, this should be read as ‘the parallel behaviour of jeweils-DPs and ILCs on the inverse reading’. See section 3 for further discussion.

30 The moved constituent is actually a PP in the ILC in (58b). This could be attributed to pied-piping. However, in section 3 it will be argued that the PP in (58b) is re-interpreted as a quantified expression for semantic reasons. Therefore, the generalisation in the main text that a quantified phrase moves is accurate.
(58) a. jeNP-construction:

\[
\text{Je GEFANGENEN}_t \text{ drei Bewacher } t_1 \text{ hat der Direktor bereitgestellt per inmate}_\text{DAT} \text{ three guards } \text{ has the director assigned }
\]

‘It was three guards per inmate that the director has assigned.’

b. ILC:

\[
\text{Für jeden GEFANGENEN}_t \text{ drei Bewacher } t_1 \text{ hat der Direktor bereitgestellt foreach inmate}_{\text{ACC}} \text{ three guards } \text{ has the director assigned }
\]

‘It was three guards to each inmate that the prison director has assigned.’

The small caps on the fronted constituent indicate that movement in (58ab) is triggered by discourse requirements (see section 4.4.1). Later, it will be shown that fronting of jeweils also takes place for discourse reasons.

Semantically, the indefiniteness restriction on the DistShare, which was observed for jeweils-DPs in chapter II.1.5, also holds for jeNP-constructions and ILCs. Compare the grammatical (56bc) from above with the ungrammatical (59ab), where the DistShare expression is definite. Again, DPs in sentence internal position are used in order to exclude the possibility that we deal with two independent DPs.31

(59) a. jeNP-construction:

\[
\text{* [den Bewacher je Gefangenen] hat der Direktor bereitgestellt the guard per inmate}_{\text{DAT}} \text{ has the director assigned }
\]

*‘The director has assigned the guard per inmate.’

b. ILC:

\[
\text{* [den Bewacher für jeden Gefangenen] hat der Direktor bereitgestellt the guard for each inmate}_{\text{DAT}} \text{ has the director assigned }
\]

‘The director has assigned the guard to each inmate.’

Finally, the three constructions behave alike regarding extraction from them. All allow for extraction of the quantified phrase, as witnessed by (60a-c).

(60) a. jeweils$_1$ hat der Direktor den Gefangenen $t_1$ drei Bewacher bereitgestellt. each has the director the inmates$_{\text{DAT}}$ three guards assigned

b. Je Gefangenen$_1$ hat der Direktor drei Bewacher $t_1$ bereitgestellt. per inmate$_{\text{DAT}}$ has the director three guards assigned

c. Für jeden Gefangenen$_1$ hat der Direktor drei Bewacher $t_1$ bereitgestellt. for each inmate$_{\text{ACC}}$ has the director three guards assigned

‘The director has assigned the inmates three guards each.’

And all of them allow for extraction of the DistShareNP, as witnessed by (61a-c).

(61) a. Drei Bewacher$_1$ hat der Direktor den Gefangenen jeweils$_1$ drei Bewacher bereitgestellt. three guards has the director the inmates$_{\text{DAT}}$ each assigned

31 For instance, sentence (i) with a definite direct object and a prepositional object in the middle field is grammatical:

(i) Der Gefängnisdirektor hat [den Bewacher] [für jeden Gefangenen] bereitgestellt. the prison director has the guard for each inmate provided

‘The prison director has provided the same guard for each inmate.’

32 For (60c), it is impossible to tell if the fronted PP has extracted out of an object DP, or if we simply have to do with a fronted prepositional object as in (i) in fn.31. The same caveat holds for (61c) below.
b. *Drei Bewacher, hat der Direktor t₁ je Gefangenen bereitgestellt.*
three guards has the director per inmate assigned

c. *Drei Bewacher hat der Direktor t₁ für jeden Gefangenen bereitgestellt.*
three guards has the director for each inmate assigned

‘The director has assigned the inmates three guards each.’

Concluding this section, it was shown that *jeweils*-DPs, *je*-NP-constructions, and ILCs behave alike in a number of respects. Semantically, all constructions give rise to the same interpretation, and all exert an indefiniteness restriction on the DistShareNP. Syntactically, all constructions consist of a quantifying expression and an indefinite NP, all of them allow for movement of the quantified phrase to DP-initial position, and all of them allow for extraction of quantified phrase and DistShareNP respectively. The semantic and syntactic parallels suggest that the three DP-constructions have the same underlying structure.

### 2.4.3 Differences between DP-Constructions and Consequences for *Jeweils*-DPs

Below (56), it was pointed out that the various DP-constructions under discussion exhibit a number of differences. These differences concern the presence or absence of a restricting NP for the universal quantifier inside the DP, the (unmarked) relative word order between quantified phrase and DistShareNP, and the presence or absence of an overt preposition. ILCs and *je*-NP-constructions contain a full NP as restriction of the quantifier, whereas *jeweils*-DPs require an antecedent DistKey expression. With ILCs and *je*-NPs, the quantified expression usually does not move, whereas *jeweils* usually moves to DP-initial position. Finally, ILCs contain an overt preposition.

Since a unified analysis assumes a single underlying structure for all three constructions, the following questions arise regarding the structure of *jeweils*-DPs.

(62). i. Do *jeweils*-DPs contain a restricting expression for the universal quantifier like *je*-NPs and ILCs? If so, what is the nature and position of this restricting expression?
ii. Why do *jeweils*-DPs normally co-occur with a DistKey antecedent, whereas ILCs and *je*-NPs do not?
iii. Do *jeweils*-DPs contain a prepositional phrase like ILCs?
iv. Why does *jeweils* move to DP-initial position in the unmarked case, and why does the quantified expression normally stay behind with ILCs and *je*-NPs?

The upcoming discussion in sections 3 to 5 provides answers to the questions in (62). Anticipating the results of the discussion, (63) shows the internal structure of *jeweils*-DPs that will be argued for.

(63)

```
  DP
     /   \\    \\
    PP₁  D'   \\
      \    \\
       QP   D₀   NP
          \   \   \\
           \   DistShare
             \  t₁ \\
              \   \\
               \  NP
                 \ \\
                  \  je-weil-s
```
In (63), the distance-distributive element *jeweils* is analysed as a PP which consists of three parts: an empty P-head (licensed by overt genitive morphology on its complement), a universal quantifier *je*, and a - what I will call - NP-proform *-weil-*, which is a proform for lexical NPs. Being an NP-proform, *-weil-* ranges over sets of entities and can provide the universal quantifier with its restriction. *Weil-* receives its value through co-indexation with a DistKey antecedent. The PP \[[P^0 jeweils]\] is base-generated in postnominal position, where it is adjoined to the DistShareNP. From there, it moves to the specifier of DP, triggered by discourse requirements (hence the contextually restricted option to stay behind).

2.5 Conclusion and Preview of Things to Come

This section has presented the first steps towards a syntactic analysis of adnominal *jeweils*. The distance-distributive element *jeweils* and the DistShareNP have been shown to form a constituent, which is a DP. Furthermore, it was shown that *jeweils* is a maximal projection located in the left periphery of the DP. Finally, a first comparison with related constructions from other languages and from German has led to the formulation of the hypotheses in (64).

(64) i. Adnominal *jeweils* is base-generated in postnominal position inside the *jeweils*-DP.

ii. English exhibits the universal underlying structure of DD-constructions overtly.

iii. Adnominal *jeweils* moves overtly to SpecDP for discourse reasons.

iv. *Jeweils* is syntactically complex. It is a maximal projection with the categorial status of a PP. The PP is headed by a covert preposition \(P^0\) that is licensed by genitive case on its NP-complement.

v. The NP-complement consists of the universal quantifier *je* and its restriction, the proform *-weil-*. The latter is co-indexed with a DistKey expression.

The last point is of particular interest. If correct, it shows that distance-distributive elements behave like regular quantifiers after all. They take their semantic restriction as syntactic complement. They differ from other adnominal quantifiers in that the restriction is not provided by a lexical NP, but by a proform which receives its value from an element in the linguistic context under co-indexation.

In the following sections, I lay out the syntactic analysis of adnominal *jeweils* in detail. I will start with a discussion of the syntax of ILCs because these have received considerable attention in the literature. I will argue that the surface structure of ILCs is different from what is commonly assumed in the literature (May 1977, 1985, Larson 1985a, Heim & Kratzer 1998). Based on the assumption that ILCs, *je*NP-constructions and *jeweils*-DPs have the same underlying structure, the analysis is extended to the latter two constructions in section 4. Section 4 forms the central part of the chapter. It introduces and defends the syntactic structure of adnominal *jeweils*. In section 5, the syntactic analysis of adnominal *jeweils* is extended to distance-distributive constructions in other languages. These are argued to have the same syntactic structure. Differences between languages are shown to derive from general cross-linguistic syntactic differences, and from the morphosyntactic feature content of the distance-distributive elements themselves.
CHAPTER III

3 The Structure of Inverse Linking Constructions (ILCs)

This section presents the syntactic analysis of ILCs, which provides the basis for the analysis of jeweils-DPs in section 4. In section 3.1, I discuss the characteristic properties of ILCs as illustrated in (65ab).

(65) a. \[\text{DP Ein Apfel [PP in [QP jedem Korb]]] ist faul.}\n
b. \[\text{DP One apple [PP in [QP every basket]] is rotten.}\]

Since ILCs in English and German behave alike syntactically and semantically, the discussion is based on English examples. All points raised apply equally well to ILCs in German. In 3.2, I present the standard account of ILCs as found (with variations) in May (1977, 1985), Larson (1985a) and Heim & Kratzer (1998). In 3.3, I raise some problems for the standard account that motivate a revised analysis of the structure of ILCs. The revised analysis is presented in 3.4. The central claim of the revised analysis is that the postnominal PP in (65) is not base-generated below the numeral one – as commonly assumed –, but above it. In particular, it is right-adjointed to an NP consisting of numeral and head noun. 3.5 shows how the properties of ILCs follow on the revised analysis. Finally, I briefly discuss an alternative version of the revised analysis that does without right-adjunction in 3.6. The purpose of this section is to show that the revised analysis is not contingent on the possibility of right-adjunction, which is in some frameworks excluded on general grounds.

3.1 The Properties of ILCs

ILCs, illustrated again in (66ab), are first discussed in May (1977):

(66) a. \[\text{DP One apple in [QP every basket]] is rotten.}\n
b. \[\text{DP Some man from [QP every city]] despises it.}\]

ILCs are DPs that contain a quantified NP (QP) that is selected by a preposition. ILCs have three characteristic properties. First, they are ambiguous between the surface scope (henceforth: ‘surface’) reading and an inverse scope (henceforth: ‘inverse’) reading (cf. 67ab). On the inverse reading, the embedded QP takes scope over the indefinite or numeral expression. It is on their inverse reading that ILCs show a behaviour parallel to that of jeweils-DPs. Therefore, the syntactic structure that gives rise to this inverse reading will be of particular interest to us. Second, on the inverse reading, the DP-internal QP can bind a pronoun outside the ILC (cf.68ab). Third, ILCs are restricted to non-specific DPs (Fiengo & Higginbotham 1981). The inverse reading is impossible with specific DPs, as shown in (69).

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33 This bound-variable reading is not available for all speakers. See chapter V.4.1 for more discussion. The use of ‘*’ and ‘#’ in (67a) and (68a) reflects the different status of the two readings. The reading in (68a) is generally impossible, whereas ‘surface’ readings as in (67a) are possible in principle, but can be excluded on pragmatic grounds (Pafel 1997:177). (i) is an example of an ILC with a plausible surface reading.

(i) Some trip to every city was fantastic.

= ‘There was a trip which led to every city and which was fantastic.’

34 As pointed out in chapter II.1.5, fn.8, the indefiniteness condition on adnominal jeweils is really a non-specificity condition (see also chapter IV.5). This way, the parallelism between ILCs and jeweils-DPs can be maintained.
(67) One apple in every basket is rotten.
   a. #There is one apple which is in every basket and which is rotten.
   b. In every basket, there is one apple that is rotten.

(68) Some man from every city despises it.
   a. *There is a specific man from every city who despises it.
   b. For every city y, some man from y despises y.

(69) This picture of everybody is now on sale.
   *For everybody y, this picture of y is on sale.

The properties of ILCs are frequently attributed to the application of LF-movement (May 1977, 1985, Fiengo & Higginbotham 1981, Heim & Kratzer 1998, Fox 2000). LF-movement raises the embedded QP to a position from where it can take scope over the numeral/indefinite expression, and from where it can bind a variable outside the ILC. I summarise these analyses under the label ‘LF-movement analysis’.

3.2 The LF-Movement Analysis

May (1977, 1985) and Heim & Kratzer (1998) assume the surface structures in (70) for the ILCs in (66):

(70) a. [DP One [NP apple [PP in [QP every basket]i]]] is rotten.
    #‘There is one apple which is in every basket and which is rotten.’
   b. [DP Some [NP man [PP from [QP every city]i]]] despises iti.
    #‘There is some man who is from every city and who despises it.’

The surface structures in (70) can be targeted by LF-movement. Since LF-movement for interpretive reasons (e.g. scope) is optional (Fox 2000), it need not apply. In this case, the QP remains in situ. It takes surface scope under the numeral/indefinite expression (cf.70ab), and is unable to bind a variable outside the ILC (cf.70b). If LF-movement applies, the QP raises across the indefinite/numeral expression. In May (1977), the QP is extracted from the embedding DP. In May (1985) and Larson (1985a), it only adjoins to the embedding DP. The latter option is illustrated in (71ab). (71ab) show that the raised QP takes scope over the indefinite/numeral expression at LF, and it is able to bind a variable outside the ILC, arguably under c-command.

(71) a. [DP [QP every basket]i [DP one apple [PP in t1i]]] is rotten.
   b. [DP [QP every city]i [DP some man [PP from t1i]]] despises iti.

3.3 Problems for the LF-Movement Analysis

The LF-movement analysis is convincing at first sight. It seems to account for the characteristic properties in an elegant and systematic fashion, and it is in line with standard assumptions about the workings of the syntactic component. Nonetheless, there are a number of problems for the LF-movement analysis, raising the question if there is no better analysis available. In addition, the analysis rests heavily on the assumption of LF-movement. Since one of the methodological principles of this thesis is to avoid LF-movement where possible, I propose to look for an analysis of ILCs that does without LF-movement.

35 At least under Kayne’s (1994) definition of c-command, according to which elements left-joined to maximal projections always c-command out of these because the latter do not dominate them.
There are three kinds of problems for the LF-movement analysis of ILCs. The first problem arises in connection with contradictory evidence regarding the landing site of the raised QP. An analysis without LF-movement would avoid such a contradiction. Second, cross-linguistic considerations argue against an LF-analysis of ILCs. An analysis without LF-movement would make possible a unified treatment of English and German ILCs, where LF-movement is not so readily available. Third, there is evidence that the surface structure of ILCs on their inverse reading is not as indicated in (70ab). The QP seems to be structurally higher than the numeral/indefinite expression at surface structure already, making LF-movement (for scope reasons) obsolete.

3.3.1 Contradictory Evidence Concerning the Landing Site
May (1985) and Larson (1985a) present empirical evidence that shows that the QP in ILCs does not extract from the embedding DP. Larson shows that certain inverse readings that would result from extraction of the QP out of the DP are not attested. I illustrate his argument using the somewhat simpler example in (72).

(72) One apple on every plate is too much.

(72) means that it is too much that every plate is such that there is one apple on it (while it is OK for some plates to have an apple on them). The reading of (72) indicates that the universal QP takes scope over the numeral. It does not extract from the DP, however, for such movement would result in the LF-structure in (73a), with the unattested reading in (73b).

(73) a. [every plate], [IP [DP one apple on t1] is too much.]
b. *'Every plate x is such that one apple on x is too much.'

That is, there should be no apple on any plate. The existence of sentences like (72), and a general ban on subextraction from subject DPs (cf. Huang 1982, May 1985), illustrated in (74), provide empirical evidence in favour of an analysis that does not assume extraction of the QP from the embedding DP.

(74) *Who did [the teacher of t1 ] call?

On the other hand, Fiengo & Higginbotham (1981) assume extraction of the QP from the embedding DP. For them, the non-specificity of ILCs (cf.69) follows from the fact that specific DPs form a barrier for extraction. This is illustrated in (75).

(75) *Whom did he read this book of t1 ?

The claim that ILCs are restricted to non-specific DPs because these do not form barriers for extraction seems to imply that extraction of the QP out of the DP is what is at stake in ILCs.

In conclusion, assuming LF-movement for ILCs leads to contradictory assumptions about the landing site of such movement. Extraction of QP from the embedding DP accounts for one set of data (the specificity effect). Adjunction of QP to DP accounts for another set (the unattested reading in (73)). In light of this contradiction, it appears promising to look for an analysis that accounts for the observed facts without assuming LF-movement of the QP.
3.3.2. Cross-Linguistic Considerations

The second problem arises from cross-linguistic considerations. (65a), repeated as (76), shows that ILCs in German are syntactically and semantically parallel to their English counterparts. The only plausible reading for (76) is the inverse scope reading. However, German shows at best weak evidence for scope driven LF-movement elsewhere in the grammar. There seems to be general agreement in the literature (cf. Frey 1993, Sæbø 1995, Pafel 1997, Krifka 1998) that sentences such as (77) lack an inverse scope reading on a neutral intonation.

(76) [Ein Apfel in jedem Korb] ist faul.
    one apple in every basket is rotten
    ‘For every basket z, one apple in z is rotten.’

(77) Ein Arzt behandelte jeden Patienten.
    A/some doctor treated every patient
    *‘For every patient, there was a (different) doctor who treated him.’

The absence of an inverse scope reading for (77) can be taken as an argument against scope-driven LF-movement in German. The question arises, then, why scope-driven LF-movement in German should apply only with ILCs.\footnote{One has to be careful here. In chapter V.4.1, it will become apparent that LF-movement for semantic reasons in German is possible, and in a restricted number of cases even necessary. However, none of the cases discussed there involves (quantifier) scope-driven LF-movement. Rather, the triggers for LF-movement are type-mismatch and the need to move indexed expressions into a position where their index is visible to the semantic derivation. Nevertheless, the status of the problem in the main text depends on the (non-)availability of scope-driven LF-movement in German. If such movement should turn out to exist in German after all, the problem evaporates. If such movement does not exist, a surface analysis for German ILCs is both more adequate and in line with the general methodological principle of avoiding LF-movement when possible.}

Concluding, the parallel structural and interpretive behaviour of English and German ILCs calls for a unified analysis. On the other hand, German provides little evidence for the application of LF-movement in other syntactic configurations. For this reason, a unified analysis in terms of surface structure is to be preferred.

3.3.3 Evidence for a Different Surface Structure

Even if the first two problems should turn out to be solvable, there is another set of data which – to my knowledge – has not been previously discussed, and which suggests that something is amiss with the LF-movement analysis. The data concern the surface structure of ILCs on the inverse reading, in particular the position of the postnominal PP. The LF-analysis assumes that the PP stands in sister position to the head noun, below the numeral/indefinite. This was shown in (70ab) above.

The problem comes in form of an unexpected asymmetry which shows up in the presence of other postnominal modifiers, e.g. relative clauses or other PPs. It turns out that inverse readings are possible if and only if the PP containing the QP (henceforth ‘QPP’) occurs in DP-final position (i.e. following all other postnominal material). In contrast, all non-final QPPs must be interpreted as PP-modifiers and can only give rise to surface readings.

Regarding the relative order of QPPs and relative clauses (‘RCs’), ILCs can have an inverse reading if and only if the QPP occurs in DP-final position (78a). If the QPP precedes the RC, the inverse reading is unavailable (78b).
(78) a. One person [RC who was famous] [QPP from every city] was invited.
   ‘Every city y is such that one famous person from y was invited.’
   b. #One person [QPP from every city] [RC who was famous] was invited.
   ‘One person who came from every city and who was famous was invited.’

The non-existence of an inverse reading for (78b) is unexpected on the LF-analysis, which presumably takes all postnominal PPs to be modifiers to the head noun. On the plausible assumption that all postnominal modifiers have the same syntactic status, it follows that LF-movement of the QPP should be equally good in (78ab), contrary to fact.37

Regarding the relative order of QPPs and other PP-modifiers, the same facts are observed. Ordinary PP-modifiers can occur in any order (79ab), while inverse readings with ILCs (with the prepositions in, on, from) are contingent on the DP-final occurrence of the QPP (80ab).

(79) a. one slave [PP with good manners] [PP from Syria] was freed.
   b. one slave [PP from Syria] [PP with good manners] was freed.

(80) a. one slave [PP with good manners] [QPP from every province] was freed.
   b. #one slave [QPP from every province] [PP with good manners] was freed.

If QPPs on the inverse reading were ordinary PP-modifiers (right-adjoined to N’), the difference between (80a) and (80b) would receive no explanation. LF-movement should apply equally well to both QPPs, contrary to fact.

To conclude, I have shown that QPPs that give rise to inverse readings with ILCs differ syntactically from other postnominal modifiers. They cannot freely change places with other modifiers, but must be DP-final. This suggests that the surface structure of ILCs - on the inverse reading at least - is not that in (70ab). With a different surface structure for ILCs, however, we need not fall back on LF-movement in order to account for the wide scope of the embedded QP. The correct scopal relationship may hold at surface structure already. In the following, I argue that ILCs do not have ‘inverse’ readings in the literal sense.

3.4 The Surface Analysis of ILCs

In this section, I would like to contest the main reason for assuming LF-movement with ILCs, namely the assumption that the QPP in ILCs is always base-generated in a position

37 The contrast is reproduced in (iab) for the German counterparts of (78ab). (ia) with the QPP in final position is grammatical, if complex on the inverse reading. In contrast, (ib) is degraded.

(i) a. Ein Schauspieler, der berühmt war, aus jeder Stadt, wurde eingeladen.
   ‘One famous actor from every city was invited.’
   b. ??Ein Schauspieler aus jeder Stadt, der berühmt war, wurde eingeladen.
   ‘One person from every city who was famous was invited.’

An inverse reading for (ib) seems possible with an intonational break between QPP and RC. Since extraposition of restrictive RCs to the right is a possibility in German, the RC may be right-dislocated (indicated by intonation) from its base-position between head noun and QPP. The possibility of right-dislocation in German makes it difficult to come up with clear judgments for German. Other factors seem to play a role as well. For instance, (ii) seems not so bad on an inverse reading, even though the QPP precedes the RC.

(ii) Ein Apfel in jedem Korb, der faul war, wurde aussortiert.
   ‘For every basket z, there was one rotten apple in z which was sorted out.’

I have no explanation for this fact.
lower than the indefinite/numeral expression. The structure of ILCs on this assumption is shown in (81).

\[(81)\]
\[
\text{DP} \\
\text{one} \\
\text{NP} \\
\text{apple} \\
\text{QPP} \\
in\text{every basket}
\]

Given the surface structure in (81), the QPP must raise at LF in order to take scope over the indefinite or numeral. The need for assuming LF-movement would disappear, though, if the surface structure for the inverse reading were not as in (81), but rather as in (82).

\[(82)\]
\[
\text{DP} \\
\text{D}^0 \\
\text{NP} \\
\text{one apple} \\
\text{QPP} \\
in\text{every basket}
\]

In chapter I.2.4.2, it was argued that numerals (and other indefinite expressions which are often characterised as weak or existential quantifiers) are not quantificational expressions in D, but rather cardinality adjectives. Like other prenominal adjectives, cardinal adjectives are adjoined to NP (Haider 1988). It follows that the postnominal QPP can adjoin to NP above the numeral in principle, especially since it is quantificational in nature.

Taking up this assumption, I propose a surface analysis for ILCs. In the spirit of Huang (1982), I assume that ILCs are structurally ambiguous at surface structure. The two readings of ILCs derive from the two surface structures in (81) and (82), which are string-identical. It follows that the labels ‘surface’ and ‘inverse’ reading are misnomers, since both are really surface readings. Nonetheless, I will retain the labels for ease of exposition. The two surface structures differ in the position of the postnominal QPP, which is determined by semantic factors. On the surface reading, the QPP is a regular modifier semantically. As such, it is adjoined to NP below the numeral/indefinite expression. On the ‘inverse’ reading, the entire QPP denotes a complex generalised quantifier, and as such must be adjoined above the numeral. The proposed analysis accounts for the characteristic properties of ILCs. In particular, it accounts for the DP-final occurrence of QPPs on the ‘inverse’ reading.

### 3.4.1 The Structure of ILCs on the ‘Surface’ Reading: Low NP-Adjunction

Regarding the ‘surface’ reading of ILCs, illustrated again in (83), nothing new must be said.

\[(83)\]
\[
\text{[One trip to every European capital] was fantastic.} \\
\text{‘There was one trip directed to every EC which was fantastic.’}
\]
I adopt the standard analysis of ‘surface’ readings, which is found e.g. in May (1985) and Heim & Kratzer (1998), and which was illustrated in (70ab) and (81) above. The PP to every European capital is analysed as a PP-modifier that occurs as sister to the NP trip. The numeral adjoins to NP above the postnominal QPP. Notice that I analyse all adnominal modifiers (pre- and postnominal) as being adjoined to NP.38

(84) a. [DP D° [NP one [NP trip [PP to [QP every European capital]]]]] was fantastic.

<table>
<thead>
<tr>
<th>D°</th>
<th>one</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NP</td>
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<tr>
<td></td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>QP</td>
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<tr>
<td></td>
<td>to</td>
</tr>
<tr>
<td></td>
<td>every EC</td>
</tr>
</tbody>
</table>

Semantically, the ‘surface’ reading of ILCs is composed by means of a type-driven semantic derivation, as found in Heim & Kratzer (1998). The QP is type-raised from <et,t> to <<e<et>>,et>, allowing for combining the values of QP and P in situ. The PP as a whole, being of type <et>, is a regular modifier to the head noun. It denotes the property of ‘being directed to every city’. This property combines by predicate modification with the property of ‘being a trip’ expressed by the head noun. At last, the result is modified by the numeral expression that determines the cardinality of the set of things with the properties of being a trip and being directed to every city.39 It is crucial for the analysis of (83) that the PP is a regular postnominal modifier. As such, it occurs below the numeral expression, as do all adnominal modifiers including other prenominal adjectives.

Since ILCs on their ‘surface’ reading do not behave like jeweils-DPs, the syntactic structure of ILCs on this reading will be of no further concern to us.

3.4.2 The Structure of ILCs on the ‘Inverse’ Reading: High NP-Adjunction

In section 2.4.2, it was pointed out that the behaviour of jeweils-DPs parallels that of ILCs on the ‘inverse’ reading. It follows that the syntactic structure that gives rise to this reading of ILCs is of particular interest to the analysis of jeweils-DPs. Below, it will be argued that the structure of ILCs on the ‘inverse’ reading is the underlying structure of both constructions.

38 See Hartmann & Zimmermann (2002), who distinguish between postnominal genitive complements to verb nominalisations (and other relational expressions), as in (ia), and postnominal genitive modifiers that are adjoined to NP, as in (ib):

(i) a. die Zerstörung der Stadt
   the destruction the city
   ‘the destruction of the city’

b. der Verein des Präsidenten
   the team the president
   ‘the team of the president’

The authors argue that a semantic and syntactic distinction into N-complements and NP-modifiers accounts for the observable differences between the constructions concerning their interpretation and distribution.

39 The derivation proceeds as follows:

(i) a. [[on in every basket]] = λx. ∀z [basket’(z) → in’(x,z)]
   b. [[so apple in every basket]] = λx. apple’(x) ∧ ∀z [basket’(z) → in’(x,z)]
   c. [[so one apple in every basket]] = λx. |x|=1 ∧ apple’(x) ∧ ∀z [basket’(z) → in’(x,z)]
The full structure for the ‘inverse’ reading of ILCs is given in (85):

(85) a. \[ \text{DP}^0 [\text{NP} \ [\text{NP} \ \text{one} \ [\text{NP} \ \text{apple}]] \ [\text{QPP} \ \text{in every basket}]]] \\
    \]

The structure in (85) differs from (84) in the adjunction site of the postnominal QPP. In (85), the QPP is adjoined higher than the numeral/indefinite expression and therefore takes scope over it at surface structure. No LF-movement is required for scope reasons (but see fn.36). Another important point is that the analysis in (85) treats the sequence of numeral one and NP apple as a single constituent, in contrast to the LF-movement analysis.

Above, it was argued that the difference in syntactic structure is semantically conditioned. A closer look at ILCs reveals that ‘inverse’ readings with ILCs predominantly show up with a restricted list of prepositions, among which we find in, from, and on. Typically, these prepositions do not allow for a sensible ‘surface’ reading, as witnessed by (86). What these prepositions have in common is that they specify the local position or origin of an entity. It lies in the nature of things that entities above the atomic level usually do not occur at more than one place simultaneously, or come from more than one place. It follows that surface readings of ILCs with these prepositions are perceived as strange. With prepositions that allow for a sensible ‘surface’ reading (e.g. with to or about), ‘inverse’ readings are hard, if not impossible, to get (cf.87).

(86) Some man from / in every city fell ill.
    #Some man who came from / lived in every city fell ill.

(87) Some trip to every city was fantastic.
    a. ‘There was some trip directed to every city which was fantastic.’
    b. ‘??’ For every city x, there was some trip to x which was fantastic.’

The data in (86) and (87) suggest that the syntactic structure in (85) is freely generated only in those cases in which the modifier structure in (84) gives rise to an implausible interpretation.40 In my view, the change in syntactic structure is effected by a change in the meaning of the postnominal QPP. The meaning change ensures the derivation of a meaningful interpretation after all. It turns the QPP in (85) from a property-denoting expression (here: the property of being in every basket) of type \( <e^t> \), into a generalised quantifier (cf. Barwise & Cooper 1981) over pluralities of type \( <e^t,t,t> \) The generalised quantifier denotes a property of sets, or the set of plural properties such that every basket contains an individual that has this property.41

40 In contrast, the generation of the “inverse” structure must be licensed by additional discourse factors for ILCs with a meaningful “surface” reading. This accounts for the difficulty to get “inverse” readings with sentences such as (87).

41 It thus turns out that the label ‘QPP’ is not just a convenient abbreviation, but is meaningful at least in the case of “inverse” readings. The entire PP really denotes a generalised quantifier on these readings.
In order to see how this works, consider a situation with three baskets which all contain two apples, three pears, and one cucumber. In this scenario, the expression in every basket denotes the three properties of being a set of two apples, of being a set of three pears, and of being the singleton set of one cucumber. Each of these properties is instantiated by one individual in each basket in the situation indicated.

The generalised quantifier interpretation of QPPs in ILCs is formalised in (88).

\[
\text{[[in every basket]]} = \lambda P. \forall z \left[ \text{basket}'(z) \rightarrow \exists X \left[ P(X) \land *\text{in}'(X,z) \right] \right]
\]

The expression in (88) takes the property of pluralities P denoted by the numeral NP as its semantic argument. The entire expression is true in a given situation if every basket in that situation contains an element from the set denoted by the numeral NP. Turning back to (85), the expression is true if every basket contains an element from the set of singleton sets of apples. Note that the expression in (88) introduces an additional existential quantifier in the nuclear scope (cf. Heim 1982) of the universal quantifier. The presence of this existential quantifier formally captures the fact that ILCs on their “inverse” readings often have the flavour of asserting the existence of an individual. This is made clear by the paraphrase of (85): In every basket, there IS an apple such that… We will encounter more instances of double quantification in chapter IV where the interpretation of jeweils is discussed.

Reinterpreting the QPP as a generalised quantifier over pluralities may look artificial at first sight, especially since the process of reinterpretation is not a compositional semantic operation. It is not possible to construe the quantifier meaning from the ‘basic’ meaning of the QPP, which is a property. The inclusion of a non-compositional procedure into the semantic component is a weakening of the semantic premise of strict compositionality from chapter I.3. However, there is independent evidence that supports the assumption that QPPs can be reinterpreted in the described manner. In English and German, semantic (or: variable) binding of a pronoun is possible with QPs that are embedded inside a PP. An example from English is given in (89a). The apparent structural configuration between semantic binder and semantic bindee is given in (89b).43

\[
\begin{align*}
(89) & \quad \text{a. In no city have I found anybody who loves it,} \\
        & \quad \text{b. [PP in QPi} \ldots \text{it].}
\end{align*}
\]

The problem is that the QP-binder does not c-command the pronoun in (89b), as it should if semantic binding is licensed under c-command only (Heim & Kratzer 1998:262ff.). The negative quantifier no was chosen in order to exclude the possibility of Quantifier Raising of the QP at LF. As argued in Beghelli (1995), negative QPs do not undergo such movement to take clausal scope at LF.44

\[42 \text{Observe that the semantic type of the NP is } <t> \text{ on the revised analysis, i.e. the NP is assumed to denote a proposition. The existence of proposition-denoting nominal arguments is argued for in chapter IV.4.1.2. The semantic analysis of ILCs is sketched in chapter IV.7.}
\]

\[43 \text{Notice that a blind application of the reinterpretation in (88) to the QPP in (89) gives the implausible result that in no city there is anything which is loved by somebody who I found. The difference between (89) and the basket-example above is due to the event modifying nature of the QPP in (89). See fn.46 on how to reinterpret event modifying QPPs.}
\]

\[44 \text{As witnessed by the impossibility of inverse scope of the prepositional object over the direct object in (ia), and the impossibility to license a negative polarity item in a structurally higher position in (ib).}
\]

\[(i) \quad \begin{align*}
    & \text{a. I showed something to nobody.} \\
    & \text{b. *I showed anything to nobody.}
\end{align*}
\]

\[*\text{There is nobody to which I showed anything.}
\]
In principle, there are two ways out of the dilemma. First, one could take the PP-layer to be invisible for c-command in this particular case (a syntactic stipulation). The fact that the phenomenon in (89) appears to hold for prepositions in general argues against this solution. The question arises why the otherwise strict conditions on c-command should be weakened to such an extent in the case of prepositions.

The second way out of the dilemma is to assume that the (quantified) PP is reinterpreted as a generalised quantifier and binds the pronoun under c-command as in (90).

(90) QPP... it.

This is the solution advocated here. The prepositional phrase and its QP-complement are reinterpreted as a quantified prepositional phrase that can bind the pronoun under c-command. I take (89a) as independent evidence for the interpretation of PPs as quantifier expressions.

Given that the PP on the ‘inverse’ reading is interpreted as a quantified expression, its structural position as the topmost NP-adjunct follows directly. In general, modifying adjuncts do not change the semantic type of the modified constituent. Normally, modifiers combine with a set-denoting expression of type <et>, say the head noun apple in (85), giving a set-denoting expression of type <et>. To give a concrete example, modification of the noun apple with the modifying adjective red is accompanied by a semantic mapping from the set of all apples to the set of red apples. Before and after modification, we have to do with sets of entities. Modification restricts the initial set to a subset. The same holds for modification with numerals. Modification of the plural noun apples (type <et,t>) with the numeral adjective two will restrict the set of all pluralities of apples (i.e. pluralities of two, three, four, five etc. apples) to the set which comprises only groups of two apples (type <et,t>). In any event, the resulting type is the same as the input type. In contrast, generalised quantifiers take expressions of type <et> or <et,t> (i.e. set-denoting expressions) as their input and map these onto truth-values (type <t>). It follows that the application of a generalised quantifier to a set-denoting expression bleeds the possibility of modification of this set at a later stage because expressions of the resulting type <t> are not of the right type to undergo further modification (the right type being <et> or <et,t>). It follows that expressions denoting a generalised quantifier will always be adjoined higher than modifier-denoting expressions, if both are adjoined to the same syntactic category.

Applying these considerations to the case of ILCs with ‘inverse’ readings, only the syntactic configuration in (91a) is interpretable. In (91b), application of the generalised quantifier before the numeral blocks the latter from combining with the NP-denotation.

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I thank Eddy Ruys for suggesting the choice of a negative quantifier.

45 This approach is taken by Giorgi & Longobardi (1991) in response to DP-internal PPs that seem to be transparent (i.e. no barriers) for c-command.

46 The presence of an event argument (see the discussion of events in chapter IV.1) forces the QPP to denote a function from relations into truth-values (type <et,t>). The value of the QPP in (89a) is given in (ia), that of the rest of the clause after λ-abstraction over the pronoun’s index in (ib). Functional application of (ia) to (ib) gives (ic), which adequately captures the truth-conditions of (89a):

(i) a. \[\lambda R. \neg \exists x [\text{city}'(x) \land \exists e (R(x)(e) \land \text{in}'(e,x))]\]
   b. \[\lambda y. \lambda e. \exists z [\text{I have found z in e and z loves y}]\]
   c. \[\lambda y. \lambda e. \exists z [\text{I have found z in e and z loves y}]\]

\[\neg \exists x [\text{city}'(x) \land \exists e \exists z [\text{I have found z in e and z loves x} \land \text{in}'(e,x)]]\]
This way, we have arrived at a semantic motivation for the structure in (85). The postnominal QPP in ILCs is adjoined above the numeral adjective because of its semantic status as a quantified expression.

3.5 Deriving the Properties of ILCs

The properties of ILCs follow on the revised analysis from the previous chapter. The observed ambiguity is due to structural ambiguity at the level of surface structure, not at the level of LF. ‘Surface’ and ‘inverse’ reading are derived from the (surface) structures in (84) and (85) respectively.

The restriction of ‘inverse’ readings to non-specific DPs follows from the fact that the definite or demonstrative determiner in specific DPs such as (69) is located in the D-head above the postnominal PP, as in (92).

From its position in D, the demonstrative will always take scope over the quantifier inside the PP, no matter where the PP combines with the (projection of the) picture noun.

The analysis also accounts for the DP-final occurrence of QPPs on the ‘inverse’ reading of ILCs (see section 3.3.3). In the previous section, it was shown that the QPP must be the last element to adjoin to NP for an ‘inverse’ reading to arise. The reason for this was shown to be the fact that adjunction of a quantified QPP blocks the adjunction of additional modifying elements above the QPP. If the QPP does not occur in DP-final position, as in (78b, 80b), i.e. if the QPP is followed by a modifying expression adjoined above it, the QPP must be interpreted as a modifying expression. The interpretation as a PP-modifier gives rise to the ‘surface’ reading only, thus accounting for the pragmatic ill-formedness of (78b) and (80b).

Finally, the analysis captures the fact that ‘inverse’ readings for ILCs are easily available only with a restricted number of prepositions that do not allow for plausible surface readings. The implausibility of the ‘surface’ reading leads to a re-interpretation of the QPP as a generalised quantifier, which results in the alternative syntactic structure.

It still needs to be shown that the revised analysis allows for a correct derivation of the “inverse” reading of ILCs. This is done in chapter IV.7. Likewise, it has not yet been shown how the revised analysis derives bound variable readings with ILCs (on the “inverse” reading, cf. 68). The discussion of this point is postponed to chapter V.4.1, where it will be discussed in the context of other constructions with similar semantic properties.
Concluding, the revised analysis can account for the characteristic properties of ILCs by shifting the burden of their analysis from the syntactic component to the semantic component. Application of syntactic LF-movement is replaced by a semantic mechanism that changes the meaning of the postnominal QPP. Both analyses are equivalent in a lot of respects. However, the surface analysis proposed here fares better regarding the problems raised in section 3.3. In particular, the LF-movement analysis has nothing to say on the DP-final occurrence of QPP on the “inverse” reading of ILCs.

I therefore adopt the revised analysis of ILCs on their ‘inverse’ reading as the basis for the discussion to come. In particular, I adopt the syntactic surface structure in (85) as the basis for the syntactic analysis of jeNP-constructions and jeweils-DPs in section 4.

3.6 An Alternative Analysis: DP-Internal Small Clauses

Before we go on to discuss jeNP-constructions and jeweils-DPs, I would like to briefly discuss an alternative syntactic analysis for ILCs on their ‘inverse’ reading which is more in line with certain current assumptions. I refer to this alternative account as the ‘Small Clause Analysis’ (henceforth ‘SC-analysis’). The SC-analysis assumes two different surface structures for the two readings of ILCs as well. The structure for the ‘surface’ reading is identical to that in (84). The difference lies in the structure for the ‘inverse’ reading.

Two assumptions are crucial for the surface analysis of the “inverse” reading in 3.4.2: (i.) the QPP is right-adjoined to NP in topmost position; and (ii.) the topmost position is determined by semantic factors, namely the interpretation of the QPP. However, the possibility of right-adjunction has come under fire in the recent syntactic literature. Following Kayne (1994), right adjunction should be excluded on principled grounds. This gives rise to the question of whether there is no alternative analysis that accounts for the DP-final occurrence of QPPs on the “inverse” reading without assuming NP-adjunction.

The SC-analysis is such an analysis. It assigns the following syntactic structure to the ‘inverse’ reading of ILCs. The base-structure of ILCs is as in (93a), their surface structure is as in (93b), with ‘Pr(P)’ standing for ‘Predicate(Phrase)’ (cf. Bowers 1993).

(93) a. DP
    D0  PrP
    NP one apple
    Pr P
     PP on every plate
  QP

The structures in (93ab) have the following properties. To begin with, the PP on every plate is not adjoined to NP, but it is base-generated as the syntactic predicate of a small clause structure PrP. The PrP is selected by a phonetically empty operator in D. The NP one apple is the subject of PrP. Semantically, the predicate PP predicates a place of this subject.

The existence of DP-internal predication is independently motivated. DP-internal predicative small clauses that are selected by a functional head have been postulated by
Abney (1987) for gerundive constructions (*John singing the Marseillaise*), and by den Dikken (1998) for the N-of-a-N construction (*an idiot of a doctor*). Kayne’s (1994) analysis of DPs containing relative clauses as involving a D-head selecting a CP whose IP is the locus of DP-internal predication also fits here.

Finally, the P-head of the PP incorporates into the head of the small clause Pr, forming a complex predicate (Baker 1988). A similar process is found with applicatives and dative shift (Baker 1988), P-to-V incorporation in particle verb constructions, as well as incorporation of a dative P into copular *be* in possessive *have* constructions (den Dikken 1992).47

The SC-analysis in (93) is fully compatible with current assumptions about the architecture of the syntactic component (Kayne 1994, Chomsky 1995). The structures in (93) are binary branching and do not involve right-adjunction. In addition, the postnominal PP need not take on a quantified reading. The additional semantic load is carried by the head of the small clause, Pr.48 This makes the syntactic structure less dependent on semantic factors than on the NP-adjunction analysis in 3.4.2, preserving a certain amount of autonomy for the syntactic component. At the same time, the SC-analysis accounts for the relevant properties of ILCs as well. The ambiguity is put down to two different surface structures (as in the NP-adjunction analysis). The impossibility of ‘inverse’ readings with specific DPs is attributed to the position of the specific determiner or demonstrative in D (as in the NP-adjunction analysis). Finally, the DP-final occurrence of the postnominal PP follows from its being the syntactic predicate of PrP. Concerning this aspect, the SC-analysis is empirically more adequate than the LF-movement analysis (as is the NP-adjunction analysis). I conclude that the SC-analysis gives an adequate account of the ‘inverse’ readings of ILCs, of course on the assumption that the SC can be appropriately interpreted.

The purpose of this section was to disperse potential doubts as to the revised analysis of ILCs. These doubts may concern the use of right-adjunction, which is often considered unattractive for conceptual reasons. It was shown that the basic assumptions of the revised analysis, structural ambiguity at surface structure, the DP-final position of the QPP on the inverse reading, and the constituency of numeral and head noun on the inverse reading, carry over to the SC-analysis, which does not rely on right-adjunction. This shows that there is no inherent connection between the revised analysis of ILCs and right-adjunction. Consequently, a rebuttal of right-adjunction need not lead to a rebuttal of the surface analysis of ILCs that is argued for here.

In what follows, I will not take a decision on the question of which analysis is more adequate. For practical reasons, I will go on to use the right-adjunction analysis. The reader should bear in mind, though, that all claims made below can be restated in the SC-format because the two analyses make identical predictions for the most part.

47 Incorporation of the head of a small clause predicate into the head of the small clause is also found in den Dikken & Naess (1992). The incorporation in (93b) violates the Projection Principle and is not in line with Baker’s requirement that incorporation must preserve the categorial structure (but see Marantz 1984). However, there is no principled reason that would block the prepositional head P in (93b) from leaving behind a trace, preserving categorial structure. The trace could either be semantically empty, or it could denote the identity function.

48 See Zimmermann (to appear, b) for an interpretation of (93b) in terms of a Skolem function that maps each plate onto one apple being on it. The Skolem function is part of the denotation of Pr. For a taste of how this works, consider chapter IV.4.1.1, fn.47, where an analogous interpretation procedure is sketched for *jeweils*-DPs.
3.7 Summary
In this section, I have presented a revised analysis for ILCs in terms of surface structure ambiguity. Of particular interest was the structure for the ‘inverse’ reading of ILCs since it is only on this reading that ILCs show a parallel behaviour to jeweils-DPs. On the ‘inverse’ reading, the postnominal PP has been analysed as being right-adjoined to an NP consisting of a numeral/indefinite expression and the head noun. The revised surface analysis of ILCs was shown to account for all their characteristic properties. Finally, an alternative small clause analysis was sketched in order to show that the revised analysis of ILCs does not depend on the existence of right-adjunction.

4 The Syntax of Jeweils-DPs
In this section, we return to the analysis of jeweils-DPs. Following a suggestion by Sauerland (2001), I show that the revised analysis of ILCs from section 3 extends to jeNP-constructions and jeweils-DPs. This makes jeNP-constructions and jeweils-DPs special instances of ILCs. If correct, all three constructions have the underlying structure in (94). (95) shows how the three constructions fit into the structure in (94).

(94)          D P
              D^0    NP
                NP    PP
                AP NP P QP
                   Q NP

(95)  i. ILC:    zwei Bewacher für jeden Gefangenen
          two guards for each prisoner

ii. jeNP:      zwei Bewacher P^0 je Gefangenen
              two guards per prisoner

iii. jeweils-DP: zwei Bewacher P^0 je jeweils
             two guards each while

In (94), a PP is right-adjoined to an NP-constituent consisting of a numeral (or another indefinite) expression and the head noun of DP. This constituent corresponds to the DistShare of d(istance)-distributive constructions. The prepositional head P of the PP takes a universal QP as complement. Finally, the entire NP is functionally selected by an empty D-head.

The structure in (94) does not differ much from that proposed by Safir & Stowell (1988) for English d-distributive each, and by Tellier & Valois (1993) and Junker (1995) for French d-distributive chac-un(e) (see chapter II.5). These analyses assume right-adjunction of a constituent to the DistShareNP as well. However, while all these analyses took the right-adjointed constituent to be a universal QP directly, the present analysis takes the adjoined constituent to be a PP embedding the QP. Since this is the major structural difference between the analyses, a great part of the discussion in this section is focused on
motivating the existence of an additional PP-layer. It turns out that German provides empirical evidence for the PP-layer in form of case marking.

The section is structured as follows. In 4.1, I extend the analysis of ILCs to jeNP-constructions, pointing out where the two constructions differ. Section 4.2 presents the analysis of jeweils-DPs as a special instance of both ILCs (on the “inverse” reading) and jeNP-constructions. Jeweils-DPs are shown to involve a regular universal quantifier that takes its restriction in form of an NP-proform as complement. The special d-distributive behaviour is due to co-indexation of this proform with a clausemate DistKey antecedent. The analysis does not assume LF-movement of jeweils for interpretive or syntactic reasons. In 4.3, I summarise the arguments against LF-movement. Finally, I show that the analysis for adnominal jeweils extends to other s-expressions such as wenigstens ‘at least’ in 4.4. Given the parallel morphological shape and syntactic behaviour of s-expressions and jeweils pointed out in chapter II.3, this is a welcome result.

### 4.1 The Structure of jeNP-Constructions

The revised analysis of ILCs extends directly to jeNP-constructions, exemplified in (96a), and also to English per-constructions (96b), which are discussed in Choe (1987:135ff.).

(96)  

a. [Drei Bewacher je Gefangenen] hat der Direktor bereitgestellt.

   three guards per prisoner has the director assigned

b. [Three guards per prisoner] were assigned by the director.

The basic claim is that jeNP-constructions (and likewise per-constructions) are but special instances of ILCs (on the “inverse” reading), licensed by the general availability of the structure in (94) (see also Sauerland 2001). ILCs and jeNP-constructions differ in that the former contain an overt preposition, whereas the latter have a covert preposition \( P^0 \), which selects the jeNP. The underlying structure for the jeNP in (96a) is shown in (97):

(97)  

```
( 9 7 )  a.          DP
       D^0       NP
        NP      PP
       AP        P^0       QP
                   NP     drei Bewacher    je
                   QP     Gefangenen

b.  [ DP D^0 [NP drei Bewacher] [PP P^0 [QP je [NP Gefangenen]]]]
```

The structure in (97) has the following properties. First, the quantifying element je is semantically restricted by the denotation of its NP-complement Gefangenen ‘prisoners’. Second, the jeNP-constituent is embedded inside a PP that is right-adjoined to the DistShareNP drei Bewacher ‘three guards’. Third, the jeNP is selected by a null preposition. Finally, the postnominal constituent can be fronted if required by discourse factors:
(98) [DP [Je Gefangenen], drei Aufseher t] hat der Direktor bereitgestellt.

‘Concerning the prisoners, the director has assigned them three guards.’

In (98), the preposed phrase *je Gefangenen* ‘per (male) prisoner’ has a prominent discourse status. It is most likely interpreted as contrastive or partial topic, indicating that other groups of people, e.g. groups of female prisoners, with fewer or more guards are under consideration as well (see Büring 1996:49 on the terminology used).

*Je*NP-constructions and ILCs differ only concerning the overt or covert realisation of the prepositional head $P^0$. This naturally raises the question of whether the former really contain a covert preposition, and, if so, how it can be licensed. An alternative analysis would be to assume that the $P$-head is filled with the element $je$ itself. In section 4.1.1, I argue against this view. I present arguments to the effect that $je$ is not a preposition, but really just a ‘pure’ quantifier which selects for an NP-complement. Following this, I discuss how the zero head $P^0$ in (97) is licensed in 4.1.2. It will emerge that $P^0$ can be licensed in two ways: either by incorporation of the $Q$-head into $P^0$, as in den Dikken (1992), or by overt morphological marking on the sister of $P^0$, as in Emonds (1987).

4.1.1 The Categorial Status of *Je* and *Per*

Turning to the categorial status of *je*, Jung (1980) analyses it as a preposition when it occurs in sentences such as (99). If so, *je* in (97) could be the head of the PP.

(99) Benzin kostet [zwei Euro *je* Liter].

petrol costs two Euros per Liter

In this section, I present evidence against the view that *je* is a preposition. The conclusion will be that the distributive element *je* is a ‘pure’ quantifying element, perhaps the only one in German.

Two sets of data cast doubt on the prepositional status of *je*. First, *je* behaves differently from regular prepositions in that it does not take a singular count noun with overt determiner as complement (cf.100ab). In contrast, overt prepositions never select for a singular count noun without overt determiner (cf.101ab).

(100) a. *je dem/einem Gefangenen b. je Gefangenen

per the / a prisoner per prisoner

(101) a. mit/ auf/ unter dem/einem Tisch b. *mit/ auf/ unter Tisch

with/ on/under the/ a table with/ on/under table

The complementary behaviour of prepositions and *je* in (100) and (101) argues against treating them as being of the same syntactic category. The different selectional properties lead to the categorisation in (102ab). Prepositions select for full DPs (102a), while *je* selects for bare NPs (102b).

49 Prepositions can optionally appear with determinerless abstract nouns such as *Befehl* ‘order’ and *Wissen* ‘knowledge’ in idiomatic expressions such as (iab).

(i) a. auf (den) Befehl von b. mit (dem) Wissen von

on (the) order of with (the) knowledge of

Whatever the reason for optional determiner-drop in (iab), it suffices to show - for the present purposes - that prepositions and *je* exhibit a different behaviour with concrete nouns, as illustrated in the main text.
(102) a. \([PP\ P\ [DP]]\) \hspace{1cm} b. \([QP\ je\ [NP]]\)

The categorial status of Q for \(je\) in (102b) has been chosen because the selectional properties of \(je\) match those of the universal D-quantifier \(jeder\) ‘every’. The parallel behaviour of \(je\) and \(jeder\) is highlighted by the fact that both allow only for singular complements (cf.103). In contrast, prepositions freely allow for plural complements (cf.104).

(103) a. zwei Blumen je Frau / *Frauen
   two flowers per woman women
b. jede Frau / *Frauen
   every woman women
(104) mit / für / unter Frauen
   with for under women

The data in (100) – (104) argue for a treatment \(je\) as a universal quantifier, and not as a preposition. The semantic nature of \(je\) determines its selectional properties. The singular NP-complement of \(je\) provides the restriction for the universal quantifier.50

\(je\) is a special quantifier in that it does not exhibit any inflectional morphology. It simply does not seem to be specified for any D-features such as case or phi-features (person, gender, number). From this, I conclude that \(je\) is not a D-quantifier, which usually contain a combination of quantificational and D-features in German. Consider some samples from the inflectional paradigm of \(jeder\) ‘every’ in (105).

(105) \(je\ - d\)-er , \(je\ - d\)-e , \(je\ - d\)-en
\(\forall\ - d\) – 3rd,sg,masc,NOM \hspace{1cm} \(\forall\ - d\) – 3rd,sg,fem,NOM \hspace{1cm} \(\forall\ - d\) – 3rd,sg,masc,ACC

I conclude that \(je\) is a bare quantifier of categorial status Q.51

The categorial status of English \(per\) in (96b) and its German equivalent \(pro\) in (106), which are both loans from Latin, is not entirely clear.

(106) Benzin kostet [zwei Euro \(pro\) Liter].
   petrol costs two Euros per Liter

Like \(je\), and unlike prepositions, \(per\) and \(pro\) only take bare singular count nouns as complements (Zifonun et al. 1997:2083). This argues for an analysis as a quantifier. On the other hand, the source words \(per\) and \(pro\) clearly were prepositions in Latin. \(Per\) and \(pro\) both have a directional meaning, and share distribution and case-marking properties with other prepositions (cf.107ab).

(107) a. per / in hortum (through/ into garden)
   b. pro / in castris (before inside camp)
   ‘through/into the garden’ \hspace{1cm} ‘before/ inside the camp.’

---

50 This is not in line with recent proposals by Matthewson (2001). Based on data from Straits Salish, Matthewson argues that quantification ranges over DP-denotations universally.

51 The analysis in (105) suggests that forms like \(jeder\) ‘every’ are analysed as the result of incorporation of the Q-head \(je\) into a (functional) D-head, or vice versa. This synchronic perspective does not match the historical origin of \(jeder\) (>8th century), which is a contraction of the Old High German form \(iowedar\) ‘each of both’ (Kluge 1999:410).
The source of the problem seems to lie in the fact that the source language Latin is a language without overt determiners. The absence of (overt) determiners makes it impossible to distinguish between prepositional P-heads and determiner D-heads. This may have led to a ‘wrong’ categorisation of per/pro as a quantifying element in English and German. In German at least, this re-categorisation may have been supported by the analogy of pro and je.

The alternative is that per/pro have retained their status of (for the target languages) special prepositions because they are still marked as loans. In this case, the restricted distribution and peculiar selection properties of per and pro in English and German would follow from their origin as loans. The latter view implies that per and pro must be prepositions with some sort of quantificational content at least in the constructions in (96b) and (106).

In conclusion, the analysis of jeNPs in (97) provides a straightforward account for the double nature of per and pro as quantificational prepositions. I assume that per and pro lexically fill the P-head in (97), and that their apparent quantificational force results from incorporation of an empty quantifier \( Q^0 \) into P. This process is discussed in the next section. If correct, per/proNPs would differ from jeNPs only concerning the question of whether P or Q is lexically filled.

### 4.1.2 Licensing \( P^0 \)

The postulation of a zero preposition \( P^0 \) lends a certain degree of abstractness to the syntactic structure in (97). It is clear that the postulation of abstract syntactic structure must be constrained in some way in order to avoid overgeneralisations. In the present case, this means that the covert head \( P^0 \) in (97) must be properly licensed.

Two general strategies can license \( P^0 \) in principle (see also chapter I.2.4.3). \( P^0 \) could be licensed through incorporation of or into an overt lexical head (e.g. Baker 1988, den Dikken 1992, Longobardi 1994). This incorporation process must satisfy general restrictions on head movement such as Travis’ (1984) ‘Head Movement Constraint’. In other words, \( P^0 \) is licensed if it stands in a structural configuration to a lexical head so that the two can be related by (successive) application of head movement.

The second way to license a covert preposition \( P^0 \) is through overt morphological marking in the complement of the empty head, in line with Emonds’ (1987:615) ‘Invisible Category Principle’. The Invisible Category is stated in (108).

\[
\text{(108) A closed category B with positively specified features C_i may remain empty throughout a syntactic derivation of the features C_i (save possibly B itself) are all alternatively realized in a phrasal sister of B.}
\]

According to (108), a syntactic head may be covert if its category is closed (which is the case for prepositions) and if its feature content is overtly realised in alternative form in its syntactic complement. The wording ‘in its syntactic complement’ signals that the alternative feature realisation does not have to occur directly on the complement, but can also be located on a daughter of the complement.

---

52 This view is found in Zifonun et al. (1997:2083), where the special behaviour of the loan preposition pro in German is attributed to its deficient integration into the German language system.

53 The analysis of pro as a preposition is supported by the occurrence of prepositional uses, as in (i):

\[
\text{(i) Der Schiedrichter pfeift eindeutig pro Heimmannschaft. }
\]

the referee whistles clearly for-the home team
The Invisible Category Principle mostly applies in languages with a rich (case) morphology, whereas languages without rich morphology tend to choose the first strategy (den Dikken 1992:129). In this section, I argue that both strategies are employed for licensing the zero head P⁰ in German jeNP-constructions. We first look at morphological (case) licensing, and then at licensing through movement.

Looking at (96a) again, we observe that the NP-complement Gefangenen carries an overt case marking, the basic form being (der) Gefangene ‘the prisonerNOM’. There seems to be some variation between speakers regarding the realisation of the case suffix as either –n or –m (see fn.55), but one of the suffixes must appear (cf.109).

(109) drei Bewacher je Gefangene-n / je Gefangene-m / *je Gefangene-∅
three guards per prisoner

The m-ending suggests that the NP is marked for dative case. Compare the inflectional paradigm for non-feminine de-adjectival or de-participial nouns in –e in table 3.⁵⁴

<table>
<thead>
<tr>
<th></th>
<th>definite NP</th>
<th>indefinite NP</th>
</tr>
</thead>
</table>
| NOM    | der Gefangene | ein Gefangene-
| GEN    | des Gefangene-n | ein-es Gefangene-n |
| DAT    | dem Gefangene-n | ein-em Gefangene-n |
| ACC    | den Gefangene-n | ein-en Gefangene-n |

The suspicion that the NP in jeNP-constructions can be overtly marked for dative case is supported by the fact that case is realised by an m-suffix if the masculine head noun is modified by an adjective. In contrast, if the head noun of the jeNP-construction is feminine, the expected feminine dative marker –r appears.

(110) a. drei Bewacher je langjährige-m Gefangenen
three guards per veteran-DAT prisonermasc

b. 100 Euro je richtige-r Antwort
100 Euro per correct-DAT answerfem

I conclude that the NP-complements in jeNP-constructions can be overtly case marked. The m- and r-endings in (109) and (110ab) suggest that the NP is marked for dative case.⁵⁵

The observation that the NP-complement is overtly case marked for dative is significant for the following reason. According to the ‘Invisible Category Principle’ in (108), a closed category, such as P, may remain empty if its feature content is realised overtly on or inside the phrasal sister of this category. Observing that languages like Latin

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⁵⁴ In German, case marking is always expressed on the first element inside the NP that can be inflected. In the paradigm in table 3, this is the determiner. Since Gefangene is a count noun it cannot occur without a determiner in the singular paradigm. Therefore, we cannot check what the dative case-ending on bare Gefangene would be. However, there is a small number of de-adjectival neuter abstract nouns in –e, e.g. (das) Böse ‘(the) evil’, which take the dative ending –m, showing that –m is the default dative marker for de-adjectival singular masculine or neuter nouns.

⁵⁵ Presumably, the optional n-ending on the bare NP Gefangenen in (109) is the result of neutralising the more marked –m-ending to the less marked –n. (iab) show that neutralisation from –m to –n is productive in other contexts as well:

(i) a. bei länger-m genaue-m Hinsehen → b. bei länger-m genaue-n Hinsehen
   at longer-DAT close-DAT scrutiny at longer-DAT close-DAT scrutiny
and German exhibit alternating pairs of overt PPs and prepositionless but case-marked NPs, Emonds concludes (ibid.:618) that “a language can utilize ‘empty P’ structures […] if features of P like Direction, Location, or P itself are realised on NP” by oblique or dative case. In other words, empty prepositions are licensed by overt dative morphology on or inside their syntactic complement. I conclude that the NP-complement of German jeNP-constructions licenses the empty head P₀ when it is overtly case-marked for dative (see also den Dikken 1992:129). This is the case with de-adjectival masculine NPs ending in –e (109), and with NPs modified by an adjective (110a). Presumably, dative case is assigned by the empty preposition in these cases.

Unfortunately, inflection in the nominal system in German is not that rich any longer. It turns out that, apart from de-adjectival masculine and neuter nouns ending in –e, most bare NPs cannot be overtly case-marked in jeNP-constructions (nor can they in other constructions). A few representative examples are given in (111).56

(111) a. drei Bewacher  je  Häftling / *Häftling-en / *Häftling-em/ *Häftling-e
three guards per inmate
b. drei Verehrer  je  Frau / *Frau-e  / *Frau-er  / *Frau-en
three admirers per woman
c. drei Mann  je  Boot / *Boot-e  / *Boot-em / *Boot-en
three man per boat

In the examples in (109), the empty preposition P₀ is not licensed by overt dative morphology on the NP-complement. For these structures, we must assume application of the second licensing mechanism for empty heads: An empty head can be licensed by way of incorporation with a lexical head.

Licensing of empty heads through incorporation can happen in two ways. The first option is that the empty head incorporates into a lexical element above it. This is the process proposed by den Dikken (1992) for dative shift constructions, and for possessive have-constructions. With dative shift, an empty ‘dative’ preposition incorporates into the main verb. With possessive have, an empty dative preposition incorporates into copular be, forming the verb have (den Dikken 1992:123ff.). However, since the D-head of the DP is equally empty this process is not applicable to jeNP-constructions.

The other way to license an empty head through movement is by incorporation of a lexical element into the empty head. This process is illustrated by N-to-D-movement with proper names in Italian (cf. Longobardi 1994:624). In the absence of an overt determiner, proper names can move in front of otherwise prenominal adjectives, resulting in the structure in (112).

(112)  [DP [D Roma₁⁺D₀] [NP antica [NP t₁]]]
Rome ancient

I would like to argue that the empty preposition P₀ in jeNP-constructions with non-inflecting nouns as in (111) is licensed by an analogous syntactic operation. The lexical quantifier je incorporates into the empty preposition P₀. Since movement of je is by

56 In some cases, an overt case-marking does not seem impossible altogether, but only archaic. (i) is an example.

(i) ?? drei Brote  je  Kind-e
three breads per child-DAT

This suggests that the strategy of P-licensing through overt dative morphology was more productive at an earlier stage of German in accordance with the richer inflectional system of the language at that time.
necessity string vacuous (P being covert), it is impossible to determine if such movement applies at surface structure, or at LF. Here, I take it to apply at surface structure. The resulting structure of jeNP-constructions without overt case marking on the NP is given in (113).

\[
\text{NP [je drei Verehrer] [PP [je1+P0] [QP t1 [NP Frau]]]]}
\]

three admirers per woman

The same mechanism applies to the per-construction in English, which has lost all inflection in the nominal paradigm. If per is analysed as a preposition selecting for a QP with a zero quantifier Q0, as suggested at the end of the previous section, Q0 is licensed by incorporating into the preposition per.

This concludes the discussion of how the empty P0-head in jeNP-constructions is licensed. I have argued that licensing is accomplished either by (dative) case morphology on the NP-restriction (with overtly inflecting nouns), or by Q-to-P movement of the lexical quantifier je into the empty preposition (with nouns that do not inflect overtly). In any event, licensing of P0 in (97) is achieved by two general licensing mechanisms for empty syntactic heads.

4.1.3 Case Alternations

In passing, I would like to direct the attention to a curious case phenomenon that sometimes emerges with jeNP-constructions in German. In place of oblique dative case, the NP-restriction of je can also optionally be marked for structural case. If the jeNP-construction occurs in subject position, case marking on the NP-restriction can alternate between dative (114a), and optional nominative case marking (114b).

\[
\text{(114) a. Drei Bewacher je Gefangene-m/n wurden bereitgestellt.}
\]

three guards per prisoner masc-DAT were assigned

\[
b. ?Drei Bewacher je Gefangene-r wurden bereitgestellt.
\]

three guards per prisoner masc-NOM were assigned

Similarly, if the jeNP-construction occurs in object position, the NP-restriction can optionally be marked for accusative.

\[
\text{(115) a. Wir bekamen 500 Euro je richtiger Antwort.}
\]

we got 500 Euro per correct-DAT answer

\[
b. ?Wir bekamen 500 Euro je richtige-∅ Antwort.
\]

we got 500 Euro per correct-ACC answer

Native speakers seem to display a certain amount of uncertainty regarding the correct case marking, with the (b)-examples having a slight substandard flavour to them.

Possibly, the observed case alternation is due to the existence of the two alternative licensing strategies for P0, which were discussed in the preceding section. Assume that the empty P0-head in (114) and (115) can be licensed either by overt case morphology on the NP-restriction, or by Q-to-P-movement of the quantifier je. If the first mechanism applies, the NP-restriction occurs with dative morphology, as in the (a)-examples. If the second

\[57\]

Of course, the empty D-head D0 must also be licensed. I leave open if this happens through overt morphology in the plural paradigm à la Emonds (1987), or by N-to-D-movement at LF à la Longobardi (1994).
mechanism applies, the empty preposition seems to have lost its ability to assign oblique case to the QP-complement after incorporation.\textsuperscript{58} In order to escape the case filter, which demands that all QPs/DPs must be case-marked, the structure must utilise a different strategy to assign (structural) case to the QP. By way of speculation, one could assume that the case of a DP, which is obligatorily assigned to the D-head, can spread not only to the head noun of the construction (indicated by case agreement between D and N), but optionally also to other QP/DP-constituents that are contained within the larger DP-structure. I tentatively assume that such case spreading is responsible for the emergence of structural case in the \textit{je}NP-constructions in (114b) and (115b).

If these admittedly speculative considerations are on the right track, the case alternations in (114) and (115) provide indirect evidence for the availability of P-to-Q raising as a licensing mechanism for P\textsuperscript{0} in \textit{je}NP-constructions.\textsuperscript{59}

4.1.4 Summary
The discussion of \textit{je}NP-constructions has delivered the following results: (i.) \textit{Je}NP-constructions are a special instance of ILCs on the “inverse” reading, and have the same syntactic structure. (ii.) The main difference between \textit{je}NP-constructions and ILCs is that the former contain a covert preposition P\textsuperscript{0} where the latter feature an overt preposition. (iii.) Finally, it was shown that the empty head P\textsuperscript{0} can be licensed alternatively by overt (dative) case marking in the complement of P, or by head movement of the bare Q-head \textit{je} into P\textsuperscript{0}.

4.2 The structure of \textit{jeweils}-DPs
We are now in a position to turn to the analysis of adnominal \textit{jeweils}-DPs in German. The main argument of this section is that \textit{jeweils}-DPs are special instances of \textit{je}NP-constructions, and (by transitivity) of ILCs on the “inverse” reading. \textit{Jeweils}-DPs differ from \textit{je}NP-constructions in that they contain an overt NP-proform –\textit{weil}– in place of a lexical NP. This proform provides the semantic restriction for the universal quantifier \textit{je}–.

\textsuperscript{58} It is possible that the inability of P\textsuperscript{0} to assign oblique dative case after incorporation of the Q-head \textit{je} lies in the nature of \textit{je}. \textit{Je} does not seem to be a case-assigning element, for otherwise its presence should block case assignment by P\textsuperscript{0} in (114a) and (115a). If so, the inability of \textit{je} to assign case seems to be inherited by the complex head \textit{je}+P\textsuperscript{0} after incorporation, and case must be assigned some other way. Notice that incorporation of a lexical head into a covert head often has the opposite effect of adding case marking possibilities. In (ia) from Modern Hebrew, an embedded transitive verb has incorporated into a covert (causative) verb, and the complex V-V-head can assign accusative case to the embedded subject and the embedded object (cf. Cole 1976).

(i)  Hirkadeti 1+V [et  hatalmidin et  ti  harikud  haxadas].

\begin{itemize}
\item (i) caused-to-dance  ACC the students ACC   the dance the new
\end{itemize}

The case in (i) differs from the above case in that the incorporated element is a case assigner itself. By way of speculation, let us assume, then, that the ability of a complex head to assign case depends on the ability of the incorporated element to assign case. If the latter is not a case assigner, the complex head will not be either.

\textsuperscript{59} Many questions remain of course. One may wonder why the adjunct status of the postnominal PP does not act as a barrier to case spreading. Whatever the answer, it can be observed that case can spread to adverbial adjuncts in Finnish (Maling 1993). Perhaps, the observed case alternation receives a better treatment in terms of the small clause-analysis presented in 3.6. On the SC-analysis, the QP consisting of \textit{je} and a restricting NP is located in the syntactic predicate of the small clause. As part of the predicate, it could potentially agree with the numeral NP in subject position of the SC, which gets its case from D\textsuperscript{0} through percolation:

(i) [DP D\textsuperscript{0} [num NPCASE,i [PrP [num NPCASE,i [P QPCASE,i]]]]]

Case agreement between NPs in subject and predicate position of a predicative copular structure is not rare, and therefore not altogether implausible for the case of \textit{je}NP-constructions. Other problems arise, though: (i.) How is P\textsuperscript{0} licensed? (ii.) How can the QP-complement of the PP be co-indexed with the subject NP of the SC although it is not the syntactic predicate of the small clause? How is the empty P-head licensed in the absence of overt oblique case on its complement? I leave these questions open for further research.
It receives its semantic value through co-indexation with an antecedent DistKey element. jeweils-DPs also differ from jeNPs in the relative position of DistShare NP and PP-adjunct. In the unmarked case, the PP-adjunct (i.e. jeweils) moves overtly to the specifier of jeweils-DPs, whereas it stays in postnominal position with jeNP-constructions. With this, the underlying structure of jeweils-DPs is as in (116a), the (unmarked) surface structure as in (116b).

\[(116)\]

\[
\begin{align*}
&\text{a.} \\
&\text{DP} \\
&\quad \text{D'} \\
&\quad \text{D}^0 \\
&\quad \text{NP} \\
&\quad \text{AP} \\
&\quad \text{np} \\
&\quad \text{drei} \\
&\quad \text{Bewacher} \\
&\quad \text{QP} \\
&\quad \text{je} \\
&\quad \text{weil-s} \\
\end{align*}
\]

\[
\begin{align*}
&\text{b.} \\
&\text{DP} \\
&\quad \text{D'} \\
&\quad \text{D}^0 \\
&\quad \text{NP} \\
&\quad \text{AP} \\
&\quad \text{np} \\
&\quad \text{drei} \\
&\quad \text{Bewacher} \\
&\quad \text{QP} \\
&\quad \text{je} \\
&\quad \text{weil-s} \\
\end{align*}
\]

The structures in (116) resemble those found in Safir & Stowell (1988) for English each and in Junker (1995) for French chacun(e) not only in terms of the overall syntactic architecture, but also in that they contain a proform.

It follows from the analysis of jeweils-DPs in (116) that adnominal jeweils is not an ‘anti-quantifier’ in the sense of Choe (1987). Instead, jeweils consists of a quantifying element je that takes its semantic restriction in form of an NP-complement just like the regular D-quantifier jeder ‘each’. This makes the German d-distributive element jeweils not an ‘anti-quantifier’, but a quantifier, albeit of a special sort. The analysis in (116) therefore refutes Choe’s claim (1987) that the phenomenon of ‘anti-quantification’ constitutes a deeper property of natural languages that must be accounted for by special assumptions. In section 5, this claim will be extended to d-distributive elements in other languages, showing that the phenomenon of ‘anti-quantification’ is only an epiphenomenon cross-linguistically (and possibly universally).

The structure of this section is as follows. In 4.2.1, I show that the empty P-head in jeweils-DPs is licensed by overt (oblique) case marking. In 4.2.2, I discuss the NP-proform –weil-. The pronominal status of –weil- is confirmed by comparing its binding behaviour with that of possessive pronouns. 4.2.3 briefly discusses related structures with other nominal proforms, such as je Stück ‘apiece’ and pro Person ‘per person’. 4.2.4 discusses why jeweils moves overtly to SpecDP in the unmarked case. Movement is
shown to be triggered by discourse structure requirements. In 4.2.5, I discuss how the facts concerning extraction from jeweils-DPs follow on the analysis in (116). Finally, the analysis is extended to the short form je, which is argued to contain a covert proform instead of overt –weil- in section 4.2.6.

4.2.1 Licensing P0: The Case of Genitives

The covert head P0 in jeweils-DPs is licensed by the same licensing mechanism that was shown to be active in (some) jeNP-constructions, namely by overt (oblique) case marking in the complement of the preposition (Emonds 1987). In the case of jeweils-DPs, the NP-complement (–weil-) of the quantifier je is invariably marked for genitive case. This was shown in chapter II.1.3, where it was also shown that German adverbials often alternate between a PP-form with overt preposition and a P-less, but genitive-marked DP. The relevant data are repeated in (117).

(117) a. (des) abend-s = am Abend
b. dies-seit-s = auf dieser Seite
c. jeden-falls = auf jeden Fall

(117)a. (des) abend-s = am Abend  b. dies-seit-s = auf dieser Seite 
c. jeden-falls = auf jeden Fall

In line with Emonds’ (1987) Invisible Category Principle, the genitive-marked adverbials in (117) can be analysed as PPs with a covert preposition, thus accounting for the alternation. By the same reasoning, the covert head P0 in (118) should be licensed by genitive marking on jeweils.

(118) [pp P0 [QP je-weil]-GEN]

I conclude that the empty P0-head in jeweils-DPs is properly licensed by genitive case.

Before going on, take note of the fact that the possibility of genitive adverbials in German allows for a direct extension of the structure in (118) to adverbial jeweils. From now on, I will treat adverbial jeweils as a PP-adverbial, the covert P-head of which is licensed by genitive case.

4.2.2 The Proform –weil-

In this section, I justify the claim that jeweils contains an NP-proform –weil-, which provides the quantifier je with its semantic restriction, and which (in the normal case) receives its semantic value through co-indexation with a DistKey antecedent. The analysis of –weil- as a pronominal element is motivated in two ways. First, the presence of jeweils exerts a semantic restriction (the plurality requirement) on potential DistKey expressions. This follows if –weil- is a pluralic NP-proform and co-indexed with a DistKey antecedent. Second and stronger, it can be shown that DP-initial jeweils parallels the behaviour of

60 According to Kluge (1999: 23: 411), there is an alternative form jewelle-n, which seems to be marked for dative case. See fn.66 for more discussion.

61 This process was productive at earlier stages of German as witnessed by the abundance of lexicalised genitive forms of temporal or locative adjuncets, e.g. gester-n ‘yesterday’, link-s ‘on the left hand’, recht-s ‘on the right hand’ (cf. also Teuber 2000). Note also Grimmelshausen’s use of gester-n (this-side-GEN) for contemporary hier ‘here’, and aller-wege-n (all-way-GEN) for contemporary immer ‘always’. Analogous lexicalised genitive forms of temporal / locative adjuncets can arguably be found in English as well: alway-s, hereabout-s, and nowadays-s.

62 Presumably, it is the entire QP that is case-marked for genitive. As with other complex nominal constituents in German, case is expressed on the first constituent that can be inflected, here the NP –weil-.
other DP-initial pronouns regarding Chomsky’s Binding Principles (1981, 1986b). The parallelism suggests that jeweils contains a proform as well.

Above, it was argued that the NP-proform –weil- denotes the restriction of the universal quantifier je. Unlike lexical NPs in jeNP-constructions, however, –weil- cannot freely denote just any entity. Normally, it is co-referent with a clausemate DistKey antecedent, as illustrated in (119), where co-reference is indicated by co-indexation.

(119) Die Jungen, haben [DP je-weil-s zwei Würstchen gegessen].

the boys have each two sausages eaten

From the restriction-denoting nature of –weil-, it follows that its value is restricted to pluralic groups (or sets) of discrete entities over which the quantifier can distribute. From this, it follows that –weil- can only be co-referent to plural-denoting antecedents (cf.119), like the plural pronoun they. As expected, mass DPs and singular count DPs are not appropriate DistKey antecedents for jeweils (cf.120), an observation that was referred to as the plural restriction on DistKey in chapter II.1.5.

(120) a. *Peter hat gerade jeweils zwei Würstchen gekauft.
   *Peter has just each two sausages bought
   Peter has bought two sausages each.’

b. *Benzin kostet gerade jeweils zwei Euros.
   petrol costs just each two Euros
   *Petrol costs two Euros each.’

The plurality requirement on DistKey receives a straightforward explanation if jeweils contains a set-denoting proform –weil-. The set-denoting nature of the proform restricts the range of possible co-referring antecedents to plural expressions.

Unfortunately, the data in (119) and (120) only suggest that jeweils should be analysed as containing a proform. They do not show conclusively that it must be. (120ab) would also be ungrammatical without jeweils containing a proform, simply for the reason that the distributive element jeweils would not have access to a plural entity over which to distribute.

The following argument is meant to show more convincingly that jeweils contains a pronominal element. Adnominal jeweils is shown to behave like possessive pronouns regarding Chomsky’s Binding Principles. Jeweils is shown to act as an intervener between a potential binder (a DP) and a pronoun inside the jeweils-DP. Presence of jeweils restricts the co-reference possibilities of the pronoun. This property of jeweils parallels that of possessive pronouns in DP-initial position. If jeweils is analysed as containing a pronominal element, namely the proform –weil-, the parallel behaviour of possessive pronouns and jeweils receives a uniform explanation.


(121) a. [Peter, liest Bücher über sich,e]   b. *[Peter, liest Bücher über ihn,]  
   Peter reads books about himself  Peter reads books about him

(122) a. Peter, liest [ Chomskys Bucher ueber sich,e]  
   Peter reads Chomsky’s books about himself
b. Peter, liest [Chomskys] Bucher ueber ihn.

Peter reads Chomsky's books about him

(123) a. Peter, liest [seine] Bucher ueber sich.

Peter reads his books about himself

b. Peter, liest [seine] Bucher ueber ihn.

Peter reads his books about him

In (121ab), the subject Peter syntactically binds the co-indexed anaphor and the personal pronoun inside the object DP, resulting in grammaticality (Principle A) and ungrammaticality (*Principle B) respectively. In Chomsky (1986b) this was put down to the fact that the 'Minimal Governing Category' for anaphor and pronoun is the matrix clause in (121). Anaphors must be bound within their minimal governing category (Principle A, cf.121a), while pronouns must be A-free within their minimal governing category (Principle B, cf.121b). In (122), the intervening possessive phrase Chomsky's reverses the grammaticality judgments: the anaphor sich must be bound by DP-internal Chomsky's, while the pronoun ihn can be bound by the matrix subject Peter. Chomsky (1986b) accounts for this reversal of judgments in the following way. The possessive phrase Chomsky's is the subject of the object DP (it is located in SpecDP), turning it into the minimal governing category for the pronoun (see fn.63). Within its minimal governing category, the anaphor sich must be bound and the pronoun ihn must be A-free in accordance with Binding Principles A and B. This accounts for the grammaticality judgments in (122). Finally, (123) shows that possessive pronouns in DP-internal position behave like possessor DPs. They are the subject of the DP, turning it into a minimal governing category in which the anaphor must be bound and the pronoun must be A-free. The details of this are irrelevant. What is important is that (123ab) show that DP-initial pronouns act as interveners for the binding possibilities of DP-internal anaphors and pronouns.

This allows for a prediction regarding the postulated status of –weil- as a proform. If jeweils really contains a proform, we expect its presence in prenominal position to affect the binding possibilities of DP-internal material as well. The following argument shows that this is the case. The argument is rather complex and rests on the observation that sentences with adnominal jeweils in direct object position and two potential plural antecedents are ambiguous. Consider the ambiguous (124).

(124) Die Popstars, haben den Sängern jeweils zwei Bücher geschenkt.
the pop stars have the singers each two books given (as a present)

a. 'Each of the pop stars has given two books to the singers.'

b. 'The pop stars have given each of the singers two books.'

On the reading in (124a), jeweils distributes over the subject denotation such that each of the pop stars gave the singers two books (i.e. the total number of books depends on the number of pop stars). On the second reading in (124b), jeweils distributes over the indirect object denotation such that each of the singers got two books from the pop stars (the total number of books depending on the number of singers). The ambiguity of (124) is parallel to that observed with possessive pronouns in (125).

63 In Chomsky (1986b:169), the term 'Governing Category' for a is defined as “a maximal projection containing both a subject and a lexical category governing a (hence, containing a)”.
(125)  Peteri hat Billj seinj Buch gegeben.

‘Peter has Bill his book given’

In (125), the pronoun *sein* ‘his’ can refer either to Peter or to Bill.

Consider now the following sequence of ditransitive sentences. Each sentence contains an anaphor inside a direct object DP. The anaphor must be bound within its minimal governing category, in accordance with principle A. In (126b) and (126c), the object DP contains an additional possessive pronoun, which is the subject of the DP (presumably in SpecDP). The following binding patterns are observed:

(126) a. Peter hat Klaus ein Buch über sichj gegeben.

‘Peter gave Klaus a book about himself.’

b. Peter, hat Klaus sein Buch über sich/*j gegeben.

‘Peter gave Klaus his book about himself.’

c. Peteri hat Klaus sein Buch über sich*i/j gegeben.

With no possessive pronoun present, the anaphor can be bound by the subject or by the indirect object, and the sentence is ambiguous (cf.126a). In (126bc), presence of the possessive pronoun turns the object DP into the minimal governing category for the anaphor, in which it must be bound. If the possessive pronoun co-refers with the subject *Peter*, the anaphor (which must be bound by the possessive) co-refers with the subject (126b). If the possessive pronoun co-refers with the indirect object, the anaphor co-refers with the indirect object (126c).

Interestingly, analogous binding facts can be observed with *jeweils*.

(127) a. Die Popstarsi haben den Sängernj zwei Bücher über sichj geschenkt.

‘The popstars gave the singers two books about themselves.’

b. Die Popstarsi haben den Sängern jeweilsi zwei Bücher über sich/*j geschenkt.

‘The popstars gave the singers each two books about themselves.’

c. Die Popstarsi haben den Sängern jeweilsj zwei Bücher über sich*i/j geschenkt.

‘The popstars gave the singers each two books about themselves each.’

Like (126a), (127a) without *jeweils* is ambiguous. The anaphor can be bound either by subject or indirect object. The insertion of *jeweils* in (127bc) results in the following picture. The anaphor can no longer be ambiguously bound by either subject or indirect object. This suggests that *jeweils* is the subject of the object DP in SpecDP, turning it into the minimal governing category for the anaphor. If *jeweils* distributes over the subject, i.e. if each of the pop stars gave two books to the singers, the anaphor has to co-refer with the subject (cf.127b). If *jeweils* distributes over the indirect object, such that each of the singers got two books, then the anaphor has to co-refer with the indirect object (cf.127c).
(127a-c) show that the presence of jeweils blocks the anaphor from being freely bound by either subject or indirect object.\(^\text{64}\) (127bc) show that the range of potential antecedents for the anaphor depends on the interpretation of jeweils, namely on which antecedent is chosen as DistKey expression. The facts in (127bc) follow on the assumption that jeweils contains an NP-proform –weil-, which is co-indexed with a pluralic antecedent (i.e. either subject or indirect object), and which in turn binds the anaphor within its minimal governing category, the jeweils-DP.

Parallel facts with reversed binding possibilities are observed if we replace the anaphor with a pronoun.

(128) a. Peter hat Klaus ein Buch über ihn\(i/^\gamma j\) gegeben.
   Peter has Klaus a book about him given
   ‘Peter gave Klaus a book about him.’

b. Peter, hat Klaus sein, Buch über ihn\(i/^\gamma j\) gegeben.
   Peter has Klaus his book about him given
   ‘Peter gave Klaus his book about him.’

c. Peter, hat Klaus sein Buch über ihn\(i/^\gamma j\) gegeben.
   ‘Peter gave Klaus his book about him.’

(129) a. Die Popstars haben den Sängern zwei Bücher über sie\(i/^\gamma j\) geschenkt.
   the popstars have the singers two books about them given
   ‘The popstars have given the singers two books about them.’

b. Die Popstars haben den Sängern jeweils, zwei Bücher über sie\(i/^\gamma j\) geschenkt.
   the popstars have the singers each two books about them given
   ‘The popstars have given the singers two books about them each.’

c. Die Popstars, haben den Sängern jeweils, zwei Bücher über sie\(i/^\gamma j\) geschenkt.
   the popstars have the singers each two books about them given

In (129bc), the pronoun sie must not be bound by the proform in jeweils. On the other hand, it is the presence of pronominal jeweils which establishes a minimal governing category within which the pronoun is A-Free. This opens the possibility for the pronoun to be bound by the subject or the indirect object in (129bc). Again, the behaviour of jeweils is parallel to that of the possessive pronoun in (128bc).

Summing up, the parallel behaviour of possessive pronouns and jeweils in (126) – (129) is accounted for on the present analysis, which takes jeweils to contain an NP-proform –weil-. In addition, the fact that presence of jeweils turns the object DP into a minimal governing category suggests that jeweils functions as the syntactic ‘subject’ of the jeweils-DP. This observation is in line with the present analysis of jeweils-DPs, which assumes jeweils to be located in SpecDP (the position for DP-internal subjects) at surface structure.

\(^{64}\) Since the intuitions concerning (127a-c) are subtle and possibly influenced by the simultaneous possibility of an adverbial reading for jeweils, consider (i), which is simpler in two respects. First, (i) contains only one potential DistKey for jeweils, thus excluding ambiguity in the reference of –weil-. Second, (i) contains the imperfectivity marker gerade ‘just’, thus excluding an adverbial interpretation for jeweils.

(i) Die Jungen, schenken dem Popstar, gerade jeweils, zwei Bücher über sich\(i/^\gamma j\), the boys give the popstar just each two books about REFL
   ‘The boys are each giving the popstar two books about themselves / *himself.’

It seems to me that the co-reference between the reflexive anaphor and the singular antecedent dem Popstar ‘the pop star’ is impossible in (i) despite the fact that our knowledge of the world suggests otherwise. If correct, data like (i) suggest that presence of adnominal jeweils indeed restricts the co-reference possibilities of a reflexive anaphor contained in the same DP.
Before going on, a word of warning concerning the nature of –weil- is in order. The discussion of (119) and (120) may have led to the incorrect impression that –weil- is a syntactic anaphor which must be licensed in its minimal governing category by a c-commanding DP-antecedent.\(^65\) That this is not the case, can be seen from sentences such as (130) (repeated from chapter II.1.8), where jeweils does not take a DP as its DistKey expression.

\[(130)\quad \text{Peter hat Maria aus jeweils zwei Gründen kritisiert und gelobt.}
\]

Peter has Maria for each two reasons criticised and praised

‘Peter has criticised and praised Maria for two reasons respectively.’

This is very much unlike the behaviour of other syntactic anaphors, which require a DP-antecedent as licensor. The behaviour of jeweils rather resembles that of the pronoun it, which can co-refer with non-DP expressions (Kamp & Reyle 1993:306, fn.1). In (131), for instance, it seems to refer to the event described by the preceding clause

\[(131)\quad \text{Bill passed the exam. It surprised everyone.}
\]

In chapter V, we will encounter a conclusive argument against treating –weil- as an anaphor. There, it will be shown that adnominal jeweils is licensed in syntactic configurations without an appropriate antecedent. In this case, the value for –weil- must be provided by the context, showing clearly that –weil- cannot be a syntactic anaphor.

4.2.3 Other NP-Proforms: Grammaticalisation

Apparently, the proform –weil- is derived from the lexical noun Weile ‘while, time’ through a process of grammaticalisation. Processes of grammaticalisation are frequently argued to involve a process of ‘bleaching’, which makes them lose part of or their entire inherent feature content (Roberts 1993, Lehmann 1995, Haspelmath 1998). As expected, –weil- has lost its semantic restriction to points of time, events, or intervals, unlike its English counterpart time in each time. As a result of bleaching, –weil- can co-refer to pluralic entities of any ontological sort. Furthermore, bleaching must also have affected the grammatical properties of Weile. As a feminine noun, Weile is not overtly case-marked for genitive, whereas the proform –weil- carries the genitive –s of the masculine and neuter paradigm (presumably forced by the need to license P\(^0\) through overt case). This suggests that –weil- has either lost its D-feature for gender or that the gender marking has changed from [+fem] to [-fem].\(^66\)

The purpose of the foregoing remarks was to motivate the assumption that the proform –weil- is derived from a full lexical noun through the process of grammaticalisation. If so, we expect to find other instances where grammaticalisation turns lexical nouns into NP-

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\(^{65}\) Recall from chapter II.5 that such an analysis was suggested for English each by Burzio (1986) and Stowell & Safir (1988). In section III.5.4, an explanation for the (non-) anaphoric nature of jeweils vs. each is given.

\(^{66}\) In fn. 60, it was mentioned that jeweil-s has an alternative form jeweil-n, with –n being the old dative marker in the feminine paradigm (nach einer Weilen ‘after a while(DAT)’). This dative ending is still found in some Upper German dialects, as witnessed by the following example from Viennese (Austrian):

\[(i)\quad \text{med ana schwoazzn dint-n} \quad \text{(Artmann 1958)}
\]

with a black ink-DAT

It could be that the switch from n- to s-ending in German jeweils coincides with the loss of the –n suffix as dative marker for feminine nouns, under a simultaneous loss or change of the gender-feature in –weile(e)-.
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proforms that can serve as the restriction for the universal quantifier je (or alternatively for pro). The expectation is borne out, as witnessed by (132ab).67

(132) a. Wir haben je / pro Person 5 Euro bezahlt.
   we have each per person 5 Euro paid.
   ‘We paid 5 Euro per person.’

b. Die Eier kosten 50 Cent je / pro Stück.
   the eggs cost 50 cents each per piece
   ‘The eggs cost 50 cent apiece.’

Person in (132a) is the proform used for groups of human individuals, especially if the gender structure of the plural group is not clear or mixed. Likewise, Stück ‘piece’ is the proform used for groups of inanimate entities. The proforms Person and Stück differ from –weil- in that they have retained some of their semantic feature content. As a result, they cannot be interchanged in (132ab), nor can they ever be used to refer to groups of abstract entities, such as events, which is possible with –weil-.

One may wonder if the presence of an NP-proform is not forced by independent grammatical requirements, such as satisfaction of the binding conditions (Chomsky 1981, 1986b). Principle C of the binding conditions states that an R-expression (= a referential expression), i.e. a DP or a proper name, must be syntactically free. An expression is free if it is not bound, and an expression is bound if it is co-indexed with a c-commanding expression. Looking back at (132ab), we see that both the subject and the NP-complement of the universal quantifier refer to the same entity, the plural set of ‘us’ and a set of eggs respectively. Being co-referent, they carry the same index so that the subject syntactically binds the NPs Person and Stück respectively. But this would result in a principle C violation if the NP-complement of je or pro were a genuine referential expression. If correct, these considerations show that pronominalisation of an NP is a precondition for its occurrence in a d-distributive construction.

In conclusion, the proform –weil- was argued to derive from the lexical noun Weile ‘while, time’ through grammaticalisation. As often with grammaticalisation, processes of bleaching accompany the development from the lexical NP to an NP-proform. Finally, I have shown that grammaticalisations into a proform complement of the universal quantifier je (or pro ‘per’) are found with other lexical nouns in German (and English as well). This shows that the derivation of jeweils, in particular the pronominisation of Weile to –weil- is by no means exceptional, and perhaps even forced by independent grammatical principles. This concludes the discussion of the proform –weil-.

4.2.4 Movement of Jeweils: Topic Fronting
In the unmarked case, jeweils moves from its postnominal base-position to SpecDP of the jeweils-DP. In this section, I argue that this movement is conditioned by the discourse structure of the DP. It is shown that German exhibits a process of (DP-internal) ‘topic-fronting’, which overtly moves DP-internal topics to the left edge of the DP, namely to SpecDP. Following Reinhart (1995:105), ‘topic’ here refers to the element that denotes the most accessible, contextually most prominent, most salient entity. On the plausible assumption that the NP-proform in jeweils forms the topic of the jeweils-DP, the (almost) obligatory overt movement of jeweils can be attributed to the application of topic fronting.

67 Additional examples are pro Nase ‘per nose’ and pro Kopf ‘per head’.
In 2.4.2, it was shown that the postnominal PP in ILCs and jeNP-constructions can move to DP-initial position under special discourse conditions. (133a) shows this for ILCs, and (133b) for jeNP-constructions.

(133) a. \[DP[PP Für jeden Gefangenen\_1 drei Bewacher t\_1] hat der Direktor bereitgestellt.\]  
    for every prisoner | three guards has the director | assigned  
    ‘As for every prisoner, the director has assigned him three guards.’

b. \[DP [Je Gefangenen\_1 drei Bewacher t\_1] hat der Direktor bereitgestellt.\]  
    per prisoner | three guards has the director | assigned  
    ‘As for the prisoners, the director has assigned each of them three guards.’

Informally, the fronted constituents in (133ab) must be interpreted as a contrastive topic. As a topic, the fronted constituent refers to the contextually most prominent or most accessible discourse referent or file card in DRT or file change semantics terms (Kamp 1981, Heim 1982).\(^{68}\) This definition seems in accordance with the more traditional notion that the topic stands for what the sentence is about, its ‘aboutness’. The topic in a topic-comment structure is not identical with presupposed or background information in a background-focus structure even though the two notions can overlap. E.g., a syntactic subject often expresses the topic and presupposed information at the same time.

The topic status of the fronted constituents in (133ab) is confirmed by applying Reinhart’s (1995) empirical test for topichood. The topic test is a negative test and is based on the referential possibilities of the Dutch demonstrative pronouns deze ‘this’ and diens ‘his\_DEM’, when used as discourse anaphora. In a nutshell, Reinhart shows that the topic of a sentence – being the most accessible discourse antecedent - cannot be picked up by deze or diens. Apparently, the co-referential potential of these elements is restricted to discourse antecedents of intermediate accessibility (Reinhart 1995:102). From this, Reinhart concludes that a constituent that cannot serve as antecedent to deze or diens must be a topic.

The topic-test also works for German where the demonstratives diese(r) ‘this’ und dessen/deren ‘his/hers\_DEM’ cannot refer back to the most accessible discourse antecedent, i.e. the topic of their clause. For illustration, consider (134a), where the demonstrative can refer to the indirect object, but not to the subject, which is the topic of the clause. (134b) shows that a free pronoun in indirect object position is an unsuitable antecedent for the demonstrative, presumably because of the contextual salience of the pronoun’s referent.

(134) a. Peteri gab Hans\_i dessen\_i Buch zurück.  
    Peter gave Hans his\_DEM | book back  
    ‘Peter gave Hans his book back.’

b. *Peteri gab ihm\_i dessen\_i Buch zurück.  
    Peter gave him his\_DEM | book back  
    ‘Peter gave him his book back.’

This should suffice in order to give an idea of how the topic-test works. In what follows, I employ the test as a diagnostic for the topic-status of the DP-internally fronted constituents in (133ab). The prediction is that the fronted constituents in (133ab) should not be able to serve as discourse antecedents for a clausemate demonstrative pronoun if

\(^{68}\) I assume that it is the discourse status of the DP, which triggers movement. Since German does not allow for preposition stranding, the embedding PP is pied-piped along.
they are fronted because of their topic status. (135) and (136) show that the prediction is borne out for ILCs and \textit{je}NP-constructions. In order to keep the judgments clear, the examples are construed with a feminine and a masculine noun in the initial DP. This way, the demonstrative pronoun refers unambiguously.

(135) a. [Ein Gärtner in jeder Stadt] pflegt deren Gärten.  
   one gardener in every city looks after its gardens.
   'One gardener in every city, looks after its gardens.'
   b. [In jeder Stadt] ein Gärtner pflegt *deren / ihre Gärten.  
   in every city one gardener looks after its / its cities
   'One gardener in every city, looks after its gardens.'

   one employee per company checks its spending
   'One employee in every company controls its spending.'
   b. [Je Betrieb] eine Angestellte kontrolliert *dessen / seine Ausgaben.  
   per company one employee checks its / its spending
   '

In (135a) and (136a), the demonstrative can refer back to the postnominal QP, showing that it is not the topic of the clause. The situation is different in the (b)-examples, where the PP-adjunct has moved to SpecDP. Here, the fronted constituent can no longer be picked up by the demonstrative pronoun, showing that it is the topic of the clause.69

The same facts are found with DP-internal possessor phrases. (137a) shows the basic case of a possessor PP in postnominal modifier position. In postnominal position, the possessor phrase is not a topic and can be picked up by a demonstrative pronoun. If a possessor phrase occurs in DP-initial position, however, it is the topic and can no longer be picked up by a demonstrative. (137b) shows this for a prenominal genitive DP, and (137c) for a fronted possessor-PP.70 Again, the judgments are those on a neutral intonation of the clause. The demonstrative is possible if the head noun is assigned prominence by (contrastive) stress.

(137) a. [DP Die Jacke [PP von Peter]] verriet dessen Anwesenheit.  
   the coat of Peter betrayed his presence
   'The coat of Peter betrayed his presence.'
   Peter's coat betrayed his / his presence
   'Peter's coat betrayed his presence.'
   c. [DP [Von Peter, ] die Jacke |1 verriet *dessen / seine Anwesenheit.  
   of Peter the coat betrayed his / his presence
   '

69 The demonstrative can refer to the fronted constituent in the (b)-sentences if the head noun of the DP receives the highest degree of accessibility or contextual prominence by independent means, e.g. contrastive stress. In this case, the fronted PP has only secondary, or 'intermediate' prominence and is a possible antecedent for the demonstrative. The judgments in the main text are those for sentences pronounced with neutral or sentence grammar intonation (see Reinhart 1995, Cinque 1993).

70 On the possibility of PP-fronting inside possessive DPs in German see Bhatt (1990) and Fortmann (1996). The similarity of (137b) and (137c) suggests that the two constructions have the same underlying structure, with the prenominal GEN- or PP-element being base-generated in postnominal position. This is in effect the analysis of prenominal genitives found in den Dikken (1998). The assumption of a shared underlying structure is further supported by the genitive-PP-alternation observed for German in connection with Emonds' Invisible Category Principle. Nonetheless, the facts surrounding prenominal genitives in German are more complex than indicated here, suggesting that synchronically the structural parallelism between (137b) and (137c) no longer holds. The reader is referred to Hartmann & Zimmermann (2002) for a detailed discussion of adnominal genitive expressions in German.
The data in (135) – (137) are summarised in form of the generalisation in (138), with the corollary in (139).

(138) Topics must occur at the left edge of DP (in German).

(139) **Topic Fronting:**
A constituent moves overtly to DP-initial position (in German) iff it is a topic.

(139) is the DP-internal counterpart to the discourse driven processes of overt scrambling and topicalisation at clause level. It supports the parallelism between clausal and nominal domain that is argued for in Stowell (1989, 1991) and Szabolcsi (1989, 1994). (139) accounts for obligatory fronting of adnominal *jeweils* on the assumption that *jeweils*, or better the embedded proform –*weil-* has topic status. The topic status of *jeweils* is confirmed by Reinhart’s topic-test. In (140a), the demonstrative pronoun can refer to the indirect object. But it cannot do so in (140b), where presence of *jeweils* turns the indirect object into the DistKey for adnominal *jeweils*.

(140)  a. Maria erzählt den Kindern jeweils eine Geschichte über deren Herkunft.
   Maria tells the children each one story about their origin
   ‘Maria is telling the children each one story about their origin.’

   b. ?* Maria erzählt den Kindern jeweils eine Geschichte über deren Herkunft.
   Maria tells the children each one story about their origin
   ‘The aunt is telling the children each one story about their origin.’

The topic status of the DistKey expression is not surprising. It seems that contextual prominence, hence high accessibility of a discourse referent is a precondition for distribution over it. If so, the DistKey must be a topic. Since the proform –*weil-* is coreferent with the topic, the DistKey expression, it inherits the latter’s topic status. As a topic, –*weil-* must move to SpecDP by topic fronting. Being a bound form, it can only do so by pied-piping the universal quantifier *je* and the empty preposition along. This explains why *jeweils* moves to SpecDP in the unmarked case.

Movement of a constituent for discourse reasons is driven by a specific discourse status of that constituent such as ‘most prominent’, ‘old information’ etc. These notions are relative in the sense that a constituent can acquire a prominent discourse status in a given context, leading to a change in word order. This explains why *jeweils* can occasionally stay behind in its postnominal base position, as in (141ab).

(141)  a. [Wieviel WÜRSTCHEN jeweils] haben die Jungen gegessen?
   how many SAUSAGES each have the boys eaten
   ‘How many SAUSAGES each have the boys eaten?’

   the boys have two SAUSAGES each bought not two oranges
   ‘The boys have bought two SAUSAGES each, and not two oranges.’

The small caps on the DP-initial phrase indicate that the postnominal occurrence of *jeweils* is accompanied by stress on some other constituent in the DP. This suggests that

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71 This judgment for (140b) does not seem to be shared by all speakers.
Jeweils can optionally remain its base position, if some other element inside the DP has a more prominent discourse status. In (141ab), the prominent discourse status of the stressed constituents seems to be due to their interpretation as contrastive topic.

Summing up, I have argued that topics must occur at the left edge of DP in German. If a topic is not base-generated at the left edge of DP, it raises overtly to SpecDP by application of topic fronting (cf.139). It was also argued that – in the unmarked case - jeweils inherits the topic status from its DistKey expression under co-reference between the DistKey and the proform –weil-. As a topic, jeweils must move overtly to SpecDP. This explains the prenominal occurrence of jeweils in the unmarked case. Jeweils moves for discourse reasons. Finally, it was shown that jeweils may optionally stay in its postnominal base-position if the role of topic is taken over by some other constituent inside the DP.

4.2.5 Extraction from jeweils-DPs

The analysis of jeweils-DPs also accounts for certain facts regarding extraction from jeweils-DPs. There are two cases to distinguish: In section 2.1.3, it was shown that the DistShareNP can extract from the jeweils-DP (cf.142). Second, the analysis of jeweils-DPs predicts that adnominal jeweils should be able to leave the DP, using SpecDP as an escape hatch. Below, this prediction is shown to hold as well, supporting the present analysis of jeweils-DPs (see also the discussion of movement of adnominal jeweils in chapter II.2.3).

The extraction of DistShareNPs from jeweils-DPs was illustrated in (39b) in 2.1.3, which is repeated as (142). In (142), the DistShare extracts from DP, leaving adnominal jeweils behind.

\[(142) [\text{Zwei Geschenke}] \text{hat Peter den Kindern} \text{ja doch gerade [jeweils, t1] gegeben.}\]

two presents has Peter the children PART PROG each given

‘It was two presents which Peter has just given to each child after all.’

I would like to argue that the present analysis of jeweils-DPs leaves room for extraction of DistShareNPs, but that the position of the trace is not as indicated in (142). In particular, I would like to argue that the extraction in (142) is analogous to that found with instances of ‘NP Split’, illustrated in (143) (from Pafel 1995:159, ex.37a)

\[(143) \text{a. Gemälde, besitzt der Louvre [DP viele t1 [PP von Leonardo]].}\]

paintings owns the louvre many of Leonardo

‘The Louvre owns many paintings by Leonardo.’

\[(143) \text{b. Schöne Gemälde, besitzt der Louvre [DP einige t1 von Leonardo].}\]

beautiful paintings owns the louvre some of Leonardo

‘The Louvre owns some beautiful paintings by Leonardo.’

In (143a), the head noun of the object DP has extracted from the DP, leaving behind a postnominal PP-modifier. (143b) shows that more than the head noun may move as long as the moved elements form a constituent. This presentation of NP Split is an oversimplification and glosses over a lot of complexities and confusing details that have made NP Split the focus of a controversial debate.\(^{72}\) It is not even clear if movement is

\(^{72}\) See e.g. Tappe (1989), Fanselow (1987b), Riemsdijk (1989), Pafel (1995), and for different accounts of the phenomenon in question.
involved in NP Split or if the structures are base generated. Following Pafel (1995), I assume that the structures in (143) are indeed derived by movement. If correct, (143a) shows that extraction from DPs can strand postnominal PP-modifiers. The possibility of PP-stranding will be an important ingredient of the analysis to come.

As pointed out repeatedly, clausal domain (CP) and nominal domain (DP) behave alike in a number of ways. One of the observable parallels concerns the availability of the SpecDP-position as an escape hatch for movement. The first empirical argument to this effect is – to the best of my knowledge – from Szabolcsi (1983), where it is shown that dative possessor DPs in Hungarian can leave the embedding DP through SpecDP. The structure of (144a) (from Szabolcsi 1994:181, ex.4b) is given in (144b).

(144) a. Mari-nak fekete volt a kalap-ja
   Mari-DAT black was the hat-POSS3sg,NOM ‘Mari’s hat was black.’
   b. Mari-nak1 ... [DP t1 hat-POSS3sg,NOM kalap-ja]

Based on data such as (144a), Willim (2000) proposes to use the extractability of a phrase from within a nominal argument as a diagnostic for the presence of a functional DP-layer. According to Willim, extractability out of a nominal argument is possible only in the presence of an empty SpecDP-position, which can serve as escape hatch.\(^{73,74}\) I will adopt Willim’s assumption that the SpecDP position functions as an escape hatch for extraction without further discussion.

Given Willim’s proposal, the extraction of the DistShareNP from the jeweils-DP in (142) constitutes a problem. Note that jeweils precedes the NP-trace in (142), indicating that it has moved overtly to SpecDP. If so, it would block extraction of the NP, which must proceed through SpecDP (according to Willem). I conclude that jeweils cannot have moved overtly in (142), so that it is still in its base position. The revised structure of (142) is given in (145).

(145) [Zwei Geschenke], hat Peter den Kindern, ja doch gerade [t1 jeweils] gegeben.
   two presents has Peter the children PART PROG each given

(143a) shows that extraction of an NP under stranding of postnominal PPs is possible. Therefore, nothing should block the jeweils-PP from staying behind in (145), especially since the fronted DistShareNP must have prominent discourse status in order to license its topicalisation. That is, jeweils is not forced to move overtly to SpecDP because it is not the topic (= the most prominent element) of the clause anyway.\(^{75}\) Considering all this, extraction of DistShareNPs from jeweils-DPs is accounted for on the present analysis.

The second type of extraction from jeweils-DPs is the extraction of jeweils itself. Extraction of jeweils is similar in nature to the extraction of the Hungarian possessor in (144). The dative possessor in (144) first moves to SpecDP, from where it can leave the

\(^{73}\) That this is only a necessary, but not a sufficient condition for extraction from DPs is shown by the ungrammaticality of extraction from specific DPs, as in (i):

(i) *Who did you invite [the friend of t1]?

\(^{74}\) Interestingly, Pafel (1995) arrives at the opposite conclusion. For Pafel, extraction from an NP contained inside a DP is highly restricted because the additional DP-layer introduces a barrier for extraction.

\(^{75}\) The analysis would still go through even if jeweils was a topic. The generalisation in (138) requires the topic to be at the left edge of DP. If this restriction applies at the level of PF (Phonological Form), jeweils in postnominal position would automatically be at the left edge after extraction of the NP, thus satisfying (138) without moving to SpecDP.
Likewise, *jeweils* is expected to be able to leave the *jeweils*-DP after movement to SpecDP. (146a) shows that such movement is possible, creating the structure in (146b). Note that the presence of the imperfectivity marker *gerade* ‘just’ excludes the adverbial reading for (146a).

(146) a. Die Jungen, haben jeweils, gerade Peter zwei Bücher verkauft.
the boys have each just Peter two books sold
‘The boys have just sold Peter two boys each.’

b. Die Jungen, haben jeweils, gerade Peter [DP ti [NP zwei Bücher ti]] verkauft.
the boys have each just Peter two books sold

Overt extraction of *jeweils* is constrained by discourse requirements and general restrictions on overt movement. Thus, extraction of *jeweils* will be accompanied by prominent stress on the moved element, indicating its prominent discourse status (a precondition for movement to SpecDP). Second, extraction of *jeweils* obeys general constraints on movement. It cannot raise across co-indexed constituents for this would result in a Principle C violation (147a) (cf. chapter II.2.2, fn.15), nor can it raise out of syntactic islands (147b). See also the discussion in chapter II.2.3.

Peter has each just the boys, two roses, given

b. *Die Jungen, bedauern jeweils, gerade, dass Peter, ti’ zwei Gäste ti einlädt.
the boys regret each just that Peter, two guests invites

The extractability of adnominal *jeweils* from its host DP was cited in chapter II.2.3 as a problem for distinguishing instances of adverbial and adnominal *jeweils*. It blurs the syntactic dividing line. This section has shown that the extractability of adnominal *jeweils* from *jeweils*-DPs is unproblematic for the present analysis of *jeweils*-DPs. To the contrary, the present analysis predicts such extraction to be possible.

In conclusion, the two observable types of extraction from *jeweils*-DPs follow on the present analysis of *jeweils*-DPs.

### 4.2.6 The Short Form *Je*

In this section, I extend the analysis of adnominal *jeweils* to its shorter counterpart *je*. I argue that *je* is structurally parallel to adnominal *jeweils*, when used as an adnominal d-distributive quantifier. Instead of an overt proform –*wel–*, the *je*-construction contains a covert proform that is co-indexed with the DistKey expression. The structure of the *je*-construction in (148a) is spelt out in (148b), with the covert proform indicated by ‘∅’. The fine structure of the *je*-PP is shown in (148c).

(148) a. Die Jungen, kauften je, zwei Bücher.
the boys bought each two books
‘The boys bought two books each.’
The parallel treatment of *je* and *jeweils* accounts for the observation from chapter II.1.9 that the two elements have the same syntactic distribution. Distributive *je* occurs in all and only in those positions where adnominal *jeweils* occurs. It only gives rise to adnominal readings (see chapter II.1.9), and it is excluded from positions reserved for adverbial *jeweils* (cf.149ab).

(149) a. Die Jungen haben je*(weils) alle zwei Würstchen bestellt.

  the boys have each (time) all two sausages ordered

  "Each time, the boys all ordered two sausages."

b. Peter hat je*(weils) gewonnen.

  Peter has each(time) won

  'Peter has won each time.'

Classifier constructions, as in (150a) with the structure in (150b), support the analysis of *je*DPs as involving a covert NP-complement.

(150) a. Benzin kostet fünf Euro je Liter.

  petrol costs five Euros per liter

b. Benzin kostet [DP fünf Euro [PP [QP je [ClP Liter [NP ∅]]]]].

In (150a), only part of the complement of *je* can be covert for semantic reasons. The presence of the classifier *Liter* shows that *je* takes a complement. The classifier must be expressed overtly because *je* and *jeweils* can only distribute over groups of discrete entities, not over mass denotations (cf. chapter II.1.5, fn.8). It requires an NP-argument which is covert in (148b), its value being determined by co-indexation with the antecedent mass DP *Benzin* ‘petrol’. I take the presence of a covert NP-proform in (150a) to support the presence of an analogous covert NP-proform in (148a), the two structures differing only regarding the presence or absence of a classifier.

The analysis of *je* as the short form of adnominal *jeweils* is in line with Safir & Stowell’s (1988) treatment of d-distributive *each* as containing a covert proform. Furthermore, since *jeweils*-DPs are analysed as special instances of *je*-NP-constructions (and ILCs), the present analysis is in line with Sauerland’s (2001) claim that the *je*-construction in (148a) is a *je*-NP-construction underlingly. According to Sauerland, *je* is an ordinary distributive universal quantifier (like *every*). The NP-complement of this quantifier is a silent copy of its (DistKey) antecedent. Presumably the content of this silent copy is recovered under identity to the antecedent. The QP formed by *je* and (covert) complement forms an ILC-like constituent with the DistShareNP, an assumption also
shared by the present analysis. According to Sauerland, (148a) has the underlying structure in (151), with the (phonetic) deletion indicated by strikethroughs.

(151) Die Jungen kauften [DP [QP je [NP Junge]] [zwei Bücher]].

the boys bought each boy two books

The present analysis of je(weils)-DPs in (148b) and Sauerland’s in (151) do not differ widely regarding their surface structure. However, the two analyses differ regarding the (non-) application of LF-movement. In Sauerland’s (2001) analysis, the QP raises out of its embedding DP at LF. In contrast, the present analysis of adnominal je(weils)-DPs does not assume LF-movement of the quantified phrase at all. In chapter IV, it will be shown that je(weils)-DPs are interpretable in situ, making LF-movement for interpretive reasons superfluous. Section 4.3 presents more evidence to the effect that the assumption of LF-movement of je or jeweils is not only unnecessary, but even detrimental to the analysis of these constructions.

There is a second argument against Sauerland’s analysis, which arises in connection with the assumption that the NP-complement of the quantifier je is a silent copy of the DistKey. Recall from chapter II.1.8 that adnominal jeweils is able to distribute over a plurality of events, e.g. over the denotation of two conjoined verbs. (152) shows that the same is possible with je.

(152) Peter hat Maria aus jei zwei Gründen [kritisiert und gelobt].

Peter has Maria for each two reasons criticised and praised

‘P has criticised and praised Mary for two reasons respectively.’

In (152), the plurality of events over which je distributes is not expressed by an NP, but by two conjoined transitive verbs. It is not clear to me how the NP-complement of the je could be a silent copy of the two conjoined verbs, neither syntactically nor semantically. The present treatment of je(weils)-DPs does not encounter this problem. Je always takes an overt or covert NP-proform as complement. This complement receives its value through co-indexation with a plural antecedent. Since the NP-proform is not restricted to range over sets of individuals, it can also refer to the set of events denoted by the conjoined Vs.

The structure of je-constructions in (148bc) is maximally abstract in that it involves not only an empty D-head and an empty P-head, but also a covert proform. The only lexical elements are the quantifier je, and the DistShareNP. Since je has no overt complement that could be case-marked, P0 must be licensed by incorporation of the lexical head je. This incorporation is followed by movement of the entire postnominal PP to SpecDP on the assumption that the constituent je-∅ inherits the topic status from the DistKey expression, as was the case with jeweils.

Since je is a syntactic Q-head, it would also be possible that it moves into prenominal surface position by successive head-movement from Q to P, and from P to D. The resulting structure of the je(weils)DP would be as in (153).

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76 Note that the P-to-D movement indicated in (153) involves extraction of the P-head out of an adjunct. Such extraction should be blocked since adjuncts form islands for extraction (see Huang 1982). Baker (1988) and den Dikken (1992:11-13) allow for incorporation of the heads of selected or lexically governed constituents into their lexical governors. This qualification allows for incorporation of the heads of ECM-subjects and lexically selected adjuncts. It is doubtful if the right-adjointed PP in (153) is lexically governed by the empty D-head. Given this, (153) should not be well-formed. The difficulty can be overcome by adopting the SC-analysis from section 3.6, which does not assume right-adjunction. On the SC-analysis, the P-head can move successively to D
Successive head-movement of \textit{je} as in (153) licenses all empty heads and derives the correct word order. Nonetheless, I do not assume that successive head-movement takes place in German. For once, the assumption of successive head-movement makes a unified treatment of \textit{jeweils} and \textit{je} impossible. Second, the discussion of ILCs, \textit{je\-NP}-constructions and \textit{jeweils-}DPs has shown that empty D\(^0\) is licensed in all these constructions without the assumption of overt movement to D. In particular, D\(^0\) in object position is licensed under lexical government by the verb (see also the discussion in chapter I.2.4.3). Third, if Q to P to D-movement took place one might expect to find overt grammatical reflexes of such movement given that the affected D\(^0\)-head is the locus of the DP’s D-features.

In section 5.1.1, I will suggest that successive head-movement from Q to P to D takes place in Slavic languages like Polish and Czech, where the d-distributive constructions exhibit a preposition \textit{po}. Movement of P to D\(^0\) is reflected by a change in the case and agreement properties of the d-distributive DP. E.g., the DP carries oblique case (presumably assigned by P) instead of the expected structural case. Such a change in grammatical properties is accounted for if the preposition has raised overtly to D\(^0\), contributing to the complex head’s feature content. Since no such effects are attested for German \textit{je-}DPs, I conclude that Q-to-P-to-D movement does not take place. It follows that \textit{je} reaches its DP-initial position by way of topic movement, same as its long form \textit{jeweils}.

In conclusion, I have argued that the short form \textit{je} has the same syntactic distribution as adnominal \textit{jeweils} because it has the same underlying structure modulo its NP-proform being covert. The analysis in terms of a covert proform accounts for the fact that \textit{je} can distribute over non-DP denotations as well. This concludes the discussion of the short form \textit{je}.

### 4.2.7 Summary

The section has shown that German \textit{jeweils-}DPs can be analysed as special instances of ILCs and \textit{je\-NP}-constructions. Adnominal \textit{jeweils} is analysed as being of categorial status PP, its empty P-head being licensed by overt genitive case in its complement. The restriction of the universal quantifier \textit{je}, \textit{\textasciitilde weil\textendash}, is analysed as an NP-proform that is co-indexed with the DistKey and which is derived from the full NP \textit{Weiße} by a process of grammaticalisation. The normal DP-initial position of adnominal \textit{jeweils} is attributed to the application of overt DP-internal movement that is driven by discourse requirements. Finally, the analysis of adnominal \textit{jeweils} was applied to its short form \textit{je}.

### 4.3 Against LF-Movement

The preceding discussion has shown that \textit{je} and \textit{jeweils} can be syntactically analysed as quantifiers that take an overt or covert NP-proform as complement. Chapter IV will show how these structures are interpreted. The upshot of the discussion will be that d-distributive constructions can be interpreted in situ, obviating the need for LF movement through the head of the small clause, Pr. It is shown in the main text below that there are independent arguments against P-to-D movement of German \textit{je}. Therefore, the right-adjunction analysis can be maintained for German.

\footnote{The parallel analysis of \textit{je\-∅} and adnominal \textit{jeweils} raises the question of which form developed first. Based on the observation that \textit{je} is attested much earlier (>9\textsuperscript{th} century) as an independent form than \textit{jeweils} (>17\textsuperscript{th} century), one could speculate that \textit{je} has acquired an additional (d-distributive) use, which - over time - has been marked overtly by \textit{\textasciitilde weil\textendash}. Against this view speaks the fact that \textit{je} does not seem to have had the d-distributive use before the emergence of \textit{jeweils}, even though \textit{je} was attested in \textit{jeNP}-constructions before the emergence of \textit{jeweils}. This suggests that the actual development was \textit{je >> je\-NP construction >> jeweils >> je\-∅}.}
for semantic reasons. Nevertheless, some analyses of d-distributive constructions assume LF-movement. Safir & Stowell (1988) argue that the covert proform that forms the complement of each is a syntactic anaphor. In order for the anaphor to be licensed in a local configuration with the antecedent, the entire QP must raise at LF (see chapter II.5.3). Sauerland (2001) argues that the QP consisting of je and the deleted NP-complement leaves the embedding DP at LF because it must take scope over the latter.

In this section, I present three arguments that show that jet(jeweils) does not move at LF. The argument is the same in each case. It will be shown that jeweils occurs in a number of configurations in which an island or a barrier for movement intervenes between jeweils and its proposed landing site. The mere possibility of jeweils in these constructions shows that it does not move at LF. Insistence on LF-movement of jeweils, on the other hand, would result in the relaxation of a number of well-established restrictions on syntactic movement. Since it will be shown in chapter IV that jeweils can be interpreted in situ, such a relaxation is unnecessary.

In section 4.3.1, I show that negative operators, which form a barrier for LF-movement of quantificational elements in German (cf. Beck 1996), can intervene between jeweils and the DistKey. In 4.3.2, I show that jeweils occurs in coordinate structures, which are also a barrier for movement (Ross 1967). In 4.3.3, I show that jeweils can occur inside adjuncts, which also constitute islands for movement (Huang 1982). The data presented argue – in my view – convincingly that jeweils does not move at LF. In section 4.3.4, I show that English each occurs inside syntactic islands as well. Applying the reasoning concerning jeweils to each, I conclude that English d-distributive each does not move at LF either. This result is important, because section 5 will take up the point that d-distributive each has certain anaphoric properties from chapter II.5. The arguments produced in this section show that whichever way the anaphoric properties are satisfied syntactically, it is not by means of LF-movement.

4.3.1 Jeweils and Negative Operators
The first argument against LF-movement of jeweils is an argument against long LF movement into the vicinity of the DistKey. The argument is built on the status of negative operators as barriers for LF-movement in German. The blocking effect of negative operators on LF-movement is discussed in Beck (1996), and – following her – in Pesetsky (2000). It is illustrated in (154) and (155).

(154) a. [Wen alles]_1 hat niemand t₁ gesehen?
Who all has nobody seen
b. Wen₁ hat Peter t₁ alles gesehen?
who has Peter all seen b.
c. *Wen₁ hat niemand t₁ alles gesehen?
who has nobody all seen

(155) a. [Wen von den Musikern]₁ hat niemand t₁ gesehen?
Who of the musicians has nobody seen
b. Wen₁ hat Peter t₁ von den Musikern gesehen?
who has Peter of the musicians seen
c. *Wen₁ hat niemand t₁ von den Musikern gesehen?
Who has nobody of the musicians seen
(154) is an exhaustive question formed by means of a question word *wen* ‘whoACC’ and an exhaustivity marker *alles* ‘all’. The question asks for a full list of all individuals that nobody saw as an answer. Beck (1996) shows that both elements must occur together at LF for semantic reasons. In (154a), the semantic requirement is guaranteed at surface structure already. (154b) shows that the question word can move alone at surface structure, leaving the exhaustivity marker *alles* behind. Since both elements must occur together at LF, one is forced to assume that *alles* moves to the question word at LF. The interesting case is (154c). (154c) is structurally parallel to (154b), the only difference being that the negative operator *niemand* ‘nobody’ intervenes between question word and exhaustivity marker. But (154c) is ungrammatical, presumably because of the intervening negative operator.

(155) shows that the same facts hold for partitive questions, which ask for elements out of a previously mentioned set denoted by the *von*-PP. The requirement that the two elements must occur together at LF is satisfied by (155a) at surface structure, and by (155b) at LF. (155b) shows that the question word can occur alone in sentence-initial position as long as the *von*-PP can raise at LF. This movement is blocked by the intervening negative operator *niemand* in (155c). Beck (1996:12) concludes on the base of such data that intervening negation blocks LF-movement in German, leading to the constraint in (156) (Beck’s ex.26).

\[(156) *[[X_k \ldots \text{Neg } [\ldots \text{k} \text{LF } \ldots]] \ldots]\]

The constraint in (156) is relevant to the analysis of adnominal *jeweils* for the following reason. Looking at sentences containing *jeweils* or *je*, we find that these are grammatical even if the negation operator *niemand* ‘nobody’ intervenes between the d-distributive element and the DistKey. (157a) is an example without, and (157b) an example with intervening negative operator.

\[(157) a. \text{Den Jungen}_i \text{ hat gerade Peter jeweils}_i \text{ zwei Würstchen } \text{bestellt.} \\
\quad \text{the boysACC has just Peter each two sausages ordered} \\
\quad \text{‘Peter has just ordered the boys two sausages each.’} \\
\quad b. \text{Den Jungen}_i \text{ hat gerade niemand jeweils}_i \text{ zwei Würstchen } \text{bestellt.} \\
\quad \text{the boysACC has just nobody each two sausages ordered}\]

If *jeweils* were to move to DistKey at LF in (157b), such movement would result in a configuration excluded by (156).

\[(158) *[[\text{Den Jungen}_i \text{jeweils}_i \text{ hat gerade [niemand}_{\text{NEG}} \text{ [ ti zwei Würstchen] bestellt]]]}\]

The grammaticality of (157b) shows, then, that *jeweils* does not move to its DistKey at LF in declarative clauses.\(^{78}\)

\(^{78}\) The qualification ‘in declarative clauses’ is necessary, for Beck (1996) assumes that the question in (i) involves LF-movement of *jeweils* to CP-adjoined position for semantic reasons.

\[(i) \text{Was hat Karl Uli und Susanne jeweils } \text{geschenkt?} \\
\quad \text{What has Karl Uli and Susanne each(time) given} \\
\quad \text{‘For each x of Uli and Susanne: what did Karl give to x?’} \\
\quad \text{(adnominal reading)} \\
\quad \text{‘For each occasion: what did Karl give to Uli and Susanne on that occasion?’} \quad \text{ (adverbial reading)}\]

Strictly speaking, Beck (1996) only shows the validity of (156) for interrogative clauses, even though she speculates on its validity for German declarative clauses. For this reason, the grammaticality of (157b) is not per
4.3.2 jeweils in Coordinate Structures

The second argument against LF-movement of jeweils is based on the fact that jeweils can occur inside coordinate structures. This is shown in (159).79

(159) Die siegreichen Jungen, erhielten [DP[den Pokal] und [jeweils, eine Medaille]].
   the victorious boys got the cup and each one medal
   ‘The victorious boys got the cup and one medal each.’

Extraction of jeweils from the DP would incur a violation of Ross’ (1967) ‘Coordinate Structure Constraint (CSC)’, which bans extraction out of coordinate structures. The effects of the CSC are shown for overt extraction in German in (160a). (160b) shows the working of the CSC for LF-movement in English (which has scope-driven QR).

(160) a. *Was haben die Jungen [[einen Pokal] und t1 (für eine Medaille)] bekommen?
   what have the boys a cup and for a medal got
   ‘What did the boys get a cup and a medal?’

   b. Someone loves [[Mary] and [every teacher]].
   *For every teacher, there is someone different who loves her and Mary.’

The comparison between the grammatical (159) and the ungrammatical (160ab) shows that jeweils does not leave the DP at LF.

4.3.3 jeweils Inside Adjuncts

The last argument against LF-movement is based on the ability of jeweils to occur inside adjuncts. An example is given in (161).

   the boys have in each two shops books bought
   ‘The boys have bought books in two shops each.’

Adjuncts are generally considered syntactic islands for extraction (cf. Huang 1982). (162a) shows that overt extraction from adjunct-PPs is impossible in German. Instead, the entire PP must be pied-piped (162b).

(162) a. *Von wem haben die Jungen [[in zwei Läden] [von wem]] eingekauft?
   of whom have the boys in two stores shopped
   ‘In whose two stores did the boys shop?’

   b. [In zwei Läden (von wem)] haben die Jungen t1 gekauft?
   in two stores of whom have the boys shopped
   ‘In whose two stores did the boys shop?’

The fact that jeweils occurs inside adjunct islands shows that it does not move at LF.

79 This test against LF-movement of jeweils is inspired by Petrova (2000), who uses the same argument in order to show that Bulgarian po does not move at LF.
4.3.4 Against LF-Movement of Binominal Each

The previous sections have adduced evidence to the effect that the German d-distributive element jeweils does not move at LF. A closer look reveals that some of the empirical arguments extend to English each. In particular, each can occur inside coordinate structures (163a), and inside adjuncts (163b) (see also chapter II.5.3).

(163) a. Two boys, got the cup and one medal each.
    b. The men, cut the salami with one knife each. (Safir & Stowell 1988: 447)

The choice of a numeral DistKey antecedent in (163a) excludes the possibility that the subject and the verb are simply deleted in the second conjunct, as in (164). In (164), each need not extract from a coordinate structure in order to get into a local configuration with its antecedent.

(164) Two boys, got the cup and two boys got one medal each.

(164) differs in meaning from (163a), though. It allows for situations in which two boys got the cup, and two other boys got one medal each. This reading is not available for (163a), arguing that each really occurs inside a coordinate structure.

Given the island status of coordinate structures and adjuncts, one is led to the conclusion that d-distributive each moves as little at LF as does its German counterpart jeweils. In light of this, there must be some other explanation for the facts presented by Safir & Stowell (1988), which showed that English each is banned from some syntactic islands. These were the underlying subject positions of main clauses (165a) and of small clauses (165b).

(165) a. *[One man each] accompanied the ballerinas home.
    b. *[We painted [two houses each] red.

The ungrammaticality of (165ab) raises the question of why d-distributive each is absent from (underlying) subject position in English, whereas German jeweils can occur in this position.

In section 5, I turn to these questions in detail. There, the first steps towards a cross-linguistic characterisation of d-distributive elements are undertaken. This enterprise will accompany us throughout chapters IV and V because the explanation for the (non-) occurrence of a d-distributive element in subject position in a given language will be shown to be partly syntactic and partly semantic in nature. By way of example, the ungrammaticality of (165a) will be attributed to syntactic reasons in section 5, while the ungrammaticality of (165b) will be shown to follow from a combination of syntactic and semantic reasons in IV.6. The picture to emerge is much more complex than a one-dimensional explanation in terms of (non-) extraction, but so are the facts.

4.4 The Syntax of other s-Expressions

The analysis of adnominal jeweils has shown that it forms part of a postnominal PP-modifier, which moves to DP-initial position overtly. In chapter II.3, it was shown that there are a number of other expressions that share certain morphological (shape), semantic (ambiguity) and syntactic (cross-categorial occurrence) features with jeweils. All these expressions were lumped under the cover term ‘s-expression’. The overall similarity in properties exhibited by the other s-expressions and jeweils seems to warrant an extension
of the syntactic analysis of *jeweils* to the former. In this section, I show this for *wenigstens* ‘at least’, assuming that the same holds for *mindestens* ‘at least’ and *höchstens* ‘at most’.

To begin with, the overt genitive marking on *wenigstens* argues for its categorial status as a PP, with an empty P-head licensed by case marking.

(166) \[ PP \ P^0 \ [QP \ wenigsten]-GEN \]

(166) is the underlying structure for both adverbial and adnominal *wenigstens*. The PP-status is backed up by diachronic evidence that shows that *wenigstens* derives from the overt PP *zum wenigsten* ‘to the least’ historically (Gebrüder Grimm 1960:46-48). The underlying PP-status of *wenigstens* fits in nicely with the fact that the cognates of *wenigstens* are expressed as overt PPs in English, the Romance languages, and – optionally - in Dutch.80 Examples are provided in (167).

(167) a. at least  
     b. au moins [French]  
     c. op z’n minst [Dutch]

The PP-status of all these elements can be taken as evidence in favour of a cross-linguistic analysis along the lines proposed here.

(169ab) show the underlying and surface structure of the *wenigstens*-DP in (168).

(168) Peter hat [DP wenigstens zwei Bücher] gelesen.  
     Peter has at least two books read  
     ‘Peter read at least two books.’

(169) a.  

     \[
     \begin{array}{c}
     \text{DP} \\
     \text{D'} \\
     \text{D^0} \\
     \text{NP} \\
     \text{AP} \text{zwei} \\
     \text{NP} \text{Bücher} \\
     \text{P} \\
     \text{PP} \\
     \text{wenigsten-s} \\
     \text{∅-s} \\
     \end{array}
     \]

b.  

     \[
     \begin{array}{c}
     \text{DP} \\
     \text{PP} \text{1} \\
     \text{wenigsten-s} \\
     \text{D'} \\
     \text{D^0} \\
     \text{NP} \\
     \text{AP} \text{zwei} \\
     \text{NP} \text{Bücher} \\
     \text{t_1} \\
     \end{array}
     \]

80 Dutch also has the alternative genitive forms *minstens* ‘at least’, and *hoogstens* ‘at most’.
The structures in (169ab) differ from that of jeweils-DPs in two ways: (i.) the empty head P0 does not take a QP, but a modified NP as complement; (ii.) the head noun of the complement NP is covert. The analysis of wenigstens resembles that of je in this respect. As argued above, the empty P-head is licensed by overt case marking in the complement, as in the jeweils-case. The postnominal base-position of the wenigstens-PP in (169a) is supported by the optional occurrence of wenigstens in postnominal position (cf.170).81

(170) Peter hat mit [ZWEI Freunden wenigstens] geredet.
    Peter has with two friends at least talked
    ‘Peter has talked to TWO friends at least.’

Since the numeral expression is embedded inside a PP (headed by mit ‘with’) in (170), the word order numeral NP >> wenigstens cannot be the result of scrambling of the numeral NP from out of the wenigstens-DP. The stress on the DP-initial numeral in (170) indicates that the postnominal occurrence of wenigstens is the marked case, and that its staying behind is motivated by discourse factors. In this case, the numeral is interpreted contrastively against other numbers of friends. From this, we can conjecture that the default movement of wenigstens to DP-initial position is conditioned by discourse, or information structure factors as well. Unlike with jeweils, which was argued to move because of its topic status, I would like to suggest that movement of wenigstens is triggered by its status as a focus particle, which – in the unmarked case – selects its focus domain to the right. In other words, default movement of wenigstens to the left takes place because the focused numeral NP has to be to the right of wenigstens at surface structure. This shows that DP-internal fronting of s-expressions can be triggered by different factors, as long as the movement takes place in order to satisfy discourse or information structure requirements.

A word of warning is in order here. From the fact that the different s-expressions share an underlying syntactic structure, it does not follow that they must be alike in all respects. The different s-expressions have different semantic properties, and this fact has repercussions for their syntactic behaviour. For instance, the quantified expression jeweils can combine with fewer expressions (predicate-denoting expressions) than the focus marker wenigstens because of their different semantic nature. In addition, different s-expressions seem to have different possible landing sites at their disposal. Wenigstens does not have to move as far as SpecDP, as witnessed by its occurrence below the definite determiner in (171).

(171) [Die wenigstens 500 Demonstranten] marschierten zum Rathaus.
    the at least 500 protesters marched to the townhall

Wenigstens in (171) could be adjoined to NP, or it could be in the specifier position of an intermediate functional projection FP, which has been proposed by den Dikken (1998) for the so-called N-of-a-N-construction.82

---

81 The paraphrase shows that the same word order variation is possible for English at least. This suggests that English at least can be analysed along the same lines.

82 Marginally, such an intermediate landing site seems possible for jeweils as well. Consider (i):

(i) Die Kinder mit [ihren jeweils zwei Spielzeugen].
   the children with their each two toys
   ‘The children with their two respective toys.’

Assuming that the possessive pronoun is located in SpecDP or D, jeweils must be located below DP.
The analysis of *wenigstens* in (169) differs from analyses that treat *wenigstens* as a modifier of the numeral alone (cf. Link 1987). In (169), *wenigstens* modifies the entire numeral NP. A similar treatment of English *at least* as being adjoined to the numeral NP instead of the numeral alone is found in Krifka (1999). Krifka shows that the focus markers *at least* or *wenigstens* can be interpreted correctly in this syntactic position. This gives additional semantic backing to the analysis proposed in (169). I conclude that the analysis of *jeweils*-DPs is applicable to other *s*-expressions, leaving open the details of this proposal for further research.

### 4.5 Summary

The chief result of the discussion of *jeweils*-DPs is that adnominal *jeweils* can be analysed as a regular generalised quantifier. *Jeweils*-DPs have the same structure as ILCs (on the “inverse” reading) and *je*NP-constructions. That is, *jeweils*-DPs contain more covert structure than what appears at first sight. The d-distributive element *jeweils* forms a postnominal PP with an empty prepositional head $P_0$, a universal quantifier *je*, and a pronominal NP-complement. The NP-proform provides the restriction for the universal quantifier, and must be co-indexed with a plural expression. This accounts for the fact that adnominal *jeweils* usually has a clausemate DistKey expression (but see chapter V!). The DP-initial position of *jeweils* is due to a general syntactic property of German. In German, topics must be located in DP-initial position. Another important result is that adnominal *jeweils* does not move at LF. Finally, it was shown that the analysis for *jeweils* might be applicable to other *s*-expressions in German and their counterparts in other languages, pending further investigation.

With this, the first two objectives of this chapter have been achieved. First, I have given a detailed syntactic analysis of both adverbial and adnominal *jeweils*. Second, the phenomenon of d-distributivity was reduced to an instance of regular quantification. It was shown that d-distributive elements can be analysed as regular quantifiers, given the correct syntactic analysis. In the following section, we turn to the last objective of chapter III, the investigation of d-distributivity from a cross-linguistic perspective.

### 5 The Cross-Linguistic Perspective

The objective of this section is to apply the analysis of *jeweils*-DPs to d-distributive DPs in other languages and account for observable cross-linguistic differences in the expression of d-distributivity (see chapter II.4 for an introductory discussion). The main claims of this section are the following: First, the syntactic analysis of *jeweils*-DPs applies to d-distributive constructions in other languages in a straightforward manner. Second, d-distributivity does not exist as an independent phenomenon in the other languages under investigation, as little as it does in German. Third, the observed variation between languages regarding the expression of d-distributivity can be accounted for in a principled way on the base of (i.) general syntactic properties of the languages in question, and (ii.) the grammatical feature content of the respective d-distributive elements, which is reflected in their morphological form.

In 5.1, the analysis of *jeweils*-DPs is applied to the other languages under discussion in chapter II.4. In 5.2, the main cross-linguistic differences between d-distributive constructions are recapitulated. Section 5.3 explains the differences in relative word order of DD and DistShare. Section 5.4 points out an interesting difference in syntactic feature content between DDs of different languages. The difference in feature content is almost
always encoded morphologically and will be shown to account for differences in the range of possible DistKey expressions, as well as for differences in the syntactic distribution of DDs across languages. The overall result of section 5.4 is that some DDs are restricted in their syntactic distribution because they contain syntactic (D-)features that must be licensed by the DistKey expression under c-command. The section concludes with the discussion of two open problems in 5.5. These problems turn out not to be solvable in purely syntactic terms, and the solution of them is consequently postponed to chapters IV and V.

5.1 Applying the Analysis Cross-Linguistically

In this section, the analysis of jeweils-DPs is applied to the respective d-distributive constructions in the languages under discussion in chapter II.4. These are English and Dutch from the West Germanic language family, Italian, French (and Romanian) from the Romance language family, Icelandic and Norwegian from Scandinavian, Russian, Czech, and Bulgarian from Slavic, and finally the two East Asian languages Korean and Japanese from the Altaic language family. The restricted sample of languages (most of them from Indo-European languages) should make it clear that this section does not aim at a full-blown typology of d-distributivity. Nonetheless, the observed patterns seem to hold quite generally, for Indo-European languages at least. Therefore, the analysis presented here may very well form the basis for a more elaborate and more inclusive typology of d-distributivity.

The movement analysis of jeweils-DPs, which assumes jeweils to be base-generated in postnominal position, allows for a unified analysis of languages with pre- and postnominal d-distributive elements. On this view, the structure in (172) (cf. 116) is the underlying structure for d-distributive constructions in all the languages under discussion.

(172) The Underlying Structure of D-Distributive Constructions Across Languages:

![Diagram](attachment:image.png)

Taking (172) as the cross-linguistically underlying structure implies that d-distributive DPs are syntactically complex cross-linguistically. (172) provides the abstract syntactic skeleton over which the overt lexical material is distributed. Apart from the fact that all languages express the DistShare overtly, languages fall into several classes depending on which parts of the postnominal PP in (172) are filled overtly, and which ones are not. The following patterns can be observed (The reader is invited to consult chapter II.4 for illustrative examples).
The West Germanic languages Dutch and English express only the quantifier overtly. Both the preposition and the NP-proform are covert. The same holds for the Scandinavian languages Norwegian and Icelandic on their regular pattern without a pronoun (cf. chapter II.4.1, in particular fn. 23 and 24)

\[173\]  
West Germanic, Scandinavian

\begin{align*}
  \text{a. } & \quad [\text{PP } P^0 \{\text{QP elk } [\text{NP } \emptyset]\}] \quad \text{(Dutch)} \\
  \text{b. } & \quad [\text{PP } P^0 \{\text{QP each } [\text{NP } \emptyset]\}] \quad \text{(English)} \\
  \text{c. } & \quad [\text{PP } P^0 \{\text{QP hver } [\text{NP } \emptyset]\}] \quad \text{(Norwegian, Icelandic)}
\end{align*}

The pattern in (173) matches that of the German je-construction in section 4.2.6 in terms of the lexical poverty of the construction.

The Romance languages French and Italian are a little richer in lexical content. They express both the quantifier and the NP-proform overtly, but they do not feature an overt preposition (nor any evidence for it, e.g. in form of case-marking).

\[174\]  
Italian, French (Romance)

\begin{align*}
  \text{a. } & \quad [\text{PP } P^0 \{\text{QP cias- } [\text{NP uno/unai}\}]\] \quad \text{(Italian)} \\
  \text{b. } & \quad [\text{PP } P^0 \{\text{QP chac- } [\text{NP un/une}]\}] \quad \text{(French)}
\end{align*}

Following Junker (1995:33), I assume that the proform un/une incorporates into the quantifier head chac- in French, thus forming a complex syntactic head at surface structure. I assume the same for Italian ciasuno/a.

Russian resembles German in that it expresses both the quantifier and (optionally) the prepositional head overtly (175a). The other Slavic languages, Czech, Bulgarian, Polish, only express the preposition po overtly (175b). The pattern in (175b) seems to match that of the English per- and the German pro-construction, on the assumption that per and pro are indeed prepositions (see section 4.1.1 for discussion).

\[175\]  
\begin{align*}
  \text{a. } & \quad \text{Russian} \quad [\text{PP po } [\text{QP kazhdyi} [\text{NP } \emptyset]]] \\
  \text{b. } & \quad \text{Czech, Bulgarian, Polish} \quad [\text{PP po } [\text{QP Q}^\emptyset [\text{NP } \emptyset]]]
\end{align*}

The prepositional status of po was supported independently in chapter II.4.2.2. The relevant example from Russian is repeated as (176).

\[176\]  
On shel po doroge.  
[Russian]  
he went on/along road  
‘He was going along the road.’

Korean -ssik- is called a particle in traditional grammars of Korean, and this is what it was called in chapter II.4.2.2. According to Martin (1992:192), Korean particles can be treated as postpositions (often with the semantics of prepositions in Western languages). If so, an analysis along the lines of the Slavic pattern (175b) seems feasible. Since Korean is left-
branching (Comrie 1987:895), the word order should be the mirror image of that found in (175b).\(^8\)

Regarding Japanese *sorezore*, it was pointed out in chapter II.4.2.2 that this element is DP-like in that it can be case-marked. Also recall from II.4. that Japanese presented us with a problem because it is the only language in which d-distributive element and regular distributive D-quantifier differ in form, but still *sorezore* is unable to distribute over non-DP denotations, or to occur with underlying subjects. In section 5.4.4, I propose a solution to this problem that rests on the assumption that *sorezore* contains D-features after all. If so, it should be a DP headed by a quantifier. Postponing further discussion until then, I assume the structure in (177) for Japanese.

\[
(177) \quad \text{Japanese} \\
\quad [PP \{QP \text{sorezore}\} P^0]
\]

This brief survey of the structure of d-distributive constructions in other languages is summarised in table 4, showing where languages differ and where they behave alike.

**Table 4: The structure of d-distributive constructions**

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>Q</th>
<th>NP</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>German</td>
<td>+ (case marking)</td>
<td>+</td>
</tr>
<tr>
<td>ii.</td>
<td>French, Italian, Japanese</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>iii.</td>
<td>Russian</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iv.</td>
<td>not attested</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>v.</td>
<td>Dutch, English, Icelandic Norwegian</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>vi.</td>
<td>Bulgarian, Polish, Czech, Korean</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>vii.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>viii.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4 shows that German is the only language that provides overt evidence for all syntactic positions in (172) (except for the D-head, that is). The Romance languages Italian and French, and possibly Japanese, fill two positions lexically, namely Q and NP. The same holds for Russian, which fills P and Q overtly. English, Dutch, Norwegian and Icelandic fill only one of the functional projections, namely Q. The same holds for the Slavic languages Bulgarian, Polish, and Czech, which express P overtly.

All attested patterns have in common that at least one of the functional heads is filled lexically, suggesting that this is a universal requirement (triggered by the need to be interpretable).\(^8\) If this reasoning is correct, the structures in rows (vii) and (viii) are

---

\(^8\) A potential problem arises from the fact that, Korean being a left-branching language, nominal modifiers (demonstratives, genitives, adjectives, relative clauses) usually precede the head noun (Comrie 1987:895). If so, the postnominal position of *–ssik* will be unaccounted for if *–ssik* forms part of a modifying PP, as argued in the text. See also fn.98.

\(^8\) Notice that this generalisation is based on a treatment of prepositions as functional elements. See Abney (1987:67), who points out the mixed character of prepositions between functional and content elements.
excluded on principled grounds for they either express no lexical material at all (i.e., they are formally identical to numeral DPs) (cf.viii), or they contain no functional element, violating interpretability (cf.vii). In contrast, the structure in row (iv) satisfies the requirement that at least one functional head must be filled overtly. It should therefore be a possible structure for d-distributive constructions. I leave it open whether the pattern is attested cross-linguistically.

Summing up, the foregoing discussion has shown that the structure in (172) is flexible enough to accommodate d-distributive constructions in other languages. All plausible combinations but one of the three elements P, Q, and NP(-proform) are attested. In 5.1.2, I take up the question whether or not all the functional heads in (172) are universally projected.

5.1.1 Licensing the Empty Heads

In all languages discussed above, the structure of d-distributive constructions is abstract to some degree, involving one or two empty elements. Therefore, it needs to be checked if all these empty elements are properly licensed.

German is the only language that licenses the empty P-head by overt case marking. It follows that all other languages must resort to head movement and lexical government in order to license the empty heads in their respective structures (see chapter I.2.4.3 and III.4.1.2).

In English and Dutch, the D-quantifiers each and elk license the empty complement NP through lexical government. The empty P-head is licensed by incorporation of Q into P.85 In Romance, the empty P-head is licensed by incorporation of the complex head [Q+N], which is the result of N-to-Q incorporation (see the remark below (174)).

Setting Korean and Japanese aside, this leaves us with the Slavic languages Bulgarian, Czech, and Polish. If their structure is as in (172), the empty elements N and Q must be licensed by incorporation into the preposition po, forming a complex head [po+Q+N]. The formation of a complex head containing (at least) an overt P and a covert Q-head is reminiscent of the analysis of per and pro from section 4.1.1. Incorporation of Q into P directly accounts for the seemingly quantifying nature of the preposition po in d-distributive constructions, without assigning any quantificational content to the preposition itself.86

Looking at the data from Slavic (including Russian) again, we see that the preposition po always occurs before the DistShare. This is shown again for Bulgarian.

(178) a. John i Mary kupicha po edna tetradka.
     John and Mary bought PREP one notebook

85 According to den Dikken (1992:57), incorporation of a lexical element into a non-lexical element will turn the latter into an L-marker. This way, lexical government of the empty NP-proform is guaranteed before and after Q-to-P movement in English or Dutch.

86 The presence of ‘quantificational’ po in other contexts poses an apparent difficulty for the proposed analysis of po as a conglomerate of P and Q: Carlson & Filip (2001) for Czech, and Pinon (2000) for Polish show that the aspectual marker po, which is syntactically realised as a suffix on the verb, also has (universal) quantificational content. I see two options. Either, we maintain the incorporation analysis for po, and analyse aspectual po not as a suffix to the verb, but say to VP (and assume that some aspectual head with aspectual/quantificational force incorporates into po). Or, we assume that prepositions in Slavic languages (which mostly provide no evidence for a syntactic DP-level anyway) can have inherent quantificational content. In the latter case, there is no need to assume two (functional) head positions (P and Q) in the structure of d-distributive constructions. A single P/Q-position would be sufficient. This in turn has repercussions for the question of universality, discussed in 5.1.2.
b. *John i Mary kupicha edna tetradka po.
John and Mary bought one notebook PREP

On the analysis presented here, it follows that *po has moved overtly across the DistShare, setting Slavic apart from the other languages under discussion. We have encountered a similar situation with the German short form *je in section 4.2.6. As opposed to there, I would like to argue that Slavic *po gets into DP-internal position in (178a) by head movement of the complex head [*po+Q+N] to D[\textsuperscript{5}].

Evidence for overt P-to-D movement comes from the fact that the presence of d-distributive *po has an effect on the case and agreement properties of the embedding *po-DP. In Polish and Czech (and in restricted form also in Russian), *po-DPs in argument position do not show the expected structural case. Instead, they are marked with oblique case, which is presumably assigned by the preposition *po. The case difference is illustrated for Polish in (179).

(179) Mama kupi\l a swoim dzieciom balon / *po balonie. [Polish]
mother bought her children balloon\text{ACC} each balloon\text{DAT}

‘Mother bought her children a balloon / one balloon each.’ (Choe 1987:67)

In Czech, *po-DPs in object position are marked for locative (oblique) case. In subject position, they do not only carry oblique case, they also disagree with the main verb. A plural *po-subject can only occur with a verb in 3rd singular:

(180) Po třech ženách vstupovalo do místnosti.
each three-LOC women-LOC\text{pl} entered\text{3sg} into room

‘(Each ten minutes), three women entered the room.’

The occurrence of oblique case and the subject-verb disagreement in number in (179) and (180) signal that the presence of *po effects a change of features in D[\textsuperscript{5}]. The change follows naturally on the assumption that *po has overtly incorporated into D[\textsuperscript{5}], overruling the latter’s feature content at least in part. In particular, the case properties of *po seem to block the assignment (checking) of structural case to D. If these assumptions are on the right track, Slavic d-distributive constructions provide overt evidence for P-to-D incorporation whatever the motivation for such movement.\textsuperscript{87} Note that this conclusion ties in with Petrova’s (2000) analysis of the preposition *po as the determiner of *po-DPs in Bulgarian. On the present account, the determiner-like properties of *po are the result of its overt incorporation into D.

5.1.2 Universal Considerations
The limited cross-linguistic survey has shown that German and Russian are the only languages that provide overt evidence for the existence of two functional heads, P and Q. All other languages in the sample express only one of these heads overtly. Even though the covert heads have been shown to be licensed in principle in 5.1.1, the question arises whether the elaborate German structure should be taken as the universal structure for d-

\textsuperscript{87} This means that the question if extraction of a head from adjuncts is possible is a relevant question for Slavic d-distributive constructions (see the discussion in fn. 76). If the answer is negative, this means that Slavic d-distributive DPs are best analysed in terms of an underlying SC structure, as presented in section 3.6. If all the languages under discussion have the same underlying structure for d-distributive DPs (as suggested by their similar properties), this means that German jeweils-DPs should be analysed as involving an SC-structure as well.
distributive constructions, or whether languages with fewer lexical elements should be analysed as containing only one functional projection, P or Q. Universal grammar considerations argue for assuming the full structure for all languages as long as the empty elements in them are properly licensed. On the other hand, reducing the number of empty heads reduces the number of head movement operations for licensing, making the syntactic derivation more economical. In addition, the absence of overt lexical material raises a learnability issue. How is a child to know that there is a PP in the d-distributive construction in English, Dutch, or Romance, if the prepositional head is never expressed overtly?

In response to the learnability problem, one can argue that the task for the English or French learning child is not as difficult as appears on first sight, as soon as the child identifies the entire d-distributive construction as a DP-constituent. In both English and French, postnominal constituents are either PPs or CPs (relative clauses), but never DPs. Examples from English are given in (181).

(181) a. the walk in the garden
b. the man who is in the garden
c. *the man the garden ≠ the man in the garden

(182) shows that the postnominal d-distributive element in *two mean each does not allow for reconstruction as a relative clause.

(182) *two men who are each

Since an analysis as a relative clause is out, and since postnominal DPs are not attested elsewhere, the child could deduce the PP-status for the postnominal d-distributive constituent by exclusion.

Pending a decisive answer to the above questions, I take the structure in (172) to be the uniform underlying structure of d-distributive constructions in all the languages under discussion, despite surface differences in their lexical realisation.

5.2 Cross-Linguistic Differences - Revisited

The following sections provide an explanation for the differences between d-distributive constructions across languages that were established in chapter II.4. The main claim of sections 5.3 and 5.4 is that two basic factors are responsible for the observed differences. The first factor is the (non-) application of overt DP-internal movement in a given language. This factor determines if the d-distributive element (DD) occurs before or after the DistShareNP. The second factor is the syntactic feature content of the DD, which is generally reflected in its morphological shape. This factor determines the other observable differences, and is the result of an apparently language-specific process of grammaticalisation, which may be arbitrary to a certain extent. I leave it open, if there is a
The deeper reason behind the question which type of language grammaticalises which grammatical element as DD.

The discussion in chapter II.4 has identified four differences between d-distributive constructions in different languages, which are briefly illustrated with examples from German and English in (183). The four differences concerned

(183) a. the relative word order between DD and DistShare
   i. Die Jungen kauften jeweils zwei Bücher.
   ii. The boys bought two books each.

b. the form of the DD as (non-)identical to the D-quantifier
   i. jeweils ≠ jeder ‘every’
   ii. each = each

c. the (non-) obligatorily DP-status of the DistKey
   i. Peter lobte und kritisierte Maria aus jeweils zwei Gründen.
   ii. *Peter praised and criticised Maria for two reasons each.

d. the (non-) occurrence of the DD with underlying subjects
   i. Jeweils ein Offizier begleitete die Ballerinen.
   ii.* One officer each accompanied the ballerinas

In table 2 in II.4, it was shown that the languages in the sample exhibit a consistent behaviour regarding (183b-d). The only exception was Japanese, which will be dealt with separately in section 5.4.4. The general observation was that if a DD in a given language is formally identical to the distributive D-quantifier of that language, then it will not be able to take a non-DP as DistKey antecedent, and it will not be able to occur in subject position. Likewise, if a DD in a given language is formally different from the distributive D-quantifier of that language, then it will also take a non-DP as DistKey antecedent, and it will be able to occur in subject position. In II.4, it was suggested that the behaviour of a DD with respect to (183c) and (183d) is predictable on the base of its syntactic feature content, which in turn is reflected in its morphological form. DDs that are formally identical to the D-quantifier are analysed as containing D-features (which must be checked). DDs that differ in form from the D-quantifier are analysed as containing no D-features (and consequently there is no need to check any). This difference was captured in form of the parameter [+/- D-features]. The relative word order of DD and DistShare does not depend on the form of the DD. In II.4, this difference was captured in form of the parameter [+/- DP-internal movement].

The postulation of the two parameters predicts a cross-classification into four possible language types concerning the expression of d-distributivity. Table 5 shows that all four language-types are attested in the sample of languages under discussion.

---

90 The last claim will have to be qualified below in light of the Japanese facts. The Japanese DD sorezore differs formally from the D-quantifier, but will be shown to contain D-features nevertheless. See section 5.4.4 for arguments and discussion.

91 Notice that the value [+ DP-internal movement] is assigned to all languages that can front the DD to prenominal position. In II.4.2.1, it was shown that such movement is attested for German, Dutch, Italian, French, Russian, Japanese, and Romanian. The Slavic languages Polish and Bulgarian are the only languages where fronting of the DD is obligatory. This suggests that the DD (here: the preposition po) in these languages moves for a different reason than prenominal DDs in the other languages.
Table 5: Types of d-distributivity across languages

<table>
<thead>
<tr>
<th>+ DP-internal movement of DD</th>
<th>+ D-features in DD</th>
<th>- D-features in DD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Dutch, French, Italian, Russian, Japanese</td>
<td></td>
<td>II. German, Bulgarian, Czech, Polish, Romanian, Japanese</td>
</tr>
<tr>
<td>- DP-internal movement of DD</td>
<td>III. English, Icelandic, Norwegian</td>
<td>IV. Korean</td>
</tr>
</tbody>
</table>

5.3 Differences in Word Order: DP-Internal (Topic) Fronting

In this section, the prenominal or postnominal occurrence of DDs (+/- DP-internal fronting) is derived from an independent grammatical property of the languages under discussion. I show that DDs can occur prenominally only in languages that (like German) exhibit overt DP-internal movement for discourse reasons. In contrast, DDs occur postnominally in languages that do not have overt DP-internal movement for discourse reasons.

In section 4.2.4, I have argued that the prenominal position of the German DD *jeweils* follows from its status as discourse topic plus a syntactic operation of topic-fronting, which applies in the clausal and in the nominal domain. The generalised rule of topic-fronting is repeated in (184).

(184) *Topic Fronting:*

A constituent moves overtly to DP-initial position if it is a topic.

Since the rule in (184) is sensitive to the relative notion of ‘topic’ (the element referring to the most prominent entity in the discourse), it leaves room for exceptions. It does not apply if some other element takes over the role of topic for whatever reason, and *jeweils* can stay behind. This accounts for the (restricted) ability of *jeweils* to occur in its postnominal base position.

It is tempting to extend this account of *jeweils* to the other languages in which DDs occur in prenominal position. The strongest hypothesis is that the DD can occur prenominally in those and only those languages which allow for DP-internal fronting of elements with a prominent discourse status, i.e. languages which have topic-fronting as in (184). As a first approximation, this cross-linguistic generalisation is captured in form of the biclausal ‘DD-fronting hypothesis’ in (185).

(185) *The DD-fronting hypothesis (to be revised):*

i. A d-distributive element can occur in prenominal position in a given language iff that language allows for DP-internal (topic) fronting.

ii. A d-distributive element must occur postnominally in a language iff that language does not allow for DP-internal (topic) fronting.

One could ask if there is a deeper connection between DP-internal topic-fronting, and topicalisation at the clausal level, but I will set this issue aside. Section 5.3.1 discusses the

---

Notice further that Japanese is placed in two cells in table IV. This is because Japanese appears to have two DDs, one with and one without D-features. In section 5.4.4, I show that the presence of two DDs solves the problem of the inconsistent behaviour of Japanese *sorezore* ‘each’ concerning (183b-d), which was pointed out in the main text.
prenominal occurrence of DDs. Section 5.3.2 discusses the postnominal occurrence of DDs.

5.3.1 DDs in Prenominal Position

The first part of the hypothesis in (185) accounts directly for the prenominal occurrence of DDs in French, Dutch, Russian, Romanian, and Japanese in (186a-f). On the unified analysis proposed in 5.1, the DD in prenominal position has moved there from postnominal base position.

\[(186)\]
\[
\begin{align*}
a. & \quad \text{the professors have read each two books} \\
& \quad \text{Les professeurs ont lu chacun deux livres.} \quad \text{[French]} \\
& \quad \text{The professors have read each two books.} \\
& \quad \text{(Tellier & Valois 1993:574, ex. 1b)} \\
b. & \quad \text{the boys have each two books read.} \\
& \quad \text{De jongens hebben elk twee boeken gelezen.} \quad \text{[Dutch]} \\
& \quad \text{The boys have each two books read.} \\
& \quad \text{'The boys have read two books each.'} \\
c. & \quad \text{boys bought each two sausages.} \\
& \quad \text{Mal’chiki kupili kazhdyj (po) dve sosiski.} \quad \text{[Russian]} \\
& \quad \text{boys NOM bought each two sausages.} \\
& \quad \text{‘The boys bought each two sausages.’} \\
d. & \quad \text{two men have carried each three suitcases.} \\
& \quad \text{Doi oameni au cîtă trei valize.} \quad \text{[Romanian]} \\
& \quad \text{two men have carried each three suitcases.} \\
& \quad \text{‘Two men have carried three suitcases each.’} \\
e. & \quad \text{men love two women each.} \\
& \quad \text{Otoko=tati-ga sorez ore huta=ri-no zyosei-o aisi teiru koto.} \quad \text{[Japanese]} \\
& \quad \text{men=pl -nom each two=cl-gen women-acc love-asp fact} \\
& \quad \text{‘The men love two women each.’} \\
\end{align*}
\]

The examples in (187) – (196) below show that DP-internal fronting for discourse reasons is attested independently in all these languages. It therefore follows from (185i) that the DD-element in these languages can occur prenominally.

We begin with French. Drawing on Milner (1978), Tellier & Valois (1993) show that a postnominal constituent can move to the left edge of its embedding DP in French (cf. 187b).

\[(187)\]
\[
\begin{align*}
a. & \quad \text{I have read all the books by Zola.} \\
& \quad \text{J'ai lu tous les livres de Zola.} \quad \text{(Tellier & Valois 1993:582, exs. 18ab)} \\
& \quad \text{I have read all the books by Zola.} \\
& \quad \text{‘I have read all the books by Zola, (but not by somebody else).’} \\
b. & \quad \text{I have read the books by Zola.} \\
& \quad \text{J'ai lu de Zola, tous les livres.} \\
& \quad \text{I have read by Zola all the books} \\
& \quad \text{‘I have read all the books by ZOLA, (but not by somebody else).’} \\
\end{align*}
\]

According to Milner (1978), the moved PP de Zola in (187b) is adjoined to the NP (in our terms the DP). I take the landing site of the PP to be SpecDP, leading to the structure in (188).\(^{92}\)

\[(188)\]
\[
\begin{align*}
\text{by Zola all the books} \\
\text{[DP \{PP de Zola\}, tous les \{NP livres\}]} \\
\end{align*}
\]

Since DP-internal movement for discourse reasons is possible in French, the DD chacun/e can also move to SpecDP, in accordance with (185i). The surface structure of prenominal chacun(e)-constructions is schematised in (189), which is structurally parallel to (188).

---

\(^{92}\) This analysis presupposes a treatment of tous les as a complex quantifier in D.
(189) \[
\text{[DP [PP P0 [QP chacun(e)]] D0 [NP deux livres t1]]}
\]
each-one two books

The structure in (189) agrees with that found in Tellier & Valois (1993:580), where prenominal chacun(e) is also located in SpecDP. The structural similarity is furthermore supported by extraction facts. Tellier & Valois (1993) show that extraction of the question word combien ‘how many’ out of the DP is possible only when chacun(e) and the PP in (187a) occur postnominally (cf.190ab). In contrast, it is blocked when prenominal chacun(e) or the PP are preposed (cf.191ab).

(190) a. Combien les professeurs ont-ils lu [t1 de livres chacun]?
   how many the professors have-they read of books each
b. Combien as-tu lu [t1 de livres de Zola]?
   how many have-you read of books by Zola

(191) a. *Combien les professeurs ont-ils lu [chacun de livres t2]?
   how many the professors have-they read each of books
b. *Combien as-tu lu [de Zola de livres t2]?
   how many have-you read by Zola of books

The parallelism between (190) and (191) follows directly if both de Zola and chacun have moved to SpecDP for discourse reasons in (191). Being in SpecDP, they block extraction of combien (see the discussion on extraction from jeweils-DPs in 4.2.5). I conclude that (185) holds for French, and that the DD chacun(e) moves to SpecDP for discourse reasons in French.

Corver (1999) shows that Dutch allows for overt fronting of postnominal PP-modifiers when the preposition is covert.\(^9\) Glossing over irrelevant details, Corver analyses the structure in (192a) as the result of DP-internal fronting of a postnominal constituent that is a predicate of the head noun. The structure after movement is shown in (192b), with XP standing for a DP-internal small clause.

(192) a. één minuut voorsprong
   one minute headstart ‘a headstart of one minute’
b. [één minuut] [XP voorsprong X0 t1]
   one minute headstart

(192a) shows that Dutch has DP-internal fronting (for more instances of DP-internal fronting see Corver 1999). Furthermore, the postnominal counterpart of (192a) invariably surfaces with an overt preposition, as witnessed by (193):

(193) een voorsprong *(van) één minuut
   a headstart of one minute

\(^9\) DP-internal fronting of PPs with overt prepositions is not attested (cf. iab).

(i) a. [DP Een boek [PP van Zola]]
   a book by Zola
b. *[PP Van Zola, een boek t1]
Based on (193), I conclude that the fronted constituent in (192) is a PP with a covert P-head. Since the Dutch DD-construction with *elk* also forms a PP with a covert P-head, (185i) predicts that *elk* can be fronted. The result of this movement is shown in (186b).

Russian allows for DP-internal fronting of PPs from postnominal position. This is shown in (194):

(194) a. [Predstavitel’ iz gamburga] tol’ko chto priehal. [Russian]
    representative from hamburg just arrived

b. [Iz gamburga, predstavitel’ t1] tol’ko chto priehal.
    from hamburg representative just arrived

‘The representative from Hamburg just arrived.’ (Borik, p.c.)

The possibility of DP-internal fronting accounts for the prenominal occurrence of *kazdhyj* in (186c) in line with (185i).

Russian also allows for DP-internal fronting. Corver (2001) shows that numeral predicates from 20 onwards from DP-internally from a postnominal base position. The preposition *de* in (195) is the spell out of a complex head [F+X] (cf. den Dikken 1998 and fn.94)

(195) a. treizeci de lei
    thirty of lei ‘thirty lei’

b. [FP treizeci2 [F’ F0+X0 1(=de) [XP lei t1 t2]]]

Consequently, overt movement of the Romanian DD *cîte* to SpecDP in (186d) is predicted to be possible by (185i).

Finally, Japanese also seems to exhibit DP-internal leftward movement that is driven by discourse requirements. Muromatsu (2000) shows that numerals in their postnominal base position receive a cardinal focus-new interpretation (196a). When they occur DP-initially (196b), they receive a specific or presuppositional interpretation.

(196) a. [Kodomo o futa-ri] sitinen-sei ni ireta. [Japanese]
    child ACC two-cl 7th-grade DAT I-sent

b. [Futa-ri no kodomo o] sitinen-sei ni ireta.
    two-cl GEN child ACC 7th-grade DAT I-sent

‘I sent two (particular) children to the seventh grade.’

Even though the notions of background or presupposition are not identical to topichood (see above), the DP-internal leftward movement is motivated by discourse factors. If we weaken the hypothesis (185) in such a way that it also subsumes other cases of DP-internal movement, e.g. movement of constituents expressing presupposed or discourse-old material, it correctly predicts that the Japanese d-distributive quantifier *sorezore* ‘each’ can occur prenominally as in (186e).

Taking stock, the first clause of the DD-fronting hypothesis in (185) makes good predictions for French, Dutch, Russian, Romanian, and Japanese. In addition, since (185i)
links overt movement to relative discourse notions such as ‘topic’, it explains why fronting in French, Dutch, Russian, and Japanese is optional.95

An apparent problem arises in connection with the other Slavic languages. As discussed in 5.1.1, movement of the DD po to prenominal position seems to be obligatory in these languages. I would therefore like to argue that the prenominal position of po is not the result of discourse-driven movement, but of another movement operation, which was already discussed in section 5.1.1. There, it was shown that po moves to the prenominal D-position by head movement, as witnessed by the (unexpected) oblique case on the DistShare. If this reasoning is correct, we have to weaken (185) accordingly. All prenominal occurrences are due to overt DP-internal movement, but not all movement operations are instances of discourse-driven (topic) movement. This being said, (185) holds for Slavic as well.

A final problematic case is Italian. The DD in Italian occurs optionally in prenominal position (cf.197a) although DP-internal topic-fronting is barely possible, if not ungrammatical (cf.197b).

(197) a. I ragazzi hanno comprato [ciascuno1 due salsicce t1]. [Italian]
    the boys have bought each two sausages

b. Ho letto, di Zola, tutti i libri.
    I have read by Zola all the books (d’Allessandro, p.c.)

In light of (197b), the prenominal occurrence of ciascuno in (197a) casts doubt on the adequacy of (185). In the absence of further evidence as to what is going on in Italian, I will leave the matter open for further research.

In conclusion, the first part of the DD-fronting hypothesis in (185) makes by and large good predictions in its weakened version. The hypothesis accounts for all the languages in the sample, except – perhaps – for Italian. I take this as evidence in favour of (185i), assuming that there is a solution for the problematic Italian facts.

5.3.2 DDs in Postnominal Position

The second clause of (185) predicts DDs to occur postnominally in those languages that do not show overt DP-internal movement. This accounts directly for English, which has no overt topic fronting (cf.198), nor overt head movement to D0 (cf. Longobardi 1994).

(198) *[By Chomsky, an article t1] is always interesting.

The postnominal position of d-distributive each follows directly.

The situation is the same in Icelandic and Norwegian. In the basic DD-construction without a possessive pronoun (cf. chapter II.4.1, fns. 23 & 24), the DD occurs postnominally in both languages.

(199) a. Guttene har kjøpt to pølser hver. [Norwegian]
    boys-the have bought two sausages each (Vangsnes, p.c.)

95 Possibly, the situation in Romanian is slightly different. I was not able to establish whether cîte occurs in prenominal position optionally or obligatorily. The same holds for the obligatoriness or optionality of numeral fronting in (195). If the prenominal position is obligatory in both cases, movement to initial position must happen for some other, syntactic reason. See the discussion of the Slavic languages in the main text. In the absence of further evidence, I have to leave the matter open for further research.
b. Strákarnir keyptu tvær pylsur hvor/ hver.  [Icelandic]
boys-the bought two sausages each\(_{\text{half}}\) each\(_{\text{f}}\)
‘The boys bought two sausages each.’ (Hrafn, p.c.)

The postnominal occurrence of the DD in (199ab) corresponds to the ungrammaticality of structures with overt DP-internal fronting in these languages. (200ab) show this for Icelandic.

(200) a. stúdent-inn/ einn stúdent frá Reykjavík  [Icelandic]
student-the a student from Reykjavik
b. *frá Reykjavík student-inn /einn stúdent (Hrafn, p.c.)

Since overt DP-internal fronting for discourse reasons does not seem to be licensed in these two languages, (185ii) correctly predicts the postnominal occurrence of the DD in (199ab).

This leaves us with Korean, in which the DD –ssik- occurs postnominally.

(201) Ai-tul-i phwunsen-hana-ssik- ul\(_{\text{DistShare}}\) sa-ess-ta.  [Korean]
child-pl-NOM balloon one ACC bought
‘The children bought a balloon each.’

The postnominal occurrence of –ssik- is unexpected since Korean resembles Japanese in allowing for DP-internal movement of number phrases to DP-internal position (albeit with no discernible difference in discourse status).96

(202) a. Ai-rul twul-ul chingchanha.yess-ta.  [Korean]
child-ACC two-ACC praise-PAST-IND
b. Twu myeng-uy ai-rul chingchanha.yess-ta.
two CL-GEN child-ACC praise-PAST-IND
‘(I) praised two kids.’ (Kim, p.c.)

Given the possibility of DP-internal fronting in (202), the postnominal occurrence of –ssik- in (201) is somewhat surprising if we think of the DD-fronting hypothesis in (185).

I can only give a speculative answer to this problem. The obligatory postnominal occurrence of the DD –ssik- may have to do with the left-branching nature of Korean DPs, as indicated in (203).

(203) \([\text{KP} [\text{QP} [\text{NP} [\text{N} \text{num}] \text{ssik}] \text{?}\text{K}]\]

In 5.1, the DD -ssik- was treated tentatively as a (possibly complex) postpositional head. Apparently, as a syntactic head, –ssik- is banned from undergoing phrasal movement to the left. It could undergo head movement, but since Korean is left-branching, there simply is no DP-initial head position into which –ssik- could move.

If this reasoning is on the right track, it suggests that the hypothesis in (185) can account only for a subset of the observable data, and is in need of revision. The relative order of DD and DistShare seems to depend not only on the possibility or impossibility of

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96 Soowon Kim (p.c.) informs me that it is not certain that head noun and numeral form one constituent in (202a). If so, (202b) is not derived from (202a) by DP-internal fronting, and the problem disappears.
overt DP-internal topic-fronting, but on other factors, such as the possibility of DP-
internal head movement to D⁹ (in Slavic), or the direction of branching inside the DP. The
latter factor seems to be operative in Korean, where the DD is a bare functional head. All
this goes to show that the word order facts surrounding d-distributive elements are more
complex than thought at first sight. Nonetheless, I propose to maintain (185i,ii) in its
revised form in (204), at least until we encounter conclusive evidence to the contrary.

(204)  The DD-fronting Hypothesis (revised version):

i. A DD can occur in prenominal position in a language iff that language allows
for overt DP-internal fronting of postnominal material for grammatical or
discourse reasons.

ii. A DD must occur postnominally in a language if that language does not allow
for DP-internal (topic) fronting or if that language is right-branching and the
DD is a bare head.

Although still sketchy in nature, the DD-fronting hypothesis in (204) shows that the pre-
or postnominal occurrence of DDs across languages is not an idiosyncrasy of the
construction. Instead, it appears to be correlated to independent grammatical properties of
the languages in question. The hypothesis accounts for the observable variation between
languages, making possible a unified underlying analysis at the same time. As such, it
may serve as the basis for further investigations into the nature and motivation of DP-
internal movement of DD.

5.4  Differences in Feature Content: D-features and Agreement

The second cross-linguistic difference of DD-constructions concerns the morphological
form of the DD itself. In chapter II.4.2.2, a bipartition was observed. In some languages,
the DD is formally identical to the D-quantifier (cf. 205a). In others, it differs in form
(cf.205b).

(205)  a. English: each, Dutch: elk, French: chacun(e), Italian: ciascuno/a, Icelandic:
        hver, Norwegian: hver, Russian: kazhdyi

        b. German: jeweils (vs. jeder), Bulgarian: po (vs. vseki/vsjako), Czech: po
           (vs.každ), Korean: -ssik (vs. kak…mata), Japanese: sorezore (vs. wh…+mo),
           Romanian: cîte (vs. fiecare, oricare)

I propose that the formal identity or difference reflects a deeper grammatical property of
the DDs in question. The argument is that DDs which are formally identical to the D-
quantifier contain a set of D-features comprising person, number, and gender features as
part of their lexical entry. Likewise, DDs that differ formally from D-quantifiers do not
contain such D-features as part of their lexical entry.⁹⁷

That the elements in (205a) contain D-features is witnessed by their ability to occur on
their own in subject position, if the preceding context provides a suitable set over which
they can quantify.

(206)  The children are happy…

        a. Each (of them) has what he/she wanted.

⁹⁷ This holds for all languages in (205b) with the exception of Japanese sorezore, to which we will turn in section
5.4.4.
In contrast, the elements in (205b) do not contain D-features, and cannot occur on their own in subject position. This is illustrated for German in (207).

(207) *Jeweils hat bekommen was er wollte.

How does this difference affect the different syntactic behaviour of DDs in the two groups in (205)? It is natural to assume that, if a functional element contains D-features, it must check them against an identical set of features on its NP-complement under agreement. (208) shows this for the regular D-quantifier *jede/r ‘each’ in German. Agreement licenses the grammatical (208a), and blocks the ungrammatical (208b) because of feature mismatch in the gender feature.

(208) a. je-den Mann
    each-[sg, masc, 3rd, ACC] man <sg, masc, 3rd >
    b. *je-den Frau
    each-[sg, masc, 3rd, ACC] woman <sg, fem, 3rd >

If a d-distributive element contains D-features, it is natural to assume that it must also check them against its NP-complement under agreement. However, this complement is an NP-proform, which by assumption does not contain any D-features of its own.

(209) [QP each <sg,αgender,hd> [NP proform<∅>]]

It follows that the DD *each in (209) cannot check its D-features, unless the NP-proform acquires the set of D-features from a co-referent expression, the DistKey. Presumably, this happens in form of a feature copying mechanism which is indicated overtly by agreement in French, Italian, and also in Icelandic. (210ab) show that the DD agrees in gender with its DistKey in French and Italian. (210c) shows that Icelandic DDs agree in number (dual or plural) with the DistKey.

(210) a. Les garçons/ Les filles ont acheté deux saucisses chacun/ chacune. [French]
    the boys masc the girls fem have bought two sausages eachmasc eachfem
    b. I ragazzi / Le ragazzie comprarono un libro ciascuno/ ciascuna. [Ital.]
    the boys masc the girls fem bought a book eachmasc eachfem
    c. Strákarnir keyptu tvær pylsur hvar/ hver. [Icel.]
    boys-the bought two sausages eachdual eachpl

After feature copying, the NP-proform has acquired the D-features of the DistKey and can check them against the D-features of the DD.

Now, if for some reason feature copying from the DistKey onto the DD cannot take place, we expect the resulting structure to be ungrammatical because the DD fails to check
its D-features against those of its NP-complement. At the same time, we expect the corresponding structures to be grammatical in those languages where the DD contains no D-features. In the following two sections, we will see two such cases. In 5.4.1, the DistKey expression is not a DP, and therefore contains no D-features that could be copied onto the NP-proform. In 5.4.2, there is a potential DistKey DP, but it is not in the right syntactic position to license feature copying onto the NP-proform.

5.4.1 Differences in the Range of Possible DistKeys

Given the mechanisms of obligatory D-feature checking and feature copying from DistKey onto the NP-proform, the differences regarding the range of possible DistKey expressions (see chapter II.4.3) fall out immediately.

In languages in which the DD contains no D-features (German, Czech, Bulgarian, Korean), it does not have to check them against D-features on the NP-proform. It follows that the NP-proform does not need to acquire a set of D-features through feature copying. And from this, it follows that the proform can be co-indexed with arbitrary plural denoting expressions, including V-conjunctions. (211ab) show that this prediction is borne out for German and Korean.

(211) a. Peter kritisierte und lobte Maria aus jeweils zwei Gründen. [German]
   ‘Peter criticised and praised Maria for each two reasons’

   b. (serotarun) twu kaji-ssik-uy iyuro Peter-nun Mary-rul chingchan-to
      (different) two CL-ssik-GEN reason-for Peter-TOP Mary-ACC praise-also
      ha-ko pinan-to ha-yess-ta.98
      do-and criticism-also do- PAST-INDICATIVE
   ‘Peter criticised and praised Maria for two reasons respectively.’

The Slavic languages Bulgarian and Czech do not allow the DD po to distribute over the denotation of verb conjunctions as in (211), for reasons unclear to me. DDs in these languages can distribute over non-DP denotations, though, namely over sets of events. The set of events can be established either by an adverbial quantifier, as in (212a). Or it can be implicit (provided by the context), as in (212b). The absence of a DP-expression as DistKey is expected because the DDs in both languages do not need an overt DP-antecedent that would copy its D-features onto their NP-proform.

(212) a. John nikogane pie [po 3 kafeta]. [Bulgarian]
   ‘John never drinks three coffees (per sitting).’ (Petrova, p.c.)

   b. V tazi stja spjat [po dvama choveka].
      in this room sleep each two people
   ‘Two people at a time sleep in this room.’

A similar example from Czech, where po is in subject position, will be provided in the following section.99 Distribution with d-distributive elements over (implicit) sets of events is the subject of chapter V.

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98 In (209b), -ssik- seems to have fronted together with the numeral, suggesting that the two form a constituent. Possibly, this fact implies that the universal structure for d-distributive constructions proposed in 5.1 does not hold for Korean. See also the doubtful remarks in fn. 83.
DDs containing D-features (in English, Dutch, French, Italian, Russian, Icelandic, Norwegian) must check them against D-features on the NP-proform. It follows that the NP-proform must acquire a set of D-features through feature copying. And from this, it follows that the proform must be co-indexed with a DistKey-DP. As a result, the sentences in (213) are all ungrammatical (on the intended reading).

(213) a. *Peter criticised and praised Mary for two reasons each. ’
    b. *Piet heeft Marie om elk twee redenen bekritiseerd en geprezen. [Dutch]
    c. *Peter a adulé et critiqué Marie pour deux raisons chacun/e. [Fr.]
    d. *Peter ha apprezzato e criticato Maria per due ragioni ciascuno/a. [Italian]
    e. *Petja hvalil i kritikoval Mashu po kazhdym dvum prichinam. [Rus.]
    f. *Pétur lofaði og gagnrýndi Maríu af ástæðunni hvor. [Icel.]
    g. *Peter roste og kritiserte Maria av to grunner hver. [Norw.]

In addition, since the DDs in these languages need a DP as DistKey, they will never be able to distribute over (implicit) sets of events like their Bulgarian and Czech counterparts in (212ab). (214) shows this for English and French.

(214) a. *One boy each came in.
    b. *Un garçon chacun est entré. one boy each is come.in *’Each time, one boy came in.’

In (214), each needs an overt NP-complement to check its D-features against. Recall that the inability to distribute over events is not due to an inherent semantic restriction on the DD. The DDs in (213) are able to distribute over sets of events as soon as these are expressed in the disguise of a DP. (215) is an example from English.

(215) [The hailstorm and the accident] caused five casualties each.

(215) shows that the ungrammaticality of (213a-g) and (214) must be due to the absence of a DistKey DP.

Let us finally turn to the case of Icelandic, which proves instructive in this connection. (213f) shows that the DD hvor cannot distribute over a non-DP denotation, presumably because there is no appropriate antecedent against which it could check its D-features (after feature copying onto the NP-proform). The surprising fact is that the Icelandic DD can distribute over non-DP-denotations (such as the V-conjunctions in (213)), as soon as it occurs in the Icelandic II-pattern with a possessive pronoun in pronominal position.

Unfortunately, I was not able to establish the facts for Romanian. It is predicted that DDs in Romanian should be able to distribute over (implicit) sets of events because they do not seem to contain D-features that need to be checked.
I suggest that the grammaticality of (216) is due to the presence of the overt possessive pronoun *sitt*, which c-commands the DD *hvorri*. As discussed in connection with the German NP-proform –*weil*– in section 4.2.2, Kamp & Reyle (1993:306) point out that pronouns can differ regarding their co-reference abilities. Some pronouns, such as *he* and *she*, can only be co-referent with DP-denotations (*he/she*-type pronouns), while others, such as *it*, can freely co-refer with non-DPs (*it*-type pronouns). This is illustrated in (217).

(217) All the boys passed the exam. *It*, *he*, *she*, surprised everyone.

I propose that the possessive pronoun *sitt* is of the *it*-type variety, and that it can therefore be co-referent with the V-conjunction *lofaði og gagnrýndi* "praised and criticised", which expresses a plurality of events in (216). In other words, the possessive seems to act as a dummy DistKey that receives its semantic value under co-indexation with the real DistKeyDP. This way, the semantic value of the V-conjunction (a plurality of events) is transferred (under co-indexation) onto a D-expression, which contains a set of D-features. These D-features can check against those of the DD *hvor* (after copying to the NP-proform). The process of feature transfer is illustrated schematically in (218).

(218) \[\text{[DistKey } \text{lofaði og gagnrýndi]} \quad \text{i} \quad \text{… sitt}_{ij} \quad \text{i} \quad \text{… hvorri}_{ij} \quad \text{plural, co-reference} \quad \text{plural, } \text{+D-features} \quad \text{feature} \quad \text{+D-features} \]

In other words, Icelandic seems to overcome the absence of a DP-denoting DistKey expression by inserting a +D-pronoun, which is able to pick up the semantic value of the pluralic DistKey expression, and which is able to check the D-features of the DD. Icelandic therefore provides direct evidence for the claim that the ungrammaticality of (213a-g) is due to the absence of a DistKey DP.

Summing up, the fact that the DDs of some languages cannot distribute over the denotations of arbitrary plural expressions (but only over DP-denotations) follows directly from their need to check off their D-features. In languages in which the DD contains no D-features, no such checking can be done. In other languages, such as Icelandic, the DD cannot distribute over non-DP denotations. In these cases, a +D-pronoun is inserted, which is able to pick up the semantic value of the pluralic DistKey expression and to check the D-features of the DD. This strategy is possible in Icelandic because the possessive pronoun *sitt* is of the *it*-type variety.

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100 The alert reader will have realised that the construction in (216) is slightly untypical for DD-constructions in that the DistShare is definite. Gunnar Hrafn (p.c.) informs me that the use of the indefinite *ástæðu* ‘a reason’ is not outright ungrammatical, but strange. Based on this, one could conclude that the Icelandic II-pattern is not a DD-construction at all. However, the following example, repeated from chapter II, fn.24, shows that the Icelandic II-pattern is possible with indefinite DistShare expressions in principle:

(218a) *Pétur lofaði og gagnrýndi* Mariu *hvorri* ástæðunni [Icel.] 100

Peter praised and criticised Mary for POSSneut each reason-the (Hrafn, p.c.)

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101 In Norwegian, this “rescue” strategy is not available even though the alternative Norwegian II-pattern contains a pronoun in prenominal position as well (see chapter II.4.1, fn.23). Presumably, the difference lies in the different nature of the Norwegian pronoun. The Norwegian pronoun *sine* is a reflexive possessive pronoun. As a reflexive pronoun it must be locally bound by (hence: be co-referent with) a DP-expression. For this reason, it cannot be co-referent with a non-DP denotation.
D-features, no such restriction is observed, and the DD is free to distribute over the denotations of non-DPs.

5.4.2 Differences in Distribution

The variation regarding the (non-)occurrence of a DD with underlying subjects also falls out from the D-feature specification (or non-specification) of the DD. We need to make one additional assumption, namely that feature copying is licensed under c-command only. The DistKey must c-command the DD at surface structure if feature copying is to apply. If we perceive of feature copying as an instance of Chomsky’s (1998) ‘Agree’, this follows directly since ‘Agree’ seems to apply under c-command.

With the additional c-command requirement in place, we can account for the ungrammaticality of DDs in underlying subject position of a root clause (cf. 219a-f). None of the DDs in (219) is able to distribute backwards over the object denotation.

(219) a.*One journalist each interviewed the politicians.
   b.*Elk, twee journalisten hebben de politici, geïnterviewd. [Dutch]
   each two journalists have the politicians interviewed
   c.*Un journaliste chacun, a interviewé les politiciens. [French]
   one journalist each has interviewed the politicians
   d.*Uno giornalista ciascuno, ho intervistato i parlamentari. [Italian]
   one journalists each has interviewed the parliamentarians
   e.*Kazhdye dva zhurnalista vzjali intervju u politikov. [Russ.]
   each two journalists took interview at politicians
   f.*Tveggja blaðamanna hver tóku viðtöl við stjórnmálamennina, [Icel.]
   two journalists- GEN each interviewed politicians-the

All the DDs in (219) contain D-features that need to be checked. However, none of the overt or covert NP-proforms in (219) is c-commanded by the DistKey expression in object position. It follows that the latter’s D-features cannot be copied onto the NP-proform under ‘Agree’. Hence, the DD cannot check its D-features against the NP-proform. Notice that this way we have arrived at a slightly different explanation for the anaphor-like behaviour of Italian ciascun/a and English each, which was observed in Burzio (1986). The DD-constructions appear to behave like anaphors because some of their features need to be licensed (via the NP-proform) under c-command. Nonetheless, the c-command requirement does not follow from the intrinsic anaphoricity of the elements in question, but from the need to check D-features.

DDs that do not contain D-features can occur in the underlying subject position of root clauses because no D-features need to be checked, and consequently no D-features need to be copied onto the NP-proform by feature copying. As a result, DDs in underlying subject position are possible in German, Korean, Bulgarian, and Czech.

(220)a. Jeweils, ein Offizier begleitete die Ballerinen, nach Haus. [German]
   each one officer accompanied the ballerinas to home
   ‘Each ballerina was accompanied home by one officer.’

   detective-two-CL NOM suspect-pl-ACC chase- PROG
   ‘The suspects are chased by two detectives each (time).’ (Choe 1987:50, ex.15)
c. Po edin student pomogna na vseki profesor. [Bulgarian]
   ‘(All) the professors were helped by one student each.’ (Petrova 2000: ex.6b)

d. Po třech ženách vstupovalo do místnosti. [Czech]
   ‘Each time / each ten minutes, three women entered the room.’

Similar facts are predicted for Romanian and for Japanese, given that the DDs in these languages differ formally from the distributive D-quantifier. In the following section, it will be shown that the prediction is borne out for Japanese, although with an unexpected twist.

In conclusion, the c-command requirement on feature copying together with the need of D-features on DDs to check (if present) gives a neat cross-linguistic account of the (non-)ability of a DD to occur in underlying subject position of a root clause. DDs with D-features cannot occur in this position because they must check their D-features under c-command. DDs without D-features are free to occur in this position because they do not have any D-features to check under c-command (nor otherwise).

5.4.3 The Locus of Agreement: The Case of Icelandic

One may wonder why the additional stipulation that the DistKey must c-command the DD should hold at surface structure. Would not LF-movement of the DistKey expression across the DD help to satisfy the c-commando requirement at this syntactic level? In this case, we cannot exclude LF-movement on the base of the methodological principle to do without LF-movement where possible, for in this case LF-movement seems necessary. Furthermore, Burzio (1986) argues that reconstruction at LF provides an account for the possibility of Italian and English DDs in constituents that have fronted overtly, as in (221) (exs. from Burzio 1986:200, 57a & 60a).

(221) a. ?[One interpreter each]1 was assigned to the visitors.
   b. ?[Un evaso ciascuno]1 si consegnerà a quei carabinieri.
      one escapee each SI will.turn.in     to those policemen
      ‘We will turn in one escapee to each of those policemen.’

If this reasoning is correct, the ungrammaticality of (219a-f) would have to follow from some independent principle that would block LF-movement of the DistKey object across the DD in subject position. Against this view, I would like to argue that the c-command requirement must be satisfied at surface structure. Again, the decisive data comes from Icelandic.

Looking at (219a-f) again, we find that LF-movement of the DistKey object across the subject would result in a weak crossover configuration. To see this, consider the structural configuration after LF-movement in (222).

(222) [DistKey1 ...[DP ...proform] ...t1]

Of course, in the derivational framework implicitly assumed here, feature copying from the indirect object to the DD in the (underlying) object in (219ab) could happen in the course of the derivation, before fronting of the object. Below, it will be argued that this is indeed what happens.
In (222), an indexed element binds a co-indexed proform and a trace to it right in this order, a typical weak crossover configuration. Since most of the languages in (219) show WCO-effects, this could be the independent principle ruling out LF-movement in (219a-f). The sensitivity to WCO is illustrated for English, Dutch, French, Italian, and Russian in (223).

(223) a. *Who has his mother seen?
    b. *Wie heeft z'n moeder gezien?
        [Dutch]
    c. *Qui a vu sa mère?
        [French]
    d. *Sua sorella odia Gianni.
        [Italian]
    e. *kogo videl ego otec?
        [Russian]

The data in (223) suggest that LF-movement of the DistKey object across the DD in subject position is ruled out for independent reasons: It would result in a WCO-violation. If so, we are free to take the c-command requirement between DistKey and DD to hold at LF.

Again, data from Icelandic show that the explanation in terms of WCO cannot be correct. (224) shows that Icelandic – like German – is insensitive to WCO-violations.

(224) Hvern sá mamma hans?
    [Icelandic]

For this reason, movement of a DistKey object across an DD in subject position should result in a grammatical configuration. Despite this, (217f) is ungrammatical. On the other hand, Icelandic DDs can occur in underlying subject position and distribute backwards over a DistKey object, if the alternative pattern with a possessive pronoun (Icelandic II) is chosen.

(225) Sinn hvor tveggja blaðamanna tóku viðtöl við stjórnmálamennina
    POSS each two journalists interviewed with politicians-the
    ‘The politicians were interviewed by two journalists each.’

The striking fact about (225) is that the DD is c-commanded by the pronoun at surface structure. It seems, then, that the possessive pronoun in (225) appears for the same reason as when the DistKey expression is not a DP (see section 5.4.1). It provides the DD with a c-commanding antecedent against which it can check its D-features. In contrast, if the D-features of the DD could be licensed at LF, it remains mysterious why only the pronominal variant in (225) is grammatical.

I conclude that the c-command requirement between DistKey and DD must be satisfied at surface structure. In minimalist terms, this condition can be restated by saying that the D-features of the DD are strong and must be checked before spellout (Chomsky

103 Olga Borik (p.c.) informs me that some speakers of Russian may marginally allow for WCO-configurations such as (223e). This is irrelevant for our purposes, since the explanation in terms of WCO will not stand anyway.
LF-movement of the DistKey expression comes too late to check the D-features on the DD. From this, it also follows that the D-features of the fronted DDs in (221) must be checked in the base position of the moved constituent before movement.

5.4.4 Two D-distributive Elements in One Language: The Case of Japanese

At the end of chapter II.4, it was pointed out that Japanese is unusual in not obeying the correlation between the morphological form of the DD, and its (non-) ability to distribute over non-DP denotations or to occur with underlying subjects. Japanese is the only language in the sample where the DD (sorezore) differs formally from the distributive D-quantifier (wh...+mo), but still it is unable to distribute over non-DP denotations or to occur with underlying subjects.

The foregoing remarks show that the correlation between these three properties that was postulated in chapter II.4 does not hold for all languages: Not every DD that differs formally from the D-quantifier can distribute over events and occur in subject position (though the reverse still holds).

On the other hand, the Japanese data do not form counterevidence to the generalisation that only DDs without D-features can distribute over events and occur with underlying subjects. A closer look at the nature of sorezore ‘each’ provides a solution to the riddle. It was already mentioned in chapter II.4.2.2, and in 5.1 that sorezore has nominal properties. It is case-marked in (226ab), and it functions as a pronoun in (226b).

(226) a. [Huta-ri no musume]-ga [sorezore-ga tadasii to] [iiha-tta] koto] two-CL GEN daughter NOM each- NOM right cp insist-past fact ‘The fact that the two daughters insisted that each of them was right.’ (Sakaguchi 1998:115, ex.3)
   b. Ken-to Erika-ga sorezore-no hahaoya-o hometa.
      Ken-and Erika-NOM each- GEN mother-acc praised ‘Ken and Erika praised their own mother.’ (Tomioka, p.c.)

In addition, sorezore is formally similar to the demonstrative pronoun sorera ‘those’ in (227) (Tomioka, p.c.):

(227) Shinbunkisya-ga futari-zutu sorera-no seizika-o sirabeta.
    news-paper journalist- NOM 2-cl-each those- GEN politician- ACC investigated ‘Those politicians were investigated by two newspaper journalists each.’

The data in (226) and (227) suggest that sorezore does have D-features after all, despite its formal dissimilarity with the distributive D-quantifier wh...+mo. The presence of D-features in sorezore accounts for its inability to distribute over non-DP denotations and to occur with underlying subjects.

(227) also shows that Japanese appears to have a second D-distributive element zutu ‘each’, which can occur with underlying subjects, licensing backwards distribution over the object denotation. The following example from Sakaguchi (1998:115, fn.1) shows that zutu can also distribute over implicit sets of events:

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104 As will be shown in chapter V.3.2, the DistKey objects in (220) must LF-move for semantic reasons after all. Except for Bulgarian, the languages that allow for backwards distributive readings with DDs in underlying subject position show no weak crossover effects. That is, LF-movement of the DistKey across the DD is licensed in these languages, ensuring interpretability.
Although many questions remain, the data in (227) and (228) suggest that Japanese has a second DD, *zutu*. The ability of *zutu* to distribute over non-DP denotations and to occur with underlying subjects suggests that it contains no D-features.\(^{105,106}\)

In conclusion, it was shown that Japanese poses no problem for the claim that there is a correlation between the feature content of a DD on the one hand, and the range of possible DistKeys and the (non-) occurrence with underlying subjects on the other. The discussion has also shown that one has to be careful with hasty conclusions regarding the syntactic behaviour of a DD on the base of its morphological shape alone. This being said, looking at the morphological shape of a DD remains a valuable tool in predicting its syntactic behaviour, when exercised with the necessary caution.

### 5.5 Two Open Problems

Section 5.4 has shown that the different feature specifications for DDs across languages determine part of their syntactic distribution. DDs with D-features are more restricted. Their DistKey antecedent must be a DP, and they cannot occur in underlying subject position of root clauses. DDs without D-features are not restricted in this way. Both restrictions on DDs where shown to follow from the need of the NP-proform to acquire D-features under c-command.

The explanation in terms of c-command does not account for all restrictions on the distribution of d-distributive elements, though. In light of the discussion so far, the ungrammaticality of the English sentences in (229ab) comes as a surprise.

(229) a. *The boys, painted two houses each, red.

b. *The journalists, said that one politician each, was stupid.

In (229a), *each* occurs in subject position of a resultative small clause (see also (72b) from II.4.2.4). In (229b) (≈(72c) from II.4.2.4), *each* occurs in subject position of an embedded clause. In both sentences, there is a potential c-commanding DistKey expression that should suffice to license the DD.

The situation in German is slightly different. The German counterpart of (229a) is grammatical (cf.230a). The counterpart of (229b) in (230b) is equally ungrammatical when the DD distributes over the DP *die Journalisten* ‘the journalists’ in the matrix clause.

(230) a. Die Jungen, haben jeweils, zwei Häuser rot angestrichen.

    *The boys have painted two houses each red.*

In (229a), *each* occurs in subject position of a resultative small clause (see also (72b) from II.4.2.4). In (229b) (≈(72c) from II.4.2.4), *each* occurs in subject position of an embedded clause. In both sentences, there is a potential c-commanding DistKey expression that should suffice to license the DD.

The situation in German is slightly different. The German counterpart of (229a) is grammatical (cf.230a). The counterpart of (229b) in (230b) is equally ungrammatical when the DD distributes over the DP *die Journalisten* ‘the journalists’ in the matrix clause.

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105 A potential problem for a structurally parallel treatment of *sorezore* and *zutu* arises from the fact that sentences with *zutu* are only grammatical if *zutu* is suffixed to the numeral, and not to the entire numeral NP (Sakaguchi 1998:115).

106 Possibly, Japanese is not the only language with two DDs with different feature specification as [+/- D]. Dutch has a genitive-marked (!) element *steeds*, which can distribute over implicit sets of events from adnominal position (cf. i), suggesting that it is the [-D]-counterpart of *elk* ‘each’.

(i) Steeds twee meisjes zijn binnen gekomen.

    *Two girls at a time came in.*
b. Die Journalisten sagten, dass jeweils ein Politiker dumm sei.  
the journalists said that each one politician stupid was  
*‘The journalists said that one politician each was stupid.’

The contrast in grammaticality between English (229a) and German (230a) is revealing. Assuming that the semantics behind the DD-construction are universal, the difference must follow at least partly from syntactic reasons. In chapter IV.6, I will argue that the contrast in grammaticality is due to the different underlying word order of English and German, SVO and SOV respectively, in interaction with semantic considerations. In a nutshell, (229a) is out because the semantic derivation does not get the right arguments in the correct order in English. In German, this problem is avoided because the verb has a different underlying position.

Turning to (229b) and (230b), both are ungrammatical, suggesting that the difference be semantic in nature. As a matter of fact, both are violations of the clausemate condition discussed in chapter II.1.7. In my view, the clausemate-condition of DD and DistKey follows from semantic reasons. In chapter IV.6, this will be shown for DDs in object position that fail to distribute over a DistKey in the matrix clause. The interpretation of DDs in subject position is a little more complex and postponed to chapter V.3. As a result, an account for the ungrammaticality of (229b) and (230b) will have to wait until then.

This concludes the unified cross-linguistic analysis of d-distributive constructions. The analysis for German was shown to extend to a range of languages. The observable differences in the expression of d-distributive constructions were shown to derive from two independent factors. The (im-)possibility of overt DP-internal movement in a language governs the occurrence of the DD in pre- or postnominal position (abstracting away from the problematic Italian facts). The syntactic feature content of the DD governs its syntactic distribution. DDs with no D-features need not have a c-commanding DP as DistKey. They can distribute over all kinds of pluralities, including implicit sets of events, and are licensed in underlying subject position of root clauses. In contrast, DDs with D-features need a c-commanding DP as DistKey. For this reason, they can only distribute over DP-denotations, and are banned from underlying subject position.

6. Conclusion

This chapter has presented the syntactic analysis of d(istance)-distributive constructions, based on the German d-distributive element jeweils. The main results are as follows.

(231) i. The constituent jeweils ‘each, each time’ is a PP with a covert P-head licensed by overt genitive morphology.

ii. There is no distance-distributivity: The universal quantifier je- takes its semantic restriction as complement. The restriction is expressed by an NP-proform –weil-

iii. Adverbial jeweils is an adverbial quantifier adjoined to VP.

iv. Adnominal jeweils is an adnominal quantifier

v. D-distributive constructions with adnominal jeweils have the underlying structure of inverse linking constructions. The jeweils-PP is base-generated as a postnominal PP-modifier, and moves to SpecDP for discourse reasons.

vi. Cross-linguistic differences in the distribution of d-distributive elements are due to two factors: a lexical factor (the syntactic feature content of the DD) that
determines its (non-)occurrence in subject position and with non-DPs as DistKey), and a general syntactic factor (the possibility of DP-internal fronting) that determines the pre- or postnominal occurrence of a d-distributive element in a given language.

This concludes the discussion of the syntax of distance-distributivity. In the next chapter, we will look at how the syntactic structures containing *jeweils* are interpreted semantically.