Boys buying two sausages each: On the syntax and semantics of distance-distributivity
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This chapter serves as the starting point of the thesis. It presents the main data to be analysed, and it develops the main questions to be addressed. The thesis aims (among other things) at a complete syntactic and semantic account of the German distributive quantifier *jeweils* ‘each’, and therefore we will start out with an overview over the main properties of *jeweils* in section 1. One of the findings of section 1 will be that *jeweils* occurs both adverbially and adnominally, leading to different interpretations. Section 2 will tease apart the adnominal and adverbial occurrences of *jeweils* in more detail. The second important finding of section 1 is that the adnominal occurrence of *jeweils* shows the behaviour of what was called distance-distributivity in chapter I. Unlike other adnominal distributive quantifiers, adnominal *jeweils* appears not to form a syntactic constituent with its restriction. Instead, it appears to form a constituent with the distributive share, which comes in the shape of a non-specific DP. The ambiguity of *jeweils* and the distance-distributive behaviour of adnominal *jeweils* lead up to the two main questions to be addressed in chapters III and IV:

1. i. Is the ambiguity of *jeweils* structural or lexical in nature?
   ii. Can the distance-distributive behaviour of adnominal *jeweils* be analysed surface compositionally?

Chapters III and IV will provide answers to the questions under (1). It will become apparent that adnominal and adverbial *jeweils* have the same meaning underlingly. The observed ambiguity must therefore be structural in nature. The different readings results from a different syntactic position of *jeweils*. Furthermore, chapters III and IV will show that a surface compositional analysis of adnominal *jeweils* is feasible, given certain assumptions about the syntactic structure and the semantics of adnominal *jeweils*.

Sections 3 and 4 will set the discussion of *jeweils* on a broader empirical footing. It will be shown that the properties of *jeweils* are observable with other elements, both intra- and cross-linguistically. Section 3 discusses the class of *s*-expressions, such as *höchstens* ‘at most’ and *wenigstens* ‘at least’. Members of this class share with *jeweils* the morphological make-up and the cross-categorial (i.e. adverbial and adnominal) distribution, which is accompanied by semantic ambiguity. Section 4 shows that distance-distributivity is a more general phenomenon that is observable in a variety of languages. Examples from different languages are presented, and a number of recurring patterns are observed. As such, section 4 will provide the base for a general theory of the syntactic and semantic properties of distance-distributivity, the beginnings of which are sketched in chapters III (for the syntax) and IV and V (for the semantics). The main claim to be defended throughout the thesis is found in (2):

2. **The Distance-Distributivity Hypothesis:**
   Distance-Distributivity is only a superficial phenomenon. All instances of apparent distance-distributive quantifiers are reducible to regular adnominal quantifiers.
The chapter concludes with a brief overview over previous analyses of distance-distributivity (mostly focussing on English each) in section 5.

## 1 Properties of jeweils

The German distributive quantifier jeweils exhibits the following syntactic and semantic properties:

### 1.1 Adverbial and Adnominal Occurrence

Jeweils occurs both adverbially and adnominally. The adverbial occurrence is shown in (3a), the adnominal occurrence is shown in (3b).

(3) a. …weil Peter [jeweils verloren hat].
   because Peter each.time lost has
   ‘…because Peter has lost each time.’

   the boys have just each two sausages ordered
   ‘The boys have just ordered two sausages each.’

In (3a), there simply is no nominal category to which jeweils could be attached. I assume that jeweils in (3a) is adjoined to the VP, which contains the subject trace in line with the VP-internal subject hypothesis (Koopman & Sportiche 1985). More arguments in favour of VP-adjunction of adverbial jeweils are provided in section 2, and in chapters III.1, and IV.1. In contrast, jeweils forms a constituent with the numeral object in (3b). This is shown by the fact that the entire constituent can be displaced, e.g. under passivisation.

(4) [Jeweils zwei Würstchen], werden gerade von den Jungen t₁ bestellt.
   each two sausages are just by the boys ordered
   ‘Two sausages are being ordered by each of the boys.’

More arguments in favour of the constituency of jeweils and the numeral NP in (4) are provided in chapter III.2.

### 1.2 Ambiguity

The English paraphrases of (3ab) show that adverbial and adnominal jeweils give rise to two different readings. As a first approximation, jeweils distributes the proposition expressed by the clause over a set E of events when it occurs adverbially. The restricting set of events is provided by the context. On this use, jeweils corresponds to English each time, at a time. When jeweils occurs adnominally, it functions like English binominal each in the paraphrase of (1b).¹ Like binominal each (Choe 1987:3), adnominal jeweils establishes a distributive relation between two arguments. In (3b), jeweils distributes sets of two sausages over atomic members of the set denoted by die Jungen ‘the boys’.

Introducing the notions ‘Distributive Key’ (DistKey) and ‘Distributive Share’ (DistShare), the distributive relations in (3ab) are schematised in (5ab). DistKey refers to the set over which the distribution takes place (i.e. it refers to the restriction of the

¹ The term ‘binominal each’ was coined by Safir & Stowell (1988). Other terms found in the literature are ‘shifted each’ (Postal 1975), and ‘anti-quantifier each’ (Choe 1987, see also section 1.4).
universal quantifier). DistShare refers to the (set of) object(s) that are distributed over the DistKey.²

(5) a. [Event]DistKey jeweils[proposition]DistShare (adverbial reading)
   b. [NPplur]DistKey jeweils[NPnum]DistShare (adnominal reading)

A more formal representation of the readings of (3ab) is given in (6ab). The distributive effect is captured by the presence of the universal quantifier ‘∀’.

(6) a. ∀e [relevant’(e)] → peter-has-lost’(e)]
   b. ∀x [boy’(x)] → ∃Y [2sausages’(Y) & ordered’(x,Y)]

(6a) reads as ‘Every relevant event e is such that Peter has lost in e.’ (6b) reads as ‘For each boy x there is a set of two sausages Y such that x ordered Y.’ In what follows, I will refer to the reading in (6a) as the ‘adverbial reading’ for obvious reasons.³ Similarly, I will refer to the reading in (6b) as the ‘adnominal reading’.

In many cases, a single occurrence of jeweils can be interpreted either adverbially or adnominally. Sentence (7a) is a case in question. It is ambiguous between the adverbial reading in (7b) and the adnominal reading in (7c).

(7) a. …, weil die Jungen jeweils zwei Bücher kauften.
   b. ‘…because the boys bought two books each time / at a time.’
   c. ‘The boys bought two books each.’ = ‘Each of the boys bought two books.’

In section 2, I argue that the two readings in (7bc) are derived from different syntactic surface structures, making (7a) a case of structural ambiguity.⁴ In the semantic analysis in chapter IV, it will be shown that both instances of jeweils have the same underlying meaning. Given this, the ambiguity of (7a) is solely the product of the different syntactic position of jeweils.

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² Unfortunately, there is considerable terminological confusion in the literature. The terminology used here is closest to Choe’s (1987), who refers to DistKey and DistShare as ‘Sorting Key’ and ‘Distributive Share’ respectively. Safir & Stowell (1988) use the notions ‘R(ange)NP’ and ‘D(istributing)NP’, Link (1986/98) uses ‘distributive domain’ and DistShare.

³ Jeweils can give (marginally) rise to a seemingly different adverbial reading which is discussed in Gil (1982:16), and which can be paraphrased as in threes in English. Imagine a scenario in which a physicist can shoot many pairs of electrons at each other with one push of the button. (i) is felicitous in this scenario.

(i) Der Physiker schoss mit einem Knopfdruck jeweils zwei Elektronen aufeinander.
   the physicist shot with a push.of the.button each two electrons at each other
   ‘The physicist shot the electrons at one another in pairs of two with one push of the button.’

In my view, German (i) does not necessitate the assumption of a third reading for jeweils. Jeweils could be taken to distribute pairs of electrons over an unspecified set of locations (e.g. the places of collision). Or, the string jeweils zwei Elektronen ‘each two electrons’ could be represented as Gruppen von jeweils zwei Elektronen ‘groups of two electrons each’. In both cases, we deal with an instance of adnominal jeweils, as will be shown in due course.

⁴ One may wonder why (3b) is not ambiguous as well. In section 2, it will be shown that the adverbial reading is blocked by the presence of the imperfectivity marker gerade ‘just, right now’, which states the existence of an ongoing event, and consequently excludes an each time-interpretation that is compatible (in present tense) only with generic or iterable event readings.
1.3 Morphosyntactic Complexity

A further property of the distributive element *jeweils* is its morphosyntactic complexity. *Jeweils* consists of three parts, as indicated in (8).

\[(8)\] \(\text{je-weil-s}\)

The first morpheme *je* is attested as a free form from the 9th century onwards (Kluge 1999:410). The second morpheme *weil(e) ‘time, while’ is a nominal form. Finally, *jeweils* contains the bound suffix –s, which is found with other adnominal/adverbial expressions such as *wenigsten-s ‘at least’, or with temporal and locative adverbials such as *abend-s ‘in the evening’, and *diesseit-s ‘on this side’. The suffix -s is a genitive marker. In chapter IV, it is argued that the genitive marking on *jeweils* expresses semantic content. The existence of genitive adverbials in German supports this view. In (9), it seems to be the genitive marking that expresses a relation. This relation can alternatively be expressed by a preposition proper, as witnessed by the minimal pairs in (9).

\[(9)\] a. (des) abend-s = am Abend b. dies-seit-s = auf dieser Seite c. jeden-falls = auf jeden Fall

each-case-GEN on any case \(=\) ‘in any event’

The relation-denoting function of genitives will become important for the semantic analysis of *jeweils* in chapter IV. Also note that the genitive case marking suggests a nominal status of the string *jeweil-s*, since only nominal phrases can be case-marked. The nominal status of *jeweil- is supported by the fact that it can be suffixed with –ig(e). The suffix -ig(e) forms adjectives from nouns (Eisenberg 1998:263), like its English counterpart –y.

\[(10)\] seine jeweil-ige Freundin

his respective girlfriend

The suffix –ig(e) usually combines with bare nouns (11a). But it can also attach to compounds that consist of a head noun plus a prenominal modifier that can be adjectival, prepositional, or determiner-like in nature (11bc) (cf. Booij 1995:4)

\[(11)\] a. [\(\Lambda [N \text{ gier}]- \text{ig}\)]  b. [\(\Lambda [P \text{ aus } [N \text{ häus}]]-\text{ig}\)]  c. [\(\Lambda [D \text{ dies } [N \text{ seit}]]-\text{ig}\)]

greed-y out house y this side y

‘greedy’ ‘out of the house’ ‘being on this side’

The data in (11) suggest that the complex form *jeweil-* is a complex nominal expression that consists of a head noun and a prenominal element. We will come back to the internal

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5 The genitive status of *wenigstens ‘at least’ is confirmed by Gebrüder Grimm (1960:46-48), where it is shown that *wenigstens has developed in the 17th century as a genitive alternative to the prepositional construction *zum wenigsten ‘to the least’. For the genitive status of the other expressions see e.g. Teuber (2000).

6 See Partee (1983/97) and Partee & Borsthef (1998) for the analysis of (Saxon) genitives as containing a relation variable in their denotation. See also Hartmann & Zimmermann’s (2002) discussion of semantic genitive in German.
structure of jeweils, and its categorial status in chapter III. The morphological make-up of jeweils will play a prominent role in the analysis to be developed.

1.4 Distance-Distributivity
The most striking property of adnominal jeweils is its behaviour as an “anti-quantifier”. The term comes from Choe (1987), who uses it to refer to a similar phenomenon in Korean and to binominal each in English. Even though I will replace the notion of ‘anti-quantifier’ shortly, the term may serve to highlight the peculiar behaviour of these elements. While regular quantifying determiners such as jeder ‘each’ take the restriction-denoting element (the DistKey) as their syntactic complement, ‘anti-quantifiers’ seem to stand at a distance to their DistKey, forming a constituent with the DistShare instead. This is schematised in (12ab).

(12) a. [jeder [Dist-Key]]...[DistShare] (distributive quantifier)
    b. [Dist-Key]...[jeweils [Dist-Share]] (distributive anti-quantifier)

Sentences with ‘anti-quantifiers’ are a challenge to compositional analyses because their readings are often truth-conditionally equivalent to those of sentences with regular quantifiers even though their (surface) syntax appears to be fundamentally different. Consider (13), which has the same truth conditions as (3b), but which differs syntactically from (3b).

    each boy has just two sausages ordered

b. \(\forall x \ [ \text{boy}'(x) \rightarrow \exists Y \ [(2(Y) \& \text{sausages}'(Y) \& \text{ordered}'(x,Y))]\)

(3) b. Die Jungen haben gerade jeweils zwei Würstchen bestellt.
    the boys have just each two sausages ordered

\(\forall x \ [ \text{boy}'(x) \rightarrow \exists Y \ [(2(Y) \& \text{sausages}'(Y) \& \text{ordered}'(x,Y))]\)

To put it another way, two different syntactic (surface) structures receive the same interpretation. In chapters III and IV, we will explore whether this truth-conditional equivalence should be accounted for in syntactic, and/or in semantic terms. As will become clear in the course of the discussion, ‘anti-quantification’ is only a superficial phenomenon, and the syntactic behaviour of the ‘anti-quantifier’ jeweils is not as dramatically different from that of the quantifier jeder as appears on first sight. In section 4, I show that elements with the behaviour of ‘anti-quantifiers’ exist in a variety of related and unrelated languages. The syntactic and semantic differences observed are systematic in nature. From the perspective of universal grammar, this argues for a unified cross-linguistic analysis, the beginnings of which will be developed in chapter III.5.

As mentioned above, I would like to replace Choe’s term “anti-quantifier” with the notion of distance-distributivity. There are three reasons for this. First, the term ‘anti-quantifier’ is somewhat misleading in that it suggests that constructions with these elements involve no quantification. We have seen above, however, that the distributive effect with adnominal jeweils is due to universal quantification. Second, “anti-quantification” seems to be exclusively found with distributive quantifiers. Third, some languages (e.g. Bulgarian) employ non-quantifiers to mark “anti-quantification”, suggesting the use of a more neutral terminology. Nonetheless, the claim that the
phenomenon of distance-distributivity is only a superficial phenomenon stands, no matter how we choose to refer to it.

It is important to point out that the term ‘distance-distributive element’ is reserved exclusively for elements that form a constituent with a nominal DistShare expression (cf. 12b). Crucially, it does not apply to elements that are commonly referred to as floated quantifiers (Sportiche 1988). In 1.10, I show that distance-distributive elements differ from floated quantifiers in important respects. Consequently, I consider distance-distributive elements (in the sense defined here) and floated quantifiers as two different elements with different properties.7

1.5 Co-occurrence Restrictions on Adnominal jeweils

While adverbial jeweils can adjoin to any VP, adnominal jeweils is subject to two co-occurrence restrictions. First, the DistKey has to be expressed by a plural expression that denotes a group or set of individuals (cf.14a). With no plural expression present, as in (14b), only the adverbial reading is possible.

(14) Plural Restriction on DistKey:
   a. Die Jungen/ Zwei Jungen/ Peter und Klaus/ kaufen jeweils zwei Bücher.
      The boys / two boys / P. and K. buy each two books
      ‘The boys / two boys / Peter and Klaus are buying two books each.’
   b. Peter / der Junge kauft jeweils zwei Bücher.
      Peter / the boy buys each time two books
      i. ‘Each time, Peter / the boy buys two books.’
      ii. *‘Peter / the boy buys two books each.’

The plural restriction on DistKey is semantic in nature. Recall that adnominal jeweils distributes sets denoted by the DistShare over atomic members of the pluralic set denoted by the DistKey. Distribution is impossible if the DistKey is a singular DP and denotes an atomic individual, for there is nothing to distribute over in this case. Any semantic account of adnominal jeweils must account for this restriction.

The second restriction concerns the DistShare. The DistShare must be expressed in form of an indefinite expression (cf.15a). With definite expressions, or with expressions headed by strong quantifiers (cf. Barwise & Cooper 1981, de Hoop 1995), only the adverbial reading is available (cf.15b).8

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7 The term ‘distance-distributive’ element is also reminiscent of the phenomenon of ‘quantification at a distance’ in French, which is discussed in Doetjes (1997: ch.10) and illustrated in (i):
   (i) Jean a beaucoup lu de livres.
      Jean has a lot read of books
      ‘John has read a lot of books.’

In (i), the quantifying element beaucoup ‘a lot’ also occurs at a distance to its restriction de livres. However, it seems to me that the two phenomena are unrelated and should be treated separately.

8 The term ‘indefiniteness restriction’ is not quite correct in two respects. First, adnominal jeweils cannot occur with indefinite mass term as DistShare, as in (ia). And second, adnominal jeweils can occur with syntactically definite expressions as DistShare, as long as these have a non-specific, or type-denoting interpretation as in (ib).

      the boys buy just each sugar
   b. Die Mädchen haben jeweils die beste Freundin (von sich) eingeladen
      the girls have each the(her) best girlfriend of REFL invited
      ‘The girls have invited the(her) best girlfriend each.’

Both (iab) seem to follow from semantic reasons: The DistShare of adnominal jeweils must denote a predicate over sets of atomic entities, thus excluding (ia) and including (ib). See also fn.9. With the necessary qualifications in place, I will go on to use the term ‘indefiniteness restriction’.
(15) Indefiniteness Restriction on DistShare:

   ‘The boys love two / several / some / many women each.’

b. Die Jungen lieben jeweils die/ jede / alle Frau(en).
   ‘The boys love the / every / all woman/en each time.’

In chapter IV.5, I argue that this restriction is semantic in nature as well. Adnominal *jeweils* requires a predicate-denoting expression as its first argument.\(^9\) Let us add immediately that the possible co-occurrence of adnominal *jeweils* and genuine adjectives like *verschiedene* ‘different’ shows that *jeweils* is not restricted to occur with numerals or other quantificational adjectives.

1.6 Adnominal *Jeweils* in Subject Position

A further interesting property of adnominal *jeweils* that sets it apart from English binominal *each* is that it can – unlike the latter (cf. Burzio 1986, Stowell & Safir 1988) – occur with the underlying subject of a clause. In this case, the subject DistShare can distribute ‘backwards’ over the object DistKey.\(^9\)

   ‘Each ballerina was accompanied home by one officer.’

b. *‘One officer each accompanied the ballerinas home.’

To be sure, any analysis of adnominal *jeweils* should say something about this difference. In III.5.4.2, this difference will be attributed to a difference in the syntactic feature content of *jeweils* and *each*.

1.7 The Clausemate Condition on Adnominal *Jeweils*

The DistKey of adnominal *jeweils* is subject to a locality restriction. Adnominal *jeweils* can only distribute over a clausemate co-argument, but not over plural DPs in a higher clause. This is shown for adnominal *jeweils* in object position in (17a), and in underlying subject position in (17b). The DistKey status of the matrix subject *die Verkäufer* ‘the store clerks’ is indicated by co-indexation with *jeweils*.

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\(^9\) The co-occurrence of adnominal *jeweils* with the quantifying expression *genau zwei Frauen* ‘exactly two women’, which is not easily construable as a (second order) predicate over sets, seems to pose a problem for the restriction to predicates.

(i) Die Jungen lieben jeweils genau zwei Frauen.
   ‘The boys love exactly two women each.’

However, closer inspection shows that the sequence *genau n NP* ‘exactly n NPs’ can be used as a predicate nominal, a diagnostic for predicative expressions (cf. Higginbotham 1987, Stowell 1991, Winter 1999):

(ii) Das sind genau zwölf Kerzen.
   ‘These are exactly twelve candles’

(i) states that a contextually given set is a set of candles and is of cardinality 12 and not higher. (ii) does not exclude the existence of other candles in the universe of discourse. Given the seemingly predicative nature of *genau n NP* ‘exactly n NPs’ in (ii), I propose that a similar predicative use is possible in (i), whatever the precise semantics of the construction.

\(^10\) (16) has an additional reading that will be discussed in chapter V.
The same holds for English binominal *each* (cf. Choe 1987). In chapters IV.5 and V.3, the clausemate condition is shown to follow from semantic factors. It is shown that the semantics of adnominal *jeweils* allow for no meaningful semantic interpretation for (17ab) even though the structures are syntactically well formed.

1.8 Adnominal *Jeweils* can Distribute over Non-DPs

Another interesting property of adnominal *jeweils* is that it is quite flexible regarding the syntactic and semantic nature of its DistKey. Moltmann (1997) shows that adnominal *jeweils* does not necessarily distribute over pluralities of individuals denoted by a DP, as in (18a). It can also distribute over pluralities of events which are expressed e.g. by verb conjunction, as in (18b). I will refer to this observation as ‘Moltmann’s observation’.

(18) a. Peter und Maria kauften jeweils zwei Bücher.
   P. and M. bought each two books
   ‘Peter and Maria bought two books each.’

b. 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.’

Again, this property sets German adnominal *jeweils* apart from English binominal *each*, which does not have this use. In English, *respectively* must be used instead.

1.9 The Short Form *Je*

The morphological complexity of *jeweils* from 1.3 is supported by the existence of a short form *je*.

(19) Die Jungen haben je zwei Bücher gekauft.
   the boys have each two books bought
   ‘The boys bought two books each.’

The short form *je* has drawn some attention in the literature (cf. Link 1986/98, Choe 1987, Moltmann 1991, Sauerland 2001). What is important here, is that *je* can be shown to be the short form of adnominal *jeweils* when used as a distributive element.\(^\text{11}\) Distributive *je* can occur in all and only in those positions where adnominal *jeweils* occurs. The short form *je* is excluded from adverbial position in (20a). In (20b), the adverbial reading is absent, showing that *je* cannot be a substitute for adverbial *jeweils* (see also Link 1986/98: 123).

\(^{11}\) *Je* has other uses as a free form. In (ia), it functions as a negative polarity item licensed by the question mood.
In (ib), it introduces a correlative structure.

(i) a. Bist du je in New York gewesen?
    ‘Have you ever been to New York?’

   b. Je kälter es wird, desto dunkler wird es.
      ‘The colder it gets, the darker it gets.’
The data in (20) clearly show that je is the short form of adnominal jeweils only.

1.10 Adnominal jeweils ≠ Floated Quantifier

Before going on, it is necessary to point out that adnominal jeweils is not a floated quantifier. The question arises because in many cases the adnominal reading of jeweils (cf.21b) is truth-conditionally equivalent to that of the floated distributive quantifier jeder ‘each’ (cf.22b).

(21) a. ..., weil die Jungen jeweils zwei Würstchen kauften.
    because the boys each two sausages bought
    ‘...because the boys bought two sausages each.’

b. $\forall x \left[ x \in \text{[the boys]} \rightarrow \exists y \left[ \text{two_sausages}’(y) \& \text{bought}’(x,y) \right] \right]$

(22) a. ..., weil die Jungen jeder zwei Würstchen kauften.
    because the boys each two sausages bought
    ‘...because the boys bought two sausages each.’

b. $\forall x \left[ x \in \text{[the boys]} \rightarrow \exists y \left[ \text{two_sausages}’(y) \& \text{bought}’(x,y) \right] \right]$

Two influential positions on floated quantifiers can be found in the literature.12 The first account goes back to Sportiche (1988) and treats floated quantifiers as genuine adnominal quantifiers that are stranded by an NP complement, which acts as restrictor semantically, and has moved to some case position overtly. The second account goes back to Dowty & Brodie (1984) and treats floated quantifiers as adverbial elements that are adjoined to VP and distribute the predicate denotation over a pluralic NP-antecedent. The two positions are illustrated in (23).

(23) a. [Die Jungen]$_1$ haben [VP$_{QP}$ jeder t$_1$] [V$_{VP}$ den Raum verlassen]].
    the boys have each the room left

b. [Die Jungen]$_{1,i}$ haben [VP jeder, [VP$_{t}$ den Raum verlassen]].
    the boys have each the room left

For our purposes it does not matter which analysis is more adequate, for it is easy to show that adnominal jeweils has properties different from that of floated jeder.

To begin with, the two elements differ in form, with jeder being formally identical to the quantifying determiner. Second, both accounts of floated quantification locate the floated quantifier jeder at the edge of VP (either in SpecVP, or adjoined to VP). This is not the position of adnominal jeweils, which cannot be adjoined to VP because it forms a constituent with the object DP inside VP. As a result, adnominal jeweils can front with the DP, as shown in (4), repeated as (24a). A similar fronting of floated jeder and an object DP is impossible, as shown in (24b) (see section 2 and chapter III.2 for more arguments to this effect).

12 An exhaustive list of proponents of both accounts is found in McCloskey (2000).
(24) a. [Jeweils zwei Würstchen], werden gerade von den Jungen bestellt.

   each two sausages are just by the boys ordered

   ‘Two sausages are being ordered by each of the boys.’

   b. *[Jeder den Raum], haben die Jungen verlassen.

   each the room have the boys left

   ‘Each the room have the boys left.’

Third, floated jeder can occur with intransitive predicates (25a), whereas adnominal jeweils cannot. (25b) has only an adverbial reading on which the boys left each time (either individually or together).


   the boys are each left

   ‘The boys are each left.’

   b. Die Jungen sind jeweils gegangen.

   the boys are each time left

   ‘The boys left each time.’

Fourth, adnominal jeweils cannot combine with definite object NPs, whereas floated jeder can. Again, (26b) differs in reading from (26a) in that it only allows for the adverbial reading on which the boys have left the room each time (either individually or together).

(26) a. Die Jungen haben jeder den Raum verlassen.

   the boys have each the room left

   ‘The boys have each left the room.’

   b. Die Jungen haben jeweils den Raum verlassen.

   the boys have each time the room left

   ‘Each time, the boys left the room.’

Fifth, adnominal jeweils can occur embedded inside another nominal constituent (27a). In contrast, floated jede(r) must occur at the edge of VP (27b).

(27) a. [Die Mütter [von jeweils zwei Söhnen]] wurden geehrt.

   the mothers of each two sons were honoured

   ‘Mothers, which had two sons each, were decorated.’

   b. *[Die Mütter [von jede zwei Söhnen]] wurden geehrt.

   the mothers of each two sons were honoured

   I take this to be sufficient evidence that German adnominal jeweils is not a floated quantifier at the edge of VP. Therefore, there is no reason for assuming that adnominal jeweils should have the semantics of the floated distributive quantifier.

1.11 Summary of Properties

This concludes our preliminary survey of the syntactic and semantic properties of jeweils that any analysis needs to account for. These are in short:

(28) i. Its cross-categorial occurrence in adnominal and adverbial position (1.1).

   ii. Its ambiguity between an adnominal and an adverbial reading (1.2).

   iii. Its morphosyntactic complexity (1.3).

13 Some of these tests are taken from Sakaguchi (1998:60ff), who shows that English binominal each differs from English floated each along the same lines. See also Junker (1995) for similar differences between French binominal chac-un(e) ‘each’ and floated chac-un(e) ‘each’.
INTRODUCING JEWEILS

iv. The distance-distributive nature of adnominal jeweils (1.4).
v. The co-occurrence restrictions on adnominal jeweils (1.5).
vi. The occurrence of adnominal jeweils with underlying subjects (1.6).
vii. The clausemate condition on adnominal jeweils and DistKey (1.7).
viii. The flexibility of adnominal jeweils regarding the syntactic and semantic nature of its DistKey (1.8).
ix. The existence of a short form je for adnominal jeweils (1.9).
x. Adnominal jeweils is not a floated quantifier (1.10).

We now turn to the syntactic distribution of jeweils and its two readings in detail.

2 Teasing Apart the Two Occurrences of Jeweils

In (7ab) above, it was shown that some instances of jeweils are ambiguous between an adverbial and an adnominal reading. This fact is illustrated again in (29), with the semiformal paraphrases in (29ab).

(29) Die Jungen haben jeweils zwei Würstchen gekauft.
the boys have each two sausages bought
a. ∀x [boy’(x) → ∃e [x bought two sausages in e]]
b. ∀e [relevant’(e) → ∃e’[e’ is related to e & the boys bought 2 sausages in e’]]

In this section, it will be shown that the two readings of (29) are derived from different syntactic surface structures. This claim is captured by the hypothesis in (30).

(30) The Syntactic Ambiguity Hypothesis:
Adverbial and adnominal jeweils are located in different syntactic positions.

The strongest argument for the hypothesis in (30) comes from the fact that both instances of jeweils can co-occur. If this happens, the first (and presumably higher) occurrence of jeweils must be interpreted adverbially, the second adnominally.

(31) Die Jungen haben jeweils jeweils zwei Würstchen gekauft.
the boys have each time each two sausages bought
‘Each time, the boys have bought two sausages each.’

Furthermore, it is possible to isolate occurrences of jeweils that only give rise to the adverbial reading, and others which only give rise to the adnominal reading. These occurrences can be shown to differ in syntactic structure. In other words, there are configurations in which jeweils can only be interpreted adverbially, and configurations in which it can only be interpreted adnominally. It follows that the ambiguity of jeweils cannot simply be lexical in nature, but that its syntactic position plays a role.

Due to the ambiguous nature of jeweils, it is often difficult to decide if a certain reading is present or absent in a given configuration. In order to control for the readings, we will make use of some semantic constraints on jeweils. In section 1.5, adnominal readings were shown to be impossible without a plural DistKey and/or an indefinite
DistShare. This is the case in (32a). Adverbial readings, on the other hand, are impossible in the presence of the imperfectivity marker *gerade* (cf.32b).  

(32)  
a. *Peter liebt jeweils diese Frau.
     Peter loves each this woman  
b. *Peter niest (gerade jeweils) / (jeweils gerade) heftig.
     Peter sneezes just each.time / each.time just loudly  

The restrictions on adnominal and adverbial *jeweils* allow for the predictions in (33):  

(33)  
i. In the presence of *gerade* ‘just’, only the adnominal reading is possible (if at all).  
ii. In the absence of a plural DistKey and/or an indefinite DistShare, only the adverbial reading is possible (if at all).  

In what follows, I will use the two diagnostics in (33) in order to control for the presence or absence of adverbial and adnominal reading.

2.1 **Adverbial *Jeweils***  
Using the diagnostics in (33i,ii) as controlling factors, the following observations can be made. First, adverbial readings are possible if *jeweils* can be construed as being attached to VP. As a result, adverbial readings are possible with *jeweils* in intransitive sentences.  

(34)  
Peter hat jeweils [VP heftig geniest].
     Peter has each.time strongly sneezed
     ‘Each time, Peter sneezed strongly.’  

The absence of an object DP in (33) leaves no choice but to treat *jeweils* as an adverb adjoined to VP (see also the discussion of the syntactic position of quantifying adverbs in chapter III.1).

Conversely, adverbial readings are absent if it is impossible to construe *jeweils* as being adjoined to VP, e.g. if *jeweils* is embedded deep inside another DP. This is illustrated in (35a), which differs in meaning from (35b). (35a) only allows for the adnominal reading, while (35b) must be interpreted under the adverbial reading (as witnessed by the ungrammaticality with *gerade*).

(35)  
a. Es werden (gerade) [DP die Mütter von jeweils zwei Söhnen] geehrt.
     It are just the mothers of each two sons honoured.
     ‘Mothers that have two sons each are (being) honoured.’

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14 The ungrammaticality of (32a) suggests that the use of stative verbs such as *liebt* ‘loves’ also blocks the adverbial reading, and could therefore be utilised as a possible control factor for adnominal readings. However, the use of stative verbs is not reliable as a diagnostic as the imperfectivity marker *gerade*. For instance, the blocking effect of the stative verb *liebt* ‘loves’ in (32a) evaporates as soon as we replace the definite object with an indefinite one, and change the tense to past (ia). In contrast, the blocking effect with *gerade* ‘just’ remains robust (ib).  
(i) a. Peter liebte jeweils eine Frau.
     Peter loved each.time a woman
     b. *Peter liebte gerade jeweils eine Frau.
     Peter loved just each.time a woman
   It are just each time the mothers of two sons honoured.
   ‘Each time, the mothers of two sons are (*being) honoured.’

That (35a) only allows for the adnominal reading becomes clearer if we substitute *die Mütter ‘the mothers’ with the singular *die Mutter, as in the ungrammatical (36a).

       It is just the mother of each two sons honoured.
       ‘Each time, the mother of two sons is (*being) honoured.’

       It is just each time the mother of two sons honoured.
       ‘Each time, the mother of two sons is (*being) honoured.’

Since adnominal *jeweils requires a plural expression as DistKey, the adnominal reading is impossible for (36a). The adverbial reading is impossible as well because *jeweils is not in a position adjoined to VP. In this respect, (36b) differs from (36a) because *jeweils is outside the DP and free to adjoin to VP. As a result, the adverbial reading is possible in (36b).

Analogous facts are observed with respect to the relative order of *jeweils and prepositions. In (37a), *jeweils occurs embedded inside a directional PP, and the sentence is ungrammatical. In (37b), *jeweils occurs outside the PP and is free to adjoin to VP, and the sentence is grammatical:

(37)   a. *Der Papst fuhr [PP nach jeweils Armenien].
       the Pope went to each time Armenia

   b. Der Papst fuhr jeweils [PP nach Armenien].
      the Pope went each time to Armenia

The data in (35)-(37) show, then, that *jeweils cannot be interpreted adverbially if it is embedded inside an (object) DP, or if it is embedded inside a PP. The adverbial reading is possible only if *jeweils is in a position in which it can be adjoined to VP. This state of affairs is summarised in (38):

(38)   **Syntactic Restriction on Adverbial Readings with *Jeweils:**
       Adverbial readings are possible only if *jeweils can be adjoined to VP.

2.2 Adnominal *Jeweils*

Turning to adnominal *jeweils, the obligatory presence of an indefinite DistShare expression suggests that this instance of *jeweils stands in a close semantic and syntactic relation to this expression. Indeed, the data in (39) suggest that adnominal *jeweils must be adjacent to the DistShare. In (39a) *jeweils is adjacent to a direct object, in (39b) to an indirect object, in (39c) to a prepositional object, in (39d) to a subject. Notice that all sentences allow for insertion of the imperfectivity marker *gerade ‘just’, showing that the adnominal reading is present.

(39)   a. Die Jungen haben jeweils zwei Würstchen gegessen.
       the boys have each two sausages eaten
       ‘The boys have eaten two sausages each.’
b. Die Jungen haben jeweils zwei Mädchen Blumen geschenkt.
   ‘The boys have given flowers to two girls each.’

c. Der Richter hat die Angeklagten zu jeweils zwei Jahren Haft verurteilt.
   ‘The judge has sentenced the defendants to two years each.’

d. Jeweils zwei Verehrer verfolgen die einzelnen Diven.
   Each two admirers stalk the individual divas
   ‘The individual divas are being stalked by two admirers each.’

(40) presents the adjacency restriction on adnominal jeweils.

(40) Adjacency Condition on Adnominal Readings with Jeweils:
Adnominal reading with jeweils are possible only if jeweils is adjacent to the DistShare expression.

(40) correctly rules in the adnominal readings for (39a-d) as well as for (35a) above. It correctly rules out the adnominal reading for (41), which only has the adverbial reading.

(41) …, weil Peter jeweils den Mädchen zwei Würstchen gekauft hat.15
   because Peter each the girls two sausages bought has
   a. ‘…because Peter has bought the girls two sausages each.’
   b. ‘…because each time, Peter bought the girls two sausages.

(40) also rules out the adnominal reading for (42a), in which jeweils is separated from its DistShare by the exhaustivity marker alle, which marks the left edge of VP (cf. Brisson 1998).16 (42b), which meets the adjacency condition, allows for the adnominal reading.

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15 (39d) shows that the DistKey does not need to c-command adnominal jeweils at surface structure. In 2.3, it is shown that adnominal jeweils can sometimes overtly move away from its DistShare. This is impossible in (41), for such movement would result in a Principle C-violation (Chomsky 1981). Under the plausible assumption that jeweils and the potential DistKey expression den Mädchen ‘the girlsDAT’ are co-indexed, the R-expression den Mädchen would be incorrectly bound by jeweils.

(i) …, weil Peter jeweils den Mädchen [t1 zwei Würstchen] gekauft hat.
   because Peter each the girls two sausages bought has

   This goes to show that an adnominal reading for (41) cannot be derived by movement, or by base-generation in a position that is non-adjacent to the DistShare. The second point is relevant here.

16 For Brisson (1998), the contribution of ‘floated’ all/alle to the meaning of a sentence is pragmatic rather than semantic in nature. Presence of all/alle adds an exhaustivity requirement that ensures that every single member of the pluralic group denoted by the subject-NP takes part in the action/achievement expressed by the VP (a ‘tight fit’ in Brisson’s terms). Without presence of all/alle, a sentence is judged felicitous even if one (or more) member(s) of the subject-group do not take part (‘loose fit’). Consider the mini discourses in (iab), assuming that the group of boys comprises at least 10 members. (ia) without all is fine, whereas presence of all in (ib) requires all the boys to have jumped into the lake, without exception.

   (i) a. The boys jumped into the lake. Except for John, who was ill.
   b. #The boys all jumped into the lake. Except for John, who was ill.

   Without going into the details of Brisson’s account, it should be noted that analysing ‘floated’ all/alle as a modifier (and not as a quantifier proper) explains the compatibility of all/alle with adnominal jeweils in (42b). Jeweils is responsible for the distributive effect, while alle makes sure that the distribution goes over every single element of the subject denotation – without exception. If both elements were quantifiers, they would compete for the same restriction, and (42b) should be as ill-formed as (i):

   (i) *Die Jungen haben gerade jeder jeweils zwei Würstchen gekauft.
      the boys have just each each two sausages bought

      ‘The boys have each bought two sausages each.’
(42)a. ..., da die Jungen (*gerade) jeweils [vp alle zwei Würstchen gegessen haben].
   ... since the boys just each time all two sausages eaten have
   ‘...since the boys have all eaten two sausages each time.’

b. ..., da die Jungen (gerade) [vp alle [jeweils zwei Würstchen] gegessen haben].
   ... since the boys just all each two sausages eaten have
   ‘...since the boys have all eaten two sausages each.’

As predicted, (42a), which only allows for the adverbial reading is incompatible with the
imperfectivity marker gerade ‘just’. (42b) remains grammatical in the presence of gerade.
I conclude that (42ab) provide strong evidence for the adjacency restriction on adnominal
jeweils.

2.3 Some Problems

Unfortunately, the picture is not always as clear as one would like it to be. The clear
distinction between adverbial and adnominal jeweils is often blurred, for various reasons.

The first problem concerns the practice of using elements that are located at the left
edge of VP in order to determine if an element is inside or outside of the VP. Above, I
have employed the exhaustivity marker alle ‘all’ to this purpose. While it is true that
elements to the left of such markers are certainly outside the VP, it cannot be established
with certainty that elements to the right of them are located within the VP. This follows
from the fact that markers of the left edge of VP in German appear to be able to freely
adjoin to any VP-projection. Therefore, they can also adjoin above jeweils if jeweils is
adjoined to VP itself. I assume that this is the case in (43a) where jeweils has an adverbial
reading although it occurs to the right of the exhaustivity marker jeweils. The syntactic
structure of (43a) is given in (43b).

(43) a. ...weil die Jungen alle jeweils laut geniest haben.
   because the boys all each time loudly sneezed have
   ‘...because the boys have all sneezed loudly each time.’

b. ...weil die Jungen [vp alle [vp jeweils [vp t1 laut geniest haben]]].

It follows that VP-edge markers are not a reliable diagnostic for showing that an instance
of jeweils is not adjoined to VP. The only way to make sure that jeweils is not adjoined to
VP is therefore to embed it inside another constituent, e.g. a DP (cf.35a), or a PP (cf.37a).

The second problem arises from an apparent violation of the adjacency condition on
adnominal jeweils. There are instances of jeweils which are non-adjacent to the DistShare,
but which give rise to an adnominal reading nevertheless. The availability of the
adnominal reading with (44) is confirmed by the compatibility of jeweils with gerade
‘just’. Small caps on jeweils show that it carries main stress.

(44) a. Die Jungen haben JEWELLS gerade zwei Würstchen DistShare gegessen.
   the boys have each just two sausages eaten

b. Die Jungen haben gerade JEWELLS Maria drei Blumen DistShare geschenkt.
   the boys have just each Maria three flowers given

The grammaticality of (42b) therefore supports Brisson’s analysis of ‘floated’ all/alle as an exhaustivity marker.

17 This practise was established by Diesing (1992), where, drawing on data from Hentschel (1986), the German
particle ja...doch is used in order to determine whether a bare subject is inside or outside the VP.
Although the data in (44) appear not to be in line with the adjacency condition on adnominal jeweils at first sight, I would like to argue that this is only apparently so. First, the main stress on jeweils in (44ab) argues for a prominent discourse status of jeweils. Such prominent discourse status is often the result of overt scrambling, which I assume must have taken place in (44ab). The structures of (44ab) are shown in (45ab), where the trace of jeweils is adjacent to the DistShare.

(45)  

\[ a. \quad \ldots \text{jeweils}_1 \quad \text{gerade} \quad [t_1 \text{drei Würstchen}_\text{DistShare}] \quad \text{gegessen} \]

\[ b. \quad \ldots \text{gerade} \quad \text{jeweils}_1 \quad \text{Maria} \quad [t_1 \text{drei Blumen}_\text{DistShare}] \quad \text{geschenkt.} \]

The adjacency condition must be weakened accordingly. The revised version is found in (46).

(46)  

\textit{Adjacency Condition on Adnominal Readings (revised version):} Adnominal readings with jeweils are possible only if jeweils or its trace is adjacent to the DistShare.

(46) accounts for the fact that adnominal jeweils can move away from its DistShare, just like dative possessors “which run away from home” in Hungarian (Szabolcsi 1983). The syntactic analysis of adnominal jeweils developed in chapter III. predicts the possibility of such movement of jeweils.

If movement lies at the heart of the superficial non-adjacency of adnominal jeweils and the DistShare, the adnominal reading should not be available if a syntactic barrier, which would block movement, separates jeweils and a potential DistShare. This prediction is borne out, as witnessed by the ungrammaticality of (47ab). In order to give rise to an adnominal reading, jeweils would have to move out of a complex noun phrase in (47a), and out of a coordinate structure in (47b), both islands for movement (Ross 1967).

(47)  

\[ a. \quad \text{Die Wachen} \quad \text{leugnen} \quad \text{gerade JEWEILS} \quad \text{die Tatsache, dass zwei Gauner} \]

\[ \quad \text{geflohen sind.} \]

\[ * \quad \text{The guards are denying the fact that two bandits each have fled.} \]

\[ b. \quad \text{Die Jungen haben JEWEILS gerade zwei Popstars und ET gesehen.}' \]

\[ \text{The boys have just seen two popstars each and ET.} \]

The third problem concerns the fact that under certain conditions adnominal jeweils can distribute over a contextually given set of events as well. In (48), jeweils gives rise to what looks like an adverbial reading.

(48)  

\[ \text{Der Papst ist jeweils drei Länder gefahren.} \]

\[ \text{The Pope has travelled to three countries each.} \]
What is curious about (48) is that its grammaticality depends on the presence of an indefinite DP inside the PP. Without an indefinite DP, the ‘adverbial’ reading is unavailable, and the sentence is ungrammatical. This was shown in (37a) above. The obligatory presence of an indefinite DistShare gives rise to the suspicion that the reading of (48) is really an adnominal reading in disguise. In section 1.8, it was shown that adnominal jeweils is able to distribute over pluralities of events as well as over pluralities of concrete individuals. I assume that this is what happens in (48), in the absence of an overt plural DistKey expression. Chapter V will discuss more cases of the kind illustrated in (48).

Summing up, the discussion of problematic cases has brought to light two things: First, one has to be careful with the diagnostics one employs. Second, apparent violations of the generalisations forwarded in 2.1 and 2.2, turn out to constitute no violation on closer inspection. The section as a whole may also serve to sharpen the reader’s attention regarding the various subtleties and empirical problems that may arise when investigating the syntactic and semantic nature of jeweils. 19

2.4 Summary
In this section, it was shown that there are two syntactic instances of jeweils, adnominal and adverbial jeweils, which come along with their own readings. The main findings concerning the syntactic distribution of jeweils are summarised in the generalisation in (49).

(49) *The Interpretation of Jeweils:*
   i. If jeweils is adjoined to VP, it is interpreted adverbially.
   ii. If jeweils or its trace is adjacent to a DistShareNP, it is interpreted adnominally.

From (49) it follows that the two readings of (29), repeated as (50a), must be derived from different syntactic surface structures. (50a) is structurally ambiguous. The two structures are given in (50bc). (50b) is interpreted adverbially. (50c) is interpreted adnominally.

(50) a. Die Jungen haben jeweils zwei Würstchen gekauft.
   b. Die Jungen, haben [VP jeweils [VP t₁ [zwei Würstchen] gekauft]].
   c. Die Jungen, haben [VP t₁ [jeweils zwei Würstchen] gekauft].

The structural ambiguity of jeweils will be subject to further scrutiny in chapter III, which explores the syntactic structure of adnominal jeweils (and to a certain extent adverbial jeweils) in more detail. The syntactic analysis proposed for adnominal jeweils provides the basis for the semantic analysis in chapter IV. The semantic analysis assigns adverbial and adnominal jeweils the same underlying meaning. Given this, the difference in interpretation is exclusively due to the difference in syntactic position of the two instances of jeweils.

19 Another problem arises from the fact that some speakers display a tendency to interpret jeweils as floated ‘jeder’ when it occurs in adverbial position, but when the adverbial reading is blocked for independent reasons (e.g. in the presence of the imperfective marker gerade). I have tried to exclude this possibility when possible.
In the following section, I show that this particular instance of structural ambiguity is not restricted to jeweils. In German, there are several other expressions that resemble jeweils morphologically, and that exhibit the same kind of ambiguity.

3 s-Expressions

This section shows that the syntactic and semantic properties of jeweils are shared by a (closed) number of expressions, which resemble jeweils morphologically. Therefore, the syntactic and semantic analysis to be developed may not only account for the specific case of jeweils, but for these other expressions as well. The expressions in question all share with jeweils the properties of being morphologically complex, of being ambiguous between an adverbial and an adnominal reading, and of being marked for genitive with an s-suffix (see fn.5). I will therefore refer to them as s-expressions. Examples are given in (51).

(51)  a. mindesten-s ‘at least’  b. wenigsten-s ‘at least’  c. höchsten-s ‘at most’

The ambiguity of s-expressions is illustrated for wenigstens in (52abc).

(52)  a. Peter hat wenigstens angerufen.        (adverbi al)
     Peter has at least called
     ‘At least, Peter has called.’

     b. Peter hat mit wenigstens zwei Freunden gesprochen.    (adnominal)
     Peter hat with at least two friends spoken
     ‘Peter has spoken to at least two friends.’

     c. Peter hat wenigstens zwei Bücher gelesen.    (ambiguous)
     Peter has at least two books read
     i. ‘At least, Peter has read two books.’
     ii. ‘Peter has read at least two books.’

The structural correspondence with the jeweils-cases is clear. In (52a), wenigstens can only be construed as adjoined to VP, giving rise to the adverbi al reading. In (52b), wenigstens is adjacent to a DP and cannot be construed as adjacent to VP. The sentence only has an adnominal reading. In (52c), wenigstens can be construed as belonging to the object DP, or as being adjoined to VP, and the sentence is ambiguous. Similar facts hold for mindesten-s ‘at least’ and höchsten-s ‘at most’.

Interestingly, the same ambiguity is found with the English counterparts of s-expressions, which have the categorial status of PP. The PP-status of the English counterparts will be of some importance to the syntactic analysis of jeweils and other s-expressions in chapter III.

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20 This is not to say that the other s-expressions share all properties of jeweils. For instance, their adnominal instances do not need a plural antecedent (cf. 52b) or an indefinite DP to combine with (cf. i.).

(i) Peter hat wenigstens den Bürgermeister eingeladen.
     Peter has at least the mayor invited
     ‘Peter has invited at least the mayor.’

In addition, the other s-expressions can also occur with APs and PPs (cf. ii.).

(ii) a. Maria ist wenigstens rothblond.   b. Maria ist wenigstens bis Wittenberg gewandert.
     Maria is at least reddish (if not red) Maria has at least as far as Wittenberg hiked
The parallel syntactic and semantic behaviour of *jeweils* and other *s*-expressions suggests that the same syntactic process has formed these elements.\(^{21}\) The restricted number of *s*-expressions indicates that this process may not be productive any longer. At the same time, the existence of other *s*-expressions tells us that the behaviour of *jeweils* is not an idiosyncrasy in German, but the result of a general process, even if this process is not active any longer. By this, the analysis of *jeweils* achieves a greater degree of explanatory power and generality.

4 Distance-Distributivity Across Languages

This section aims at placing the discussion of *jeweils*, in particular of adnominal *jeweils*, within a wider, cross-linguistic context. In section 1.3, it was shown that adnominal *jeweils* has the properties of a distance-distributive element. It appears to form a constituent not with its restriction (the DistKey), but with its DistShare, thus posing a challenge for compositionality. As it happens, distance-distributive elements are attested not only in English and German, but also in a variety of languages from different language families. This suggests that we are not dealing with a language-specific peculiarity in the case of adnominal *jeweils*, but with a general phenomenon that ideally should be accounted for in a cross-linguistically unifying manner. Ideally, the analysis of adnominal *jeweils* should be extendable to distance-distributive elements cross-linguistically. One of the objectives of this thesis is to explore whether and how this is possible.

This section presents a range of data from related and unrelated languages and discusses cross-linguistic similarities and differences in the grammatical encoding of distance-distributivity. As will emerge, the differences appear to be systematic in nature (though problems remain). The systematic nature of the differences argues for a cross-linguistic analysis of distance-distributivity that will be undertaken in chapter III.5 (regarding the syntax), and in chapters IV.6 and V.3 (regarding the semantics). The picture to emerge may serve as a first step towards a proper and exhaustive typology of distance-distributivity.

The structure of this section is as follows. In section 4.1, I will introduce a sample list of languages that also display distance-distributivity. In 4.2, I will discuss similarities and differences in the grammatical encoding of distance-distributivity in these languages. Regarding the differences, the languages under discussion seem to fall into different classes, with some grammatical properties following from others. Section 4.3 provides a brief summary of the cross-linguistic overview on distance-distributivity.

\(^{21}\) This assumption is confirmed by the fact that *wenigstens* and *jeweils* seem to have developed in the same period. As pointed out in fn. 5, the first occurrences of the genitive form *wenigstens* ‘at least’ are attested for the 17th century. Interestingly, *jeweils* shows up in the same period. It is used in Grimmelshausen’s *Simplicissimus* from 1668 (cf. Gebrüder Grimm 1871:2362):  

(i) …doch waren diese *jeweils* lustiger als jene, daneben aber auch trotzig, tyrannisch, mehrenteils gottlos, …

‘yet each of these was merrier than those, but apart from that also more defiant, despotic, mostly ungodly…’

The almost simultaneous emergence of *jeweils* and other *s*-expressions suggests that all these genitive expressions have resulted from the same process, and should therefore receive a unified analysis.
4.1 Languages Exhibiting Distance-Distributivity

In section 1.4, the term ‘distance-distributivity’ was introduced as a descriptive term, referring to the fact that a distributive element appears to combine with the DistShare, instead of the DistKey (its restriction). I will restrict myself here to distance-distributivity in the narrow sense, i.e. distance-distributivity markers that are expressed adnominally on the DistShare.\(^\text{22}\) The list in (53) gives a non-exhaustive sample of languages that exhibit distance-distributivity in the narrow sense. Gil (1982a:18-19) lists more examples of adnominal distance-distributivity from Tagalog (Austronesian), Hindi (Indo-European), Nubian (Eastern Sudanic, Nilo-Saharan), Bura (Chadic, Afroasiatic), and Ga (Kwa, Niger-Congo). Most of these languages express distance-distributivity by reduplication of the numeral, i.e. like in Hungarian (54n) or in Georgian (54p). The wide range of languages exhibiting distance-distributivity lets it appear possible that distance-distributivity is a universal feature of human language.

(53) i. German, English, Dutch (West Germanic, Indo-European)
ii. Norwegian, Icelandic (Scandinavian, Indo-European)
iii. French, Italian, Romanian (Romance, Indo-European)
iv. Russian, Czech, Bulgarian (Slavic, Indo-European)
v. Japanese, Korean (East Asian, Altaic?)
vii. Irish (Celtic, Indo-European)
vii. Hungarian (Finno-Ugric)
viii. Turkish (Turkic, Altaic)
ix. Georgian (Caucasian)

Examples for each language are given in (54a–p). Note that all sentences in (54a–p) must be interpreted distributively due to the presence of the distance-distributivity marker.

(54) a. The boys have read two books\(_{\text{DistShare}}\) each. [English]

b. De jongens hebben elk twee boeken\(_{\text{DistShare}}\) gelezen. [Dutch]

‘The boys have read two books each.’

c. Guttene har kjopt to pølser hver. [Norwegian]\(^\text{23}\)

boys-the have bought two sausages each (Vangsnes, p.c.)

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\(^\text{22}\) See Gil (1982a) for a discussion of distance-distributivity in a broader sense, which includes any instance of universal (i.e. distributive) quantification which is not syntactically expressed on the DistKey, but elsewhere in the clause, be it on the DistShare NP, or be it on a verbal form as e.g. in the native American language Maricopa (see Gil 1982a:339ff.). The reader is referred to Gil’s work as one of the earliest discussions of distance-distributivity with a wide empirical coverage.

\(^\text{23}\) There is an alternative way of expressing distance-distributivity in Norwegian (Vangsnes, p.c.). In (i), the distance-distributive element \(\text{hver}\) occurs prenominally together with a reflexive possessive pronoun which agrees with the DistShare

\[ \text{(i) Guttene har kjopt hver sine to pølser} \quad \text{[Norwegian]} \]

\[ \text{boys-the have bought each their-REFL two sausages} \]

The difference does not seem to be dialectal, since both (54c) and (i) are acceptable to the same speakers (Vangsnes, p.c.). I will refer to this pattern of expressing distance-distributivity as Norwegian II.
INTRODUCING _JEWEILS_ 41

c. Strákarnir keyptu tvær pylsur hvor/ hver. [Icelandic]
boys-the bought two sausages each (Hrafn, p.c.)
hvor/hver [Icelandic]
d. Les professeurs ont lu deux livres chacun. [French]
the professors have read two books each (Tellier & Valois 1993:574, ex.1a)
f. I ragazzi compraron un libro ciascuno. [Italian]
the boys bought a book each (Burzio 1986:198, ex.50b)
g. Doi oameni au cărat cîte trei valize-LOC. [Rom.]
two men have carried each three suitcases
‘Two men have carried three suitcases each.’ (Gil 1982a:19, ex.1f)
h. Mal’chiki kupili (po) dve sosiski kazdyj. [Russian]
boys NOM bought two sausages each
‘The boys bought two sausages each.’ (Borik, p.c.)
i. Chlapci koupili po dvou párcích / párkách. [Czech]
boys bought each two sausages-LOC
‘The boys bought two sausages each.’ (Filip, p.c.)
j. John i Mary kupicha po edna tetradka. [Bulgarian]
John and Mary bought each one notebook
‘John and Mary bought a notebook each.’ (Petrova 2000)
k. Otoko=tati-ga sorezore huta=ri-no zyosei-o aisi teiru koto. [Jap.]
men =pl-nom each two=cl-g en women-acc love-asp fact
‘The men love two women each.’ (Sakaguchi 1998:115, ex.1)
l. ai-tul-i phwungsen-hana-ssink-ul sa-ess-ta. [Korean]
child-pl NOM balloon one each ACC bought
‘The children bought one balloon each.’ (Choe 1987:49, ex.13)

Icelandic (Hrafn, p.c.) also has an alternative strategy to express distance-distributivity (= Icelandic II). It resembles Norwegian II (see fn.23) in that the distributive element _hvor/hver_ also occurs in prenominal position together with a possessive pronoun.

(i) Sinn hvor tveggja bláamanna tóku viðtöl við stjórnálmamennina. [Icelandic]
POSS each two journalists GEN interviewed with politicians-the
‘The politicians were interviewed by two journalists each.’

Icelandic differs from Norwegian, in that there seems to be no free variation between the two alternatives. Instead, the Icelandic II-pattern is found in contexts from which Icelandic I is excluded for semantic reasons. See chapter III.5.4.2 and 5.4.3 for discussion of this point.

Data in Choe (1987), quoted from Pesetsky (1982:69-74), show that Russian also has an alternative strategy for expressing distance-distributivity, which is structurally identical to the Czech (54i) and Bulgarian (54j) pattern:

(i) Ja dal mal’čikam po jabloku. [Russian]
gave boys masc,dat,pl each apple neut,dat,sg
‘I gave the boys an apple each.’ (ex. from Pesetsky 1982:69-74)

The existence of the pattern in (i) in other Slavic languages could mean that the difference is dialectal in nature. I will refer to the second pattern of distance-distributivity in Russian as ‘Russian II’.

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The existence of the pattern in (i) in other Slavic languages could mean that the difference is dialectal in nature. I will refer to the second pattern of distance-distributivity in Russian as ‘Russian II’.
The distance-distributive element (henceforth ‘DD’) is adjacent to the DistShare expression in all the languages exemplified in (54). Apart from this similarity, two important differences meet the eye directly. These are the relative order of DD and DistShare, which may vary from language to language, and the morphological shape of the DD. These and other differences will be the subject of further scrutiny in the next section. In what follows, I restrict my attention to the languages listed in (53i-v).

4.2 Similarities and Differences Across Languages

The following properties are shared by the distance-distributive constructions in all the languages under discussion. To begin with, a functional element (or an expression containing a functional element), namely the DD, occurs adjacent to an indefinite nominal constituent that acts as the DistShare of the distributive relation. Together they seem to form a constituent. A second similarity is that the indefiniteness condition on DistShare seems to be active in all languages. Third, the plurality constraint on DistKey seems to be observed in all languages. Fourth, the clausalmate constraint seems to be active in all languages.26

Besides these similarities, the sample of languages under discussion exhibits the following differences regarding the ways distance-distributivity is encoded.

(55) Cross-linguistic Differences in Distance-Distributive Constructions:
   i. Differences in the relative word order of DD and DistShare
   ii. Differences in the morphological shape of the DD
   iii. Differences in the range of possible DistKeys for the DD
   iv. Differences in syntactic distribution

(55i) concerns the question of whether the DD precedes or follows the DistShare. (55ii) concerns the question of whether or not the DD is formally identical to the distributive determiner quantifier (henceforth D-quantifier), which forms a constituent with the DistKey. (55iii) concerns the question of whether the DD can distribute over the denotations of non-DPs, e.g. over (implicit) sets of events. (55iv) concerns the possibility

or impossibility of the DD to occur with the underlying subject of a clause. We will look at each difference in turn.27

4.2.1 The Relative Order of DD and DistShare

The difference in word order (cf. 55i) is illustrated by a comparison between German (56a) and English (56b).28

(56)a. Die Jungen haben jeweils zwei Würstchen gekauft. DD>>DistShare
    the boys have each two sausages bought

b. The boys have bought two sausages each. DistShare>>DD

Other languages in which the DD precedes the DistShare are Dutch (54b), Romanian (54g), Japanese (54k), and the Slavic languages Czech and Bulgarian (54ij). Other languages in which the DD follows the DistShare are the Scandinavian languages Norwegian and Icelandic (54cd), French (54c), Italian (54f), and Korean (54l). In chapter III.5, it will be argued that the difference in relative word order between languages follows from a general difference in their DP-syntax.

Things are not quite that simple, though. On closer inspection, it shows that some languages allow for an optional occurrence of the DD before or after the DistShare. To these belong French (Tellier & Valois 1993, Junker 1995), Italian (d’Allessandro, p.c.), Russian (Borik, p.c.), Dutch, and German. This means that in French, Italian, and Russian, the DD can optionally precede the DistShare (57a-c), whereas in German and Dutch it optionally follows the DistShare (58ab).29

(57)  a. Les professeurs ont lu chacun deux livres. [French]
    the professors have read each two books
    (Tellier & Valois1993:574, ex.1b)

b. I ragazzi hanno comprato ciascuno due salsicce. [Italian]
    the boys have bought each two sausages (d’Allessandro, p.c.)

c. Mal’chiki kupili kazhdyj (po) dve sosiski. [Russian]
    boys bought each two sausages (Borik, p.c.)

27 I neglect another difference that has to do with the fact that some languages allow for universal QPs as DistKey antecedents. (iab) are examples from Bulgarian (Petrova 2000) and Korean (Choe 1987:12) respectively.

(i)  a. Vsyyko dete izyade po edna yabulka.
    every child ate each one apple
    *’Every child ate one apple each.’

    man PL each woman-one-CL-each-with dance- past
    *’Each man danced with a woman each.’

Structures as in (iab), in which a universal QP is the DistKey for the DD, are ungrammatical in English and German. Choe (1987:12,fn.5) puts this fact down to varying degrees of tolerance that languages exhibit with respect to the double expression of distributivity. On this line of reasoning, Korean and Bulgarian would be more ‘tolerant’ than English. Another possibility is that the difference has to do with the varying ability of distributive QPs in different languages to introduce a plural discourse referent by means of the semantic process of ‘abstraction’ (cf. Kamp & Reyle 1993:309ff.). I leave the question open because it does not have a direct bearing on the discussion.

28 Notice that, for the time being, I will focus exclusively on the adnominal use of jeweils.

29 As shown in fns.23 and 24, the DD can optionally precede the DistShare in Norwegian II and Icelandic II. In this case it must be accompanied by a pronoun. According to Tomioka (p.c.), Japanese sorezure can also optionally follow the DistShare.
(58) a. Die Jungen haben ZWEI Würstchen jeweils gekauft. [German]
    the boys have two sausages each bought
b. De jongens kochten twee worstjes elk. [Dutch]
    the boys bought two sausages each (den Besten, p.c.)

At least in German, the different word order comes along with stress on the DistShare. This together with the fact that optionality in word order is often triggered by discourse requirements suggests that the discourse structure plays a role in determining the relative order of DD and DistShare, at least in some languages. Chapter III.5.3 will show this suspicion to be justified.

4.2.2 The Morphological Form of the DD

The second difference in (55) pertains to the morphological form of the DD. There are two possibilities: (i.) the DD is formally identical to the distributive D-quantifier, or (ii.) it is not. In the latter case, the DD can take on various forms. The first possibility is realised by English, Dutch, Norwegian, Icelandic, French, Italian, and Russian. Compare the DDs in (54a-f, h), with their D-quantifier counterparts in (59):

(59) a. Each boy has read two books
    b. Elk jonge heeft twee boeken gelezen.      [Dutch]
    each boy has two books read
   c. Hver gutt har kjøpt to pylser.       [Norw.]
    each boy has bought two sausages
   d. Hver strákur keypti tvær pylsur        [Icelandic]
    Each boy bought two sausages
   e. Chaque professeur on lu deux livres.      [French]
    each professor has read two books
   f. Ciascun ragazzò ha comprato due salsicce.    [Italian]
    each boy has bought two sausages
   g. Kazhdyj mal’chik kupil dve sosiski.       [Russian]
    each boy bought two sausages (Borik, p.c.)

In all cases, D-quantifier and DD are formally identical.

Languages in which DD and D-quantifier differ formally are German, Czech, Bulgarian, Korean, as well as Japanese. Compare (50a), and (54i-l) from above with the D-quantifier examples in (60):

(60) a. Jeder Junge hat zwei Würstchen gekauft. jeder vs. jeweils [German]
    each boy has two sausages bought

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30 I follow Grevisse (1980) and Junker (1995) and treat the two French forms chacun(e) and chaque as formally identical. According to Grevisse (1980), chaque is a regressive form of chacun. This is confirmed by the fact that chacun occurs in the (prenominal determiner) position of chaque in Old and Classic French (cf. ia). Conversely, chaque can occur in place of distance-distributive chacun in spoken French (cf. ib).

(i) a. Entre chacune tour estoit espace de trois cents douze pas.
    between each tower was distance of three hundred twelve steps
    (Rabelais, Gargantua, 53; Junker 1995:32)
   b. Prenez trois jetons chaque!
    take three jetons each
b. 
 each boy bought two sausages (Filip, p.c.)

Każd chlapec koupil dva párky. každ vs. po [Czech]

c. 
 each boy bought two sausages (Petrova, p.c.)

Vsjako momche kupi dve jabulki. vsjako vs. po [Bulgarian]

d. 
 boy each book ACC two cl DIST buy PAST-DEC

Sonyen-mata chayk-ul twu kwen-ssik sa-(a)It-ta. –mata vs –ssik [Korean]

‘Every boy bought two books.’ (Kim, p.c.)

e. 
 which student-MO sausage ACC two-cl bought

Dono gakusei-mo sooseezi-o hutatu katta. wh…mo vs sorezore [Japanese]

‘Every student bought two sausages.’ (Tomioka, p.c.)

Distance-distributive elements that are not formally identical to a D-quantifier can come in different forms. In German, a quantificational morpheme je- combines with a noun – weil- and a genitive marker. In Bulgarian, Czech, (as well as in Polish), the DD has the shape of a preposition which is independently attested (cf.61a). Sakaguchi (1998:115) points out that the Japanese form sorezore can occur as a case-marked argument (cf.61b). The case marking indicates that sorezore is a nominal constituent like jeweil- (which is equally case-marked).

(61) a. On shel po doroge [Russian]

he went on/along road

‘He was going along the road.’

b. [Huta-ri no musume]-ga [sorezore-ga tadasii to] iiha-tta] koto] [Japanese]

two-CL GEN daughter NOM each NOM right CP insist-pst fact

‘The fact that the two daughters insisted that each of them was right.’

(Sakaguchi 1998:115, ex.3)

Finally, Korean –ssik- is treated as a particle, or postposition in Korean reference grammars (Martin 1992:196). It seems that –ssik- is restricted to the position and function of a distance-distributive element.

In chapter III.5, it will be shown that German and Bulgarian or Czech distance-distributive constructions are not so very different (nor are the distance-distributive constructions in the other languages under discussion). There it will be argued that German jeweils contains a covert prepositional head. Therefore, a difference between the German and the ‘Slavic’ pattern of distance-distributivity lies in the fact which part (P or Q) is realized overtly. This position is confirmed by the parallel existence of prepositional distance-distributive constructions in English (cf. Choe 1987:135ff.) and German, illustrated in (62ab). Both languages employ a loan preposition from Latin for this purpose.

(62) a. The boys bought a balloon per person.

b. Die Jungen kauften einen Ballon pro Person [German]

The existence of PP-paraphrases that behave – for all matters and purposes – alike to DD-constructions supports the analysis of DDs as involving a preposition also in those languages where the preposition is not realised overtly.
4.2.3 The Range of Possible DistKeys for DD

In section 1.8, it was shown that German adnominal jeweils can distribute over pluralities of entities that are not denoted by a DP-argument, and that therefore are not sets of concrete individuals. The relevant example was presented in (18b), repeated as (63). In (63), jeweils distributes over the denotation of a conjoined verb cluster.

(63) Peter kritisierte und lobte Maria aus jeweils zwei Gründen.

Peter critisised and praised Maria for each two reasons

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

The same is impossible with DDs in English (64a), Dutch (64b), French (64c), Italian (64d), Icelandic (64e), Norwegian (64f), and Russian (64g). Note that the inability to distribute over other than DP-denotations manifests itself with those DDs that are formally identical to the distributive D-quantifier in their language.

(64) a. *Peter criticised and praised Mary for two reasons each.

b. *Piet heeft Marie om elk twee redenen bekritiseerd en geprezen. [Dutch]

P. has M. for each two reasons criticised en praised

c. *Pete ha adulé et critiqué Marie pour deux raisons chacune/e. [French]

Peter has praised and criticized Mary for two reasons each

masc/fem
d. *Peter ha apprezzato e criticato Maria per due ragioni ciascuno/a. [Ital.]

Peter has praised and criticized Maria for two reasons each

masc/fem
e. *Pétur lofaði og gagnrýndi Maríu af ástæðu hver. [Icel.]

Peter praised and criticised Mary of reason each

DUAL
f. *Pete ha apprezzato e criticato Maria per due ragioni rispettivamente. [Italian]

Peter praised and criticized Maria for two reasons respectively

(d’Allessandro, p.c.)
g. *Pétrja hvalil i kritikoval Mashu po kazhdym dvum prichinam. [Russ.]

Peter praised and criticized Mary PREP each two reasons

DATpl

Instead of a DD-construction, these languages use different strategies in order to express the proposition in (63). 31

Given their inability to distribute over events, it should come as no surprise that the distributive quantifying expressions in (64) cannot be used adverbially. For instance, they cannot be used in order to distribute over an implicit, but contextually salient set of events. In such a case, the D-quantifier has to select an overt proform that is semantically specified to range over events, situations, or point of times.

(65) a. Each *(time), two boys laughed

b. Elk *(keer) zijn twee jongens gekomen. [Dutch]

each time have two boys come

31 Some languages, such as Italian, pattern like English and use an adverbial corresponding to respectively (a). Others, like Norwegian employ an adjective meaning different (ib).

(i) a. Peter ha apprezzato e criticato Maria per due ragioni rispettivamente. [Italian]

Peter has praised and criticized Maria for two reasons respectively

(d’Allessandro, p.c.)

b. Peter roste og kritiserte Maria av to forskjellige grunner. [Norwegian]

Peter praised and criticized Maria of two different reasons

(Vangsnes, p.c.)

The Icelandic II-pattern from fn.24 (with a definite DistShare) is also grammatical in this construction.

(ii) Pétur lofaði og gagnrýndi Maríu af sitt hverri ástæðunni. [Icelandic II]

Peter praised and criticized Mary of poss each reason-the

(Hrafn, p.c.)

For a discussion of (ii), see chapter III.5.4.1, in particular fn.96.
In contrast, DDs in Korean, Czech and Bulgarian can - like German \textit{jeweils} - distribute over events that are denoted by non-DPs or left implicit. Note that the DDs in these languages are \textit{not} formally identical to the D-quantifier.\footnote{The only exception is Japanese, which does not allow for distribution over (implicit) events with \textit{sorezore} (Tomioka, p.c.). See chapter III.5.4.4 for discussion of this point.}

\begin{enumerate}
\item Peter a \textit{gagné} chaque *(fois) / *chac-un(e)(fois). \textbf{[French]}
\item Peter has won each time (Roy, p.c.)
\item Peter ha \textit{vinto} ogni *(volta) / *ciascuno/a (volta). \textbf{[Italian]}
\item Peter has won each time (d’Allessandro, p.c.)
\item Petja kazhdyj *(raz) vyigryval \textbf{[Russian]}
\item ‘Each time, Peter won.’ (Borik, p.c.)
\item Peter vant hver *(gang). \textbf{[Norw.]} \\
\end{enumerate}

\begin{enumerate}
\item Peter won each time (Vangsnes, p.c.)
\end{enumerate}

In contrast, DDs in Korean, Czech and Bulgarian can - like German \textit{jeweils} - distribute over events that are denoted by non-DPs or left implicit. Note that the DDs in these languages are not formally identical to the D-quantifier.\footnote{The only exception is Japanese, which does not allow for distribution over (implicit) events with \textit{sorezore} (Tomioka, p.c.). See chapter III.5.4.4 for discussion of this point.}

\begin{enumerate}
\item na- nun [phwungsen- hana-ssik-ul] sa-ess-ta \textbf{[Korean]}
\item I bought a balloon (each time/ each day/ at each store).' (Choe 1987:52,ex.18)
\item Po třech ženách vstupovalo do místnosti. \textbf{[Czech]}
\item each three LOC women LOC entered 3sg into room
\item ‘(Each time/ ten minutes), three women entered the room.’ (Filip, p.c.)
\item Mary byaga po 5 mili predi zakuska. \textbf{[Bulgarian]}
\item Mary runs each 5 miles before breakfast
\item ‘Mary runs 5 miles before breakfast (every morning).’ (Petrova 2000:ex.3b)
\end{enumerate}

(66) a. na-nun [phwungsen- hana-ssik-ul] sa-ess-ta \textbf{[Korean]}

\begin{enumerate}
\item I bought a balloon (each time/ each day/ at each store).' (Choe 1987:52,ex.18)
\item Po třech ženách vstupovalo do místnosti. \textbf{[Czech]}
\item each three LOC women LOC entered 3sg into room
\item ‘(Each time/ ten minutes), three women entered the room.’ (Filip, p.c.)
\item Mary byaga po 5 mili predi zakuska. \textbf{[Bulgarian]}
\item Mary runs each 5 miles before breakfast
\item ‘Mary runs 5 miles before breakfast (every morning).’ (Petrova 2000:ex.3b)
\end{enumerate}

In (66a), the DD –\textit{ssik}-- takes a contextually salient plurality (time, event, place) as its DistKey in the absence of a plural expression within the clause. In Czech (66b), \textit{po} also distributes over an implicit but salient set of events. The same holds for Bulgarian (66c).

The foregoing observations could give the false impression that the different behaviour of DDs in different languages is due to a sortal restriction on the DistKey. It looks as if those DDs that are formally identical to D-quantifiers are restricted to distribute over groups of concrete individuals, whereas DDs that differ formally are not restricted in this respect and can consequently distribute over groups of events as well. The English example in (67) shows that this explanation cannot be correct.

(67) The accident and the hailstorm caused five casualties each.

In (67), \textit{each} distributes over a group of events consisting of an accident and a hailstorm. The difference between (67) and (64a) lies solely in the syntactic category of the DistKey expression. In (64a), it is a verb conjunction. In (67), it is a DP. This shows that languages of the \textit{each}-type are sensitive to the syntactic category of the DistKey expression, not to the ontological nature of its denotation. More to the point, a DD seems to be sensitive to the presence of D-features in the DistKey in languages in which it is formally identical to the distributive D-quantifier. In contrast, the DD is insensitive to the presence of D-features in the DistKey in languages of the \textit{jeweils}-type, in which DD and distributive D-quantifier differ formally. As a result, DDs in these languages are free to choose any
plural expression as their DistKey. In fact, they can even distribute over an implicit set of events (cf. 66).

Summing up this section, it was shown that in some languages the DD can distribute over pluralities (of events) that are not expressed by a clausal mate DP. In others, this was shown to be impossible. As a first approximation, it seems that distribution over the denotation of non-DPs is possible in precisely those languages in which the DD is not formally identical with the distributive D-quantifier.

4.2.4 DDs with Underlying Subjects
In 1.6, it was shown that German jeweils can occur with underlying subjects. The example is repeated as (68).

(68) Jeweils ein Offizier begleitete die Ballerinen nach Haus.  
  each  two officer accompanied the ballerinas to home
  ‘Each ballerina was accompanied home by one officer.’

In (68), the subject denotation is distributed backwards over the denotation of the object DP. However, jeweils in underlying subject position allows for a second reading on which it distributes over a contextually salient group of events (cf.69).

(69) Jeweils zwei Offiziere kamen herein.  
  each  two officers came in
  ‘Two officers came in each time.’

In (69), jeweils gives rise to what looks like an adverbial reading. Chapter V will deal with adverbial-like readings of adnominal elements in greater detail. There, it will be demonstrated that jeweils in (69) is really an instance of adnominal jeweils. Postponing the discussion until then, it can be observed that some languages allow the DD to occur with an underlying subject (on one or both of the uses exemplified in (68) and (69)), while others do not.

Languages in which the DD can occur with an underlying subject are (apart from German) Korean (70a), Czech (70b), and Bulgarian (70cd).

(70) a. [hyengsa-twumyengssik]-i[yonguicha-tul]-ul ccoch-ko-iss-ta [Korean]  
  detective-two-CL-each -NOM suspect-pl-ACC chase-PROG
  ‘The suspects are chased by two detectives each (time).’(Choe 1987:50, ex.15)

b. Po třech ženách vstupovalo1 do místnosti. (= 66b) [Czech]  
  each threeLOC womenLOC enteredLoc into room
  ‘(Each timel / each ten minutes), three women entered the room.’

c. Po edin student pomogna na vseki profesor. [Bulgarian]  
  each one student helped to every professor
  ‘(All) the professors were helped by one student each.’ (Petrova 2000: ex.6b)

d. Po edna yabulka beshe izgnila. [Bulgarian]  
  each one apple was rotten
  ‘(Each time / in each basket), one apple was rotten.’ (Petrova, p.c.)
In all these languages, the DD differs from the distributive D-quantifier in form. Languages in which the DD cannot occur in underlying subject position are English, Dutch, French, Italian, Russian, Icelandic, and Norwegian. Examples are given in (71a-f).

(71)  

a. *One journalist each interviewed the politicians.  
b. *Elk een journalist heeft de politici gëinterviewd. [Dutch]  
c. *Un journaliste chacun a interviewé les politiciens. [French]  
d. *Uno giornalista ciascuno ha intervistato parlamentari. [Italian]  
e. *Kazhdye dva zhurnalista vzjali intervju u politikov. [Russian]  
f. *Tveggja blaðamanna hvor; tóku viðtöl við stjórnimalamennina. [Icel.]

In all these languages, the DD is formally identical to the distributive D-quantifier.

The following data from English show that the exclusion of DDs from (underlying) subject position does not only hold for matrix subjects, but also for embedded subjects of any sort.

(72)  

a. *One journalist each interviewed the politicians.  
b. *The journalists considered one politician each stupid.  
c. *The journalists said that one politician each was stupid.

In (72a), each occurs with the underlying subject of a matrix clause. There is no (c-commanding) plural DP that could be a potential DistKey antecedent. In (72b), each occurs in the subject position of a small clause. It has a potential DistKey antecedent in form of the matrix subject. In (73c), each is in subject position of a (finite) embedded clause with a potential DistKey antecedent in the matrix clause. All three sentences are ungrammatical. The data in (72) provide crucial evidence for the approach to distance-distributivity taken in this thesis. In the course of chapters III, IV, and V, it will emerge that the three sentences in (72) are ungrammatical for different reasons. (72a) is excluded for purely syntactic reasons. (72bc) are ruled out by semantic and syntactic factors in combination, albeit of a different kind.

In this section, it was shown that some languages allow the DD to occur with an underlying subject, while others do not. A cursory glance at the data suggests that the set of languages that do not allow for DDs in underlying subject position matches (with the

33 There are two exceptions: First, Sakaguchi (1998:122) points out that Japanese sorezore ‘each’ cannot occur with underlying subjects. This is witnessed by (i), a variation on Sakaguchi’s ex. 8a.
(i) *Sorezore [hito-rî-no gakusha]-ga [huta-rî-no gakusei]-o osie-ta.  
    *each one-cl-GEN scholar-NOM two-cl-GEN student-ACC teach-PAST  
    *One scholar each taught two students.

Second, Icelandic DDs can occur in underlying subject position if they are realised in the Icelandic II pattern. See chapter III.5.4.3 for more details.

34 The possibility of the DD each with the derived subject of passives in English shows that the restriction holds for underlying subjects only (see Burzio 1986:201).
(i) [One interpreter each], was assigned t1 to the visiting diplomats.
exception of Japanese, see fn.33) the set of languages in which DD and distributive D-quantifier are identical in form.

### 4.3 Organising the Differences

The cross-linguistic differences and similarities between DDs that were observed in sections 4.2.1 to 4.2.4 are summarised in Table 2.

**Table 2: The patterns of adnominal distance-distributivity**

<table>
<thead>
<tr>
<th>i. relative word order</th>
<th>DD &gt;&gt; DistShare</th>
<th>DistShare &gt;&gt; DD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>German, Dutch, (French), (Italian), Czech, Bulgarian, Romanian, Japanese, (Russian)</td>
<td>English, Korean, French, Italian, (Dutch), (German), Icelandic, Norwegian, Russian</td>
</tr>
<tr>
<td>ii. morphological form DD</td>
<td>= D-quantifier</td>
<td>≠ D-quantifier</td>
</tr>
<tr>
<td></td>
<td>English, Dutch, French, Italian, Icelandic, Norwegian, Russian</td>
<td>German, Korean, Bulgarian, Czech, Romanian, Japanese</td>
</tr>
<tr>
<td>iii. category DistKey</td>
<td>+DP</td>
<td>unspecified</td>
</tr>
<tr>
<td></td>
<td>English, Dutch, French, Italian, Icelandic, Norwegian, Russian, Japanese</td>
<td>German, Korean, Bulgarian, Czech</td>
</tr>
<tr>
<td>iv. DD with underlying subject</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>English, Dutch, French, Italian, Icelandic, Norwegian, Russian, Japanese</td>
<td>German, Korean, Bulgarian, Czech</td>
</tr>
</tbody>
</table>

The most remarkable result of this survey is that the cells in rows (ii) to (iv) contain the same languages, suggesting that there may be a deeper connection between the properties in (ii) to (iv).\(^{35}\) If correct, certain predictions concerning the syntactic and semantic behaviour of a DD in a given language can be made on the base of its morphological form.

In chapters III and IV, the first impression will be shown to be correct. It will be argued that the morphological shape of the DD in a given language (presumably the result of grammaticalisation) reflects its morphosyntactic properties. These properties (encoded in the form of features) determine its behaviour regarding the properties in row (iii) and – partly - in row (iv). That is, I argue that the behaviour of a DD with regard to (iii) and (iv) is predictable on the base of its morphological form. The relevant factor here is whether the DD contains syntactic D-features (as in English), or not (as in German). Let us parametrise this difference as \([+/- \text{ D-features}]\). Chapter III.5.4 lays out how the cross-linguistic differences between DDs in (iii) and (iv) can be derived on the base of this distinction.

\(^{35}\) An apparent exception is Japanese sorezore which is found in the right-hand cell in row (ii), but in the left-hand cells in rows (iii) and (iv). In chapter III.5.4.4, it will be argued that Japanese nonetheless fits into the general pattern laid out in the main text. That is, in Japanese, too, the syntactic distribution of sorezore is predictable on the base of its syntactic feature content, even though sorezore is not formally identical to the distributive D-quantifier.
The difference in word order can be captured descriptively by postulating a second parameter, [+/- DP-internal movement]. This parameter determines whether or not the DD can occur before the DistShare. In III.5.3, this (so far only descriptive) parameter is shown to capture an independent grammatical property of the languages under discussion, namely whether or not they allow for overt DP-internal fronting. There, it will emerge that a positive specification of the parameter [+/- DP-internal movement] actually subsumes different kinds of DP-internal movement operations that apply for different reasons. Nevertheless, they all lead to the same result, namely that the DD shows up in prenominal position.

In general, the systematic pattern observed in table 2 lets a cross-linguistic, parametrised analysis seem feasible and welcome. The two independent parameters [+/- D-feature] and [+/- DP-internal movement] are expected to interact in forming a 4-way classification of language types. As will be shown in chapter III.5, all language types are attested. Naturally, an analysis that gives a unified account of the different DD-patterns observed in languages is preferable over any language-particular analysis. In chapter III.5, I will propose a unified analysis of distance-distributive constructions for the languages in the sample. I will argue that distance-distributive constructions in all these languages have the same underlying structure. The observable differences will be derived from the factors discussed above. However, at the end of chapter III.5, it will also become apparent that the restricted distribution of DDs in languages of the English type, i.e. their absence form underlying subject position, cannot be entirely syntactic in nature. The absence from some syntactic positions does not follow from syntactic factors alone, but from the interaction of syntactic and semantic factors. This will be discussed in chapters IV.6 and V.3.

5 Previous Studies of Distance-Distributivity

In this section, I give a brief overview over existent work on the topic of distance-distributivity. In addition, I discuss two syntactic analyses of distance-distributive (=binominal) each in more detail. These are the analyses in Burzio (1986) and in Safir & Stowell (1988), which have proven quite influential for the discussion of distance-distributivity in generative studies. Burzio (1986) accounts for the restricted distribution of each in terms of syntactic binding. Safir & Stowell (1988) account for the restricted distribution of each in terms of LF-extraction. Both accounts are syntactic in nature. The main purpose of the following discussion is to embed the present analysis in its historical context, and to show that purely syntactic analyses cannot account for the distribution of each in isolation, nor for the behaviour of distance-distributive elements in other languages. The section ends with a plea for an integrated syntactic and semantic account.

5.1 An Overview

Not surprisingly, the phenomenon of distance-distributivity has been the topic of earlier studies, a few of which are listed in the following. The list makes no claim as to completeness. The earliest discussion of distance-distributivity in the generative tradition seems to be Postal (1975) (see references therein and in Gil 1982a for earlier references). The - to my knowledge - typologically widest array of data concerning distance-distributivity in the broad sense (see fn.22) is found in Gil (1982a). In general, research on distance-distributivity in the generative tradition has focussed on English distance-distributive each (cf. e.g. Postal 1975, Burzio 1986, Choe 1987, Stowell & Safir 1988, Sakaguchi 1998). In addition, there are some studies of distance-distributive elements in
other languages, mostly comparing these to English *each* (cf. e.g. Burzio (1986) for Italian, Choe (1987) for Korean, Tellier & Valois (1993) and Junker (1995) for French, Sakaguchi (1998) for Japanese, Moltmann (1991), (1997), Link (1998), Liptak & Zimmermann (2000), Zimmermann (to appear, a), Sauerland 2001 for German *je(weils)*. The existing studies are mostly case studies that focus on the similarities and differences of distance-distributive constructions between two languages. To my knowledge, no comprehensive unified analysis of distance-distributive constructions in a wider range of languages exists to date. The present study tries to make a few initial steps in this direction.

Perhaps the two most influential analyses of distance-distributive *each* are those found in Burzio (1986) and Safir & Stowell (1988). For this reason, they deserve some closer scrutiny. The following discussion briefly points out the merits and weaknesses of each analysis. It will also bring to light that the analyses do not extend to German *je(weils)*. Therefore, they are no good candidates for a cross-linguistically unifying analysis of distance-distributivity.

5.2 Burzio (1986): DDs as Anaphors

Burzio (1986) observes the impossibility of English *each* and Italian *ciascuno/a* with underlying subjects (cf.73a). Based on this observation, he (ibid.:199) concludes that these elements must be syntactic anaphors and must be licensed under c-command, as is the case with other syntactic anaphors (cf.73b).

(73)  a. *One journalist each interviewed the politicians.
    b. *Herself; asked John.

The suspicion that *each* and *ciascuno/a* are anaphors is strengthened by the fact that the same elements are absent from other positions forbidden for syntactic anaphors, e.g. from the subject position of an embedded tensed clause. Compare the presence of *each* in (74a) with (74b), which contains a syntactic anaphor.

(74)  a. *We expected that one student each would call.
    b. *John expected that himself would win.

Burzio’s analysis is convincing at first sight, and can account for a range of data including the relative acceptability of *each* and *ciascuno/a* with derived subjects (cf.75a), or topicalised objects (75b). According to Burzio (1986:201), the fronted phrases in (75) reconstruct to their base-position at LF, in which case the distance-distributive element is licensed (exs. from Burzio 1986:200, 57a & 60a).

(75)  a. *One interpreter each, was assigned each to the visitors.
    b. *Un evaso ciascuno, si consegnerà a quei carabinieri.

We will turn in one escapee to each of those policemen.

Finally, the clausemate condition from section 1.7 follows directly on the assumption that anaphors must be locally bound.

Nevertheless, the analysis faces two serious problems. First, the analysis of distance-distributive elements as anaphors does not apply to German. The possibility of adnominal *je(weils)* with underlying subjects shows that it cannot be a syntactic anaphor. The fact that
adnominal jeweils can occur with non-DP antecedents shows the same. In light of these facts, the clausemate condition – which holds for both each and jeweils - cannot really have to do with anaphoricity. The second problem concerns the adequacy of the analysis for English. Burzio (1986:213, fn.21) acknowledges that distance-distributive each is excluded from positions where syntactic anaphors are possible (see Junker 1995:65 for the same point). These are the subject positions of ECM-constructions and small clauses (see also (72b) above).

(76)  a. *We expected one student each, to call.
    b. *We considered one student each, guilty.

(77)  a. John expected himself, to win.
    b. John considered himself, guilty.

The contrast between (76ab) and (77ab) makes the analysis of distance-distributive each as an anaphor appear highly problematic. In chapter III, each and (likewise ciascuno/a) are not treated as syntactic anaphors in the analysis of distance-distributive elements instead, their undeniable anaphoric traits (e.g. the non-occurrence in underlying subject position in (73a)) are derived from the fact that they contain D-features which must be checked under c-command. The ungrammaticality of (76ab) will be shown to follow from independent reasons in chapter IV.6.

5.3 Safir & Stowell (1988): An LF-Movement Account

In response to the problem encountered by Burzio’s analysis, Safir & Stowell propose an analysis in terms of LF-movement. They maintain Burzio’s anaphor account of each, but introduce stronger licensing conditions for it. According to their analysis, the distance-distributive element each projects a QP that is right-adjointed to the DistShareNP. Each selects an anaphoric empty category (co-indexed with the DistKey) as complement, and a PRO (co-indexed with the DistShare) as specifier. The anaphoric empty category must be licensed by the co-indexed DistKey in a local configuration (adjacency at LF). This configuration is created through LF-movement of the eachQP out of its embedding DP, followed by adjunction to IP. This movement is followed by a second movement operation on the part of the DistKey antecedent. As a result of this movement, the DistKey will c-command each at LF. For illustration, consider the LF-structure of (78a) in (78b).

(78)  a. [IP The boys bought [DP two sausages [QP PRO each e_i]].]
    b. [IP The boys bought [DP [QP PRO each e_1], [IP t_2 bought two sausages t_1]].]

The strength of the LF-movement analysis lies in the fact that it provides a unified analysis for the impossibility of each in any underlying subject position (see the paradigm in (72)). Since subjects are syntactic islands for subextraction out of them (Huang 1982), the eachQP cannot subextract out of the subjects in (76ab). As a result, (76ab) are ungrammatical. This gives the LF-movement analysis a certain edge over Burzio’s analysis. In addition, the clausemate condition can be derived on the assumption that LF-movement of each is an instance of Quantifier Raising (QR). Since QR is generally taken to be clausebound at least with universal (strong) QPs (see Reinhart 1997 for discussion), the eachQP can never enter into a local relationship with a DistKey expression in a higher clause. At first sight, then, the LF-movement analysis seems to give an adequate account of the syntactic behaviour of distance-distributive each. This may also explain why the
LF-movement analysis has found follow-ups in the form of Sakaguchi’s (1998) and Sauerland’s (2001) analyses, which also heavily rely on LF-movement of the distance-distributive element.

A closer look at the details reveals that the LF-movement analysis also faces certain problems. Like the anaphor analysis, it cannot explain why German adnominal jeweils can occur in underlying subject position, and why adnominal jeweils can occur without DP-antecedents. The LF-analysis therefore does not provide a uniform explanation for distance-distributive elements in both English and German. Given the otherwise very similar behaviour of the two elements, this state of affairs is very unfortunate. A second and more serious problem arises from the possibility of distance-distributive each inside adjuncts. Safir & Stowell (1988) would predict the sentences in (79ab) to be ungrammatical, contrary to fact.

(79)  a. The men, cut the salami with one knife each.  (Safir & Stowell 1988:447)
   b. The boys, bought books in two shops each.

Adjuncts have the same status as subjects regarding subextraction. According to Huang (1982), subextraction from adjuncts is ruled out generally. The grammaticality of (79ab) would therefore be unexpected if each had to LF-raise to its DistKey antecedent. It seems, then, that Safir & Stowell’s analysis can account for a certain set of data that are problematic for Burzio (cf. 76ab). At the same time, the analysis fails with regard to another set of data (79ab). This shows that LF-movement analyses à la Safir & Stowell are not without problems, and should therefore be reconsidered. In chapter III.4.3, I provide (more) syntactic evidence against an LF-movement analysis of DDs. In chapter IV, I show that LF-movement is not required for semantic reasons. From this, I conclude that distance-distributive constructions should not be analysed in terms of LF-movement.

5.4 What About Semantics?

The two analyses in 5.1 and 5.2 approach the phenomenon of distance-distributivity from a purely syntactic perspective. Neither of them is a fully adequate account for English each, nor can they be applied to German jeweils or other distance-distributive elements that are licensed in subject position. Given this state of affairs, it is unclear what a purely syntactic account of distance-distributive elements should look like if the two basic tools of syntactic analysis – an analysis in terms of binding and an analysis in terms of extraction – do not work.

One may wonder if an integrated syntactic and semantic account would not produce better results, especially in light of the peculiar semantic behaviour of distance-distributive elements.

The special semantic behaviour of distance-distributive elements in various languages has been analysed in Choe (1987), Junker (1995), Link (1998), and Moltmann (1991, 1997). These analyses will be discussed in chapter IV.3. Unfortunately, the above studies (with the exception of Moltmann 1997 perhaps) do not pay much attention to surface compositionality. Nor do they aim at providing a unified cross-linguistic analysis of distance-distributive elements that would shed light on their different syntactic distribution in different languages.

In chapter III to V, I attempt to fill this gap. I will provide a unified analysis for distance-distributive constructions in a variety of languages. All constructions are argued to share one underlying structure, and all constructions are argued to be interpretable from
surface structure. The observable cross-linguistic differences in distribution are derived from three independent factors: (i.) differences in the grammatical properties of the distance-distributive element itself (this is reminiscent of Burzio’s anaphor account); (ii.) general syntactic differences between languages; and (iii.) the interaction of semantic operations involved in interpreting distance-distributive constructions with syntactic factors, which may cause the semantic derivation to crash. It will be argued that a complete and accurate account of the behaviour of distance-distributive elements, both within one language and cross-linguistically, is possible only by taking into account all three factors.

6 Conclusion

This introductory chapter on jeweils in particular, and on distance-distributivity in general has brought to light the following facts:

(80) i. *Jeweils* is ambiguous between an adverbial and an adnominal reading.
ii. The two readings of *jeweils* correspond to two different syntactic positions: *Jeweils* is interpreted adverbially when it can be construed as being adjoined to VP. *Jeweils* is interpreted adnominally when it (or its trace) is adjacent to a numeral or indefinite expression, the DistShare (and when the semantic requirements are satisfied).
iii. Some of the properties of *jeweils* are found back with a number of formally related expressions, the so-called s-expressions, arguing for a unified analysis.
iv. Adnominal *jeweils* is not a floated quantifier, but a distance-distributive element.
v. Distributive elements with similar properties are attested in a variety of languages, including Italian, French, Dutch, Icelandic, Norwegian, Russian, Czech, Bulgarian, Korean and Japanese.
vi. Observable cross-linguistic differences in the expression of distance-distributivity arguably follow from the values of two parameters: [+/- D-features] and [+/- DP-internal movement].
vii. The discussion of Burzio (1986) and Safir & Stowell (1988) on distance-distributive (= binominal) *each* has shown that a purely syntactic analysis does not give a satisfactory account of the phenomenon. This argues for an integrated syntactic and semantic account.

Chapter III presents the syntactic analysis of *jeweils* in particular, and of distance-distributivity in general. The two parameters in (80vi) will be motivated and their application will be discussed in detail. Chapter IV presents the semantic analysis of distance-distributivity. It will be shown that a surface compositional interpretation of distance-distributive constructions is possible.

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36 Precursors of this analysis are found in Lipták & Zimmermann (2000) and Zimmermann (to appear, a).